SOCIAL CAPITAL AND CONSERVATION OF BIODIVERSITY:
A STUDY OF VANASPATI VANA PROJECT IN ORISSA

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IN

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BY

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DECLARATION

I, Aditya Keshari Mishra, hereby declare that the research embodied in the present thesis, titled: 'Social Capital: Conservation of Biodiversity: A Study of Vanaspati Vana Project in Orissa', is an original research work carried out by me under the supervision of Professor E. Haribabu, Department of Sociology, University of Hyderabad, for the award of Doctor of Philosophy in Sociology from the University of Hyderabad.

I declare to the best of my knowledge that no part of this thesis was earlier submitted for the award of research degree in part or full to this or any other university.

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CERTIFICATE

This is to certify that Aditya Keshari Mishra has carried out the research work embodied in the present thesis, titled: 'Social Capital and Conservation of Biodiversity: A Study of Vanaspati Vana Project in Orissa', for the degree of Doctor of Philosophy in Sociology is prepared under my supervision.

I declare to the best of my knowledge that no part of this thesis was earlier submitted for the award of research degree in part or full at any university.

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Aditya Keshari Mishra

Content

List of Abbreviations

BDA: Biological Diversity Act

BDR: Biological Diversity Rule

BHS: Biodiversity Heritage Site

BMC: Biodiversity Management Committee

CBCDC: Community-based Biodiversity Conservation and Development Committee

CBD: Convention on Biological Diversity

CCAMLR: Convention on the Conservation of Antarctic Marine Living Resources

CCF: Chief Conservator of Forest

CCG: Community-based Conservation Group

CCI: Colonial Conservation Initiatives

CCMSWA: Convention on the Conservation of Migratory Species of Wild Animals

CCPWCNH: Convention Concerning the Protection of the World Cultural and Natural Heritage

CF: Conservator of Forest

CFM: Community Forest Management

CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora

CO_2: Carbon Dioxide

CPR: Common Pool Resource

CPRM: Common Pool Resource management

CSD: Commission on Sustainable Development

CWIIWH: Convention of Wetlands of International Importance especially as Waterfowl Habitat

DFID: Department for International Development

DFO: Divisional Forest Officer

DoF: Department of Forest

EB: Executive Body

EC: Executive Committee

EPA: Entry Point Activity

FAO: Food and Agricultural Organization

FD: Forest Department

FDA: Forest Development Agency

FGD: Focused Group Discussion

FIUPGR: FAO International Undertaking on Plant Genetic Resources

FPC: Forest Protection Committee

FSI: Forest Survey of India

GB: General Body

GBS: Global Biodiversity Strategy

GMO: Genetically Modified Food

GoI: Government of India

GoO: Government of Orissa

GSS: Gandhamardan Surakshya Samiti

GVVS: Gandhamardan Vanaspati Vana Society

IFI: International Financial Institution

IMF: International Monetary Fund

INC: Intergovernmental Negotiating Committee

IPM: Integrated Pest Management

IPPC: International Plant Protection Convention

IPR: Intellectual Property Right

ITTA: International Tropical Timber Agreement

IUCN: International Union for the Conservation of Nature and Natural Resources

IUPN: International Union for the Protection of Nature

JBIC: Japan Bank for International Cooperation

JFM: Joint Forest Management

LBF: Local Biodiversity Fund

MDG: Millennium Development Goal

MoEF: Ministry of Environment and Forest

MoU: Memorandum of Understanding

NAS: National Academic of Sciences

NBA: National Biodiversity Authority

NBAP: National Biodiversity Action Plan

NBF: National Biodiversity Fund

NCA: National Commission on Agriculture

NFP: National Forest Policy

NGO: Non-Governmental Organization

NRC: National Research Council

NTFP: Non-timber Forest Product

OBC: Other Backward Class

OSVVS: Orissa State Vanaspati Vana Society

PA: Protected Area

PBR: People's Biodiversity Register

PCCF: Principal Chief Conservator of Forest

PCCI: Post-colonial Conservation Initiatives

RF: Reserved Forest

RO: Range Officer

SBB: State Biodiversity Board

SBF: State Biodiversity Fund

SC: Scheduled Caste

SD: Sustainable Development

SFP: Social Forestry Programme

SIDA: Swedish International Development Agency

SIFPG: Self-initiated Forest Protection Group

SSS: State Society Synergy/Synergy between Society and State

ST: Scheduled Tribe

SWC: Soil and Water Conservation

TK: Traditional Knowledge

UN: United Nations

UNCED: United Nations Conference on the Environment and Development

UNCHE: United Nations Conference on the Human Environment

UNEP: United Nations Environment Programme

UNESCO: United Nations Educational, Scientific and Cultural Organization

UNFCCC: United Nations Framework Conventions on Climatic Change

USA: United States of America

VFPC: Village Forest Protection Committee

VFW: Village Forest Worker

VP: Village Forest

VSS: Vana Samraksyan Samiti

VVP: Vanaspati Vana Project

WB: World Bank

WC: Washington Consensus

WCED: World Commission on Environment and Development

WCU: World Conservation Union

WDR: World Development Report

WPC: World's Parks Congress

WRI: World Resources Institute

CHAPTER – I

Introducing the Problem of Study

The theory of social capital has been increasingly applied in the analysis of subjects especially associated to human and social sciences at different levels. According to Harriss and de Renzio (1997), the theory of social capital helps in explaining the 'social factor' and the 'social processes' – mobilization, participation, empowerment and conservation – of contemporary participatory development. It has been employed in different social contexts at different levels. In recent times, this conceptual framework has been used to understand the processes of conservation of biodiversity (the short-hand of biological diversity). As literature suggests, of late, there has been a worldwide realization that biodiversity is a global issue that can have local solutions (CBD 1992 [UNEP 1992], BDA 2002 [MoEF 2002]). In fact, concern over the alarming loss of biodiversity and the role of local communities in conserving biodiversity have induced many countries of the world to get together and formulate what is called as the Convention on Biological Diversity (CBD) in 1992. The CBD, 1992 recognizes the preservation and maintenance of knowledge, innovations and practices of indigenous and local communities as well as the emphasis on cooperation for the technology development and transfer/dissemination (Article 8[j], CBD 1992 [UNEP 1992]). As a result, the Contracting Parties or the signatories have been forced to incorporate the provisions of the CBD, 1992 in their national legislations in the processes of the conservation and development of biodiversity. In recent times, India, considered as one of the megadivisity countries of the world as well as one of the signatories of CBD, has implemented a national legislation i.e. Biological Diversity Act 2002. The central objective of BDA 2002 is to reformulate and restructure the 'processes and practices'

connected to conservation and development of biodiversity by highlighting the central role of local communities.

One such experiment has been operating under the banner of Vanaspati Vana Project (VVP) at Gandhamardan Reserved Forest (RF), situated in the territorial jurisdiction of Balangir and Bargarh districts of western Orissa, Orissa, India. The fundamental objective of VVP is to cultivate/conserve and care for (protect/preserve) the medicinal species available at the 'natural habitat' of Gandhamardan RF through artificial conservation techniques, such as *in-situ* conservation, *in-situ* preservation, *ex-situ* demonstration and *ex-situ* nursery. However, the present study focuses only on the *in-situ* conservation. Funded by the Ministry of Health and Family Welfare, Government of India, India, the VVP has formed several groups in the form of community-based biodiversity conservation and development committees (CBCDCs) at grassroot levels. The dominant objective of these CBCDCs is to participate and practice in the process of conservation and sustainable management of the biodiversity of medicinal plants. In order to achieve the target objectives of the *in-situ* conservation of VVP, these CBCDCs have been functioning by performing community-level 'collective action' on the one hand and 'external collaboration' with the Forest Department on the other in conservation of medicinal bio-resources. Thus, this collective community action and collaborative networking or synergy of/between community (society) and government (state) – in abbreviation SSS – has been recently analyzed by the social capital framework. The reason is that the social capital framework provides improved explanations in the functioning of these CBCDCs at village levels.

With this short background, the present study attempts to explore the role of these CBCDCs and their level of collective action and collaboration with the Forest Department in the process of conservation and sustenance of biodiversity of medicinal

plants at Gandhamardan RF. In this context, the present study based on sociology of development perspective, employs social capital thesis and critically highlights community-based conservation initiatives and their partnership with Forest Department by analyzing major tasks they perform in the processes of conservation and development of medicinal bio-resources. At the outset, the current chapter begins with an epigrammatic conceptual understanding of biodiversity (conservation of biodiversity) and social capital and later introduces the basic problem as well as the methodology of the present study.

1.I Conceptual framework: sociology of development perspective

The term 'development' is a post-World War II concept used to describe and explain economic and social change throughout Africa, Asia, Latin America, and Southeastern Europe (Caputo 2008). The sociology of development, as a specialty within the discipline of sociology, has emerged in 1950s and 1960s in response to the new world situation that appeared soon after the World War II (1939-45). Following the Second World War, wide-ranging decolonization led to the emergence of dozens of 'underdeveloped' new African, Asian and Caribbean countries. Thus, as a distinct area of research in the post-war period, the sociology of development is associated with the growing concern for the political and socioeconomic development of the post-colonial world. The dominant objective of these underdeveloped countries would consequently move from a position of underdevelopment to one of development, characterized by multifaceted modernity and one-way, consequential economic and technological progress (Payne 2005). Focusing on this new wave of underdeveloped countries, immersed with ardent economic, political, cultural, developmental and social characteristics, the sociology of development as a branch of sociology has soon emerged to address the formal study of development. The key intellectual challenges for this

newborn sub-discipline are: What are the causes of economic transformation in these human societies? What are the policies through which governments can stimulate the processes of economic growth?

The newly emerged sub-discipline i.e. sociology of development has in course of time evolved/produced/engaged with new theories of 'development' to examine the development of underdevelopment. The sociology of development has encompassed several ideas in the past sixty years: the modernization of economic and social institutions, the idea of sustained economic growth within a national economy, the idea of the continuing improvement of the material well-being of the earth's human population, the idea of more extensive utilization of the world's resources, and the idea of the replacement of 'traditional' institutions and the values with 'modern' successor (Little 2008). Thus, the trajectory of sociology of development during these six decades could be analyzed in three major phases of development (Haynes 2008).

The *first phase* of development from 1950s and 1960s has been systematically focused on the modernization theory and dependency theory. The dependency theory (some times referred to as underdevelopment theory) and its derivatives are mainly concerned with developmental iniquities engendered by unjust economic and political global structures. The leading scholars of this tradition are Andre Gunder Frank (1971, 1984, 1994), Samir Amin (1987) and Walter Rodney (1972). The modernization theory, in contrast, focuses on domestic factors, with little explicit attention on external factors and issues. The leading protagonist of this tradition is Walt Rostow (1960).

The *second phase* of development from 1970s and 1980s has concentrated on the strategies of basic needs and structural adjustment programmes. According to Paul Stewart (2006), the key figure of this tradition, emphasizes on the uniform basic foundation of development: sufficient food, clean water, adequate shelter, functional

sanitation, primary health care, and elementary education. The structural adjustment strategy – associated with the names of Germany's Margaret Thatcher, Germany's Helmut Kohl and the USA's Ronald Reagan and George H. W. Bush – basically aims at: encouraging a high level of fiscal and monetary discipline; advancing reforms leading towards market economies; and encouraging free trade, free capital flow and economic cooperation among countries (Haynes 2008). As a result, under the pressure from Western governments and key International Financial Institutions (IFIs) – especially the World Bank (WB) and the International Monetary Fund (IMF) – many developing country governments were gradually forced and ultimately developed neo-liberal policies. However, the outcomes were disappointing in terms of increasing developmental inequalities (Stiglitz 1998).

Finally, the *third phase* of development from 1990s and 2000s has primarily equated with the strategy of Washington Consensus and Millennium Development Goals. The neo-liberal development policies manifested in Structural Adjustment Programmes have acquired the name of 'Washington Consensus' a title that has been put forwarded by the Washington-based leaders (especially the US government, the IMF, and the World Bank) (Weisbrot and Baker 2002). The Washington Consensus, according to Ha-Joon Chang (2002), comprises a set of 'good policies' and 'good institutions' aiming at the promotion of economic development in developing countries. Good policies include stable macroeconomic policies, a liberal trade and investment regime, privatization and deregulation of state-owned assets where as good institutions comprise democratic governments, protection of property right, an independent central bank, and transparent corporate governance institutions and financial establishments (Haynes 2008).

The development initiatives (during these six decades) have produced negligible results in reducing developmental imbalances, especially in the developing world (Haynes 2008). As a result, a new strategy of development – under the banner of Millennium Development Goals (MDGs) that aim at all round development of individuals in the developing countries – has been announced in September 2000. There are eight dominant objectives of MDGs, which are supposed to be achieved by 2015. These are: (MDG-1) Eradicate extreme poverty and hunger; (MDG-2) Achieve universal primary education; (MDG-3) Promote gender equality and empower women; (MDG-4) Reduce child mortality; (MDG-5) Improve maternal health; (MDG-6) Combat HIV/AIDS, malaria, and other diseases; (MDG-7) Ensure environmental sustainability; and (MDG-8) Develop a global partnership (United Nations 2008).

Thus, the approach of development has shifted its attention from 'reduction of poverty and inequality' to an 'all-inclusive development strategy'. The development model has encompassed the areas of poverty, education, gender, child mortality, (maternal) health, environmental sustainability and development of global partnership. One of the important implications of the MDG (United Nations 2001 and 2008) is related to its focus on the sustainable (environmental) development (MDG-7). In recent times, the sociology of development has gradually engaged itself in the area of environment and (sustainable) development. The MDG-7 clearly puts emphasis on the *conservation* and *sustainable* development of environmental or biological resources. It has declared four major targets to achieve its objective: (T-1) Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources; (T-2) Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss; (T-3) by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation; and (T-4) By 2020, to have achieved a

significant improvement in the lives of at least 100 million slum dwellers (United Nations 2008). In addition, the Convention on Biological Diversity, 1992 also emphatically focuses on the conservation and sustainable development of biodiversity.

The CBD, 1992 also highlights the role of local communities in the processes of conservation and sustainable development of biodiversity. To quote the Preamble of CBD, 1992:

> The contracting parties … Recognizing the close and traditional dependents of many indigenous and local communities embodying traditional lifestyles on biological resources, and the desirability of sharing equitably benefits arising from the use of traditional knowledge, innovations and practices relevant to the conservation of biological diversity and the sustainable use of its components.

In addition, Article 8(j) of the CBD, 1992 also enshrines the need for involvement of local communities and their knowledge systems in the process of biodiversity conservation. To quote Article 8(j), CBD, 1992:

> Subject to its national legislation, respect, preserve and maintain knowledge, innovations, and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourages the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices.

The world's most leading and financially-rich institution – the World Bank – has put forward the need for 'participatory development' in order to achieve MDGs by 2015. The Bank has suggested the active collaboration among poor people, the middle class and other groups in society. In short, the Bank realizes that to deliver enhanced participation in development requires the inclusion of common people and their representative organizations in decision-making structures and processes at various levels, from the local to national (World Bank 2003). In addition, the *World*

Development Report (WDR) - 2003 has also recommended participatory institutional mechanisms to encounter various issues and to achieve sustainable development. The WDR, 2003 has strongly suggested the active role of 'informal institutional mechanisms' – trust, networks and other forms of social capital – and 'formal institutional mechanisms' – codified rules and laws – in the processes of participatory development. Thus, the late twentieth century development policies – for example, MDGs, CBD, and WDR – have increasingly included the conceptual framework i.e. participation in the process of development.

1.I.a Participatory development and social capital

The dominant objective of participatory approach to development is to ensure greater efficiency and effectiveness of investment and of contributing to the processes of democratization and empowerment (Mansuri and Rao 2004). The recent history of the participatory approach to development can be traced back to the work of Paulo Freire (1970), whose *Pedagogy of the Oppressed* argues that the 'oppressed' needed to unite to find a way to improve their own destines. Later the literature was strongly influenced by the works of Olson (1965) and Russell Hardin (1982) on collective action to achieve a common goal or pursue a common interest. Property right theorists like Demsetz (1970) and North (1990) argued that common property resources would be overexploited as demand rose unless the commons were enclosed or protected by strong state regulation. However, since mid-80s, the champions of development practitioners like Chambers (1983), Escobar (1995) and Scott (1998) have criticized state due to its inefficiency in managing resources and have strongly focused on participatory approach in development. To quote Uma Kothari (2001):

> In recent years there has been widespread adoption in the development aid industry of participatory approaches to development in an espoused attempt to enable those individuals and groups previously excluded by more top-down

planning processes, and who are often marginalized their separation and isolation from the production of knowledge and the formulation of policies and practices, to be included in decisions that affect their lives.

In 1994, the World Bank has defined participatory development as:

> ... a process through which stakeholders influence and share control over development initiatives and the decisions and resources which affect them.

For DFID (2000) in its remarkable manifesto on human rights, participation is:

> … enabling people to realize their rights to participate in, and access information relating to, the decision-making processes which affect their lives.

Thus, the participatory approaches to development are about the identification, collection, interpretation and analysis of local communities and their knowledge systems (Kothari 2001). According to Robert Chambers (2005), the participatory development is broadly engaged in four areas: (i) Information Sharing: People are informed in order to facilitate collective individual action; (ii) Consultation: People are consulted and interact with an agency, which can then take account of their feedback; (iii) Decision-making: People have a decision-making role, which may be theirs exclusively, or joint with others, on specific issues of a policy or project; and (iv) Initiating action: People are proactive and able to take the initiative. This participatory development, especially its focus on the local communities has been increasingly analyzed by the theory of social capital, the latest theoretical framework for participatory development. The theory of social capital is defined as a 'resource' (Harriss 2002) for participatory development by creating and sustaining social relationships and networks – interaction, norms, trust and reciprocity in groups, communities, organizations and institutions.

1.I.b Social capital: the theoretical framework of the study

In recent years, the participatory development model, to a great extent, has been focusing on the theory of social capital while studying the functioning of various policies, programmes and projects especially relating to (participatory) development at grassroots

levels. While studying these aspects, the biggest contribution that social capital certainly provides, is the recognition, significance and commemoration of 'social relations' of individuals that enhances individual(s)'s livelihoods, development programs and socioeconomic growth. The concept of social capital captures the idea that social bonds and social norms are important for sustainable livelihoods. Its value was identified by Tonnies (1887), shaped by Jacobs (1961) and Bourdieu (1986), later given a novel theoretical framework by Coleman (1988, 1990), and brought to wide attention by Putnam (1993, 1995).

For a common man's understanding, social capital refers to social connections or networks and the trust and reciprocity that bring productive outcomes (Putnam 2000). Although there is not a unified definition, the social capital has been defined by a number of social scientists. These definitions on social capital can be broadly subsumed under two major theoretical stands/debates. In fact, the theoretical debates within the theory of social capital tend to focus broadly on 'functionalist approach', which draws on the works of James Coleman and Robert Putnam on the one hand, and the 'critical approach' of Pierre Bourdieu on the other. For Coleman (1990), social capital is constituted in the space between social structure and agency, between and among individuals, so that it 'inheres in the structure of social relationships'. While Coleman's work on family and education have been influential in the development of social capital theory, his work has been overshadowed by Robert Putnam (Baron et al. 2000) who moves the emphasis from family to community and from individual to collective social capital (Portes 1998; Lin 2001). Putnam sees that societies are made up of families and communities, of networks of friends and colleagues. He stresses the importance of the trust, values and reciprocity that make relationships work and sustain the connections

that bind societies together. Social capital in this way fosters social cohesion, a sense of security and belonging, and offers opportunities.

In contrast, a more critical understanding of the concept and role of social capital follows the work of Pierre Bourdieu (1986). He emphasizes 'the social construction of the content of social capital' (Fine 2001), and the significance of the social and material contexts in which people generate resources. Since, in his view, access to economic, cultural and social resources or capitals, are constrained and defined by social systems (Edwards et al. 2003), Bourdieu finds that the relationship between the different forms of capital provides a framework for understanding the 'micro-politics of power' (Skeggs 1997). Thus, Bourdieu uses the notion of social capital as a device to allow for a more nuanced or 'theoretically refined' understanding of how structural inequalities are sustained (Portes 1998). Interestingly, his understanding of how economic factors impact on social relationships is reversed in mainstream social capital theory which is oriented towards as how social factors impact positively or negatively on economic and political spheres. Though Bourdieu's work has been marginalized by mainstream social capital theory, as somehow missing the point (Fine 2001), it has been useful to those critical of 'the functional approach', since it constitutes the 'conflict and power side of social capital' (Siisiäinen 2000; Arneil 2007).

Much of the working definitions on social capital while studying the conservation and development of natural resources have been referring to the functional approach to social capital. For example, the definition provided by Ellinor Ostrom (1999) is one of them: 'the shared knowledge, understandings, norms, rules, and expectations about patterns of interactions that groups of individuals bring to a recurrent activity'. Moreover Pretty and Ward (2001) outline several aspects of social relations - relations of trust, reciprocity and exchanges, common rules, norms and sanctions, and connectedness,

networks and groups – which are often indicated as important mechanisms to build social capital assets. However, the use of 'critical approach' to social capital as devised by Bourdieu and its relevance in understanding the processes of conservation and sustainable development of biodiversity is important.

1.I.c Social capital: community, participation and collective action

As understood from the above sections, the constituents of contemporary participatory conservation model – that integrates community (and civil society-based organizations [NGOs]) on the one hand, and the public agencies (forest department) on the other – have been increasingly analyzed by applying social capital as a conceptual framework. The process of collective conservation and sustainable development of biodiversity calls for communities and their social capital in initiating and invigorating various conservation activities. In this context, the theory of social capital in the process of participatory biodiversity conservation is primarily based on three interrelated concepts: community, participation and collective action. In fact, these three concepts are considered as necessary preconditions for the processes of formation of social capital and collective conservation. Hence, the following section briefly delineates a conceptual understanding of these three categories.

Community

The term 'community' in sociology has been a dominant source of sociological inquiry since the earliest days of the discipline. Each of the three most influential nineteenth century sociologists – Karl Marx, Emile Durkheim and Max Weber – regarded the social transformation of community in its various forms to be a fundamental problem of sociology and sociological theory. It is important to understand the community in its sociological sense while co-opting the community in any development programme. The

community is a form of social organization, social existence, and social experience (Almgren 2000).

While defining community in sociology, it is always required to mention the two dominant sociologists who have made substantial contributions to sociological understanding of community, Ferdinand Tonnies and Emile Durkheim. While focusing on the historical trend of social relationship from *Gemeinschaft* to *Gesellschaft*, Ferdinand Tonnies (2001 [1887]) considers 'Gemeinschaft' as community that refers to personal relationships, which are intimate, traditional and informal – the kind of relationships associated with small towns in which everybody knows and cares about one another – whereas 'Gesellschaft' (another form of community) refers to relationships that are essentially opposite to 'Gemeinschaft' – they are impersonal, contractual, logical, and rational. Similarly, Emile Durkheim (1984 [1893]) conceptualizes two forms of social solidarity i.e. mechanical solidarity and organic solidarity, which are characteristic features of the traditional societies and modern societies respectively. According to the classical concern, the concept of community is related to certain quality of human association, occurring within the confines of limited, shared physical territory.

Following the classical sociological tradition, various sociologists have conceptualized the notion of community. According to Carle Zimmerman (1938), community consists of four characteristics: social fact, specification, association and limited area. George Hillary (1955), in a content analysis of ninety-four definitions of community advanced in sociological literature, discovers basic consensus on only three definitional elements: social interaction between people, one or more shared ties, and an area context. David McMillan and David Chavis (1986) suggest a state of community exists when four elements co-exist: membership, influence, integration and fulfillment of needs, and shared emotional connections. Ogburn and Nimkoff (1964) define a

community as a group or a collection of groups that inhabits a locality. The residential tie to an area and total organization of social life are important features of community. They also highlight ecological aspects of community in the definition: 'community is groups inhabiting a locality, with a specific natural environment, of fertile lands or navigable water ways with varying degrees of precipitation and temperature' (Ogburn and Nimkoff 1964).

The structure of community is not free from the power relations that operate at community level, which are closely associated with the social processes – cooperation, competition, conflict so on and so forth. The community power theorists have provided a way of thinking about power, the forms it takes, and how it is obtained and used. The power can be enforced through the processes of cooperation or conflict. In fact, the power relation that operate at community level can be explained in two categories namely the elitist and the pluralist (Norlin and Chess 1997). The elitist model of community power structure can be attributed to the work of Floyd Hunter (1953). According to him, the power is informally and socially structured. The people at the top have power based on wealth and organizational and social status. He came to the conclusion that in every community there is the occurrence of privileged few (power holders) who possess the power to give definite functions to certain persons[1]. The pluralist position of power structure, in contrast, has been developed by Robert A. Dahl[2]. The basic premise of Dahl is that 'in a political system where nearly every adult may vote but where knowledge, wealth, social position, access to officials, and other resources are unequally distributed, who actually governs'? In fact, according the

[1] Floyd Hunter, *Community Power Structure: A Study of Decision Makers* (Chapel Hill: University of North Carolina Press, 1953).
[2] Robert A. Dahl, *Who Governs? Democracy and Power in an American City* (New Haven: Yale University Press, 1961).

pluralist tradition, the social power is decentralized and embedded in a value and normative structure based on democratic principles.

Some of the recent studies try to redefine the community taking into account of the changes in their characteristics and boundaries. Chauhan (2003) argues that village is communitarian in the sense that numerous interactions occur among the same set of individuals beyond the interest group formations which binds the villagers together in reciprocal ties, repeated over generation. The nature of village community as a cohesive and self-sufficient unit of social life has undergone several re-examination, pointing to internal differentiations and external relations, both in the traditional and emerging scenarios. Developmental processes, through decentralizing of power and decision making, have given fresh meaning to the collective sentiments of village communities as the villagers assert their identity when dealing with 'others' or negotiating the processes connecting them with the wider world.

While studying community in conserving biodiversity, it could be argued that the concept can be approached in spatial, socio-cultural and economic terms. Spatially communities can be considered as 'groupings of people who physically live in the same place or locality'. Socio-culturally they can be considered as 'social groupings who derive a unity from common history and cultural heritage, frequently based on kinship'. Economically the concept can be referred as 'groupings of people who share interests and control over particular resources'. Thus, combining these three, the concept of community can be conceptualized as an entity socially by a common cultural identity, living within defined spatial boundaries and having a common economic interest in conserving and managing the biological resources of a particular area.

Participation

According to the *Oxford English Dictionary*, participation is 'the action or fact of partaking, having or forming a part of'. In that sense, participation could be transitive or intransitive; moral, amoral or immoral; forced or free; and manipulative or spontaneous (Rahnema 2000). The transitive forms of participation are oriented towards a specific goal or target whereas intransitive forms of participation are occurred when the subject lives the partaking process without any predefined purpose. According to Orlando Fals-Borda (1988), participation is:

> A special kind of power – people's power – which belongs to the oppressed and exploited classes and groups and their organizations, and the defence of their just interests to enable them to advance towards shared goals of social change within a participatory system.

The conceptual involvement participation is part of a fundamental shift in the development thinking over the past twenty years which seeks to focus on people-centred (Oakley 1991), and based on the need for a radical shift in emphasis from external professionals to local people (Chambers 1983). In recent years, an unprecedented interest in adopting the concept of 'participation' by the governments and also the development institutions, according to Majid Rahnema (2000), is due to six major reasons: (i) The concept is no longer perceived as a threat; (ii) Participation has become a politically attractive slogan; (iii) Participation has become, economically, an appealing proposition; (iv) Participation is now perceived as an instrument for greater effectiveness as well as new source of investment; (v) Participation is becoming a good fund-raising device; and (vi) An expanded concept of participation could help the private sector to be directly involved in the development business.

Now the need for participatory approaches is being embodied in conservation. 'Properly mandated, empowered and informed, communities can contribute to decisions

that affect them and play an indispensable part in creating a securely-based sustainable society' (IUCN 1991). Participation helps in strengthening the capacities of rural people to gain responsibility for their natural resources. Participation varies from being passive at one level to self-mobilization at the other. In fact, the manifestation of participation at community level occurs in several forms. The major forms of participation have been depicted in Table 1.1.

Table 1.1
Forms of participation

Sl No.	Types	Components
1	Passive Participation	Being told what is going to happen or already happened.
2	Participation in information giving	Answer questions posed by extractive researchers
3	Participation by consultation	Consulted and external agents listen to views
4	Participation by material incentive	Provision of resources for participation
5	Functional participation	Forms groups to meet predetermined objectives
6	Interactive participation	Joint analysis to joint actions by using local institutions
7	Self-mobilization	Already empowered, take decisions independent of external institutions

Source: M. P. Pimbert and J. N. Pretty. 1994. 'Participation, People and the Management of National Parks and Protected Areas: Past Failures and Future Promise'. London: United Nations Research Institute for Social Development.

Cohen and Uphoff (1977) describe participation as people's involvement in decision-making process about what would be done and how; their involvement in implementing programmes and decisions by contributing various resources or cooperate in specific organizations or activities; their sharing in the benefits of development programmes; and/or their involvement in efforts to evaluate such programmes. Taken together, these four kinds of involvement appear to encompass most of what would generally be referred to as participation in development activities. The contemporary collective conservation needs to focus on the active involvement or 'participation' of the members of the

community in the processes of formulation as well as implementation of different conservation projects and programmes.

Collective action

Collective action is easiest to identify when there is a clearly defined group that takes part. According to *Oxford Dictionary of Sociology* collective action refers to 'action taken by a group (either directly or on its behalf through an organization) in pursuit of members' perceived shared interests'. Most of the definitions on collective action focus on the *involvement of a group of people*, it requires a *shared interest* within the group and it involves some kind of *common action* which works in pursuit of that shared interest. Examples of collective actions include collective decision-making, setting rules of conduct of a group and designing management rules, implementing decisions, and monitoring adherence to rules. Collective action can take place either through formal organization or through informal organization or in some cases through spontaneous action. Collective action has been described as taking various forms including the development of institutions, resource mobilization, coordination activities and information sharing (Poteete and Ostrom 2003). A detailed description on the 'collective action' has been mentioned in chapter four. The purpose of collective action affects the level at which we have to analyze the phenomenon: which institutional level (operational, collective choice or constitutional level if we use Oakerson's (1992) institutional framework) and which social unit (individual, group, community, intra-community etc.).

In this context, the present study from the perspective of sociology of development finds its importance. It has systematically used the social capital theory, the latest theoretical framework of participatory development, which has recently been used as a conceptual framework to understand participatory conservation. Thus, based on

social capital framework, the present study attempts to understand the interaction between the local community and the public institution (Forest Department) – as a form of social capital – in the processes of conservation and sustainable development of biodiversity of medicinal plants. Before focusing on the research questions, objectives and argument of the present study, the following section briefly delineates the key conceptual categories relating to biodiversity conservation.

1.II Understanding Biodiversity: a conceptual note

The term 'biodiversity' is a modern contraction of biological diversity. Biodiversity could be simply defined as "the diversity of life forms", where 'bio' means life and 'diversity' refers to the variety of life forms. In the words of I. R. Swingland (2001), 'diversity refers to the range of variation or variety or differences among some set of attributes; biological diversity thus refers to variety within the living world or among and between living organisms'. The concept of biodiversity is easiest to understand (in terms of the million of species that inhabit the earth) but very difficult to define. Several scholars have provided definitions as well as interpretations to arrive at a systematic 'conceptualization' and 'characterization' of biodiversity. The concept of biodiversity connotes different things to different people. To quote Reed F. Noss (1990):

> To a systematist, it might be the list of species in some taxon or group of taxa. A geneticist may consider allelic diversity and heterozygosity to be the most important expressions of biodiversity, whereas a community ecologist is more interested in the variety and distribution of species or vegetation types. To a wildlife manager, managing for biodiversity may mean interspersing habitats to maximize edge effects, thereby building populations of popular game species. Some nonbiologists have complained that biodiversity is just another 'smokescreen' or environmentalist ploy to lock up land as wilderness.

Adams (1994) characterized biodiversity as being a widely used term '…having no unified definition'. Reed F. Noss (1995) argues 'although sometimes considered

equivalent to species richness (the number of species in an area), biodiversity is much more'. In addition, while conceptualizing biodiversity as an object of investigation, Guyer and Richards (1996) argue 'biodiversity is a bit like an iceberg – most of it hidden from view, and (like the underwater portion of an iceberg) indefinite in shape and extent. Several attempts have been initiating to arrive at a systematic conceptualization of biodiversity. Before focusing on this aspect, the following section briefly introduces the intellectual background of the concept of biodiversity.

1.II.a Background

The term 'biodiversity' has been coined in 1986 by biologists who wish to express a complicated, scientific understanding of the natural world, and who wish to inspire a rapid, widespread effort to conserve the natural world. As literature suggests, through out the 1960s and 1970s, biologists generated/stimulated public alarm over the deteriorating environment. The well-known biologists, for example, Ehrenfeld (1981), Ehrlich and Ehrlich (1981), and Myers (1979) raised the awareness that the diversity is a threatened commodity (Takacs 2001). During 1980s, the discussion on 'biodiversity' was first entered into the domain of scientific literature. The initial effort was led by Water G. Rosen, a biologist by profession and senior programme officer at the National Research Council (which advises the National Academic of Sciences [NAS]), brought together prominent scientists from the NAS with the clout of the Smithsonian Institution to host the National Forum on BioDiversity in 1986. Thus, the deliberate effort of W. G. Rosen at National Forum on BioDiversity held in Washington DC under the auspices of the US National Academy of Sciences and the Smithsonian Institution during 21-24 September 1986 (Sarkar and Margules 2002) was particularly focused on the imperiled diversity and staged an awakening event that enkindled, and received, widespread attention from the public. Walter G. Rosen coined the term 'biodiversity' at this august event in order to

encapsulate biologists understanding of a chaotic, diminishing natural world, and would raise public awareness about threats to the natural world (Takacs 1996). The Forum was followed by a significant textbook *BioDiversity* edited by E. O. Wilson. The text i.e. *BioDiversity*, the collection of essays that chronicled the National Forum, assembles several experts, namely Paul Ehrlich, Daniel Janzen, Tom Cade, Lester Brown, Michael Soulé, and other scientists. Thereafter the World Commission on Environment and Development (WCED) published its report entitled *Our Common Future* just after a year in which propagated the term 'sustainable development' where the term biodiversity has been mentioned two times without having any discussion on the complexities that it encountered (Müller 2002).

Soon after the Forum as well as the publication of BioDiversity by Wilson, significant attention was focused on the 'crisis of extinction'; biodiversity ultimately entered as a significant issue in Northern American as well as in international environmental policy framework (Noss 1995). As a result, numerous academic endeavours have been carried out – in the form of reports, articles etc. that enforced for the publication of biodiversity specific journals – in order to address the crisis of extinction as well as its concern. As Takacs marks 'biodiversity did not appear as a key word in *Biological Abstracts*, and *biological diversity*. In 1993, biodiversity appeared seventy-two times, and biological diversity nineteen times'.

The inaugural journal with 'biodiversity' in its titled traced back to the emergence of *Canadian Biodiversity* in 1991, *Tropical Biodiversity* in 1992, *Biodiversity Letters* and *Global Biodiversity* in 1993 (Sarkar and Margules 2002). Having all these academic efforts, the conceptual mushrooming of biodiversity didn't come to the fore until early 1990s. The conceptual mushrooming of biodiversity was entered to the forefront only during the United Nations Conference on the Environment and

Development (UNCED) in 1992, more specifically through its 'Convention on Biological Diversity (CBD) at Rio Janeiro, 1992. Soon after the Rio Convention the concept of biodiversity has occupied one of the primary categories in the domain of environmental discussions worldwide.

1.II.b Defining biodiversity

To continue the above discussion, though the concept of biodiversity may be difficult to define, precisely, 'but its intended meaning is not hard to fathom: it refers to diversity at all levels of biological organization, from alleles, to populations, to species, to communities, to ecosystems', says Sahotra Sarkar (1999). Biodiversity, in its broadest sense, refers to 'the variety of life' (Guyer and Richards 1996) on earth. It is an umbrella term for nature's variety – ecosystem, species and genes. According to Knopf (1992), the definitions of biodiversity are 'as diverse as the biological resources'. In fact, the definitions range from 'the number of different species occurring in some location' to 'all of the diversity and variability in nature' (Spellerberg and Hardes 1992) and 'the variety of life and its processes' (DeLong 1996). It comprises 'the variety of living organisms, the genetic differences among them, the communities and ecosystems in which they occur, and the ecological and evolutionary processes that keep them functioning', mentions Don C. DeLong, (1996). Malcolm Hunter (1999), on the other hand, defines biodiversity simply as 'the diversity of life'; however, an all-inclusive definition on biodiversity is desirable to understand the term biodiversity.

Don C. DeLnong, after reviewing eighty-five definitions on biodiversity and related literature on biodiversity, has construed five major approaches [based on the methods devised by Borsodi (1967), Tibbetts and Moake (1969), and Sherman and Johnson (1990)] to acquire a complete understanding of the term biodiversity. These five approaches, according to DeLong (1996), provide 'an objective and sound definition of

biodiversity'. These five approaches are: (i) definition based on derivation; (ii) definition based on classification; (iii) definition based on characterization/attribution; (iv) definition based on comparison; and (v) definition based on operation. Based on these five approaches, DeLong (1996) offers a more comprehensive definition of biodiversity. Thus, based on these five approaches, DeLong (1996) defines biodiversity as:

> Biodiversity is an attribute of an area and specifically refers to the variety within and among living organisms, assemblages of living organisms, biotic communities, and biotic processes, whether naturally occurring or modified by humans. Biodiversity can be measured in terms of genetic diversity and the identity and number of different types of species, assemblages of species, biotic communities, and biotic processes, and the amount (e.g., abundance, biomass, cover, rate) and structure of each. It can be observed and measured at any spatial scale ranging from microsites and habitat patches to the entire biosphere.

However, a universally acclaimed definition on biodiversity has finally declared at the Rio Convention, 1992. Article 2 of the CBD, 1992 reads biodiversity as:

> 'Biological diversity' means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

1.II.c Components of biodiversity

The biodiversity is regarded as a complex of living organisms, with a key molecules of life at one extreme, and communities of species within ecosystems at the other. Broadly, as literature suggests (Gaston and Spicer 2004; Swingland 2001), there are three levels of biodiversity: species, genetics and ecosystem. These three levels are interrelated and yet distinct enough that they can be studied as three separate components. The following section covers these three levels of biodiversity.

Species Diversity

Species diversity refers to the variety of species within a region (Hunter 1999). It constitutes the variety of species that are found in an ecosystem. Species is the unit used to classify the millions of life forms on earth. Each species is distinct from other species – for example, horses and donkeys are distinct species, as are lions and tigers. It is much easier to count the number of species at any given sample site, particularly if attention is restricted to well-known organisms. It is also possible to estimate this number in a region or country. This measure, known as species richness, provides one possible measure of how much biodiversity a site has and a basis for comparing sites. It is most straightforward, and in many ways the most convenient and useful measure of biodiversity.

Genetic Diversity

Genetic diversity refers to the variation of genes within the species (Swingland 2001). It refers to the range of genetic information coded in the DNA of a single population species. The genes found in organisms can form enormous number of combinations; each of which gives rise to some variability. Genes are the basic units of hereditary information transmitted from one generation to the other. It is this type of diversity that gives rise to different varieties (for example, rice, mangos, etc.). Some variations are easy to see, such as size or colour; some different, such as taste or flavour, can be perceived by other senses; and some others, such as susceptibility to disease, are not obvious to the senses. Differences between individual organisms have two causes: variation in the genetic material and variation caused by environmental influence on each individual organisms. When the genes within the same species show different versions due to new combinations, it is called genetic variability. It is the basic source of biodiversity.

Ecosystem Diversity

An ecosystem is a set of life forms (plants, animals, microorganisms) interacting with one another and with non-living elements (soil, air, water, minerals etc.). It refers to the variety of habitats that host living organisms in a particular geographical area. Ecosystem diversity is, therefore, the diversity of habitats which include the different life forms within it (Gaston and Spicer 2004). The term also refers to the variety of ecosystems found within a bio-geographical area. Ecosystem diversity is difficult to measure since the boundaries of the communities which constitute the various sub-ecosystems, are elusive. This is the diversity of ecological complexity showing variations in ecological niches, tropic structure, food-webs, nutrient cycling etc. The ecosystems also show variations with respect to physical parameters like moisture, temperature, altitude, precipitation etc. Diversity of ecosystems is often assessed in terms of the diversity of species. This may include evaluation of their relative abundance.

1.II.d Distribution of biodiversity: megadiversity countries

The distribution of biodiversity across the globe is not homogenous. It is estimated that the earth's genes, species, and ecosystems have evolved over 3,000 million years[3]. While the total number of species is not known, biologists estimate that there are between five millions to thirty millions (5-30 millions) of species on our earth, and out of these, only 1.5 million have been identified. There are 3,00,000 species of green plants and fungi; 8,00,000 species of insects; 40,000 species of vertebrates; and 3,60,000 species of microorganisms[4]. This diversity of life forms is not uniformly distributed across the globe. Generally speaking, temperate regions tend to have less diversity than tropical regions. Closed tropical forests, for example, are estimated to contain at least 50 per cent

[3] Jeffrey A. McNeely, 'Critical issues in the implementation of the convention on biological diversity', in Anatole Krattiger *et al.* eds, *Widening perspectives on biodiversity* (IUCN and the International Academy of the Environment, 1994), p.07.

[4] World Resources Institute (WRI), *A guide to the global environment 1992-1993* (Oxford: Oxford University Press, 1992), p.127.

and perhaps 90 per cent of the world's species, even though they cover only 9 per cent of the earth's land surface[5]. This is due to the effect of latitudinal variation as well as other natural trends of spatial variation that has ultimately resulted in the heterogeneous distribution of diversity. Handful of countries have been identified in which biodiversity is particularly overrepresented. These countries are referred as 'megadiversity countries'. These megadiversity countries have specific ecological, historical, social, and economic structures.

According to Myers (2001), a country is considered as megadiversity 'that either (a) contains 20,000 higher plant species or, in the case of a country with fewer than 20,000 but more than 10,000 such species, at least 5,000 endemics; or (b) contains at least 2,000 species of higher vertebrates (mammals and birds), 200 such species as endemics'. The concept of megadiversity countries is close to that of 'centres of diversity', which refer to the existence of areas with high biodiversity, particularly large numbers of species and a high concern of endemic organisms (Sarukhán and Dirzo 2001). There are seventeen megadiversity countries on the earth that encompass 60-70 per cent of all global biodiversity (Mittermeier and Mittermeier 1997). These countries are: Brazil, Indonesia, Colombia, Mexico, Australia, Madagascar, China, Philippines, India, Peru, Paupa New Guinea, Ecuador, USA, Venezuela, Malaysia, South Africa and Democratic Republic of Congo/Zaire (Myer 2001). Mittermeier and Mittermeier (1997) have identified six major criteria in identifying these seventeen megadiversity countries: species richness, concentration of endemisms, diversity of habitats, presence of tropical forest ecosystems, presence of marine ecosystems and cultural diversity[6].

[5] Ibid., p.130

[6]Species richness basically refers to the species of plants and four groups of animals such as mammals, birds, amphibians, and reptiles. Concentration of endemisms mostly refers to the percentage of endemic species present among a country's total resident species. The diversity of habitats essentially refers to the diversity of distinct ecosystems, usually considered to be the diversity of vegetation types. The cultural diversity principally refers to the diversity of ethnic groups in a given country who have been playing an

Similarly, McNeely *et al.* (1990) have advocated lists of species of a country – vertebrates, swallowtail butterflies and higher plants – in order to identify twelve megadiversity countries in the world. The IUCN, in addition, has mentioned that the number of megadiversity countries, from the botanical point of view, is only about ten. Thus, the most commonly treated megadiversity countries are only twelve. These are: Brazil, Indonesia, Colombia, Australia, Mexico, Ecuador, Madagascar, Peru, Zaire, China, India and Philippines. With the exception of Australia, the remaining are developing countries, many of which are considered to be the poorest in economic terms in the world[7].

1.II.e Importance of biodiversity

As we know, the world is inhabited by great diversity of life forms – animals, plants, and microorganisms – living in diverse habitats and possessing diverse qualities. Since the beginning of human civilization, human beings have been profoundly depending upon these natural resources (biodiversity) for their domestic as well as commercial purposes. The biodiversity is also considered as a precious prerequisite for the survival of human beings as they provide food and other necessary requirements like shelter, clothing, tools and medicine. The significance of biodiversity in terms of its commercial utility, ecological services, social and aesthetic value is enormous (Hunter 1999). We get benefits directly or indirectly from this natural resource base in innumerable ways. Sometimes we realize and appreciate the value of the organism only after it is lost from the earth. The multiple uses or values of biodiversity have been discussed in the following headings. Before doing so, the following discussion on the significance of

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important role 'in the modes in which biodiversity is perceived, maintained, used and appreciated' [Jose Sarukhán and Rodolfo Dirzo, 'Biodiversity-rich countries' in Simon Asher Levin (ed) *Encyclopedia of biodiversity* (California: Academic press, 2001,)].

[7] World Conservation Monitoring Centre, *Global biodiversity: status of the Earth's living resources* (London: Chapman and Hall), p. 154.

biodiversity has used 'value' in the broadest sense rather than simply focusing only on monetary aspects[8].

(i) **Consumptive use value:** These are direct use values where the biodiversity products can be harvested and consumed directly, such as food, fuel, medicine etc (Shiva 1992). A large number of wild plants are consumed by human beings as food. About 80,000 edible plant species have been reported from the wild. About ninety per cent of present day food crops have been domesticated from wild tropical plants. It is also estimated that about seventy-five per cent of the world's population depends upon plants or plant extracts for medicine. The drug 'Penicillin' used as an antibiotic is derived from a fungus called *penicillium*. Similarly, 'Quinine', the cure for malaria is obtained from the bark of Cinchona tree, while Digitalin is obtained from foxglove which is an effective cure for heart ailments. Recently, 'Vinblastin' and 'Vincristine', two anticancer drugs have been obtained from Periwinkle plant, which possesses anticancer alkaloids. That apart, our forests have been used since ages for fuel wood. The fossil fuels like coal, petroleum and natural gas are also products of fossilized biodiversity. Firewood collected by individuals is not normally marketed, but is directly consumed by tribes and local villagers, hence falls under consumptive value.

(ii)Productive use value: These are the commercially usable values where the product is marketed and sold (Shiva 1992). It may include number of wild gene resources that can be traded or used by scientists for introducing desirable traits in the crops and domesticated animals. These may include the animal products like tusks of elephants, musk from musk deer, silk from silkworm, wool from sheep, fur of many animals, lac

[8] Kevin J. Gaston and John I. Spicer, *Biodiversity: An Introduction* (USA: Blackwell Publishing Company, 2004). Gaston and Spicer describe the value of biodiversity into two major headings: use value and non-use value. Use value (again subdivided into direct-use value and indirect-use value), according to them refers to the value of the biodiversity which is deeply linked to the processes of production and consumption. On the other hand, the non-use value refers to the value that doesn't have direct use value. They have further divided the non-use value into four components: option value, bequest value, existence value, and intrinsic value.

from lac insects etc all of which are traded in the market. Many industries are dependent upon the productive use values of biodiversity e.g. the paper industry, plywood industry, railway sleeper industry, silk industry, textile industry, ivory-works, leather industry, pearl industry etc.

(iii) Social Value: These are the values associated with the social life, customs, religion and psycho-spiritual aspects of the people (Hunter 1999). Many of the plants are considered holy and sacred in our country like Tulsi, Peepal, Mango, Lotus, Bael etc. The Leaves, fruits or flowers of these plants are used at the time of worship. Some of our social customs are also closely woven around the wildlife. Many animals like cow, snake, bull, peacock, owl etc. also have significant place in our psycho-spiritual (religious) arena and thus hold special importance. Thus biodiversity has distinct social value that varies from society to society.

(iv) Ethical Value: The ethical value means that we may or may not use a species, but knowing the very fact that a particular species that exists in nature gives us pleasure (Hunter 1999). Ethics provide the basis for deciding what is good or bad, right and wrong. The World Charter for Nature, adopted by the United Nations in 1982, states that 'every form of life is unique warranting respect regardless of its worth to man, and to accord other organisms such recognition, man must be guided by a moral code of action'.

(v) Aesthetic Value: Each species and ecosystem adds to the richness and beauty of life on earth. Perhaps no artificial medium can match the sheer joy of watching a sunset over an ocean, the sight of a leaping deer, the sound of a singing bird, and the smell of wet earth after the first rains. A natural ecosystem, once destroyed, is impossible to recreate. The number of people who visit a natural site is an indication of its aesthetic value (Hunter 1999). The great Himalayan is a case in point. People from far and wide spend a

lot of time and money to visit wilderness area where they can enjoy the aesthetic value of biodiversity and this type of tourism is now commonly known as eco-tourism. The collection of revenue on such eco-tourism gives us even a monetary benefit due to the aesthetic value of nature.

(vi) Optional Values: These values include the potentials of biodiversity that are presently unknown and need to be explored. In fact, the optional value is 'the value of knowing that there are biological resources existing on this biosphere that may one day prove to be an effective option for something important in the future' (Gaston and Spicer 2004). There is a possibility that we may have some potential cure of AIDS or cancer existing within the depths of marine ecosystem, or a tropical rainforests.

(vii) Ecosystem Value: The ecosystem value refers to the services provided by ecosystems like prevention of soil erosion, prevention of floods, maintenance of soil fertility, cycling of nutrients, fixation of nitrogen, cycling of water, their role as carbon sinks, pollutant absorption and reduction of the threat of global warming (Hunter 1999).

However, in recent times, we have been witnessing that this rich natural resource base i.e. natural capital has been experiencing/undergoing increasing pressure leading to alternations/degradations of the natural stock of bioresources. There are several factors, which are responsible for this bio-depletion. A detailed description has been discussed in the following section.

1.II.f Loss of biodiversity: major causes

It is commonly understood that the extinction or loss of a species is a natural process (Swingland 2001; Futuyma 1986; Cox and Moore 1985). Studies of the fossil record show that the average longevity of a given species lies in the range of 1 to 10 millions years (Raup 1988). According to the fossil record, no species has yet proved immortal; as few as 2-4 per cent of the species that have ever lived are believed to survive today.

'The continuous and contemporaneous processes of speciation and extinction form the two necessary prongs of the evolutional process', says Swanson (1997). It is this constant reshaping of the biological diversity on earth that allows life to continue in the context of a changing physical environment (Marshall 1988). According to Swanson, 'various parts (life forms) come and go in order to maintain the integrity of the whole'. With the changing environments, former inhabitants have lost their 'best-adaptive status' to invaders and have been replaced (Swanson 1997:24). Thus the process of 'natural extinction' is natural in order to preserve life on earth.

But the crisis of our current 'mass extinction' is largely beyond the category of natural extinction. It is essentially due to the direct and indirect interventions or threats of human beings to the ecosystems. As literature suggests, a massive extinction, driven by human beings, has been started for some 40,000 years[9]. In recent times, when we have more exact estimates of extinction, the situation has become far more drastic, as reviewed by the IUCN (Hilton-Taylor 2002), which we usually use as the basis of our review from the year 1500 A.D. onwards. The total recorded extinctions for this 500 year period are 811 species, including 331 vertebrates, 388 invertebrates, and 92 plants. At present, the rate of destruction of tropical forests, some 17,500 species are being lost per year, which is around 1,000 to 10,000 times greater than extinction rates prior to human intervention (Wilson 1988). According to Wilson (1988), the current extinction rates are three or four orders of magnitude greater than the natural rate because of the impacts of the human activities.

The threat to biological diversity arises when the rate of extinction of species far exceeds the rate of speciation (Swanson 1997). Human activities are at the root of virtually all extinction threats. Destruction of fragile habitats, wetlands, coral reefs,

[9] R. Dirzo and P. H. Raven, 'Global state of biodiversity and loss', *Annual review of environment and resources* (2003, Volume 28), Pp 137-67.

tropical and temperate forests, rivers and grasslands has accelerated in recent years due to human population increases and commercial exploitation of forests, ocean fish and other wildlife, as well as the introduction of non-native species, either intentionally or accidentally. The massive pollution and chemical contamination of air, water and soil and even the atmosphere that surrounds the earth are altering the climate and bringing about unforeseen declines in wildlife and plants. Conventionally the major causes of the extinctions or the loss of biological resources have been categorized under three human-induced causal factors: overexploitation; habitat destruction; and species introduction (Swingland 2001; Swanson 1997; Ehrlich and Wilson 1991; Diamond 1989). Ehrlich and Kremen (2001), on the other hand, have given a logical equation towards the causal analysis of the loss of biological resources. According to them, I = PAT where 'I' refers to impact of 'human activities on nature'; 'P' refers to population; 'A' refers to 'affluence (per capita consumption)'; and 'T' refers to 'technology'. Thus, the impact of human enterprise on nature, according to them, is the product of population, affluence, and technology[10].

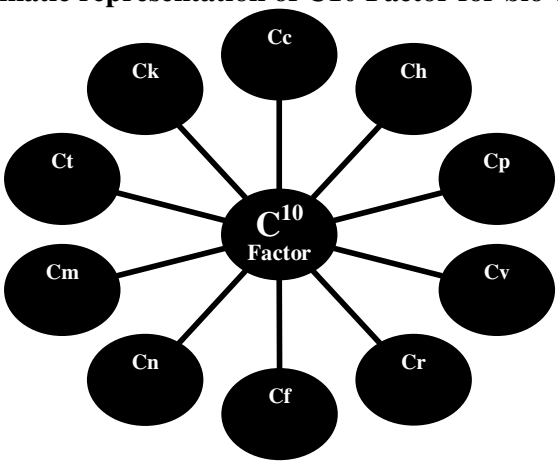
The loss or the extinction of biological resources, apart from nature-induced factor, is, in fact, mainly rooted in human-induced factor. This human-induced factor can be shaped in three major domains: social, economic, and political. These three governing domains require a systematic discussion while construing a thorough strategy for the process of conservation of biodiversity. Similarly, *Global Biodiversity Strategy* outlines six major causes for the loss of bioresources: (i) the unsustainable high rate of human population growth and natural resource consumption; (ii) the steady narrowing spectrum of traded products from agriculture, forestry, and fisheries; (iii) economic systems and

[10] These three variables causing the impact of have to do with population growth i.e. overconsumption, poorly designed environmental technologies, and faulty economic arrangement [P. Ehrlich and C. Kremen, 'Human effects on ecosystems, overview' in S. A. Lavin (ed.) *Encyclopedia of Biodiversity* (San Diego: Academic Press, 2001,) Pp 383-93].

policies that fail to value the environment and its resources; (iv) inequity in the ownershil, management and flow of benefits from both the use and conservation of biological resources; (v) deficiency in knowledge of natural ecosystems and its application; and (vi) legal and institutional systems that promote unsustainable exploitation (WRI, IUCN, UNEP 1992). Based on the literature, the present study describes ten major factors leading to loss of biodiversity. These ten factors have been presented in the following diagram.

Diagram 1.1

Diagrammatic representation of C10 Factor for bio-depletion



Cc: Climatic change; Ch: Climbing of human population; Cp: Constriction of poverty; Cv: Conversion; Cr: Commercialization; Cf: Commodification; Cn: Colonization; Cm: Communication; Ct: Contamination; and Ck: Corrosion of traditional knowledge system.

To provide a systematic causal analysis of the loss or extinction of biodiversity, the present study provides C^{10} factor analysis under the rubric of four major domains: natural or physical, social, economic and political. The C^{10} factors are: climatic change, climbing of human population, constriction of poverty, conversion, commercialization, commodification (ecotourism), colonization, communication (transport), contamination (chemicalization or pollution), and, at last, corrosion of traditional or local knowledge system.

(i) Climatic change: Scientists are now intensively studying atmospheric carbon dioxide, methane, and other 'green house' gases that are transparent to light but that absorb heat. During the past 100 years, global levels of carbon dioxide (CO_2), methane, and other trace gases have been steadily increasing, primarily as a result of burning coal, oil, and natural gas[11]. Primack (2001) mentions that the concentration of CO_2 in the atmosphere has increased from 290 parts per million (ppm) to 350 ppm over the last 100 years, and it is projected to be double somewhere in the latter half of the 21st century (Primack 2001). This rising of temperature, as a result, witnesses more natural events such as hurricanes, flooding, and regional drought, which are closely associated with extreme weather.

(ii) Climbing of human population: The climbing or the unprecedented growth of human population leads to loss of bioresources (Ehrlich and Ehrlich 1981). The population reached about 1 billion by 1800, and appears to be heading towards 10 billion by 2046 and 21 billion by 2100, which has been projected by the World Bank and United Nations[12]. The size and density of human populations certainly increase impacts on biodiversity, not all humans, however, create the same impact. For example, upper- and middle-income consumers use resources and produce pollution at levels many times higher than lower-income consumers and the poor irrespective of comparing economic classes within a single society or so-called developed and less-developed countries (Sponsel 2001). Ecologists claim that such increasing numbers are incompatible with many ecological and evolutionary processes, including the persistence of large predators, the continuation of annual migration of birds, speciation in large organisms and the

[11] Primack argues the clearing of forest to create farmland and burning firewood for heating and cooking also contribute to rising concentration of CO_2. [R. B. Primack, 'Extinction, causes of' in S. A. Lavin (ed.) *Encyclopedia of Biodiversity* (San Diego: Academic Press, 2001,)].

[12] M. E. Soulé, 'Conservation: tactics for a constant crisis', *Science*, [1991, Volume 253, No. 5021,].

protection and maintenance of native biotas in the face of increasing pressure from human populations and introduced species (Soulé 1991).

(iii) Constriction of poverty: Along with increasing of population, the problem of depletion of bioresources is compounded by the presence of poverty, the aspirations of people the world over for a better quality of life, and by social and political forces that impede the smooth transition to minimum levels of prosperity, health, and justice. Soulé (1991) mentions that the price of raising human economic welfare to a standard similar to that in the wealthier countries will be biotic devastation in the tropics on a scale inconsistence with the persistence of wildlands[13]. Ehrlich and Wilson (1991) reveal that the magnitude of human aspirations, including demands of natural resources, would require most tropics or wildlands for grazing, farming, energy production, mining, transportation and other uses.

(iv) Conversion: Conversion/alteration/modification includes numerous types of forests, grasslands, and wetlands, and increasingly sacrifices an enormous amount of biodiversity. For example, various types of forest had covered about 70 per cent of Thailand until World War II, whereas today only 15 per cent of the country is forested, largely because of agricultural expansion and logging[14]. It has been estimated that through agriculture and other allied activities, humans prevent about 40 per cent of the earth's total primary biological production annually (Vitousek et al. 1986). This magnitude of resource use definitely diminishes the carrying capacity of the earth.

(v) Commercialization: The commercial farming industries cause the massive destruction of forests and other ecosystems especially while developing monocrop plantations in the tropics such as bananas, cocoa, coconut, coffee, cotton, eucalyptus, and tobacco. Aquaculture is yet another form of commercial and industrial farming. It has

[13] *Ibid.* p. 746

[14] L. E. Sponsel, 'Human impact on biodiversity, overview' in S. A. Lavin (ed.) *Encyclopedia of Biodiversity* (San Diego: Academic Press, 2001,)p. 400.

been endangering mangrove forests and other coastal ecosystems and their biodiversity throughout the tropics in recent years (Sponsel 2001). The shrimp or prawns cultivation in Chilika Lake of India has grown exponentially with the investment of heavy capital and technology; the benefit of the cultivation largely goes to certain section of the society. The commercial motive of this shrimp cultivation is much expensive to be consumed by local populations. As a result, this cancerous growth of shrimp farms is degrading and destroying the local economies in particular, and the natural resource base of Chilika and its adjacent ecosystems.

(vi) Commodification: The development of market economy and the rise of city lifestyles (most appropriately the process of urbanization) are largely responsible for the commodification of nature – the commercial/monetary evaluation of biota and landscape. The market economy evaluates the economic valuation of environmental products and services, such as medicinal products and other products from tropical forests. Although this is necessary in order to counteract the demands of the growing population as well as the industries/corporations and other market forces, this economic evaluation, at the same time, sales and diminishes the biodiversity by disturbing and ignoring other non-economic bioresources (Sponsel 2001). Though the development of cities is mostly in anthropogenic environments, the inhabitants of the urbanites or cities preserve fragments of nature as 'objects' – in the form of park, botanical garden, zoos etc. – for their amusement and entertainment. This objectification of nature also brings larger amount of revenue to the local or the national governments. The development of 'ecotourism' is a case in point.

(vii) Colonization: Colonialism, in its various forms, has affected biodiversity throughout the world. During the last 500 years, Europeans introduced plant and animals from the Old World into their overseas colonies, especially areas that were climatically

similar to parts of Europe, like portions of Burma, California, Chile, Kenya, and South Africa (Sponsel 2001). As a result, this process of Europeanization of local ecosystems, according to Sponsel (2001), has reduced native bioresources and has created 'neo-Europes'. Europeans are not the only colonials; others were also developed in order to exploit the land, resources, and labour of other society. Some of the other examples are the Aztec in Mexico; the Inca in the Andes; Arabs in many parts of Africa; Europe in Asia; and Chinese in much of East and Southeast Asia (Sponsel 2001). Sponsel (2001) points out that all empires have affected local biodiversity through biotic exchange and environmental modification and conversion.

(viii) Communication: Long-distance ocean travel and trade became possible with the development of seaworthy ships, which has facilitated European colonialism and widespread biotic introductions. The introduction of species (either intentional or unintentional) into the isolated regions worldwide has been accelerated with the advent of modern transportation and international commerce. Now, more than 600 species of animals and plants are directly threatened by illegal international trade. Powerful motorized fishing boats and enormous 'factory boats' have been involved in catching fish and other aquatic species from oceans and lakes (Primack 2001). As a result, the effect of these motorized boats affects the aquatic species and its proximate ecosystems.

(ix) Contamination: Bioresources/species are being destroyed due to the effect of the environmental degradation/contamination. The most subtle form of environment degradation is contamination or pollution that is normally caused by pesticides, sewage, fertilizer run-off from agricultural fields, industrial chemicals and wastes, emissions from factories (Mishra and Mishra 2008), automobiles, and sediment deposits from eroded hillsides. Pesticides, herbicides, oil products, heavy metals (such as mercury, lead, and zinc), detergents, and industrial wastes directly kill organisms living in and

around aquatic and other forms of natural environments (Primack 2001). In recent times, several forms of air pollution, such as acid rain, ozone and smog, ozone depletion and ultraviolet radiation are gradually widespread, which have largely been affecting our ecosystems, leading to killing of several living organisms.

(x) Corrosion of traditional knowledge system: Many indigenous/traditional societies maintain heuristic models for preservation of bioresources through their intimate environmental knowledge, sustainable economy, natural resource management and conservation practices, spiritual ecology, and protection of sacred places (Sponsel 2001). These knowledge systems have been developed as a result of long tradition of oral culture that has been passed from one generation to other (Sarukhan and Dirzo 2001). However, in course of time this knowledge system has been destroyed or has been more specifically replaced by alternative forms of knowledge i.e. 'modern scientific knowledge system'.

Thus, the C^{10} factor clearly demonstrates that the human-induced factors play major role, in contrast to nature-induced factors, in causing bio-depletion or extinction. In this context, it is indispensable to develop alternative models of conservation not only for the conservation and sustainable use of bioresources, but also for the future of human society since the latter is closely related with the former.

1.III. Conservation of biodiversity: interests and initiatives

The craving interest intriguing the conservation of biodiversity stems from the gradual loss of bioresources since long time. According to Ehrlich and Wilson (1991), the loss of biodiversity has become an everyday concern for everyone for three basic reasons: (i) the ethical and aesthetic aspects of biodiversity; (ii) the direct economic benefits obtained by the human beings from biodiversity in the form of foods, medicines, and industrial products; and (iii) the provision of essential services that biodiversity provides (for

example, the maintenance of gaseous of the earth). Substantiating the reason for bio-conservation, M. Geetha Rani and M. S. Swaminathan (1998) claim that 'the conservation of biological diversity and its sustainable and equitable utilization are essential not only to support the functioning of ecosystems and human economics, but also to ensure the continuing process of evolution'. As a result, multifarious efforts have been carried out at various times to conserve and sustainable use of the bioresources (refer chapter 3). The latest initiative in the process of conservation is 'Convention on Biological Diversity, 1992'. However before focusing on CBD, 1992, the following section briefly conceptualizes the term 'biodiversity conservation'.

1.III.a Understanding 'biodiversity conservation'

The concept of 'biodiversity conservation' is a combination of two terms 'biodiversity' and 'conservation'. We have already defined the term biodiversity in the above section. The term conservation is a process for the protection and preservation of natural resources that exist on earth. It is a universal practice/process in the human societies/cultures to alter their surroundings in order to compete and survive. It is a form of socioscientific process that integrates the methods/techniques/processes/practices of both natural and human/social sciences. As a socioscientific process, the conservation aims at altering the attitude and behaviour of human beings on the protection and sustainable use of the various forms of living organisms on the earth. Thus, the term conservation is used as a 'generic' term for any act of protecting natural environment, or behaviour that promotes the sustained well-being of bioresources and ultimately binds nature-society relationship (O'Riordan 2002).

The concept of 'conservation of biodiversity'/'biodiversity conservation' together refers to the protection/promotion and sustainable use of the biological resources. The conservation of biodiversity involves/integrates various methods (*in-situ* and *ex-situ*) and

practices/process (bottom-up, top-down, participatory) of the natural scientists, social scientists. It also involves several actors from grassroots levels to the international levels: local communities, civil society-based organizations (NGOs), national agencies and international agencies. According to the CBD, 1992 the dominant objectives of conservation of biodiversity are: conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of the benefits. The present section characterizes the conservation biodiversity into four categories: conservation as a scientific process; conservation as a sociocultural process; conservation as a process of (sustainable) development; and conservation as a form of social movement.

(i) Conservation as a scientific process

The practice of conservation as a systematic effort has been started in natural sciences. Conservation as a scientific process has been developed in 1980s with the emergence of the discipline of Conservation Biology. The discipline of 'conservation biology', an independent scientific specialty of human creation, has emerged in the 1980s to apply scientific practices to the protection of species, which are threatened or on the brink of extinction. Unlike other fields in biology, the core mission of conservation biology, according to David Ehrenfeld (1995), is to 'preserve sustainable assemblages of as much of the earth's biodiversity as it is possible to save'.

(ii) Conservation as a sociocultural process

The process of conservation is sociocultural in nature. It is socially/culturally founded in human society (O'Riordan 2002). Hence, it is closely related to social sciences. As Alcorn (1994) states:

> While proof of conservation success is ultimately biological, conservation itself is a social and political process, not a biological process. An assessment of

conservation requires therefore an assessment of social and political institutions that contribute to, or threaten, conservation'[15].

The practice/operation of conservation mostly occurs in a sociocultural context. The local/traditional communities have been conserving the biodiversity based on their local/traditional/indigenous knowledge systems, which have been acknowledged by the CBD, 1992. The local/traditional conservation practices are embedded in local institutions and transmitted culturally from generation to generation (Toledo 2001). According to Toledo (2001), the practices are generally site and context specific in nature.

In contemporary society, the process of conservation (especially after World War II) has marked two major changes. The first is a shift of focus from a 'species' to an 'ecosystem'. The second change is associated with 'human factor' that has been neglected in earlier practices of conservation. Now-a-days, the conservationists are increasingly focusing the integration of the methods of natural science and the practices of the cultural/social social science especially 'social relationships' in the process of conservation of biodiversity (Meine 2001).

(iii) Conservation as a process of development

The process of conservation is clearly understood as development. As a process of development, conservation is understood as a defense against the gradual depletion of total stock of bioresources. The objective of 'biodiversity conservation' emphatically announces the conservation and sustainable development of bioresources for current and future generations. The process of conservation, according to *Global Biodiversity Strategy* (World Resources Institute, World Conservation Union, and United Nations Environmental Programme 1992) refers to:

[15] Adapted from V. M. Toledo, 'Indigenous Peoples, Biodiversity and' in Simon Asher Levin (ed) *Encyclopedia of biodiversity* (California: Academic press, 2001,) pp. 451-463].

> The management of human use of the biosphere so that it may yield the greatest sustainable benefit to current generations while maintaining its potential to meet the needs and aspirations of future generations: thus conservation is positive, embracing preservation, maintenance, sustainable utilization, restoration, and enhancement of the natural environment'.

Thus, the concept of biodiversity conservation is closely linked to the idea of sustainable development[16], which has commonly negotiated/declared at the World Commission on Environment and Development in 1987. The outcome of the WCED, 1987 in the form of a policy document *Our Common Future* (1987) clearly delineates conservation as 'the sustainable use of natural resources for human benefit, without compromising the interests of future generations'. Thus, conservation of biodiversity is linked to the concept of sustainable development.

(iv) Conservation as a form of social movement

Conservation is also considered as a form of social movement that aims at changing the attitudes and perceptions of the human beings towards the conservation and sustainable use of the various components of bioresources. It is an act and a thought process that led to the continuity of various life-systems on the earth. According to Timothy O'Riordan (2002), the process of conservation, as a form of social movement, takes four main manifestations: the preservation movement, the eco-management movement, precautionary approach, and direct action. The supporters of the preservation movement advocate for retaining the status quo in the protection of particular ecosystems, cultural heritage, or modes of living. In fact, the basic objective of this movement is to protect habitats, ecosystems, or natural processes that are critical for the healthy functioning of various life forms on the earth. Based on utilitarian approach, the eco-management

[16] Sustainable development refers to the idea of development that 'meets the needs of the present without compromising the ability of future generations to meet their own needs'. Quoted from: World Commission on environment and Development, *Our Common Future*, (WCED, 1987).

movement seeks to 'maximize the value of natural resources yet leave them sustainable for future use'. The precautionary approach on conservation of biodiversity mainly focuses on rules and regulations for its persuasion. It believes in a society that is more eco-centric than techno-centric in nature. The direct action is characterized by a more common form of conservation that accentuates the civic networking of individuals and organizations/institutions towards the protection and sustainable use of bioresources. Hence, conservation of biodiversity is a form of social movement. However, the current study considers the conservation of biodiversity as a form of sociocultural process and a form of (sustainable) development. It is based on these two forms/features of biodiversity conservation.

1.III.b Conservation of biodiversity: a short historical account

The processes and practices of conservation of biodiversity – considered as one of the significant slogans of environmental discourse in recent years – is not new to human civilization. As Craig W. Allin (1995) says 'from time immemorial, aboriginal cultures around the world developed taboos that served conservation purposes, and wildlife reserves are known to have been established more than a thousand years ago'. The (re)discovery of the processes of conservation of biodiversity, in present times, could be traced back to the cultural practices of the indigenous peoples as these peoples, proved by the scientific evidences, virtually inhabited, modified, manipulated, and finally maintained the bioresources on the earth (Toledo 2001).

The indigenous/traditional people who live in about seventy-five of the world's 184 countries are basically referred as tribal, aboriginal, national minorities, or the first people of the earth (Toledo 2001)[17]. These people are the originals or oldest inhabitants

[17] Victor M. Toledo has outlined seven criteria for understanding of indigenous peoples. The seven criteria are: (i) descendants of the original inhabitant of a territory; (ii) 'the ecosystem peoples' who are referred as shifting or permanent cultivators, herders, hunters and gatherers, fishers, or handicraft makers; (iii) carrying out small-scale, labour intensive form of rural production; (iv) followers of 'consensus-based decision making process'; (v) adherents

of an area or region, or who have lived in a traditional homeland for many generations. Recognizing the inhabitants and the importance of indigenous peoples, V. M. Toledo (2001) calculates the percentage of this population of selected countries: Papua New Guinea (77 per cent), Bolivia (70 per cent), Guatemala (47 per cent), Peru (40 per cent), Ecuador (38 per cent), Myanmar (33 per cent), Laos (30 per cent), Mexico (12 per cent), and New Zealand (12 per cent). These indigenous peoples occupy a substantial share of the world's little disturbed tropical and boreal forests, mountains, grasslands, tundra, and desert, along with large stretches of coastline and nearshore waters (including mangroves and coral reefs) (Durning 1993). The importance of indigenous territories to biodiversity conservation is therefore evident.

These communities control enormous areas of natural resources. On a global scale it is estimated that the total area under indigenous control probably reaches between 12 and 20 percent of the earth's land surface (Toledo 2001). The cultural diversity of these indigenous societies is closely linked to the conservation of biodiversity. As literature suggests, the cultural properties of indigenous societies – language, ideas, beliefs, customs, institutions, technologies, religious practices and ceremonies – provide resource towards the protection of biodiversity (McNeely 2001; Toledo 2001). These societies treat nature as a fundamental source that nurtures, nourishes and navigates the actions and interactions of indigenous people (Toledo 2001). Thus, this deep bond between the cultural diversity as well as the biodiversity of indigenous societies facilitates the perception that the natural world as well as the social world is intrinsically linked.

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of common language, religion, moral values, beliefs etc.; (vi) Possessors of nonmaterialist attitude towards natural resources; and (vi) Conquerors of a dominant culture and society. V. M. Toledo, 'Indigenous peoples, biodiversity and' in S. A. Levin (ed.) *Encyclopedia of Biodiversity* (San Diego: Academic Press, 2001).

In contrast to the indigenous/traditional/pre-modern nature of conservation, the modern form of conservation has emerged during eighteenth century due to the global spread of European technology (Allin 1995). In fact, the beginning of the modern form of conservation is closely related to the materialization of Enlightenment and its impact on the processes and practices of conservation. As Allin (1995) points out, 'the Enlightenment believed people could improve themselves by improving nature, offering a programme of progress through science, technology and industry'. The dominant feature of the Enlightenment is that human progress and development is premised on the effective exploitation of the natural resources. The nature has been seen as a collection of means for human ends, raw materials for the factories, machines and new productive technologies which were certainly created (Barry 2000). In addition, the science has been developing new insights in the processes of production, and in conjunction with technology provides more effective ways in which individuals could exploit nature. In this context, it could be premised that the natural resources or the biodiversity has become 'disenchanted' (Barry 2000). That is, whereas once the nature or natural resources were variously seen as 'enchanted' or permeated with spiritual significance – as in Hinduism where certain natural objects symbolizes as the God's creation – with the effect of Enlightenment, especially the Industrial Revolution, the natural environment has transformed and reduced to a storehouse of raw materials for individuals economic purposes (Barry 2000). Thus, the 'conservation for development' during the Enlightenment era has started to exploit the biological resources for the socioeconomic development of the individuals.

As a conscious goal of human society, the conservation of biodiversity has emerged only in twentieth century especially after the World War II. The post-War years that provide freedom to the colonial nations have started to initiate international efforts in

conserving biodiversity. Several nations and international organizations started to assemble together to (re)think measures that safeguard the issues relating to conservation of biodiversity. One such major initiative was the establishment of International Union for the Protection of Nature (now known as the World Conservation Union) in 1948. The dominant objective of this international Union is to preserve the entire world's natural resources or biological resources. In 1978 the Union has declared the establishment of 'protected areas'. It has devised eight categories of protected areas in the processes of conservation and development of biodiversity (see Table 1.2).

Table 1.2
IUCN categories and conservation objectives

Category	Name	Conservation objectives
I	Scientific reserve/strict nature reserve	To protect nature and maintain natural processes in an undisturbed state to permit scientific study, environmental monitoring, education, and the maintenance of genetic resources
II	National park	To protect natural and scenic areas of national or international significance for scientific research, education and recreation
III	National monument/ natural landmark	To protect and preserve nationally significant natural features because of their special interest or unique characteristics
IV	Managed natural reserve/ wildlife sanctuary	To protect nationally significant species, groups of species, biotic communities, or physical features of the environment where these require human manipulation for their perpetuation
V	Protected landscape	To maintain nationally significant natural landscapes that are characteristic of the harmonious interaction of man and land while providing opportunities for public enjoyment through recreation and tourism
VI	Resource reserve	To protect natural resources for future use and to prevent or contain development activities that could affect the resource pending the establishment of further management objectives
VII	Natural biotic area/ anthropological reserve	To allow the way of life of societies living in harmony with the environment to continue undisturbed by modern technology
VII	Multiple-use management area/managed resource area	To provide for the sustained production of water, timber, wildlife, pasture, and outdoor recreation

Source: B. S. Orlove and S. B. Brush, 1996, 'Anthropology and the conservation of biodiversity'. *Annual Review of Anthropology*. Vol. 25, pp. 329-52.

To exemplify a few more initiatives could be: International Plant Protection Convention (IPPC), Rome, 1951; the World's Parks Congress, Seattle, 1962; the Convention of Wetlands of International Importance Especially as Waterfowl Habitat (CWIIWH), Ramsar, 1971; the Convention Concerning the Protection of the World Cultural and Natural Heritage (CCPWCNH), Paris, 1972; the United Nations Conference on the Human Environment (UNCHE), Stockholm, 1972; the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Washington, 1973; the Convention on the Conservation of Migratory Species of Wild Animals (CCMSWA), Bonn, 1979; the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), 1980; the FAO International Undertaking on Plant Genetic Resources (FIUPGR), Rome, 1983; the International Tropical Timber Agreement (ITTA), Geneva, 1983; the United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 1992; the World Summit on Sustainable Development, Johannesburg, 2002 and so on.

Among international gatherings, the 1972 Stockholm conference, however, provided an immediate attention on the importance of environment (both natural and manmade), which had influenced a gradual thinking on the conservation of bioresources in subsequent years. As a result, after two decades of Stockholm conference, the 'biodiversity conservation' in a structured manner was addressed at Rio, 1992. Since 1992 Rio Conference, the conservation of biodiversity has been regularly focused in almost all international gathering on environmental issues; the World Summit on Sustainable Development, 2002 at Johannesburg could be a classic example. Hence before analyzing straightway to the 1992 Rio Convention on Biological Diversity, it is important to draw an understanding on the three major world gatherings – Stockholm, Rio de Janeiro, and Johannesburg – and their major agendas.

The deliberation of the Stockholm conference was from 5 to 16 June 1972. Based on the sole motto of 'Only One Earth', the treaty was premised upon the need for a common outlook and for common principles that would inspire and guide the peoples of the world in the preservation and enhancement of the human environment. As the first major international event, the Stockholm conference was mainly focused on the protection and development of human environment - both natural and manmade. Principle 21 of the Declaration has special significance. It states that the states have the responsibility to ensure activities within their jurisdiction, which do not cause damage to the environment beyond their own jurisdiction. To quote the Principle 21 of the Declaration of Stockholm conference: 'states have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction'. Thus, it recognized the sovereign right of the state over its environment. As an outcome of the Conference, the United Nations Environment Programme (UNEP) was established at Nairobi to act as a catalytic instrument to promote the outcomes of the conference.

After two decades of the Stockholm conference, Rio Conference or the UN Conference on Environment and Development (UNCED) or the Earth Summit was held in June 1992 in Rio de Janeiro, Brazil. The conference has produced at least seven major achievements: the Rio Declaration on Environment and Development (containing 27 principles); Agenda 21 - a blue print for environment and development into the 21st century; The United Nations Framework Convention on Climate Change (UNFCCC); the Convention on Biological Diversity (CBD); the Commission on Sustainable Development (CSD); Agreement to Negotiate a World Desertification Convention; and

the Statement of Principles for the Sustainable Management of Forests. This Earth Summit has provided a forum to address issues of both environment and development, and to highlight differences in perspective between the North and South.

The Johannesburg Declaration on Sustainable Development was held from 2-4 September 2002. The representatives have collectively affirmed to achieve sustainable development. The Summit declares a "collective responsibility to advance and strengthen the interdependent and mutually reinforcing pillars of sustainable development - economic development, social development and environmental protection - at local, national, regional and global levels". The Summit also focuses on the indivisibility of human dignity and is resolved through decisions on targets, timetables and partnerships to speedily increase access to basic requirements such as clean water, sanitation, energy, health care, food security and the protection of biodiversity. At the same time, the representatives affirm to work together to assist one another in order to have access to financial resources, benefit from the opening of markets, ensure capacity building, use modern technology to bring about development, and make sure that there is technology transfer, human resource development, education and training to banish forever underdevelopment, global consensus and partnership. The Summit reaffirms its commitment to the Stockholm Agenda 21 and Rio Programmes for achieving sustainable development.

1.III.c Convention on Biological Diversity (CBD), Rio de Janeiro, 1992

The Convention on Biological Diversity (CBD) came to the fore for signature at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in June 1992[18]. It entered into force on 29 December 1993 and currently has 191

[18] The World Conservation Union, currently known as IUCN elaborates the goal of CBD, 1992 as 'The Convention on Biological Diversity … should serve as a key coordinating, catalyzing, and monitoring mechanism for international biodiversity conservation. It will also be the primary means of establishing accepted international norms for biodiversity conservation. Although current international agreements

parties and 168 signatures. The subject of discussion of this world meeting was 'environment and development'. Another central agenda of the conference was the Convention on Biological Diversity, 1992. Each of the nations was represented by its negotiating team, and much of the focus was upon the division between the materially richer countries of the North and the more biodiversity-rich countries of the South. Also present were many non-governmental organizations representing a wide range of interest groups: animal rights, indigenous peoples' rights, conservation groups etc.

(i) The evolution of the Convention

Broadly three factors brought the agreement of CBD, 1992 into fore. First, there was an urgent need of conserving the natural habitats or tropics, which are situated in the South. Second, there was an increasing demand of the South for additional resources for conservation of bioresources. Third, as a sharp contrast to the domination of western scientific knowledge system, there was also the demand of an equal respect of their traditional knowledge systems for resource management (Kothari 1997). By taking these factors into account, the origin of the negotiations for the CBD, 1992 was discussed in the 1987 Governing Council decision 14/26 of the United Nations Environment Programme (UNEP), which called upon UNEP to convene an Ad Hoc. In 1988, UNEP set up an Ad Hoc Working Group of Experts on Biological Diversity to look into the harmonization of existing conventions related to biological diversity. At its first meeting, the Group of Experts agreed on to elaborate an internationally binding instrument on biological diversity. In May 1989, another Ad Hoc Working Group of Experts on Biological Diversity was established to prepare an international legal instrument for the conservation and sustainable use of biological diversity, taking into account the need to

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cover some elements of biodiversity conservation, taken together they do not cover all the world's threatened biodiversity, and they do not adequately address the closely related issues of use, ownership, funding, and technology transfer' [IUCN, UNEP and in consultation with FAO and UNESCO, *Global Biodiversity Strategy: Guidelines for Action to Save, Study, and Use Earth's Biotic Wealth Sustainably and Equitably*, 1992].

share costs and benefits between developed and developing countries and the ways and means to support innovation by local people (Kothari 1997). The Ad Hoc Working Group, which in February 1991 became the Intergovernmental Negotiating Committee (INC), held seven working sessions (five negotiating) which culminated in the adoption of an agreed text of the Convention on Biological Diversity through Nairobi Final Act of the Conference for the Adoption of the Agreed text of the Convention on Biological Diversity.

(ii) Central goals and commitments

The fundamental purpose of the CBD has been enshrined in Article 1 of the document that reads as:

> The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

Hence the dominant objective of the Convention is based on three broad themes:

- The conservation of biological diversity;
- The sustainable use of biological diversity;
- The equitable sharing of the benefits of such use.

The manifestations or the systematic accomplishments of these objectives have been mentioned in several articles of the document. The document comprises of 42 articles and two annexes. The first few articles deal with general principles, definitions (for terminological clarifications), and scope of the CBD. The focal part of the Document, articles 5 to 17, deals with various aspects of biodiversity: identification and monitoring; conservation in natural or human-modified surroundings; rational or

sustainable use, creation of awareness, impact assessments, access to genetic material, safeguarding of relevant traditional knowledge and practices, benefit-sharing of resource use, and exchange of information and technology between countries. The remaining articles declare about the institutional structure, and other related provisions for operationalizing the objectives.

(iii) Conservation and sustainable use: principles and prerequisites

The Preamble of the Convention states that the parties 'need to develop scientific, technical, and institutional capacities' for the planning and implementation of appropriate measures. In fact, the CBD advocates that the states should develop their respective national strategies, plans or programmes or should adapt the existing strategies in line with the Convention for the conservation and sustainable use of biodiversity. Focusing on the methods of conservation, the CBD emphasizes on both *in-situ* and *ex-situ* conservation techniques. As a part of the *ex-situ* conservation, the states should 'adopt measures for the recovery and rehabilitation of threatened species and for their reintroduction into their natural habitats under appropriate conditions' (Article 9(c), CBD 1992).

However, so far as *in-situ* conservation method is concerned, the CBD, 1992 again focuses/supports application of the so-called modern parks and protected areas. In fact, it highlights that the states should engender the expansion of more of parks and protected areas. Thus, as a part of obligation, each state must establish a system of parks and protected areas (Article 8(a) and must promote development policies in, around, and outside of protected areas that will contribute to the conservation of biodiversity (Article 8(c), CBD 1992). To quote some sections of Article 8 of the Convention:

> Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity.

> Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity.
>
> Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use.

The Convention has very diplomatically handled the issue of local communities. It has emphatically recognized the role of local communities in the areas of significant biodiversity. To quote the Preamble of the Convention:

> The contracting parties … Recognizing the close and traditional dependents of many indigenous and local communities embodying traditional lifestyles on biological resources, and the desirability of sharing equitably benefits arising from the use of traditional knowledge, innovations and practices relevant to the conservation of biological diversity and the sustainable use of its components.

In this contest, it is interesting to locate similar crucial clause of the Article 8(j), which reveals that indigenous and traditional populations have had at their disposal for protecting and promoting their rights relative to those of the State and civil society at large. To quote:

> Subject to its national legislation, respect, preserve and maintain knowledge, innovations, and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourages the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices.

Thus three important thrusts are present in the above: respect for traditional systems, seeking their consent for the wider use of these systems, and ensuring that the resulting benefits are shared equitably with them. In order to practice these principles at ground reality, we need a set of legal, administrative, and institutional arrangements, which have

been hardly focused in the Convention. Furthermore, it is very interesting to note the intention of the Convention. On the one hand, the Convention emphasizes on strengthening of western notion of parks and protected areas wherein the local communities and their customary rights over the resources would be thrown out. On the other hand, although the Convention underlines 'to protect and encourage customary use of biological resources in accordance with the traditional cultural practices that are compatible with conservation or sustainable use requirements'; it has not explicitly mentioned the rights of the local people in areas to be conserved for biodiversity. Hence it is very exciting to see how successful 'local people' are in using the Convention, which not only restructures their relations with the nature but also their socioeconomic relations as well. With this global concern for biodiversity conservation, the following section clearly discloses the trajectory of biodiversity conservation with specific reference to India.

1.IV Conservation of Biodiversity in India

In response to this international effort, the contracting parties are gradually amending and reformulating their national policies and programmes towards the conservation and management of biodiversity. In this context, India as a signatory to CBD, 1992 is not an exception. After a decade of the CBD's implementation, India has revised, reformulated and finally implemented her national legislation in 2002. In fact, the Government of India has explicitly enacted the Biological Diversity Act, 2002 in accordance with the CBD, 1992. However, prior to BDA, 2002, several initiatives have been carried for conserving biodiversity (see Table 1.3) (refer chapter four for details).

Table 1.3
Indian biodiversity conservation initiatives

Year	Conservation initiatives
1865	Indian Forest Act
1878	Indian Forest Act

1879	Elephant Protection Act
1887	Wild Birds and Animals Preservation Act
1894	Forest Policy
1897	Indian Fishery Act
1927	Indian Forest Act
1936	National Park Act
1952	National Forest Policy
1972	Wildlife (Protection) Act
1980	Forest Conservation Act
1986	Environment (Protection) Act
1988	National Forest Policy
1990	National JFM Guideline
1996	Panchayat (Extension to the Scheduled Areas) Act
2000	National JFM Guideline

Source: K. Sarap, 2007, 'Forests and Livelihoods in Orissa' in O. Springate-Baginski and P. Blaikie (eds.) *Forests, People and Power: The Political Ecology of Reform in South Asia*. London: Earthscan.

The dominant objectives of BDA, 2002 are to promote conservation of biodiversity, sustainable use of the bioresources and equitable sharing of benefits. The central provisions of the Act are: emphasizing on the participation of local communities in the use of their resources and knowledge; recognizing on the indigenous or traditional knowledge, through appropriate laws or other measures such as registration of such knowledge. With this in view it provides for the establishment of National Biodiversity Authority, State Biodiversity Boards and Biodiversity Management Committees at national, state and grassroots levels respectively.

In order to operationalize the provisions of the BDA, 2002, the Ministry of Environment and Forest, Government of India has legislated Biological Diversity Rule in 2004. The BDR, 2004 primarily deals with provisions relating to the establishment and functioning of NBA, SBB and BMC. So far as local communities are concerned, the BDR, 2004 strongly recommends the constitution of BMC at the village level for the purpose of promoting conservation, sustainable use and documentation of biodiversity in the concerned locality. Another important function of BMC is to prepare People's

Biodiversity Register, a document that records the diversity of species such as flora, fauna, crops, livestock so on and so forth of a particular locality.

Thus, a conscientious contemplation of the conservation of biodiversity in India, as envisaged in CBD, 1992, has in recent years characterized two fundamental features. First, the processes and practices of conservation in India emphatically advocate the importance of the local or the village communities as well as their knowledge, innovation and practices related to conservation and sustainable management of biodiversity. Second, the conservation paradigm in India has also gradually adopted a participatory model of conservation that integrates government institutions at the one hand, and the local communities (as well as the NGOs) on the other hand.

1.V Vanaspati Vana Project in Orissa

In recent years, one such experiment is operating under the banner of Vanaspati Vana Project (VVP) at Gandamardan hills RF of Bolangir and Bargarh districts situated in western tract of Orissa, India. The project has been funded by the Ministry of Family Welfare, Government of India, India. The dominant objective of the VVP is to undertake the task of promotion, conservation and sustainable management of the biodiversity of medicinal plants. To operationalize this crucial objective at ground reality, the VVP has formed several groups in the form of 'resource conservation groups' at grassroots levels. Furthermore, based on JFM model, these community-resource conservation groups have been functioning by performing 'community collective action' on the one hand and 'collaborative networking' with the Forest Department in order to achieve the target objectives of the VVP.

1.VI Research questions

Based on the literature cited in above sections, the present study raises the following research questions relating to the theory of social capital and the conservation of

biodiversity in general and conservation of biodiversity of medicinal plants in particular.

The major questions are:

1. How do the process of social capital formation – bonding, bridging and linking – provide in understanding the participatory conservation of biodiversity of medicinal pants?

2. How do the intra and inter community levels of social capital facilitate the collective conservation actions of the communities and the government (forest) department?

3. What are the major components of Vanaspati Vana Project in accomplishing the agenda of conservation of biodiversity of medicinal plants?

4. How do the synergetic relations – as guided by the social capital framework – between the village community and the forest department and their dynamic interaction work in tandem in the interest of conservation of biodiversity of medicinal plants?

5. What are the factors that influence the formation and erosion of social capital, which ultimately determine the participatory conservation at grassroot level?

1.VII Objectives of the Study

The central focus of the study revolves around the following objectives:

- To review the development of social capital framework and its applicability in understanding biodiversity conservation;

- To review the major principles and practices as well as the institutional arrangements in conserving biodiversity with specific reference to India;

- To understand the methods adopted by the Vanaspati Vana Project in the process of conservation of biodiversity of medicinal species;

- To systematically use social capital theory as a guiding framework to understand the actors and institutions involved in the conservation and sustainable development of biodiversity conservation and the dynamic interaction among them; and

- To explain the factors influencing the formation and erosion of social capital and its corresponding impact on the processes of participatory conservation at grassroot level.

1.VIII Argument of the study

The participatory conservation process is linked to social capital framework in the sense that social capital is an antecedent variable and participatory conservation is a consequent variable.

CHAPTER - II

Methodology of the Study

Based on the perspective of sociology of development especially its latest theoretical framework i.e. social capital, the present study attempts to understand the role of community-level biodiversity conservation and development committees (CBCDCs) in the processes of conservation and sustainable development of the biodiversity of medicinal plants. The department of forest acts as a facilitating agency in operationalizing the objectives of the VVP in Gandhamardan hills RF of Orissa.

2.I Location of the Study

The empirical investigation has been conducted in and around Gandhamardan hills reserved forest. It is because the VVP has been implemented in and around the Gandhamardan hills RF. Situated in the western tract of Orissa, Gandhamardan RF comes under the territorial jurisdiction of Harishankar range (Balangir [west] forest division) of Balangir district and the Nrusinghanath range (Bargarh forest division) of Bargarh district of Orissa. Hence, the study has been conducted in two districts of Orissa i.e. Balangir and Bargarh. The study is based on fourteen CBCDCs of Harishankar range and Nrusinghanath range.

2.II Methodology

The study is primarily focused on *in-situ* conservation component of the VVP. For this purpose, the VVP has formed twenty-five CBCDCs in both Harishankar range and Nrusinghanath range that come under the Balangir and Bargarh districts of Orissa respectively. These twenty-five CBCDCs have been spread in twenty-five village communities. Out of these twenty-five CBCDCs, the present study has purposively selected fourteen CBCDCs: six from Harishankar range and eight from Nrusinghanath

Range. The six CBCDCs of Harishankar range are Mahulpali, Kandravata, Kuthurla, Dudumdarh, Nuapali and Sapmund that come under the gram panchayats of Nandupala and Rengali of Khaprakhol block of Balangir district (see table 2.1). Similarly, the eight CBCDCs of Nrusinghanath range are: Rasmunda, Georgegarh, Laudimal, Manbhang, Majhipali, Magurmal, Kuradhiphasa and Lergaon that come under the gram panchayats of Bhengrajpur, Paikmal and Mithapali of Paikmal block of Bargarh district (see Table 2.1).

Table2.1
The location of the sample villages

SL. NO.	**Name of CBCDCS**	**No. of households**	**Gram Panchayat**	**Block**	**Area Allotted**
1	Mahulpali	21	Nandupala	Khaprakhol	100 ha
2	Kandravata	43	Nandupala	Khaprakhol	100 ha
3	Kuthurla	78	Nandupala	Khaprakhol	100 ha
4	Dudumdarh	62	Nandupala	Khaprakhol	100 ha
5	Nuapali	24	Nandupala	Khaprakhol	100 ha
6	Sapmund	38	Rengali	Khaprakhol	100 ha
7	Rasmunda	42	Bhengrajpur	Paikmal	75 ha
8	Georgegarh	178	Paikmal	Paikmal	300 ha
9	Laudimal	98	Mithapali	Paikmal	50 ha
10	Manbhang	46	Mithapali	Paikmal	100 ha
11	Majhipali	55	Bhengrajpur	Paikmal	75 ha
12	Magurmal	25	Bhengrajpur	Paikmal	75 ha
13	Kuradhiphasa	77	Mithapali	Paikmal	100 ha
14	Lergaon	63	Bhengrajpur	Paikmal	75 ha

These fourteen village-level CBCDCs consist of eight hundred and fifty (850) households.

The VVP has approved a total area of 3000 hectares of Gandhamardan hill RF for the purpose of *in-situ* conservation in both the ranges of Harishankar and Nrusinghanath. Out of these 3000 hectares of RF area, the VVP has distributed 1450ha of reserved forest area among these fourteen village-level CBCDCs for the purpose of *in-situ* conservation of medicinal plants in Gandhamardan hills RF. Six hundred hectare (600ha) of reserved forest area has been allotted to the above-mentioned six CBCDCs of Harishankar range.

Similarly, eight hundred and fifty hectare (850ha) of reserved forest are has been allotted to the above-mentioned eight CBCDCs of Nrusinghanath range. Thus, the study has been conducted 1450ha of Gandhamardan hills reserved forest area for the purpose of *in-situ* conservation, which has been distributed to fourteen CBCDCs of Harishankar and Nrusinghanath range that come under Balangir and Bargarh districts of Orissa.

The study has been carried out in three phases. The first phase i.e. 'pilot study' has been conducted during November-December, 2006 to gain an understanding about the operation of VVP as well as the socioeconomic profile of the study area. The second phase of field study has been undertaken during June-October, 2007. During this phase, critical attempts have been made to understand the socioeconomic structure of these fourteen village communities and the functioning of VVP especially its various components in the processes of conservation and sustainable development of biodiversity of medicinal species. The third phase has been conducted in October-November, 2008 to gather update information relating to the functioning of the VVP.

The study is explanatory in nature. Based on the theory of social capital, the study attempts to explain the operation of VVP and its various components in the processes of conservation and sustainable development of biodiversity of medicinal plants. It also explains the level of participation of the members of the CBCDCs/village communities on the one hand, and the interaction between the village community and the forest department on the other in the process of collective conservation of biodiversity.

2.III Sources of data

The study is primarily qualitative in nature. For this purpose, primary data have been collected from the members of the executive committee of the CBCDCs, the general body of CBCDC report card and the in-charge forest officials. The study has collected four categories of primary information. Initially, the researcher had tried to collect the

detailed socioeconomic information of these village communities from the panchayat/block offices. However, the researcher could not get accurate information about these villages. As a result, the researcher was compelled to begin a census study to understand the socioeconomic and occupational structure of these fourteen village communities that comprise eight hundred and fifty households. This is the first category of primary data of the present study.

Table 2.2
Sources of primary data

Sl No.	Sources of Primary Information	Total Numbers
1	Census study	850 households
2	Focused Group Discussions	58 (08-12 members)
3	General Body Report Cards	54 individuals
4	In-charge Forest Officials	Divisional Forest Officers – 02, Range Officers – 02 Foresters - 05

The second category of primary data has been collected from the executive committee (EC) members and general body members of the CBCDC based on focused group discussion. The EC is the representative body of the CBCDC at the village level. The EC also plays a crucial role in the operation of various activities of the VVP. They are also accountable to the CBCDCs in undertaking various tasks of the VVP. Hence, it is important to understand the perception, attitude, democratic functioning and networking of the EC members in the context of functioning of VVP in Gandhamardan hills RF.

The third category of primary information has been collected from the knowledgeable persons from the CBCDCs-based village communities in order to know the efficiency of the EC members as well as the local forest officials involved in functioning of VVP. Hence, these persons are considered as general body of CBCDCs report cards on the nature of functioning of the office-bearers of CBCDCs and the in-charge forest officials. This village-level general body of CBCDC report card has

collected information from certain male populations of the CBCDCs villages. The women are only considered as the object of human-labour. They do not know about various components of the VVP. Hence, the general body of CBCDC report card information has been only collected from the male members of the CBCDC villages.

The fourth category of primary information has been collected from the local forest officials who are in-charge of the functioning of the VVP at the Harishankar and Nrusinghanath range of the Balangir (west) forest division and Bargarh forest division respectively. Hence, the study has collected information about the functioning of VVP from divisional forest officers of both the divisions, the range officers of both the ranges and the in-charge foresters.

That apart, the secondary sources of information have been collected from articles, books and conference proceedings relating to the focus/demand of the current study. Also, government orders, policy documents and appraisal report have also formed secondary source of information for the present study.

2.IV Tools and techniques of data collection

The tools that have been used to collect the empirical data are structured interview schedule and an extended interview guide. The structured interview schedule has been used for census study to collect households' information at the village/community level. An extended interview guide has been used for personal interviews and group discussion. The techniques adopted in the collection of the primary data are mainly community level face-to-face interviews from the general body members of CBCDCs and in-charge forest officials; and the focused group discussions with the general body members and executive committee members of the CBCDCs. The focused group discussion has gained prominence as a technique in qualitative research methodology, particularly in action research.

2.V Unit of analysis

The unit of analysis of the present study is CBCDCs. The source of primary data of these CBCDCs is the executive committee and general body members of CBCDCs. The executive committee of each CBCDC is consisting of 10-15 members. In addition, the response of the members of general body of CBCDCs i.e. general body report card has been qualitatively described. Based on the perspective of sociology of development especially its latest theoretical framework i.e. social capital, the present study attempts to understand the action and interaction among the members of the CBCDCs and also between the members of the CBCDCs and the in-charge forest officials in the processes of participatory conservation and sustainable development of biodiversity of medicinal plants.

2.VI Structure of the study

The present study is structured in six chapters. The Inaugural chapter, *Introducing the Problem of Study,* introduces the background, conceptual understanding, theoretical framework, research questions and objectives of the study. In general, it lays out a foundation for the ensuing chapters of the study. The second chapter, *Methodology of the Study*, mentions about the methods and techniques, location and sources of information for the present study. The third chapter, *Understanding Social Capital*: *A Framework for Biodiversity Conservation*, attempts to understand the social capital framework: elements, processes, forms and levels in understanding the conservation of biodiversity. *Conservation of Biodiversity in India: Major Practices and Policy Frameworks*, the fourth chapter, deals with the conservation of biodiversity with specific reference to India.

The fifth chapter, *Gandhamardan Hills Range: The Locus of Medicinal Plant Species*, mainly focuses on the socioeconomic and occupational structure of the study

area. The sixth chapter, *Social Capital and Vanaspati Vana Project in Orissa: Communities, Connectedness and Conservation*, mainly unearths the findings and analysis of social capital in relation to the functioning of VVP at grassroots levels. The seventh chapter, *Summary of Findings and Conclusion*, concludes the study with some concluding statements and policy recommendations. It also highlights some areas for further research.

CHAPTER – III

Understanding Social Capital: A Framework for Biodiversity Conservation

Social capital is the 'resource' that has roots in the norms and social relations embedded in the social structures of societies that enable people to coordinate action in order to achieve desired goals (Borgida, Sullivan, Oxendine, Jackson, and Riedel 2002). The coordinated action is based on trust in others that facilitates networking, produces coordinated activity to achieve shared goals (Coleman 1988 and 1990; Halpern 2005; Putnam 2000). Trust-based participation is said to have significant effects in the area of civic engagement and in those institutions where governance is rooted in broad-based participation (Putnam 1993). In this context, social capital, defined in terms of a certain type of social structure and a set of norms, can be accumulated by encouraging the formation of community level CBCDCs, especially among the resource-dependent communities who are living in and around the biologically rich areas. This cohesively creates networked groups with increased bargaining power to deal with the public agencies as well as market and access to information, technology and know-how towards biodiversity conservation.

During late 1990s, an increasing number of scholars have taken interest to study processes of conservation and management of natural resources/biodiversity and its development especially in the third world countries. They have been using 'social capital' as a 'theoretical framework'/'frame of analysis' to explain the success and failure of various conservation-led development projects. Reflecting upon this continued focus on the social capital and the conservation of biodiversity, the present study critically examines this theoretical paradigm as an 'analytical framework' (experimented in chapter six) in understanding the joint venture of the community-based conservation

groups (CCGs) or the community-based biodiversity conservation and development committees (CBCDCs) and the forest department for conservation and sustenance of biodiversity. The present chapter attempts to make sense of the conceptual contours of 'social capital' as it has immensely influenced the study and practices of contemporary conservation in India and beyond. The chapter explores the emergence of social capital as a form of micro-sociological theory, the way it shapes and reconstructs the current academic and sociopolitical discourse, the way it redefines the relationship between individual and society, the way it contributes to the discussion of community participation in/and conservation of biodiversity.

3.I Understanding social capital

Since the middle of the 1990s, the search for an alternative conceptual model for a meaningful understanding of the processes and practices of participatory development has led to the making of the phrase called 'social capital'. The credit for the development and popularization of the model goes to the works of three most seminal figures, namely Pierre Bourdieu, James Coleman and Robert D. Putnam. Pierre Bourdieu advanced the notion of social capital as a conceptual tool to integrate two conflicting theories of social action: economism and semiologism (Karner 2000). Economism diminishes the value of social exchanges by prioritizing economic transactions in which individuals pursue their own self-interest with a trivial emphasis to social situation; whereas semiologism accentuates social exchanges of communicative acts by downplaying the economic factor. The perspective of social capital mediates these contradictory theses by recognizing both the self-interest of actors as well as the influence of the social and economic situations (Karner 2000). Hence social capital can be rightly considered as a non-economic recourse/factor for economic development. In recent times, social capital has been used as a 'resource' for participatory socioeconomic as well as environmental

development by creating and sustaining social relationships and networks – interaction, norms, trust and reciprocity in groups, communities and organizations. Before delving deeper into a clear understanding of this framework, it is advisable to trace its genesis in sociology.

3.II The Genesis of social capital

The history of social capital has deep and diverse roots. To quote Alejandro Portes (1998), a sociologist:

> Despite its current popularity, the term does not embody any idea really new to sociologists. That involvement and participation in groups can have positive consequences for the individual and the community is a staple notion, dating back to Durkheim's emphasis on group life as an antidote to anomie and self-destruction and to Marx's distinction between an atomized class-in-itself and a mobilized and effective class-for-itself.

The existing literature shows that there is no consensus on when and where the phrase 'social capital' was first used (Grootaert and Bastelaer, 2001; Winter 2000; Woolcock and Narayan 2000). A critical review of the genesis of social capital, as presented in Table 3.1, suggests that many well-known thinkers and scholars of the eighteenth ad nineteenth centuries did discuss the theme of social capital, but they did not label the issue as 'social capital'. For example, in 1759 [1976], Adam Smith raised the issue of how to balance the needs of self-interest and the moral community in his work *The Theory of Moral Sentiments*. In 1762 [1993], Rousseau discussed the importance of shared values and social contract.

Table 3.1
Early thinkers on social capital

Period	Authors	Themes
1759	Adam Smith	How to balance the needs of self-interest and the moral community
1762	J. Rousseau	Shared values and social contract
1840	Alexis de Tocqueville	Association and reciprocal action
1848	Karl Marx and F.	Labourers' struggles and their solidarity

	Engels	
1887	Ferdinand Toennies	Gemeinschaft and Gesellschaft relationships
1893	Emile Durkheim	Norms and values shared by group members
1904, 1922	Max Weber	The role of culture, religion and trust
1908	George Simmel	Group Affiliations and reciprocal exchanges
1916	Lydia J. Hanifan	Social capital refers to "those tangible assets that count for most in the daily lives of people: namely good will, fellowship, sympathy and social intercourse among the individuals and families who make up a social unit". Source: Woolcock (1998), Winter (2000).

Source: M. Woolcock, 1998, 'Social Capital and Economic Development: Toward a Theoretical Synthesis and Policy Framework'. *Theory and Society*. Vol. 27, No. 02, pp. 151-208.
I. Winter, 2000, 'Major Themes and Debates in the Social Capital Literature: The Australian Connection' in I. Winter (ed.) *Social Capital and Public Policy in Australia*. Melbourne: Australian Institute of Families Studies.

As evident from Table 3.1, the theoretical framework of social capital could be clearly traced back to the works of many prominent figures of contemporary social sciences in general and sociology in particular. In this context, the present section underscores the ideas of certain key sociological thinkers, political scientists and economists on the score.

The current interest in the role that associational life plays in society was foreshadowed in the works of Alexis de Tocqueville over a hundred and fifty years ago in America. He drew attention to what he saw as the foundation stone of vibrant American democracy:

> 'Nothing, in my view, more deserves attention than the intellectual and moral associations in America. American political and industrial associations easily catch our eyes, but the others tend not to be noticed' (de Tocqueville [1840] 1969).

Alexis de Tocqueville argued that 'an association unites the energies of divergent minds and vigorously directs them towards a clearly indicated goal' (de Tocqueville [1840] 1969). This greatly facilitates social collaboration and effects solution to pertinent problems through collective action. Such associational life acts as a counterbalance to the dangers of individualism that might otherwise eventually degenerate into an

'exaggerated love of self which leads a man to think of all things in terms of himself and prefer himself to all'. Tocqueville claims that through associational life, 'feelings and ideas are renewed, the heart enlarged, and the understanding developed only by the reciprocal action of men upon one another' (de Tocqueville [1840] 1969).

Economists claim that precursors to the concept of social capital can be found in their discipline as far back as the work of Adam Smith in the eighteenth century. Well-known for his early advocacy of the merits of market, Smith also drew attention to the importance of mutual sympathy, networks and values in sustaining of such markets (Bruni and Sugden 2000). His examples were not always positive, such as when he highlighted the ways in which merchants' meetings were used by them to conspire against the public for greater private profit (Smith [1776] 1979). However, after Adam Smith, economists have hardly shown any interest in examining the role of social networks and norms in economic life. Of course, the exceptions could be identified, such as Irving Fisher's early attempt to broaden the definition of capital to include 'social organizational forms' (Fisher 1965 [1906]), Coase's work on the nature of the firm (Coase 1937) and Loury's work on racial income differences (Loury 1977).

The notion of social capital can be found in the works of sociologists, although not in explicit form/terminology. From the inception of sociology, the seminal figures of the discipline have been constantly exhibiting enormous interest on the very notion of social capital. While considering 'capital', Karl Marx focuses more centrally on the economic dimension and its function, which he systematically analyses in his texts *Capital* (Marx 1976 [1867]) and in *Grundrisse* (Marx 1973). Marx, when referring to the organization of class relations in capitalist societies at the level of the organization of

production, explicitly designates capital as a social relation (Jordan 1971)[19]. On the basis of this formulation, the appellation social capital may appear superfluous. Indeed, with such a formulation, Marx would, unwittingly, set the framework upon which, subsequent to his analysis, claims will be raised to the effect that the notion of social capital, as it appeared in the course of the twentieth and early twenty-first centuries, is a hyperbole, a metaphor or an oxymoron (Gozzi 2003). Nevertheless, it remains a fact which has not been given prominence in the voluminous relevant bibliography that Marx did actually use the term 'social capital'[20].

For his part, Emile Durkheim is not explicitly concerned with social capital. Yet, as it emerges from his work, particularly from his thesis on *Division of labor in society* (1960 [1893]), or from the more mature *Suicide* (1975 [1897]), the concern about the meaning, impact and outcome of sociability, which develops and blossoms in all kinds of social groups, is intense and persistent. Durkheim puts stress upon the constitutional and *sine qua non* importance of society that the intermediate association intersecting between civil society and individuals. He emphasizes that groups, as they stand in proximity to individuals, attract them into their sphere of activation and thus draw them into the general current of social life (Durkheim 1975).

Weber's association with the issue of social capital appears indirect. It may relate to R.D. Putnam's version of social capital, who defines it in direct relation to trust (Jones 2001). Weber believes that trust does not always develop on a voluntary basis; it may be imposed by an organization upon its members. This is effected through various

[19]The dimension of (exploitative) social relations is *sine qua non* for Marx for the emergence of capital. Thus, we know that the means of production and subsistence, while they remain the property of the immediate producer, are not capital. They become capital only under circumstances in which they serve at the same time as means of exploitation and subjection of the labourer (Fisher 1896).

[20] By social capital Marx means the total capital available in any given industrial or modern society, which consists of the aggregate of the various distinct and diverse individual capitals. The sum of capitals is characterized as social capital since the total of the society's members is directly or indirectly involved in its creation through the division of labour (see Marx 1976). Please refer certain related presentation in Law and Mooney (2006).

compulsions that organizations, through hierarchy, exert upon the latter which results into their disciplining, and through their perpetuation the emergence of so-called 'enforceable' trust (Woolcock 1998).

George Simmel's notion of 'social circle' appears quite germane to any discourse of social capital (Bagnasco 2003). The point that is manifest is that it is very difficult to trace a formal discourse of the concept in the trajectory of sociology. However, from sociology's continual engagement with the issue of 'structure vs. agency', one may sense certain commonalities/continuities between its prime discourse and the discourse of social capital[21].

However, the first explicit (of sociological interest) appearance of the notion of social capital came 90 years ago, in a piece of writing by Lydia Hanifan. Hanifan (1916) uses the notion of (community) social capital to highlight the importance of social relations among individual members in general and of participation and cooperation among members in particular. In fact, this form of social capital is used explicitly as a metaphor only, without any further claims (Hanifan 1916)[22]. Four and a half decades after Hanifan's article, the concept re-appears in 1961 in a book by Jane Jacobs (1961), where she dwells upon the existence of social networks that is formed among the neighbourhoods of US cities. Jacobs argues that these networks are absolutely necessary as the elements of trust are found in them that strengthen local social cohesion; and these networks should be sustained as they form an irreplaceable part of the social capital of each city neighbourhood (Jacobs 1961).

[21] It has been reported that the formulation 'social capital' first emerged in the work of economists, such as Alfred Marshall (referred by Grootaert and Bastelaer 2001) and John Hicks, in order to describe the distinction between temporary and permanent stocks of physical capital (Woolcock 1998).

[22] Farr (2004) in his investigation of social capital's conceptual history has shown that Hanifan's ideas were intellectually related to the critical pragmatism of John Dewey. Dewey first explicitly referred to social capital in 1900.

Although the appearance of social capital in Jacobs' work is noteworthy, it carries no follow-up. Rather, it is the economist Greg Loury's (1977) use of social capital that bears greater continuity. Indeed, Loury uses the term social capital to designate its origins and impact among the structured social inequalities of minority ethnic-racial groups. For Loury (1977), the social context in which one finds oneself embedded strongly conditions one's achievement. This is profoundly evident whenever social divisions that structure inequalities, such as race or class, are at play. In such a context, Loury describes social capital as the impact of one's own social position, which acts to further or impede the acquisition of human capital [the market-valued assets of education and skills] (Loury 1977).

With this delineation of certain scholars and their relatedness to the notion of social capital, Table 3.2 may help us in summarizing our impression in a more concise manner.

Table 3.2
'Social capital' in the social science literature: an overview

Period	Author	Source
1961	Jane Jacobs, urban planning work: "networks are a city's irreplaceable social capital. Whenever the capital is lost, from whatever cause, the income from it disappears, never to return until and unless new capital is slowly and chancily accumulated".	Woolcock (1998), Winter (2000)
Late 1970s	Glenn Loury, economist used the term "social capital" in his critique on neoclassical theories of racial income inequality.	Portes (1998)
1986	Pierre Bourdieu, Sociologist: Forms of capital – economic, cultural and social.	Bourdieu (1986), Winter (2000)
1988	James Coleman, Sociologist: In his work on school participation in Chicago referred to "social capital".	Winter (2000)
1993	Robert Putnam, political scientist: *Making Democracy Work*.	Pantoja (2000), Winter (2000)
1996	The World Bank, *The Social Capital Initiative*: Concept and measurement of social capital. Impact of social capital on Development. Social capital theory link to the process of socioeconomic growth.	Grootaert and Bastelaer (2001),

It is evident from the Table 3.2 that the development of 'social capital' as an explicit theoretical framework in mainstream sociology appears only during the late 1980s, and it continues to engage western scholars from multi-disciplines. Bourdieu is of the opinion that economics has a tendency to ignore individuals' social life and over-emphasize their economic life (Bourdieu 1986). While having clear sociological origins, this concept is from the outset readily accepted by a variety of social sciences. Among three seminal figures of the concept, only Bourdieu can be classified as a 'pure' sociologist, although he began his academic career as an ethnologist, and his philosophical background always played an important role in his attempt to theorization. Putnam, the most popular of the three, is a political scientist. Although Coleman is a sociologist, he has strong connections with rational-choice theory, which is a basis of economic analysis. Needless to say, a significant number of present-day practitioners of social capital are economists. Furthermore, the variety of issues to which this concept is applied is indeed broad, probably broader than is the case with other comparable concepts like physical, financial, natural or human capital.

3.III Meaning and definition of social capital

Despite its multidisciplinary orientation, the concept is yet to evolve a consensus among scholars across disciplines in regard to its precise definition. In fact, the difficulty in getting a concrete/uniform definition/theoretical framework of social capital arises not because of its wider application, but because of the philosophical confusion of language and the use of metaphoric construction (Bankston and Zhou 2002). It is always advisable to define a concept on the basis of its terminology. The term 'capital' (of social capital) broadly refers to resource or an input for production. According to *Merriam--Webster Dictionary*, it refers to 'accumulated wealth, especially as used to produce more wealth'. It is usually identified with tangible, durable, and alienable objects, such as buildings and

machines, whose accumulation can be estimated and whose worth can be assessed (Solow 2000). As Field (2003) says, 'in economic thought, the term 'capital' is originally meant an accumulated sum of money, which could be invested in the hope of a profitable return in the future'. In contemporary times, social scientists, however, have discovered a plethora of capitals in order to analyze several stages/states/aspects of social life (see Table 3.3). This multiple categorization of capital facilitates the researcher in obtaining a comparative understanding of the concept.

Table 3.3
Forms of Capitals

Types	Meaning
Physical Capital	Stock of produced goods that contribute to the production of other goods and services (For example machinery, and computers).
Economic Capital	Also referred to as financial capital – especially the stock of money (for example a sum of money in a bank).
Biological Capital	Also treated as natural capital – the total stock of natural resources and their services on earth (for example plants and organisms).
Human capital	Total stock of skills and knowledge/expertise accumulated by an individual (for example, human resources).
Cultural capital	Stock of cultural practices in the society based on societal norms, values and religious belief systems (For example protecting 'Tulsi tree', material non-material culture).
Social capital	Features of the processes of social interaction or social relationship that facilitate collective action.

In his seminal article on 'Forms of capital', Bourdieu (1986) expands the notion of capital beyond its economic conception which emphasizes material exchanges, to include 'immaterial' and 'non-economic' forms of capital, specifically cultural and symbolic capital. In fact, he explains how the different types of capital can be acquired, exchanged, and converted into other forms. Since the structure and distribution of capital represent the inherent structures of the social world, Bourdieu argues that an understanding of its multiple forms helps in elucidating the structure and functioning of the social world (Bourdieu 1986).

Etymologically, the word 'social' is derived from a Latin term *socius* which means 'to join or unite together, to associate, to do or hold in common, to share with'. The *Shorter Oxford English Dictionary* lists the following meaning for the word 'social': living or disposed to live in companies or communities, desirous of the pleasant society or companionship of others, living together in more or less organized communities, frequently with specialized castes, belonging to a community, pertaining to society or its organization as a natural or ordinary condition of human life, pertaining to the mutual relationships of human beings or of classes of human beings, and connected with the functions and structures necessary to membership of a group or society (Pawar 2006). In sum, the term 'social' in 'social capital' broadly refers to 'social relationship'; whereas 'capital', as mentioned above, stands for resource, input or a factor for the process of production. Thus the phrase social capital refers to social relationships, social interactions and collective [interaction] actions in accentuating the productive behaviour among the members of the society. Interpreting the notions of 'social' and 'capital', Fine (2001) argues that 'the social takes as its point of departure anything that is not reducible to individualistic exchange relations and, correspondingly, social capital is anything other than tangible assets'.

3. IV Defining social capital

Social capital does not have a clear, unified and undisputed definition (Dolfsma and Dannreuther 2003; Foley and Edwards 1997). For researchers, the term is popular partly due to the broad range of outcomes it can explain; the multiplicity of application of social capital has rather led to a multiplicity of definitions. However, the commonalities of most definitions of social capital are that they focus on social relations that yield productive benefits (see Table 3.4 for details).

Table 3.4
Definitions of social capital

Authors	Definitions	Source
Baker	"A resource that actors derive from specific social structures and then use to pursue their interests; it is created by changes in the relationship among actors".	Baker 1990
Belliveau, O'Reilly and Wade	"An individual's personal network and elite institutional affiliation".	Belliveau, O'Reilly and Wade 1996
Bourdieu	"The aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition".	Bourdieu 1986
Bourdieu and Wacquant	"The sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition".	Bourdieu and Wacquant 1992
Boxman, De Graaf and Flap	"The number of people who can be expected to provide support and the resources those people have at their disposal.	Boxman, De Graaf and Flap 1991
Burt	Friends, colleagues, and more general contacts through whom you receive opportunities to use your financial and human capital".	Burt 1992
Knoke	"The process by which social actors create and mobilize their network connections within and between organizations to gain access to other social actors' resources".	Knoke 1999
Portes	"The ability of actors to secure benefits by virtue of membership in social networks or other social structures".	Portes 1998
Brehm and Rahn	"The web of cooperative relationships between citizens that facilitate resolution of collective action problems".	Brehm and Rahn 1997
Coleman	"Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the structure".	Coleman 1990
Fukuyama	"Social capital can be defined simply as the existence of a certain set of informal values or norms shared among members of a group that permit cooperation among them".	Fukuyama 1997
Inglehart	"A culture of trust and tolerance, in which extensive networks of voluntary associations emerge".	Inglehart 1997
Portes and Sensenbrenner	"Those expectations for action within a collectivity that affect the economic goals and goal-seeking behavior of its members, even if these expectations are not oriented towards the economic sphere".	Portes and Sensenbrenner 1993
Putnam	"Features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit".	Putnam 1995
Thomas	"Those voluntary means and processes developed within civil society which promote development for the collective whole".	Thomas 1996
Loury	"Naturally occurring social relationships among persons which promote or assist the acquisition of skills and traits valued in the marketplace... an asset which may be as significant as financial bequests in accounting for the maintenance of inequality in our society".	Loury 1992
Nahapiet and Ghoshal	"The sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. Social	Nahapiet and Ghoshal 1998

	capital thus comprises both the network and the assets that may be mobilized through that network".	
Pennar	"The web of social relationships that influences individual behavior and thereby affects economic growth".	Pennar 1997
Schiff	"The set of elements of the social structure that affects relations among people and are inputs or arguments of the production and/or utility function".	Schiff 1992
Woolcock	"The information, trust, and norms of reciprocity inhering in one's social networks".	Woolcock 1998

Source: Adler, P.S. and S. Kwon, 2002, 'Social capital: prospects for a new concept', *The Academy of Management Review*, Vol. 27, No. 01.

Much of the contestation over the definition of social capital stems from the epistemological differences in the work of three principal figures of the concept: Bourdieu, Coleman and Putnam. Pierre Bourdieu (1986) used the concept of social capital as part of a theory of social stratification. Social capital was introduced to demonstrate those ties that are used by elite groups to reproduce their privileged status. While attempting to define social capital, Bourdieu and Wacquant (1992) in their work *An Invitation to Reflexive Sociology* mention:

> Social capital is the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalised relationships of mutual acquaintance and recognition.

Hence Bourdieu claims that the 'possession' of social relationship provides for differential access to resources. He argues that social capital is an aspect of the differentiation of classes. Thus, to Bourdieu, social capital is a symbol of 'instrument of power' (Harriss 2002). Several scholars emphasize Bourdieu's conception of social capital as 'resources derived from one's belongingness to a group'. 'Bourdieu's concept of social capital has widely been used in the study of social inequality and hierarchical social structures…. social capital as a means to exclude others from access to resources has been a major focus of those influenced by Bourdieu' (Birner and Wittmer 2003).

James Coleman, the pioneer of the concept holds social capital as an aspect of social structure that constitutes 'a certain asset for the individual (Harriss 2002). According to Coleman (1988):

> Social capital is [taken to mean] the set of resources that inhere in family relations and in community social organization and that are useful for the cognitive or social development of a child or young person.
> Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of social structure, and they facilitate certain actions of the individuals who are within the structure.

Thus, for Coleman, social capital remains in the structure of relations among/between individuals and it facilitates actions of individuals who are connected by the structure of relations (Harriss 2002).

Robert Putnam, whose work (1993) led to widespread induction of the concept of social capital in development literature, has been preceded (along somewhat similar lines) by the work of Coleman (1988). Putnam (2000), reflecting on the concept, says:

> Whereas physical capital refers to physical objects and human capital refers to the properties of individuals, social capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them. In that sense social capital is closely related to what some have called "civic virtue." The difference is that "social capital" calls attention to the fact that civic virtue is most powerful when embedded in a sense network of reciprocal social relations.

Apart from these three pioneers of social capital framework, several scholars have also shown their interests on the development of social capital. The scholarship of Michael Woolcock on social capital literature is important. Woolcock defines social capital as 'the norms and networks facilitating collective action for mutual benefits' (Woolcock 1998). Woolcock with Deepa Narayan (2000) has devised four distinct

perspectives in approaching research on social capital: communitarian, networks, institutional, and synergy. First, the communitarian perspective equates social capital with local organizations, such as, clubs, associations and civic groups. This perspective also implicitly assumes that communities are homogenous entities, which automatically include and benefit all members of the community. Second, the network perspective on social capital, 'stresses the importance of vertical as well as horizontal associations between people and of relations within and among such organizational entities as community groups and firms'. Third, the institutional perspective claims that the very capacity of social groups to act in their collective interest depends on the quality of the formal institutions under which the communities reside. This perspective is closely associated with the society's political, legal, and economic institutions. Fourth, the synergy perspective suggests three central tasks: (i) to identify the nature and extent of a community's social relationships and formal institutions, and interaction between them; (ii) to develop institutional strategies based on these social relations, particularly the extent of bonding and bridging social capital; and (iii) to determine how the positive manifestations of social capital – cooperation, trust, and institutional efficiency – can counteract sectarianism, isolationism, and corruption (Woolcock and Narayan 2000).

The World Bank has quickly adopted this concept for wide circulation and has launched the Social Capital Initiative in October 1996, which generated several studies showing a positive impact of social capital on development and income improvement. According to the World Bank (1998), social capital doesn't simply allude to 'sum of the institutions' that enfold a society rather the 'glue' that clamps them together. To quote the World Bank (1998):

> Social capital refers to the institutions, relationships, and norms that shape the quality and quantity of a society's social interactions. Increasing evidence shows that social cohesion is critical for societies to prosper economically and for

development to be sustainable. Social capital is not just the sum of the institutions which underpin a society – it is the glue that holds them together.

3.V Processes and forms of social capital

Based on different characteristics and functions, literatures have classified social capital into different processes and forms. The major processes of social capital are: bonding, bridging and linking social capital. Similarly, the most common forms of social capital in literature include structural and cognitive social capital; strong and weak social capital; horizontal and vertical social capital.

3.V.a Bonding, bridging and linking social capital

From a social cohesion perspective, recent literature distinguishes social capital into three important processes (Putnam 2000; Woolcock 2001). These are bonding, bridging and linking social capital.

i. *Bonding social capital*: It refers to the connection based on strong ties between immediate family members, neighbours, close friends, and business associates sharing similar demographic characteristics.
ii. *Bridging social capital*: It refers to the connection based on weaker ties between people from different ethnic, geographical and occupational backgrounds but with similar economic status and political influence. For example, similar land-ownership features belong to different castes.
iii. *Linking social capital*: It refers to the connection based on social ties between poor people and those in positions of influence in formal organizations, such as banks, agricultural extension offices, schools, housing, authorities, or the police. For example, those who have political power and close contact with bureaucrats, they try to maximize this type of social capital.

3.V.b Structural and cognitive social capital

Structural social capital is related to the pattern of social networks and other structures such as associations, clubs, cultural groups and institutions supplemented by the rules, procedures and precedents that govern them; and cognitive social capital consists

primarily of a set of shared norms, values, attitudes and beliefs of individuals relating to trust, reciprocity and cooperation (Uphoff and Wijayaratna 2000). The objective and externally-observable structural social capital facilitates mutually beneficial collective actions through established roles and durable social networks supplemented by rules, procedures and precedents (Uphoff 2000; Hitt et al. 2002). The subjective and intangible cognitive social capital predisposes people towards mutually beneficial collective action through shared values and attitudes (Uphoff 2000).

3.V.c Strong and weak social ties (social capital)

Granovetter (1985) distinguishes social capital according to the strength of social ties. Strong ties refer to close persistent and binding relationships, such as those that exists with families and close friend groups; weak ties, in contrast, refers to more casual, temporary and contingent relationships, such as those that exist with people from different backgrounds and friends from different social niches. Strong ties come from affection, willingness to help and great knowledge of each other. Strong ties create great solidarity and offer personal support, whereas weak ties are used more for informational support. Weak ties link people to the broader communities and to a wider range of potential resources (Erickson 2004).

3.V.d Horizontal and vertical networks (social capital)

Social capital is also distinguished between horizontal and vertical networks (Woolcock and Narayan 2000). Horizontal social capital refers to lateral ties between people of similar status and power in a community, vertical social capital, in contrast, refers to ties between people of different hierarchy and unequal power among people. While horizontal social capital operates through shared norms and values, vertical social capital operates through formal hierarchical structures. Similar to bonding and bridging, horizontal social capital encompasses diverse group of people and it serves to establish

connection and a common goal among community members through civic engagement. Similar to linking, vertical social capital establishes link of citizens to community leaders and decision-makers, and creates environment for social change through laws and policies.

The literature also identifies several other forms of social capital. For example, formal [membership in clubs, social groups and organizations] and informal [informal social connection with extended family, friends, neighbours and workmates] (Pichler and Wallace 2007); and open [civically-engaged and open membership] and closed [protective and exercising closed membership] (Heffron 2000)

3.VI Levels of analysis for social capital

Social capital exists at different hierarchy in the society. As a result, it can be analyzed at different levels. From the level of analysis perspective, social capital can be classified into two groups: (i) individual and collective levels and (ii) micro-, meso-, and macro-levels.

3.VI.a Individual and collective levels of social capital

There are divergent views regarding whether social capital is an attribute of an individual (individual good) or an attribute of a community (community good). Some authors conceive social capital at the individual level, where others conceive it at the society level. Kilby (2002) writes that social capital exists within levels or scales as one feels belonging to family, community, country etc. simultaneously. Contemplating similar views, Adler and Kwon (2002) argue that sources of social capital lie in the social structure within which the actor is located. Social capital, thus, has both an individual and an aggregate component (Slangen et al. 2004). The foundation of social capital lies in the group, but it can be used by the group as a whole or individuals within the group (Sander 2002).

Proponents of individual social capital (Bourdieu 1986; Becker 1996; Lin 2001; Glaeser et al. 2002; Erickson 2004; Yang 2007) view social capital largely as an attribute of an individual. Individual social capital refers to a person's potential to activate and effectively mobilize a network of social connections based on mutual recognition and maintained by symbolic and material exchanges (Bourdieu 1986). The basic premise behind the individual level social capital is that it is an individual who creates, maintains and subsequently gains advantage from social capital. Proponents of collective social capital (Granovetter 1985; Putnam 1993; Fukuyama 1995; Newton 2001; Van der Gaag and Snijders 2003) believe that social capital has not only an individual aspect, but also a community aspect and define it mostly, an attribute of a society. As an attribute of a society, social capital refers to a quality of networks and relationship that enables individuals to cooperate and act collectively (Putnam 1993). Collective social capital emphasizes social capital as a collectively-produced and owned good, from which the whole community could benefit. It is looked at primarily in terms of its benefits to society rather than the individual.

3.VI.b Micro-, meso-, and macro-level social capital

Several authors generalize the individual and collective level social capital approach and analyze social capital at multiple levels: micro, meso and macro (Turner 2000; Chen 2005). Social capital, at the micro level, looks at relationships between individuals, households and neighborhoods; at the meso level, it focuses on communities, groups, institutions and organizations; and at the macro level, it focuses on the forms of institutional and political environment in nations or states (Bourdieu 1986; Grootaert and van Bastelaert 2001). This means that the micro level refers to relations between individuals, the meso level refers to relations between groups or firms and the macro level refers to relations between regions or nations. Halpern (2005) distinguishes micro,

meso and macro social capital as the social relations among people at the individual, community and societal levels, respectively.

Micro social capital involves norms, values and networks of horizontal relationships among individuals, households and neighbours, and which facilitate interactions among these actors. Meso social capital involves networks of vertical relationships and networks of associations that facilitate interactions among groups, communities, firms and NGOs. Macro social capital involves the formalized institutional relationships and structures that govern the political regime, civil society, the rule of law and government (Hopkins 2002; Bjornskov and Svendsen 2003).

3.VII Measuring social capital

The most persistent criticism of social capital is related to the common agreement regarding the establishment of valid and reliable measures of it. Several attempts have been carried out to arrive at a universal model of measurement in order to quantify social capital. Obtaining a single universal model of measuring social capital is, however, not possible. Michael Woolcock and Deepa Narayan (2000) express three basic reasons for the lack of common measures/techniques of social capital: (i) the most comprehensive definitions of social capital are multidimensional, incorporating different levels and units of analysis; (ii) the nature and forms of social capital change over time, as the balance shifts between informal organizations and formal institutions; and (iii) because no long-standing cross-country surveys were initially designed to measure social capital, contemporary researchers have had to compile indexes from a range of approximate items (measures of trust, confidence in government, voting trends, social mobility, and so on). In addition, what is more important, any attempt to measure social, one has to certainly deal with ambiguous concepts such as ‘community’, ‘network’, ‘organization’ and ‘institution’, which are very problematic to measure. However social capital may be

difficult to measure, but it is not impossible. In recent times, several studies have been undertaken by identifying useful alternatives for social capital using different types and combination of qualitative, comparative and quantitative research methodologies.

While several studies recently developed, formal models use this concept of social capital and its measurement (Annen 2002; Glaeser et al. 2000; James 2002); many of the well-known measurements of social capital have taken a somewhat different form. One measure is membership in informal and formal associations and networks. The measures that capture the informal give-and-take through communitywide festivals, sporting events, and other traditional methods of fostering social connections are very important indicators of the underlying stocks of social capital (Woolcock and Narayan 2000). Based on data from a survey of 1,400 households in 87 villages across Tanzania (Narayan 1997) and Narayan and Pritchett (1999) have developed an index of social capital at the household and community levels that has included density and characteristics of informal and formal groups and networks. The dimensions of this index include group functioning, financial and in-kind contributions to groups, participation in decision-making process, and heterogeneity of membership.

Another dominant way of measuring social capital is by measuring trust through exercising the responses of respondents to large-scale surveys of a population. Many standardized surveys, such as Monitoring the Future Survey, and the Eurobarometer, which includes questions that provide measures of trust and trustworthiness (Ostrom and Ahn 2003). Various empirical studies have been conducted utilizing these survey data to examine the causes and consequences of social trust (refer for example Putnam 2000). Numerous studies have also been initiated to develop the indices of social capital at the national or sub-nation levels. In his research comparing North and South Italy, Putnam (1993) examines social capital in terms of the degree of civic engagement, as measured

by voter turn out, newspaper readership, membership in choral societies and football clubs, and confidence in public institutions. Northern Italy, where all these indicators are higher, shows significantly improved rates of governance, institutional performance and development when other orthodox factors were controlled for. His recent work on the United States (Putnam 1995) uses a similar approach, combining data from both academic and commercial sources to show a persistent long-term decline in America's stock of social capital. Putnam validates data from various sources against the findings of the General Social Survey, widely recognized as one of the most reliable surveys of American social life.

To assess social capital at the community level, Onyx and Bullen (2000) have developed a questionnaire for the state of New South Wales, Australia, from which they isolated eight underlying factors that constituted an individual's social capital: participation in the local community, proaction in a social context, feelings of trust and safety, neighbourhood connections, connections with family and friends, tolerance of diversity, value of life, and work connections. Thus, the practitioners of social capital – with only a decade of history of empirical applications and attempts at measurement – have been improvising by innovating subject-specific as well as context-specific methodologies (both qualitative and quantitative) to evaluate social capital starting from grassroots levels to national levels.

3.VIII Social Capital and biodiversity conservation: an interface

Social capital is defined by the World Bank as 'the norms and social relations embedded in the social structures of societies that enable people to coordinate action to achieve desired goals' (World Bank 2000). In fact, social capital can be broadly conceptualized as the capacity of an individual or a group to obtain valued material or symbolic goods by virtue of his/her or their social relationships and group memberships or to the capacity

of a plurality of individuals to enjoy the benefits of 'collective action' by virtue of their social participation, trust in institutions, or commitment to establish several methods to accomplish several activities. As exemplified by several empirical studies (Pretty 1995 and 2002; Pretty and Smith 2004), individuals – when organized and institutionalized in the form local association(s) – have been managing 'natural' resources in the form of collective action. In fact, the 'collaborative collective action', as an upshot of local institution(s) at community level, has been playing a crucial role in conserving and managing various forms of natural resources – water, forests, aquatic resources etc. In this section we link the formation of social capital in rural communities and their role in conserving and managing natural capital. In fact, this section, for all intents and purposes, highlights how social capital, embedded in participatory groups within rural communities, has been persistently undertaking decisive roles towards the conservation and management of natural resources or biodiversity resources. However before that, the following section briefly emphasizes the theories of collective action – that is considered as the precondition to the theory of social capital – especially at the community level. In fact, the theories of collective action and social capital are closely related in the processes of conservation and management of natural or biological resources.

3.VIII.a Theories of collective action and management of natural (biological) resources

The significance of communities and their collective actions have long been understood in the literature on management of common pool resources (CPR)[23]. As literature suggests (Pretty and Ward 2001), for as long as individuals have managed natural

[23] Common pool resources can be managed under four basic types of regimes: (i) 'open access', which refers to a 'free for all' situation, where rules regulating access to and allocation of benefits from the resource are absent; (ii) 'public property', where access rights for the public are held in trust by the State; (iii) 'private property', where tradable rights are owned by an individual, household, or company; and (iv) 'common property', where a set of rules is present to govern access to, allocation of, and control over the CPRs (Steins and Edwards 1999).

resources, they have engaged in forms of collective action: collaborating on management of farm, forest, grassland, and aquatic resources. To quote Jules Pretty and Hugh Ward (2001):

> Although constructive resource management rules and norms have been embedded in many cultures and societies, from collective water management of Egypt, Mesopotamia and Indonesia to herders of the Andes and dryland Africa; from water harvesting in Roman north Africa and southwest North America to shifting agriculture systems, it has been rare for the importance of such local groups and institutions to be recognized in recent agricultural and rural development.

In both developing as well as industrialized countries, policies and practices have been tended to be preoccupied with changing behaviour of individuals rather than of groups or communities (Pretty and Smith 2004). As a result, the collective actions of the community-level institutions have diminished their importance and have often entirely disappeared; and so the state has increasingly taken responsibility for natural resources, often under the mistaken assumption that local resources are inevitably misappropriated and mismanaged by local communities (Jodha 1990; Pimbert and Pretty 1995; Ghimire and Pimbert 1997; Gadgil et al. 2000; Pretty and Ward 2001; Samson 2003). However, the indispensability of the communities (local institutions) and their collective actions have recently been recognized in the process conservation and sustainable management and development of biodiversity (Ostrom 1990; CBD 1992; BDA 2002).

Collective action has been institutionalized in many forms of association, through clan or kin groups; traditional leadership; hunting, grazing, and fishing societies; women's self-help groups; youth and religious groups; and the forest protection committees. The community's collective action, so far as the management of natural resources or more specifically the biological resources is concerned, typically occurs if resource users seek to overcome the problems associated with the 'tragedy of commons'

or specifically 'the tragedy of open access' and agree on decision-making arrangements governing the use of natural resources (Steins and Edwards 1999). Theories of collective action concern settings in which there is a group of individuals, a common interest among them, and potential conflict between the common interest and each individual's interest. Scholars have developed a large body of literature pertaining to the organization of collective action in natural or biological resource management. The present study has divided the literature related to the theories of collective action into two broad categories: (i) first-generation collective action theories; and (ii) second generation collective action theories.

(i) The first-generation collective action theory

The first-phase or the first-generation collective action theories is based on a pessimistic view of the potential of collective action to overcome problems, such as elite capture. A number of scholars theorized that only in rare circumstances are groups of individuals likely to act in a coordinated and cooperative manner (Hardin 1968; Olson 1965; Sandler 1992). For example, Mancur Olson (1965) theorized that groups of individuals with a shared interest will *not* act on behalf of that interest. Rather, Olson posits that since 'members of a large group rationally seek to maximize their personal welfare; they will not act to advance their common group objectives unless there is coercion to force them to do so' (Olson 1965). According to Olson, the problem is that there is no incentive for all to share the cost of collective action; instead, each member of the group prefers that another member pay the entire cost - hence the 'free rider' problem. Olson does concede, however, that small groups are not only quantitatively, but qualitatively different from large groups, and that with smaller groups the free rider problem is reduced.

(ii) The second-generation collective action theory

A substantial body of empirical research – more appropriately known as the second-generation collective action theories – challenges the earlier i.e. first-generation theorizations of collective action (Baland and Platteau 1996; Bromley et al. 1992; Chamberlin 1974; Gibson et al. 2000; Ostrom 1990). For example, Ostrom's (1990) work takes issue with the conceptualization of the free rider problem and other difficulties associated with collective action. The previous analysts had restricted the possible responses to the collective action quandary to either control by a strong central government or regulation through a system of private property rights. In this light, Ostrom (1990) presents a third option: individuals can have agency to create their own agreements, institutions and systems of management, which have the capacity to change over time and prevent tragic outcomes. The Table 3.5 provides an overview of the second-generation collective action theories especially their focus on common pool resources.

Table 3.5
Design principles for collective action as developed in CPR theory

Wade's conditions for successful CPRM (1988):
1. The nature of the resource
2. The costs of exclusion technology
3. The relationship between resources and user groups
4. The characteristics of the user group
5. The relationship between users and the state

Ostrom's design principles characterization of CPR systems (1990):
1. Clearly defined boundaries
2. Congruence between allocation and access rules and local conditions
3. User's ability to modify the operational rules through collective-choice arrangements
4. Monitoring of management system
5. Graduated sanctions
6. Conflict resolution mechanisms
7. Management rights of resource users are not challenged by external agents

Hanna et al. design principles of property rights regimes (1995):
1. Definition of legitimate interests in the CPR
2. Articulation of rules for user participation

3. Congruence of rights and responsibilities
4. Incentive structure of rules reflects long-term sustainability of CPR
5. Congruence of boundaries
6. Distribution of decision-making authority
7. Provision of monitoring, sanction, and enforcement mechanisms

Pinkerton and Weinstein's basic criteria for fruitful collective resource management (1995):

1. Accountability
2. Effectiveness
3. Representativeness
4. Adaptability

Source: N. A. Stein and V. M. Edwards, 1999, 'Collective action in common-pool resource management: the contribution of social constructivist perspective to existing theory', *Society and Natural Resources*, Vol. 12.

The Table 3.5 shows that a diverse group of scholars who belong to second generation collective action theory have identified factors that influence the prospects for collective action: social and economic heterogeneity, group size, the existence of non-linear relations and the mediating role played by the institutions (Agrawal 2000; Agrawal and Gibson 1999; Baland and Platteau 1996; Campbell et al. 2001; Poteete and Ostrom 2004; Quiggin 1993; Vedeld 2000).

These theories of collective action and the notion of social capital are interrelated in the current discussion on the role of local communities in biodiversity conservation. On the one hand, this is so because the theories of collective action provide analytical foundations for social capital research (Ostrom and Ahn 2003). According to Elinor Ostrom and T. K. Ahn (2003), 'the economic and political performances of societies, from villages to international communities, depend critically on how the members of a community solve the problem of collective action'. The contemporary theorists of social capital, almost without exception, open their discussion on social capital by placing the problem of collective action while dealing with the management of natural or biological resources. In fact, social capital research (consciously or unconsciously) makes use of

the collective action paradigm initially while focusing on the role of communities on the conservation of biodiversity.

3.VIII.b Elements of Social capital in biodiversity conservation

In recent times, scholars and practitioners engaged in analyzing community-level collective action, have become increasingly interested in how relationships based on trust, reciprocal exchange and social networks, in a single word 'social capital', affect outcomes (Carpenter et al. 2004; Daniere et al. 2002; Dasgupta and Serageldin 2000; Grootaert 1998; Grootaert and van Bastelaer 2002; Narayan and Pritchett 1999; Woolcock 1998; Woolcock and Narayan 2000). It is argued that when individuals are well connected in groups and networks, and when their knowledge is sought, incorporated, and built upon during planning and implementation of conservation and development activities; then, they are more likely to sustain stewardship and protection over the long term (Cernea 1991; Pretty 1995; Singh and Ballabh 1997; Krishna 2002; McNeely and Scherr 2003).

The current discussions on social capital and conservation of biodiversity widely recognize the effectiveness of community-level institutions as well as the collaborative collective action in bringing about positive biodiversity outcomes where the idea of 'social connectedness' is considered as an important capital asset. This social connectedness or social capital, as it lowers the costs of working together, facilitates cooperation among the members of the group to engage collectively in resource conservation. However, there is an inadequacy of literature pertaining to the idea of 'social capital and the conservation of biodiversity'. As literature suggests, very few scholars have engaged in this area. Jules Pretty is one of them, if not the only scholar, who is constantly working on this area. Jules Pretty (2002; 2003) with David Smith (2004) has identified four central aspects of social capital that strengthen the idea of

community level biodiversity conservation: relations of trust; reciprocity and exchanges; common rules, norms and sanctions; and connectedness, networks and groups. The present study has extensively borrowed these aspects for a systematic understanding of the mutual relationship between social capital and conservation of biodiversity.

(i) Relations of trust

Trust enhances cooperation. It reduces the transaction costs among people, and so also the conservation of resources. Instead of having to invest in monitoring others, individuals are able to trust them to act as expected. This saves money and time. It also creates a social obligation – by trusting someone this engenders reciprocal trust. There are two types of trust: the trust we have in individuals whom we know; and the trust we have in those we do not know, but which arises because of our confidence in a known social structure. Trust takes time to build, but it is easy to break (Gambetta 1988; Fukuyama 1995)[24], and when a society is pervaded by distrust, cooperative arrangements are unlikely to emerge (Baland and Platteau 1998).

(ii) Reciprocity and exchanges

Reciprocity and exchanges also increase trust. There are two types of reciprocity (Coleman 1990; Putnam 1993). Specific reciprocity refers to simultaneous exchanges of items of roughly equal value; and diffuse reciprocity refers to a continuing relationship of exchange that at any given time may not be met, but eventually is repaid and balanced. This contributes to the development of long-term obligations among people, which can be an important part of achieving positive environmental outcomes (Platteau 1997). Participatory biodiversity thrives on such relationships.

[24] Fukuyama (1995) emphasizes the fundamental value of trust for the progress of large, democratic and cooperative organizations. Trust is seen to arise when communities share sets of moral values so as to create expectations of honest behaviour.

(iii) Common rules, norms, and sanctions

Common rules, norms and sanctions are mutually agreed upon or are considered as norms of behaviour that place group interests above those of individuals. They give individuals the confidence to invest in collective or group activities, knowing that others will also do so. Individuals can take responsibility and ensure that their rights are not infringed. Mutually-agreed sanctions ensure that those who break the rules, they will be punished.

These are sometimes called the rules of the game (Taylor 1982), the internal morality of a social system (Coleman 1990), or the cement of society (Elster 1989). They reflect the degree to which individuals agree to mediate or control their own behaviour. Formal rules are those set out by authorities, such as laws and regulations, while informal ones are those individuals use to shape their own everyday behaviour. Norms are, by contrast, preferences and indicate how individuals should act; rules are stipulations of behaviour with positive and/or negative sanctions. A high social capital implies high 'internal morality', with individuals balancing individual rights with collective responsibilities (Etzioni 1995).

(iv) Connectedness, networks and groups

Connectedness, networks, and groups and the nature of relationships are the vital aspects of social capital. There may be many different types of connection between groups. They may be one-way or two-way, and may be long-established, or subject to regular update. Connectedness is manifested in different types of groups at the local level. It also implies connections to other groups in society, from both micro to macro levels (Uphoff 1993; Flora 1998; Grootaert 1998; Woolcock 1998; Ward 1998; Pretty and Ward, 2001; Krishna 2002; Pretty 2002). Jules Pretty (2002) has devised five elements of connectedness:

i. *Local connections*: strong connections among individuals and within local groups and communities;
ii. *Local-local connections*: horizontal connections between groups within communities or between communities, which sometimes become platforms and new higher level institutional structures;
iii. *Local-external connections*: vertical connections between local groups and external agencies or organizations, being one-way (usually top-down) or two-way;
iv. *External-external connections*: horizontal connections between external agencies, leading to integrated approaches for collaborative partnerships; and
v. *External connections*: strong connections among individuals within external agencies.

Even though some institutions recognize the value of social capital, it is common to find that not all of these connections are being emphasized. For example, a government may stress the importance of integrated approaches between different sectors, but may fail to encourage two-way vertical connections with local groups. The development institutions that emphasize the formation of local associations without building upward linkages with other external agencies may lead to endanger or break down their chances of success. In this context, Pretty and Ward (2001) suggest three principles: more linkages lead to better results; two-way relationships are better than one-way; and linkages subject to regular update are generally better than historically-embedded ones.

3.VIII.c Social capital and resource management: some empirical evidences

Social capital improves the efficiency of society by facilitating coordinated action (Winder and Mundt 1998). In contemporary times, we have been witnessing an extraordinary expansion of collective management programs throughout the world under the name of community management, participatory management, joint management, decentralized management, indigenous management, user-participation, and co-management. These advances, that also analyze social capital formation, have been

centered on participatory and deliberative processes leading to local group formation in six major sectors: watershed/catchment management; irrigation management; microfinance delivery; forest management; integrated pest management; and farmers' groups. In the past decade, Pretty and Smith (2004) estimate that 4,08,000 – 4,78,000 new groups have arisen in these sectors - mostly in developing countries (Table 3.6). Most of the groups have evolved to be of similar small rather than large size (as predicted by Olson *et al.* 1983), typically with 20-30 active members (40 for microfinance). These numbers of groups have amounted to the total involvement of some 8.2-14.3 million people. Most groups show the collective effort and inclusive characteristics, which are, according to Flora and Flora (1993), vital for improving community's well-being and leading to sustainable outcomes. In these groups, social capital is both operational and effective.

Table 3.6
Social capital formation in natural resource management

Country and Programme details	Groups
Watershed Catchment Groups	
India–Programmes of the state government and NGOs in Rajasthan, Gujarat, Karnataka, Tamil Nadu, Maharashtra, Andhra Pradesh	30,000
Brazil-275,000 farmers in 3 southern states adopted zero-tillage and conservation farming as part of microbacias (watersheds) groups	15,000-17,000
AustraliaÐnational Landcare programme with about one third of farmers in landcare, waterwatch and coastcare groups	4,500
KenyaÐMinistry of Agriculture catchment approach to soil and water conservation	3,000-4,000
Honduras/GuatemalaÐNGO programmes for soil and water conservation and sustainable agriculture	700-1,100
USA-farmer-led watershed initiatives	1,000
Burkina Faso/Niger-water harvesting programmes	3,000
Irrigation water users' groups	
Sri Lanka-Gal Oya and Mahaweli authority programs	33,000
Nepal-water users groups as part of government programs	5,000-8,000
India-participatory irrigation management in Gujarat, Maharashtra, Tamil Nadu and Orissa	1,000
Philippines-National Irrigation Administration turned over 1.2 m ha to local management groups	3,500-5,000
Pakistan-water users' association in Punjab and Sindh	14,000
Microfinance institutions	
Bangladesh-Grameen Bank nationwide	50,000
Bangladesh-Proshika groups	75,000
Pakistan-Aga Khan Rural Support Programme in Northern Areas	2,600
12 Countries (Nepal, India, Sri Lanka, Vietnam, China, Philippines, Fiji, Tonga, Solomon	1,27,000-

Islands, Papua New Guinea, Indonesia and Malaysia) with wide variety of bank and NGO programs	1,70,000
Joint and Participatory Forest Management	
India-joint forest management and forest protection committees in all states	15,000
Nepal-forest users' groups	5,300
Integrated Pest Management	
Indonesia (1 million graduates trained in rice and vegetable IPM programmes with farmer field schools), Vietnam, Bangladesh, Sri Lanka, China, Philippines, India (a further 800,000 trained)-not all remain in groups	18,000-36,000
Farmers Groups for Research and Experimentation	
Kenya-organic farming groups	185
Colombia-Farmer research committees	250
Denmark-pest management groups	620
Netherlands-farmer study groups for horticulture and arable	500
Total	**4,08,000-4,78,000**

Source: J. Pretty and H. Ward, 2001, 'Social Capital and Environment', *World Development*, Vol. 29, No. 02.

The importance of social capital in affecting conservation of biodiversity outcomes may also be related to how it is used. For example, Ostrom (1998) emphasized that the benefits that accrue from social capital at a local level arise from self-organized resource governance systems. In other words, social capital directed toward stewardship may be more important in affecting environmental performance than social capital directed towards advocacy. Social capital may improve conservation performance at the local level. However, it does not necessarily imply that the federation of such networks on a national level (Pretty and Ward 2001) will be successful or that the requirements for effective collective action will exist at higher levels of aggregation.

Thus, it is important to note that many aspects of social capital may not directly lead to improvements in national biodiversity conservation performances. For instance, a country might be characterized by a high level of trust and functional networking, but this may not translate itself into a better state of biodiversity conservation. Indeed, given the time constraints on all individuals, the greater the time spent in one particular set of activities or networks the less time that can be devoted to competing activities. Furthermore, an increase in membership of social institutions that focus on the

conservation does not necessarily imply a rise in civic engagement focused on the conservation and management of biodiversity.

Concluding remarks

The chapter has described the theoretical framework of social capital as conceptualized by seminal figures – Bourdieu, Coleman and Putnam – as well as the international institutions (the World Bank). Social capital refers to resources that inhere in social relationships. The chapter also delineated different processes and forms as well as the levels of social capital. The second section of the chapter provides major elements of social capital that facilitates biodiversity conservation. The properties of social capital help to explain in understanding the participatory conservation that integrates local communities and the public institutions i.e. government, which has been discussed in chapter six. Thus, it could be argued that the theory of social capital is not a substitute for conservation of biodiversity rather a prerequisite for it.

CHAPTER – IV

Conservation of Biodiversity in India: Major Practices and Policy Frameworks

There is an increasing realization that the present variety of living organisms will not be maintained, unless the value as well as the stock of biodiversity is revealed, appraised, signified and ultimately conserved. The importance as well as the conservation of biodiversity has been, globally for the first time, realized at the 1992 United Nations Conference on Environment and Development at Rio de Janeiro under the banner of 'Convention on Biological Diversity (CBD)'. The Convention begins with a biological foundation (natural science), but gradually builds upon with economics, sociology, political science, and other human and social sciences to undertake new principles and practices towards biodiversity conservation. India, as a signatory to the CBD, 1992, has also restructured its conservation measures – for example, Biological Diversity Act, 2002 and Biological Diversity Rules, 2004 – in light of the CBD, 1992.

The present chapter describes the trajectory of biodiversity conservation with specific reference to India. The chapter is broadly structured in two sections. The first section, in short, delineates the conservation of biodiversity in colonial India. The second section demonstrates the conservation of biodiversity in post-colonial India. Thus, the chapter under discussion critically analyzes the practices and processes involved in biodiversity conservation both in colonial and post colonial India.

4.I Conservation of biodiversity in India

Although the interest for 'biodiversity conservation' has emerged in India only after CBD, 1992 or especially in 2002 through the emergence of Biological Diversity Act, 2002, the interest for conservation of biodiversity could be traced back to the colonial India. As literature suggests (Kothari 1992 and 1997), the contemporary conservation

initiatives, especially till the last quarter of 20th century have been the byproduct of the direct/indirect reproduction/partial reproduction of the colonial conservation practices. Hence, it is an obligatory task for the current research to begin the discussion on biodiversity conservation right from the colonial period. Thus, the present section, in brief, analyzes the development of biodiversity conservation in India in two broad sections: the colonial conservation initiatives (CCI) and post-colonial conservation initiatives (PCCI).

4.I.a Colonial conservation initiatives (CCI)

The colonial conservation initiatives are primarily centered on the implementation of forest-led legislative actions that have led to the development/destruction of the forest resources (discussed in detailed in following sections) in India. This forest-led conservation action has been playing a definite role, even today, in (re)shaping the forest resources in India. However, prior to British colonialism, the forest management initiatives have been practised in India[25]. In fact, while analyzing the conservation initiatives in colonial India, our main emphasis will be on the unraveling of the historical processes through the development of forestry policy, management, and legislative frameworks, which have certainly restricted the customary rights of the forest-dwelling communities.

[25] As literature suggests, two thousand years ago, as much as 85 per cent of the Indian subcontinent was covered with forests (Bentley, Singh and Chatterjee 1988). While there is little written record describing early human-forest interactions, Vedic literature indicates that forests were held in high esteem, and the ethnobotanical knowledge of the people of those times was extensive (Rawat 1991). Extracting one couplet from Rigveda that expresses the importance of forest resources, Mark Poffenberger and Chhatrapati Singh (1996) mentions, 'I have praised the Queen of the Forest, Mother of Wildlife, Redolent of balm, sweet scented, possessing much food…'. Apart from this Vedic orientation of forest importance, even the most powerful rulers recognized and respected the importance of forests for communities and for the environment. Kautilya, the famous authority on statecraft in the Mauryan period, wrote a treatise on forest regulations. Shivaji, the dynamic Maratha leader, in his edict of 1670 instructed his officers that mango and jackfruit trees 'must never be touched … Our people have nurtured them like their own children over periods. If they are cut, their sorrow would know no bounds … Rather it would bring ill repute to the ruler who hurts the citizenry. Furthermore there is grave danger in the loss of tree cover' (Gadgil 1991). However by the time of the Moghul era, the forest destruction and commercialization had gradually started. A timber market had penetrated much of the Deccan and northern belt, and accelerated clearance of plains forests for agricultural land to increase state revenue (Singh 1996).

The ecological history or more specifically the conservation history of colonial India is of special interest in view of the intimate connection that has been built through the conservation initiatives of British rule that ultimately led to the degradation of natural or bioresources[26] on the one hand and the alienation of forest communities on the other hand (Gadgil and Guha 1993). At the time when the Europeans came in contact with India, Europe, at that time, was on the threshold of the momentous process of social change commonly known as the 'Industrial revolution'. Three elements of that revolution had greatly influenced the colonial rulers in India, which are of special interest when we (re)construct conservation initiatives in British India. According to Madhav Gadgil and Ramachandra Guha (1993), these three elements are: first, it lowered the emphasis on resource gathering and food production for subsistence, focusing instead on the gathering, production, transport and transformation of resources for use as commodities; second, cooperation with neighbours of long standing, the characteristics among people engaged in subsistence gathering and food production, became less and less important, leading to complete breakdown of cohesion among the local communities; and finally, perhaps most importantly, the changing 'hardware' (commodity) of resource use was accompanied by a dramatic change in its software (which was measured in terms of money and market). These three characteristics of the industrial mode of resource use are central to a proper understanding of the conservation discourse of the colonial rule. To quote Gadgil and Guha (1993):

> For the elevation of commercial over subsistence uses, the delegitimization of the community, and the abandoning of restraints on resource exploitation-all ran counter to the experience of the vast majority of the Indian population over which

[26] According to Gadgil and Guha (1993), this connection is of special interest in recent times when we are talking about western imperialism and environmental degradation. To him, 'world ecology has been profoundly altered by western capitalism, in whose dynamic expansion other ecosystms were disrupted, first through trade and later by colonialism' [M. Gadgil and R. Guha, *This Fissured Land: An Ecological History of India* (1993, Delhi: Oxford University Press)].

the British were to exercise their rule. This was a clash, in more ways than one, of cultures, of ways of life.

With these cardinal features of Industrial Revolution that played an influential role in shaping the colonial conservation projects, the early days of British rule, as literature suggests, were characterized by a state of total indifference to the needs of forest conservation; indeed, up to the middle of the nineteenth century, the British Raj saw, as Guha (1983) says, a fierce onslaught on India's forests[27]. This exploitative tendency of Raj over forest resources was primarily due to the demands made by the occupation for military purposes and to supply the teak export trade. Furthermore, the administrators were destroying the forests with a misconception, as Guha (1983) would rightly represent, 'the forests represented an obstruction to the 'prosperity' of the country, as their removal would add to the class of land paying revenue'. Another crucial reason behind the destruction of forests was undoubtedly the development of railway networks. This process was greatly intensified in the early years of the building of the railway network after about 1853. To quote Gadgil and Guha (1993): 'while great chunks of forests were destroyed to meet the demand for railway sleepers, no supervision was exercised over the felling operations; a large number of trees were felled and lay rotting on the ground'. The establishment of railway was created to meet the need for rapid troop communication felt after the Sipoy Mutiny (in the year 1857) and for enabling the characteristic pattern of colonial trade – export of primary commodities from the colony and import of finished goods into the colony from the metropolis (Guha 1983). To sum up, from 1770 to 1860, forests were increasingly viewed as an asset of the state with great commercial potential[28]. In addition, Gadgil and Guha (1993) mention

[27] Ramachandra Guha, 'Forestry in British and post-British India: A historical analysis' in *Economic and Political Weekly* (1983, Mumbai: Sameeksha Trust Publication).
[28] Richard P. Tucker, 'The British empire and India's forest resources: the timberlands of Assam and Kumaon, 1914-1959' in John F. Richard and Richard P. Tucker (eds.) *World Deforestation in the twentieth*

that the ultimate focus of the colonial administration was to destroy the forest resources for generating more revenues in favour of imperial administration.

However the over depredation of the biodiversity of forest resources finally awoke the colonial authorities, because the colonial rule realized that the rich forest resources of India were being overexploited by the private enterprises in a reckless and wasteful manner (Guha 1983). Therefore, the colonial rule was forced to develop a 'regulatory framework' – in the form of formal bureaucratic administrative set ups – to administer the overexploitation of forest resources in order to safeguard their long-term imperial interest (Guha 1983). It was within this context that the imperial 'Forest Department' was formed in 1864. Even after the establishment of Forest Department, the task of checking the ongoing rate of deforestation and the consolidation of the forest estate could not be accomplished without the assertion of state monopoly right over the forest (Guha 1983). As a result, the colonial rule under the banner of forest protection had passed several legislations in order to legitimate their state monopoly over the forest resources. The major legislative actions were as follows:

(i) The Indian Forest Act, 1865

The Indian Forest Act, 1865 provided for the protection of the forest only after it had been selected and declared as a government forest. The salient features of the Act were: (i) it asserted state monopoly over a forest land; (ii) it gave the government an indisputable power to draw up legislation for most forest lands and pastures; (iii) minor penalties were provided for certain offences in forests and with respect to trees. However this Act did not prove to be very successful due to the following reasons: it dealt with only state-owned forests; the definition of the forest that was given in this Act did not

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century (Durham, N.C.: Duke University Press, 1988) cited in Mark Poffenberger and Chhatrapati Sing, 'Communities and the state: re-establishing the balance in Indian Forest Policy', in Mark Poffenberger and Betsy McGean (eds.) *Village voices, forest choices: joint forest management in India* (Delhi: Oxford University Press, 1996).

apply to many areas and included some tracts that were not meant to be covered by it; and there were no provisions regarding the rights of users (Negi 1994). According to Guha (1983), the Act provided a series of prohibitions but said nothing about the protection of biodiversity of forest resources. In addition, the colonial administrators themselves were dissatisfied with the Act due to its restriction in dealing with communities and their forest use practices. The Act clearly stated that the law should not 'abridge or affect any existing rights of individuals or communities' to the forest resources [section 2 of Forest Act of 1965 cited in (Poffenberger and Singh 1996)]. As a result, the Act, 1865 was replaced thirteen years later by a far more comprehensive piece of legislation i.e. the Forest Act of 1978.

(ii) The Indian Forest Act, 1878

The revised Act of 1878 equipped the imperial rule to maintain strict state control over forest resources. The salient features of this Act were: (i) a system of reserved and protected forests was constituted for the first time; (ii) this Act also empowered the government to regulate the wastelands; (iii) armed with the provisions of this Act, the revenue department and the forest department, were able to regulate most forest and grazing lands; (iv) this Act provided the demarcation by the state of valuable tracts of forest needed for extending the network of railways that was going on at a very fast pace at that time; (v) it provided for enough flexibility over the rest of the forest land; (vi) this Act also established that the use of the forest by the villagers was not a right (unless specifically recognized) and it was a privilege of concession which depended solely on the will of the British rulers; (vii) the absolute ownership of the forest was vested with the British regime (Negi 1994). The Act, 1878 had also provided underpinnings in the 'scientific' management of forests, enabling the working of compact blocks of forest for commercial timber production. It provided three classes of forests: reserved forests,

protected forests, and village forests. In reserved forests, a legal separation of rights was attached that safeguard total state control by a permanent settlement. In protected forests (also controlled by the state) the rights were recorded but not settled. However, the control was firmly maintained by 'outlining detailed provisions for the reservation of particular tree species as and when they became commercially valuable, and for closing the forest whenever required to grazing and fuelwood collection'[29]. The village forests were not controlled by the state. These were provided to the rural population at the clemency of the colonial administration. Thus, the construction of these three categories of 'colonial conservation techniques' of 1878 Act, undoubtedly, explained the foundation on the emergence of systematic monopolization of British over India's biodiversity of forest resources. The Act provided the state with the legitimate right of property of total control over forest land and people. To quote Ramachandra Guha (1983):

> The provisions of the 1978 Act ensured that the state could demarcate 'valuable' tracks of forest, needed especially for railway purposes, and retain enough flexibility over the remaining extent of forest land to revise its policy from time to time. Monopoly right was established by a legal sleight of hand, which sought to establish that the customary use of forest by the villagers was based not on 'rights' but on 'privilege' and that this 'privilege' was exercised only at the mercy of the local rulers. Since the British were now the rulers, the rights of absolute ownership were held to be vested in them.

In addition, Gadgil and Guha (1993) argue:

> Under the provisions of the 1978 act, each family of 'rightholders' was allowed a specific quantum of timber and fuel, while the sale or barter of forest produce was strictly prohibited. This exclusion from forest management was, therefore, both *physical*

[29] Given the increased commercial demand and their relatively precarious position, from the government's point of view, protected areas were gradually converted into reserved forests where the state could exercise fuller control. Thus the 14,000 square miles of state forest in 1878 (the year the Act was passed) had increased to 56,000 square miles of reserved forests and 20,000 square miles of protected forests in 1890-the corresponding figures a decade later being 81,400 and 3,300 square miles respectively [M. Gadgil and R. Guga, *This fissured land: an ecological history of India* (1993, Delhi: Oxford University Press)].

– it denied or restricted access to forests and pasture – as well as *social* – it allowed 'rightholders' only a marginal and inflexible claim on the produce of the forests.

(iii) The Forest Policy, 1894

After the establishment of a structured forestry set up in 1864, with the appointment of Dr. Dietrich Brandis as the first Inspector General of Forest, the first National Forest Policy was formulated in 1894. This document, bearing the circular No.22-F dated 19th October 1894, was based on 8th and 9th Chapters of Dr. Voelcker's Report on 'Improvement of Indian Agriculture and Review of Forest Administration in British India for 1892-93'. These documents differed in their approach considerably. While Dr. Voelcker attempted to recommend the role of forestry as subservient to agriculture, the Inspector General of Forest adopted a conservative approach and discussed in detail the principles, which should underlie the management of a state forest in India. However, the efforts were made to accommodate both viewpoints and to produce a document, which lays down the general policy regarding management of forests in British India. As per the policy, forests, being state property were broadly classified under four headings namely, Forest for Preservation, Forest for Commercial purposes, Minor Forests and Pasture Lands. The Policy was produced in the following few lines, which were later largely reflected in the Forest Act of 1927 (Negi 1994).

- The forests of India, considered as the State property, were classed under four headings: (i) Forests the preservation of which is essential on climatic or physical grounds; (ii) Forests which afford a supply of valuable timbers for commercial purposes; (iii) Minor forests; and (iv) Pasture lands.
- The first category of forests is generally situated on hill slopes, where the preservation of such vegetation as exists, or the encouragement of further growth, is essential to the protection from the devastating action of hill torrents on the cultivated plains that lie below them.
- The second category of State forests includes the great tracts from which our supply of the more valuable timbers – teak, sal, deodar and the like – is obtained.

They are for the most part (though not always) essentially forest tracts, and encumbered by very limited rights of user; and, when this is the case, they should be managed mainly on commercial lines as valuable properties of, and sources of revenue to, the State.

- The third category of forests includes those tracts which, though true forests, produce only the inferior sorts of timber, or the smaller growths of the better sorts. The forests are useful chiefly as supplying fuel and fodder or grazing for local consumption; and these must be managed mainly in the interests of the population of the tract which supplied its forest requirements from this source.
- The fourth category of forests is referred to pastures and grazing grounds proper, which are usually forests only in name. It is often convenient, indeed, to declare them forests under the Act, in order to obtain a statutory settlement of the rights. The State on the one hand and private individuals or communities on the other, possess over them.

Although, the aim of this policy was to manage state forests for public benefit, certain regulation of rights and restriction of privileges for the use of forest by the neighbouring populations was provided in this policy.

(iv) The India Forest Act, 1927

The Indian Forest Act, 1878 was modified in parts. It was later on replaced by the comprehensive Indian Forest Act, 1927. The Act, 1927 contained almost all the major provisions of the earlier. This is the basic forest law of India today. The salient provisions of this Act are (Negi 1994):

- The State Government is vested with the power to constitute any forest or wasteland, that is, its property or over which it has proprietary rights, into a reserved forest.
- The State Government is empowered to make rules for regulating the management of village forests.
- The State Government may notify any forest land or wasteland which (is not a reserved forest) as a protected forest.

- The State Government may notify to regulate or prohibit in any forest or waste land the breaking up or cleaning of land for cultivation, the pasturing of cattle, and the firing or cleaning of the vegetation.
- The State Government controls all rivers and their banks with regard to the floating of timer and all timber and other forest produce in transit. It is empowered to regulate the transit or timber and other forest produce.
- Any Forest Officer or Police Officer is authorized to arrest without orders from a Magistrate and without a warranty, any person against whom a reasonable suspicion exists of his having being concerned in any forest offence punishable with imprisonment for one month or upwards.

Similar to forest resources, the value of wildlife has been appreciated in colonial India[30]. Closely related to the biodiversity of forest resources, the colonial India also brought a couple of legal mechanisms for the protection of wild species in India. The major legislative actions that engendered to protect and conserve the wildlife from exploitation were: the Elephants Preservation Act, 1879; some sections of Indian Penal Code, 1860; Wild Birds and Animals Preservation Act, 1887; Wild Birds and Animals Protection Act, 1912; National Park Act, 1936; and the Indian Fishery Act 1897. In fact, the main purpose of initial legislations during the British era was to regulate hunting (Negi 1994). The present study only focuses on the biodiversity of forest patch (medicinal plants). Hence, the discussion on the legal framework on wildlife is not necessary for the current study.

To conclude, the colonial biodiversity conservation initiatives were largely based on the principle of 'exclusion and exploitation'. The distinction between 'rights' and 'privileges' provided by the colonial conservation policies, was rightly treated as an

[30] Our ancient scriptures have attached religious significance to protecting animals and birds. During the reign of Chandragupta, provisions were made for establishing areas for wild animals along the borders of the country or in other suitable areas where animals and birds were given full protection and also cared for (Negi 1994). In the famous edicts given in Ashoka pillars there is a ban on the killing of both wild and domesticated animals. Punishments were prescribed for offences like trapping, killing or injuries deer, bison, birds or fishes which were declared to be under state protection or which were kept in reserved parts.

exploitative disposition of colonial administration that attempted to obliterate centuries of customary use by village communities all over India. The forest conservation projects during colonial era could be characterized into two broad statements. On the one hand, under the banner of forest protection and management, the colonial initiatives through several acts and policies have systematically legitimized its power in (over)exploiting the forest resources of India. On the other hand, as a consequence of the progressive diminution of 'rights' and the consequent loss of control over forest resources, Guha argues (1983), the village communities were brought directly under the subjugation of the colonial state. Thus, to conclude, the biodiversity of forest resources and their management during colonial era, as a consequence of the 'creative colonial conservation practices', had systematically produced four essential attributes:

- First, at the most fundamental level, the demarcation and fencing of large tracts of reserved forest meant an effective loss of control by the forest dwellers over their habitats – a control so necessary for the reproduction of their existence.
- Second, though the state had, in certain areas, made over some forests under the settlement, for the villagers to utilize (the so-called 'third class i.e. village forests'), the loss of community ownership had effectively broken the link between man and forest. According to Guha (1983), 'this alienation of man from forest can be compared to the alienation Marx talks about - that of the primary producers after being separated from the means of production'.
- Third, the large areas of forests (especially the overexploitation of forest resources [timer for example]) under the colonial administration had also gradually strengthened towards a process of intensification of colonial capitalist expansion.
- Fourth, as a result of the above three major consequences, perhaps the ultimate consequence of colonial forestry inventiveness was the decline in traditional conservation and management systems around the forests.

4.I.b Post-colonial conservation initiatives (PCCI)

While colonial policies towards the conservation of India's bioresources can only be expected to have been exclusionary as well as exploitative, it would be reasonable enough to have expected independent India's government to adopt alternative methods of conservation in order to change the long-persisting colonial conservation policies/practices. Yet, as a matter of fact, the independent India's conservation paradigm has adopted a 'state-centric approach' that, at the one hand, predominantly embraces the ownership (and, worship) of state and, at the other hand, astoundingly alienates the village communities in the processes of conservation of bioresources (Mishra 2007). At the time of Indian Independence in 1947, for example, the area under Reserved and Protected forests were 31 and 15 million hectares respectively, however, by 1950-51, the net area under the control of the Forest Department had increased to 68 million hectares, and between 1946 and 1951 the area under state control more than doubled from 26 million hectares to 54 million hectares (Murali, Sharma, Rao, Murthy, and Ravindranath 2000).

The post-colonial India, till the emergence of National Forest Policy of 1988, has been systematically continuing and commemorating the colonial conservation practices, which have been industriously replicated in her post-Independent environment-related policies and programmes. The National Forest Policy, 1988 has brought a breakthrough - discarding the 'commercial exploitation' and 'emphasizing the involvement of village communities' in the processes of protection, regeneration and development of forest resources – that has been in practice even today in various processes of conservation. With this brief background, the following section thoroughly explores the biodiversity conservation related initiatives especially after Independence till the emergence of

Biological Diversity Act, 2002 that has directly dealt with the conservation and sustainable management of biodiversity.

(i) Constitutional provisions on conservation

As part of the natural environment and life-support system, living organisms of our natural environment (more specifically bioresources) have been reflected in our Constitution. The Constitution of India has given due recognition to the protection of forest, wildlife and the forest-dependent tribal communities. The major Constitutional provisions are: Under Section 10 of the Constitution (Forty-second Amendment) Act 1976, amendments were made in Article 48, which reads as:

> Protection and improvement of environment and safeguarding of forests and wildlife – The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country.

Similarly, under Section 11 of the Constitution (Forty-second Amendment) Act 1976, a new Article 51A under Part V-A, was added to the Constitution in 1976. This Article reads as:

> Fundamental Duties: It shall be the duty of every citizen of India – (g) To protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures.

In addition to the above two Articles, the Supreme Court of India has also adjudicated cases concerning forests and environment under Article 14 – Equity before Law. So far as protection of tribal communities is concerned, it has been provided under Article 46 which states:

> Promotion of educational and economic interests of Scheduled Castes, Scheduled Tribes and other weaker sections – The State shall promote with special care the educational and economic interests of the weaker sections of the people, and, in

particular, of the Scheduled Castes and the Scheduled Tribes, and shall protect them from social injustice and all forms of exploitation.

(ii) Major legislative actions relating to biodiversity conservation

India after Independence has initiated several policy initiatives to enhance the conservation activity of the biological resources (especially the forests), which have been discussed in the following sections. After a detailed description on various legislative initiatives, the present chapter has also discussed the emergence of legislations that are directly linked to the conservation of biodiversity i.e. Biological Diversity Act, 2002 and Biological Diversity Rules, 2004 and National Biodiversity Action Plan, 2008.

(a) The National Forest Policy, 1952

India after independence has replaced the 1894 forest policy in 1952. The Indian Forest Policy, 1952 was initiated to allow exclusive 'State control' over forest management. The policy aimed to increase government control over forest resources and to develop forests to meet the timber needs of industry and defence. The policy advocated the extension of forestry beyond the forest area, to meet local and national demands. This policy also classified forests in four groups: protected forest, national forest, village forest and tree lands. It declared that village communities should not be permitted to exercise their traditional rights over the forests at the expense of national interest. The Indian Forest Policy, 1952 has recognized the need for:

(i) balanced and complementary land use, under which the forests would produce the most and deteriorate the least;
(ii) checking denudation in mountainous regions, the erosion progressing along the treeless banks of the rivers and the invasion of sea-sands on coastal tracts;
(iii) establishment of tree lands wherever possible, for the amelioration of physical and climatic conditions and promoting the general wellbeing of the people;
(iv) increasing supplies of fodder and small wood for making agricultural implements;

(v) sustained supply of timber and other forest produce required for defence, communication and industry; and

(vi) getting the maximum revenue in perpetuity, while fulfilling the needs enumerated above.

The major drawbacks of the policy were: the policy was biased towards promoting timber yield to generate revenue, by replacing so-called inferior species with valuable commercial species; and there was no emphasis on sustainable management of non-wood forest products and involvement of the people in management and protection of forests (Ravindranath and Sudha 2000).

(b) The Forest Conservation Act, 1980

The Forest Conservation Act, 1980 was enacted to reduce indiscriminate diversion of forestland for non-forestry purposes and to help regulate and control the recorded forest land use changes. This Act made it compulsory for Central Government approval to be sought before any forestland could be put to non-forestry uses. It also made it mandatory for compensatory plantations to be raised on an equivalent non-forested land or equal to double the area, on degraded forestland.

(c) The Social Forestry Programme during 1980

The report submitted by National Commission on Agriculture (NCA), 1976 noted that forests occupied 23 percent of India's land, but their contribution to the National Product was less than one percent. The NCA report has also suggested the beginning of Social Forestry Programme (SFP) on non-forestry lands such as village commons, government wastelands and farmlands to reduce pressure on forests. The main objectives of the SFP were: (a) to increase firewood, fodder, small timber, and minor forest product supplies for the rural population so as to lighten the burden on production forestry, (b) to restore a proper ecological balance, and (c) to ensure optimum utilization of land, water, livestock and human resources. The NCA emphasized on production-based forestry. As a result,

the SFP had to deal with two components – planting trees on private lands or farm forestry, and afforestation of village commons, degraded forests, irrigation tank beds and roads and canal margins. The exotic species such as Eucalyptus and Acacia were developed (Ravindranath and Sudha 2000). These exotic species had several advantages over the native varieties as they were fast-growing, met urban demand for poles, fetched better prices, and enjoyed a high rate of seedling survival (Ravindranath and Hall 1995; Ravindranath and Sudha 2000; Murali *et al.* 2000).

(d)The National Forest Policy, 1988

Acting upon the recommendation of the NCA, 1976, the Government of India, through a resolution dated 7th December 1988 formulated a new forest policy i.e. the National Forest Policy, 1988. The major objectives of the National Forest Policy (NFP), 1988 are:

- Maintenance of environmental stability through preservation and, where necessary, restoration of the ecological balance that has been adversely disturbed by serious depletion of the forests of the country.
- Conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna that represent the remarkable biological diversity and genetic resources of the country.
- Checking soil erosion and denudation in the catchment areas of rivers, lakes, and reservoirs in the interest of soil and water conservation, for mitigating floods and droughts and for the retardation of siltation of reservoirs.
- Increasing the sustainability of the forest/tree cover in the country through massive afforestation and social forestry programmes, especially on all denuded, degraded and unproductive lands.
- Meeting the requirements of fuel wood, fodder, minor forest produce and small timber of the rural and tribal populations.
- Increasing the productivity of forests to meet essential national needs.
- Encouraging efficient utilization of forest produce and maximising substitution of wood.
- Creating a massive people's movement with the involvement of women for achieving these objectives and to minimize pressure on existing forests.

Thus, the NFP, 1988 comparatively differed from the previous policies. This Policy stated that forests were not to be commercially exploited rather they were meant to conserve soil and the environment, and meet the subsistence requirements of local people. The emphasis was laid on environmental stability, maintenance of ecological balance and protection of rights and concessions of the tribal people. The Policy realized the importance of protecting NTFPs, improving their quality and enhancing their production for generating employment and income among the local and tribal people, besides fulfilling their domestic requirements of fuelwood, fodder and construction timber.

(e) The National JFM Guidelines, 1990

As mentioned above, the SFP during 1980s was primarily dominated by the Forest Department based on monoculture afforestation practices especially exotic species i.e. Acacia and Eucalyptus with a rare or minimal participation of the local community. As a result, the Government of Orissa and the Government of West Bengal passed resolutions recognizing the significance of local community towards the protection of forest. In fact, in response to the 1988 Forest Policy in general and the success stories of Orissa and West Bengal in forest management in particular, the Government of India passed a guideline on 1st June, 1990 to launch the participatory approach of forest management which was commonly known as 'Joint Forest Management (JFM)'. It recommended the participation of local communities in the regeneration of degraded forest, and notified that villages that are effectively protecting the forest would have exclusive rights to that forests' produce. Soon after the implementation of 1990 Guidelines, most of the state governments passed JFM resolution in their respective states.

The Guidelines aim at recognizing the rights of local communities over a clearly defined degraded patch of forest. The communities are eligible to receive benefits for the

responsibility of protection and conservation of specific forest patches. It also strongly encourages Forest Department to enlist the expertise of local non-governmental organizations to serve as catalysts between the government and the village community. The highlights of JFM are:

- It encourages a partnership between communities and the Forest Department and recognizes the role of NGOs.
- Access and benefits accrue only to organized communities undertaking regeneration. Equal opportunities are promised and also provided the participation of local communities.
- Usufructory rights to all-wood forest products and a percentage of the final timber harvest will be given to the participating communities on successful protection and fulfillment of the conditions laid down by the state.
- A 10-year micro-plan detailing forest management, institutional and technical operation is to be developed by the community management organizations with the local foresters.
- The Forest Department will fund SFPs for nursery raising, and the communities are encouraged to seek additional funds from other agencies as well.

(f) The National JFM Guidelines, 2000

After almost ten years of experience with JFM in different states, on 21st February 2000, the Government of India circulated/upgraded guidelines for various JFM activities in response to many issues confronting to the forest protection committees (FPCs), NGOs and the Forest Department. The major features of the guidelines are:

- Register the JFM or village committees under the Societies Registration Act, 1860 to provide them with legal back up. All adults of the village should be eligible to become members of the JFM Committees.
- At least 50 percent of the JFM General Body and 33 percent of the members in the Executive Committee should be women. A similar percent of women should be present to hold the respective meetings, and at least one of the office bearers should be a woman member of the committee.

- The JFM programme should cover both good forests and degraded forests, though the protected area network is outside its purview. Different Memorandum of Understandings (MoUs) should be drawn up for each of these forest types with regard to sharing of benefits, management strategies and the extent of area to be protected.
- State level representative forums or working groups need to be constituted to resolve conflicts in the functioning of the JFM Committees and to maintain harmony among different groups participating in the JFM.
- The self-initiated community forest management (CFM) committees need to be identified, recognized and registered as JFM Committees after proper verification of records and inquiry.
- For long-term sustainability of resources, a certain percent of revenue earned from the final harvest of the Committees and the Forest Department needs to be ploughed back for forest protection with transparent mechanism of income sharing among stakeholders.
- Concurrent and periodic monitoring of progress and performance of the programme should be undertaken at the division and state levels.

Thus, the analysis of legislative actions during post- Independent India till the emergence of Biological Diversity Act, 2002 figures out number of Acts and Policies towards the conservation of natural or biological resources. The formulation of these legislative mechanisms towards conservation had incredibly followed the colonial conservation models/practices – maximizing revenue from nature conservation – till the emergence of National Forest Policy, 1988. Hence, after 40 years of 'colonial conservation hangover', India has started to rethink/reorient its 'conservation discourse' through the implementation of NFP, 1988 and the national JFM Guidelines (1990 and 2000) that integrate the Forest Department and the communities into a single window in the process of conservation and sustainable management of biological resources.

4.1.b.iii Enactment of Biological Diversity Acts and Rules

The Ministry of Environment and Forest (MoEF), an implementing body of the Government of India, is continuously initiating steps to harmonize national policies and programmes in implementing various Multilateral Environment Agreements through wide-ranging consultations with concerned Ministries, State Governments, Non-Governmental Organizations (NGOs), experts and other stakeholders; to which the Rio Declaration on Convention on Biological Diversity, 1992 is not an exception. As stated in chapter one, the major objectives of the CBD, 1992 are: the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits. The Convention has reaffirmed that states have sovereign rights over their biological resources and that the states are responsible for conserving these resources and using the same in a sustainable manner. The contracting parties to the CBD are, therefore, required to integrate considerations of conservation and sustainable use of biological diversity in their various programmes and policies. The Parliament of India in accordance with the CBD, 1992 has enacted the Biological Diversity Act, 2002, the Biological Diversity Rules, 2004, and the National Biodiversity Action Plan, 2008.

(A) Biological Diversity Act, 2002

The Biological Diversity Act (BDA), 2002 was formulated after India became signatory to the CBD, 1992. The draft legislation was developed through an intensive consultation process involving all stakeholders such as the central government, state governments, institutions of local self-government, scientific and technical institutions, experts, non-governmental organizations, industry, etc (Brahmi, Dua and Dhillon 2004). The Act was passed by the Parliament in December 2002 and received the assent of the President of India on 5th February 2003. The Preamble of the Biological Diversity Act, 2002 states:

> An Act to provide for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of

biological resources, knowledge and for matters connected therewith or incidental thereto.

Thus, like CBD, 1992, the pertinent objectives of the BDA, 2002 are mainly threefold in nature. These are: conservation of biological diversity, sustainable use of its components, and equitable sharing of the benefits arising out of the use of biological resources. The Act consists of twelve chapters and sixty-five sections. Some of the salient provisions mentioned in the BDA, 2002 for regulation, access to biological diversity, and conservation and sustainable use of biodiversity are:

- Conservation and sustainable use of biological diversity.
- Conservation and development of areas important from the standpoint of biological diversity by declaring them as biological diversity heritage sites.
- Protection and rehabilitation of threatened species.
- Respect and protect knowledge of local communities related to biodiversity.
- Regulation of access to biological resources of the country with the purpose of securing equitable share in benefits arising out of the use of biological resources, and associated knowledge relating to biological resources.
- Securing the provision for sharing of benefits with local people as conservers of biological resources and holders of knowledge and information relating to the use of biological resources.
- Involvement of institutions of self-government in the broad scheme of the implementation of the Act through constitution of committees.

Key Provisions and regulations

The BDA, 2002 explicitly mentioned restriction in accessing the biological resources. It declares that certain persons are not to undertake biodiversity related activities without the proper approval of National Biodiversity Authority (NBA), which is reflected in Section 3.1:

> No person referred to in sub-section (2) shall, without previous approval of the National Biodiversity Authority, obtain any biological resource occurring in India

or knowledge associated thereto for research or for commercial utilization or for bio-survey and bio-utilization.

The BDA, 2002 also pronounces that the results of the biodiversity related research are not to be transferred to certain persons without the approval of the NBA. To quote Section 4:

> No person shall, without the previous approval of the National Biodiversity Authority, transfer the results of any research relating to any biological resources occurring in, or obtained from, India for monetary consideration or otherwise to any person who is not a citizen of India or citizen of India who is non-resident as defined in clause (30) of section 2 of the Income-tax Act, 1961 or a body corporate or organization which Is not registered or incorporated in India or which has any non-Indian participation in its share capital or management.

That apart, persons or corporate sectors should take prior permission from State Biodiversity Board (SBB) while using bioresources for commercial purposes, which has been highlighted in Section 7 that says:

> No person, who is a citizen of India or a body corporate, association or organization which is registered in India, shall obtain any biological resource for commercial utilization, or bio-survey and bio-utilization for commercial utilization except after giving prior intimation to the State Biodiversity Board concerned:
>
> Provided that the provisions of this section shall not apply to the local people and communities of the area, including growers and cultivators of biodiversity, and *vaids* and *hakims*, who have been practicing indigenous medicine.

The key provisions of the BDA, 2002 in achieving the conservation of biological diversity are as follows:

- Prohibition on transfer of Indian genetic material outside the country, without specific approval of the Indian Government.
- Prohibition on anyone claiming an Intellectual Property Right (IPR), such as a patent, over biodiversity or related knowledge, without permission of the Indian Government.

- Regulation of collection and use of biodiversity by Indian nationals, while exempting local communities from such restrictions.
- Measures for sharing of benefits from the use of biodiversity, including transfer of technology, monetary returns, joint Research and Development, joint intellectual property rights (IPRs) ownership, etc.
- Measures to conserve and sustainable use of biological resources, including habitat and species protection, environmental impact assessments (EIAs) of projects, integration of biodiversity into the plans, programmes, and policies of various departments/sectors.
- Provisions for the participation of local communities in the use of their resources and knowledge, and to charge fees for this.
- Protection of indigenous or traditional knowledge, through appropriate laws or other measures such as registration of such knowledge.
- Regulation of the use of genetically modified organisms (GMOs).
- Setting up of National, State, and Local Biodiversity Funds, to be used to support conservation and benefit-sharing.
- Setting up of Biodiversity Management Committees (BMC) at local village level, State Biodiversity Boards (SBB) at state level, and a National Biodiversity Authority (NBA).

Innovation in Institutional Restructuration

For the effective implementation of the Act, the BDA, 2002 has proposed a decentralized-three-tier institutional structure to develop national strategies, plans and programmes for conservation and sustainable use of biological resources. This institutional structuration would take measures for identification and monitoring biodiversity-rich areas and notify threatened species. It would also undertake promotion of incentives for research, training, public awareness and education with respect to biodiversity, and make assessment of environment impact of any activity likely to have adverse impact on biological diversity. The proposed three-tier institutions are: National Biodiversity Authority (NBA), State Biodiversity Boards (SBB) and Biodiversity

Management Committees (BMC), which are acting as catalyzing institutions at national, state and grassroot levels respectively.

National Biodiversity Authority

The Chapter III of the Act recommends the establishment of National Biodiversity Authority. According to the provision of the Act (Section 8.3), the head office of the NBA has been functioning at Chennai. The NBA has been established on 1st October 2003. The NBA deals with all the matters relating to requests for access by foreign individuals, institutions or companies, and all matters relating to transfer of results of research to any foreigner, for which prior approval of NBA is required (Sections 3 and 4). The powers and functions of NBA have been mentioned in Section 18, which says:

> "(a) advise the Central Government on matters relating to the conservation of biodiversity, sustainable use of its components and equitable sharing of benefits arising out of the utilization of biological resources;
> (b) advise the State Governments in the selection of areas of biodiversity importance to be notified under sub-section (1) of section 37 as heritage sites and measures for the management of such heritage sites;
> (c) perform such other functions as may be necessary to carry out the provisions of this Act".

That apart, The NBA may also take measures necessary to oppose the grant of IPR in any country outside India, on behalf of the Central Government on any biological resource obtained from India or knowledge associated with biological resource which is derived from India.

State Biodiversity Board

The Chapter VI of the BDA suggests the establishment of State Biodiversity Board. The SBB at state level is to be set up by the state governments to deal with the matters relating to access by Indians for commercial purposes. The Section 23 of the BDA deals with the functions of the SBB. The major functions are: to advise state governments

matters relating to the conservation of biodiversity, sustainable use of its components and equitable sharing of the benefits arising out of the utilization of biological resources; and to regulate by granting of approvals or otherwise requests for commercial utilization or bio-survey and bio-utilization of any biological resource by Indians.

Biodiversity Management Committees

Institutions of self-government are required to set up Biodiversity Management Committees (BMCs) in their respective areas for undertaking conservation, sustainable use, documentation of biodiversity and chronicling of knowledge relating to biodiversity (Section 41.1). The Chapter X of the Act deals with the constitution of the committees that are to be set up all local bodies, which have been clearly enshrined in Section 41(1) of the BDA:

> Every local body shall constitute a Biodiversity Management Committee within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity.

The BMCs may also levy collection fees from the persons collecting biological resources from their respective areas. To quote Section 41.3:

> The Biodiversity Management Committees may levy charges by way of collection fees from any person for accessing or collecting any biological resource for commercial purposes from areas falling within its territorial jurisdiction.

The NBA and the SBBs are required to consult the concerned BMCs on matters relating to the use of biological resources and associated traditional knowledge (TK) within their jurisdiction (Section 41.2). It says:

The National Biodiversity Authority and the State Biodiversity Boards shall consult the Biodiversity Management Committees while taking any decision relating to the use of biological resources and knowledge associated with such resources occurring within the territorial jurisdiction of the Biodiversity Management Committee.

The establishment of Biodiversity Fund

The BDA of 2002 also recommends the monetary support for the conservation of biodiversity through the establishment of three-structure of 'Biodiversity Funds'. This three-tier structure of the Fund will be actively functioning at national, state and local levels, which has been mentioned in Sections 27, 32 and 42. The monetary benefits, fees and royalties received as a result of approvals by NBA will be deposited in the 'National Biodiversity Fund (NBF)'. The Fund will be used for conservation and development of areas from where resources have been accessed, including management and conservation of heritage sites wherever applicable.

The NBF at national level will be applied for: channeling benefits to the benefit claimers; conservation and promotion of biological resources and development of areas from where such biological resources or knowledge are associated; and socioeconomic development of the areas where such rich biological resources or knowledge have been accessed. Similarly, the State Biodiversity Fund (SBF) will be applied towards: the management and conservation of Biodiversity Heritage Sites (BHS); compensation or rehabilitation of any section of the people economically affected as a result of the declaration of a area as Biodiversity Heritage Site; and the conservation and promotion of biological resources; socioeconomic development of areas from where the biological resources and knowledge are obtained. The Local Biodiversity Fund (LBF), at last, will be applicable towards the conservation and promotion of biodiversity in the areas falling

within the jurisdiction of the concerned local body and for the benefit of the community that is closely related to the conservation of biodiversity.

Biodiversity Heritage Site

Section 37 of the BDA, 2002 recommends the establishment of Biodiversity Heritage Site (BHS) that reads as:

> (1) Without prejudice to any other law for the time being in force, the State Government may, from time to time in consultation with the local bodies, notify in the Official Gazette, areas of biodiversity importance as biodiversity heritage sites under this Act.
>
> (2) The State Government, in consultation with the Central Government, may frame rules for the management and conservation of all the heritage sites.
>
> (3) The State Government shall frame schemes for compensating or rehabilitating any person or section of people economically affected by such notification.

The establishment of BHS is a particular way of achieving *in-situ* conservation by declaring biodiversity rich areas as BHS. The idea behind establishing this new category is to enable protection of areas of biodiversity importance.

(B) Biological Diversity Rule, 2004

In order to further elaborate and operationalize the provisions of the BDA, 2002, the Ministry of Environment and Forest, Government of India, on 15th April 2004, notified the Biological Diversity Rules. The BDR, 2004 is the executive order made by the Government in order to carry out the purposes of the BDA, 2002. The BDR, 2004 primarily deals with the setting up and the functioning of the NBA, SBB and BMC at national, state and local levels respectively. The Rules, 2004, among other things, outline the procedures to be followed for access to biological resources (wild plants and animals, crops, medicinal plants, livestock, etc), their commercial utilization, transfer of rights of research, and intellectual property rights related to biodiversity. From the point of view of local communities, it is important to understand the process of allowing

access/utilization of bioresources and also the role of communities. As mentioned in last section, the BDA, 2002 under Section 41(1) relating to local community on the establishment of BMC clearly states:

> Every local body[31] shall constitute a Biodiversity Management Committee within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity.

Under the Biodiversity Rule, Sec 22 specifies the constitution and role of Biodiversity Management Committees, and states:

> Every local body shall constitute a Biodiversity Management Committee (BMCs) within its area of jurisdiction.
>
> The main function of the BMC is to prepare People's Biodiversity Register (PBR) in consultation with local people.

The Peoples Biodiversity Register (PBR) is a document that records the diversity of species such as flora, fauna, crops, livestock etc. The Register is supposed to contain comprehensive information on availability and knowledge of local biological resources, their medicinal or any other use or any other traditional knowledge associated with them. Till now, there is no legal protection available for the knowledge recorded in the PBR. This is problematic when it comes to the question of access to this document. Even though communities create and maintain a database of their resources and knowledge, there is no other requirement that their consent would be sought when it comes to accessing the information in the PBRs. The Rule, 2004 has narrowed down the scope and

[31] (h) 'local bodies' means Panchayats and Municipalities, by whatever name called, within the meaning of clause (1) of article 243B and clause (1) of article 243Q of the Constitution and in the absence of any Panchayats or Municipalities, institutions of self-government constituted under any other provision of the Constitution or any Central Act or State Act.

function of the BMC as spelled out in the Section 41(1) of BDA, 2002. Therefore, the role for BMCs defined in the BDR, 2004 is a complete comedown from what was envisaged in the BDA, 2002which itself had its own set of problems.

That apart, few other critical problems both from the point of view of Act and Rules are:

- The definition of local body is problematic, as it leaves out Gram Sabha or other village assemblies. Since the local body has to appoint/select the BMC, the political affiliation and relationship between a village and the Panchayat body will play an important role in the constitution and functioning of the BMC.
- The process of constituting the local body i.e. BMC is by nomination. Rules 22(2) and (3) expressly mention that the members will be nominated by the local body and the Chairperson will be elected by the committee, then the BMC could become another power center and might not actually function to conserve biodiversity or protect community rights.

(C) National Biodiversity Action Plan, 2008

According to the provisions of the BDA, 2002 and the recommendations of the BDR, 2004, National Biodiversity Action Plan (NBAP), 2008 has been prepared. Section 36(1) of BDA which suggests:

> The Central Government shall develop national strategies, plans, programmes for the conservation and promotion and sustainable use of biological diversity including measures for identification and monitoring of areas rich in biological resources, promotion of *in situ*, and *ex situ*, conservation of biological resources, incentives for research, training and public education to increase awareness with respect to biodiversity.

The process of preparing the NBAP, 2008 for India was carried out by the MoEF, Government of India, involving wide consultations and planning with various stakeholders across the country. This NBAP document is broadly based on the evaluation of existing legislations, regulatory systems, implementation mechanisms, existing strategies, plans and programmes. It proposes to design actions based on the assessment

of current and future needs of conservation and sustainable utilization, and of physical and fiscal instruments, with particular reference to implications and impact of such instruments on short and long term basis (NBAP 2008). Considering the multidisciplinary nature of biodiversity, the actions identified in the NBAP are aimed towards the integration of the three objectives of the CBD, 1992 into relevant sectoral or cross-sectoral plans, programmes and policies. The NBAP, 2008 takes into account ecosystem approach, where appropriate, and promotes mainstreaming of gender considerations.

The objectives of the NBAP, 2008 have been focused on the following areas: (i) strengthening and integration of *in-situ*, on-farm and *ex-situ* conservation; (ii) augmentation of natural resource base and its sustainable utilization ensuring inter- and intra-generational equity; (iii) regulation of introduction of invasive alien species and their management; (iv) assessment of vulnerability, and adaptation to climate change and desertification; (v) integration of biodiversity concerns in economic and social development (vi) pollution impacts; (vii) development and integration of biodiversity database; (viii) strengthening implementation of policy, legislative and administrative measures for biodiversity conservation and management; (ix) building of national capacities for biodiversity conservation and appropriate use of new technologies; (x) valuation of goods and services provided by biodiversity and use of economic instruments in decision-making processes; and (xi) international cooperation (NBAP 2008).

Based on the above-mentioned objectives, the NBAP, 2008 has suggested action plans, which are to be achieved with the support of the different Departments and Ministries of the central as well as state governments, complemented by NGOs and civil society organizations working in the field of biodiversity. In addition, the state

government and Panchayati Raj Institutions (PRIs) would be encouraged to undertake their own action plans consistent with the present NBAP, 2008. The broad Action Plans are:

- Expand the protected area (PA) network of the country including conservation and community reserves, to give fair representation to all biogeographic zones of the country.
- Develop appropriate models for on-farm conservation of livestock herds maintained by different institutions and local communities.
- Promote *ex situ* conservation of rare, endangered, endemic and insufficiently known floristic and faunal components of natural habitats, through appropriate institutionalization and human resource capacity building.
- Promote decentralized management of biological resources with emphasis on community participation.
- Develop a unified national system for regulation of all introductions and carrying out rigorous quarantine checks.
- Assess the need for adaptation to future impacts of climate change at national and local levels, and the scope for incorporating the outputs of such assessments in relevant programmes, including watershed management, coastal zone planning and regulation, agricultural technologies and practices, forestry management, and health programmes.
- Develop strong research base on impact assessment and conduct rigorous impact assessment of development projects, with a focus on biodiversity and habitats.
- Minimize and eliminate activities leading to loss of biodiversity due to point and non-point sources of pollution and promote development of clean technologies.
- Develop an integrated national biodiversity information system with distributive linkages for easy storage, retrieval and dissemination including through augmentation of extant efforts of spatial mapping of natural resources and development of interactive databases at national level.
- Strengthen systems for documentation, application and protection of biodiversity-associated traditional knowledge, providing adequate protection to these knowledge systems while encouraging benefits to communities.
- Develop specific complimentary capacity building measures based on national needs and priorities for the formulation and implementation of national rules and

procedures on liability and redress to strengthen the establishment of baseline information and monitoring of changes.

- Promote, consolidate and strengthen global cooperation, especially with United Nations (UN) agencies and other international bodies on issues related to biodiversity.

Concluding remarks

The present chapter has systematically analyzed the conservation of biodiversity in India. The discussion on Indian system of conservation is grouped under two broad categories: the colonial conservation practices and the post-colonial conservation practices. The colonial conservation practices are primarily intended to accrue maximum benefits out of the conservation.

The post-colonial Indian conservation practices had inherited the colonial tradition till the arrival of NFP, 1988. The NFP, 1988 represents a significant departure from the existing policies since it insisted that the village communities must be actively involved in programmes of protection, conservation and management of forests. India has implemented its first biodiversity-based legal framework in 2002 through the Biological Diversity Act, 2002.

In fact, being a signatory to the Convention, India has enacted the Biological Diversity Act, 2002 and in subsequent years the Biological Diversity Rules in 2004 and the National Biodiversity Action Plan in 2008 to accentuate the process of conservation of biological diversity, sustainable use of its components and equitable sharing of benefits arising out of the use of biological resources. These legal concerns towards conservation have increasingly focused on the role of local communities in biodiversity conservation. Within this context, the present study makes an attempt to understand the functioning of Vanaspati Vana Project in Orissa in the subsequent chapters based on the theory of social capital.

CHAPTER V

Gandhamardan hills Range: The Locus of Medicinal Plant Species

As discussed in chapter four of the present study, India has been experiencing/witnessing several changes through various legislative frameworks in the process of conservation and sustainable development of biodiversity. India has significantly witnessed a shift from state/department driven conservation to joint/collaborative/participatory/integrative conservation models. This participatory conservation integrates communities on the one hand, and the forest department on the other. As mentioned in chapter one, one of such participatory conservation has been operating in Gandhamardan hills RF in Orissa under the banner of Vanaspati Vana Project, which has been critically analyzed in chapter six. The Present chapter describes the socioeconomic profile of the study area. The chapter characteristically features the socioeconomic background of the village communities in and around the Gandhamardan hill RF that comes under the districts of Balangir and Bargarh of Orissa.

5.I Geographic, socioeconomic, forest and medicinal plants profile of Orissa

The present-day state of Orissa was formed in 1936 from parts of three provinces – Central Province, Bengal Presidency and Madras Presidency, as well as parts of Bihar. The state of Orissa has situated on the eastern track of Indian peninsula is quite rich in natural resources and has several bio-diversity hot spot areas of the Indian subcontinent. It is located between the parallels of $17^0$27'N and $22^0$34'N latitudes and meridians of $81^0$27'E and $87^0$29'E longitudes. It is bounded by the Bay of Bengal on the east; West Bengal and Jharkhand on the north; Chattisgarh on the west and Andhra Pradesh on the south. The state of Orissa can be divided into five major morphological regions: the Orissa Coastal Plain in the east: the Middle Mountainous and Highlands Region; the

Central Plateaus; the western rolling uplands; and the major flood plains. The total geographical area of the state is 15.57 million hectares. According to 2001 census, Orissa comprises of a total population of 36,706,920 (3.57 per cent of the total population of India), out of which about 18,612,340 are male and 18,094,580 are female.

Orissa is among the poorest states in India, with very high levels of poverty. About 47 per cent of the population has been classified as below the poverty line in 2000 (Planning Commission [GoI] 2003). The per centage of poor people in southern and western Orissa is particularly high. Scheduled Tribes and Scheduled Castes are among the poorest groups in the state; the tribal population, which accounts for about 22.13 per cent of the total population, is the poorest of all. Of the total number of poor, 90 per cent live in rural areas, and poverty is particularly intense among tribal populations living in forest-fringe villages. The majority of tribal people live in southern and western Orissa, where most of the state's biodiversity of forests are located.

The state of Orissa with its varied topography climate and vegetation is endowed with rich biodiversity including a large variety of medicinal plants. Orissa, according to the Forest Survey of India (FSI) 2003, ranks fourth among India's states and union territories in terms of area under forest cover. The total area of the state is 155,707 Sq. km. The survey records the forested area as 58,136 Sq. km which is 37.34 per cent of the total geographical area of Orissa. The actual forest covers 30.2 per cent of geographical area. Clearly, about seven per cent of forestland area in the state does not contain any tree cover. Furthermore, forest cover is distributed unevenly in different regions of the state. The per centage of forest area to geographical area is much below the state average (30.2 per cent) in coastal districts. Southern Orissa (Gajapati, Kandhamal, Koraput, Malkangiri, Nabarangpur and Rayagada) and western Orissa (Kalahandi, Balangir, Bargarh, Sambalpur and Deogarh) have much greater forest cover, although this has

decreased in recent years. The main reasons for conversion of forest have been mining [35 per cent], irrigation [22 per cent], human habitation and others [16 per cent] and infrastructure: railway, transmission lines etc. [17 per cent] (Sarap 2007).

Orissa has also one of the oldest and richest traditions of using medicinal plant remedy. The tribal people of the state still depend on traditional ethno-medicines for day-to-day primary health care. The forests of Orissa, particularly the Gandhamardan hills, the Similipa hills, the Malayagiri hills, the Mahendragiri hills and the protected areas of the state are rich in medicinal plants. The following section presents a brief account of the profile of medicinal plants that are found in different tracts of Orissa.

Northern Orissa: For a long time, Shimilipal-Keonjhar belt was a storehouse of the medicinal plants particularly, Rauvolfia Serpentina. The Khadia tribals are the dominating tribe in Shimilipal so far as the collection of medicinal plants is concerned. They supply the raw materials and sell the collection at weekly markets. Out of the total 1076 plant species identified in Shimilipal, about 552 (51.3 per cent) are considered to be medicinal, and 70 of them are used extensively (Ratha 2005). During the last 20-30 years, there was an immense market demand for the medicinal plant resources of this particular region. As a result, scarcity of medicinal plants is a reality. But, heavy market demand has inspired the development of individual entrepreneur to go for cultivation of medicinal plants. Following is a case of an individual entrepreneur.

> The entrepreneur like Bismaya Kumar Dalei is a case in point. He employed local tribals to collect the Rauvolfia Serpentina (RA) from the wild and develop the cultivation in a nursery. This RA is popularly known in Orissa as 'Patal Garuda', which have been traditionally used for the treatment of snake bite. He took waste lands in lease and planted RA in about eight (8) acres of land. In the first phase of harvesting, he has sold about 4.5 quintals of dry roots to a leading trading company. He believes that the net profit per acre may be Rs. 70, 000 to 80, 000 (price at about Rs. 110/kg. of dry roots) [Ratha 2005].

Southern Orissa: The southern Orissa, particularly the Koraput district has pioneered in the cultivation of medicinal plants because since many years the local people of Koraput-Padua belt have resorted to commercial cultivation of Pippala, a species of piper whose roots are traded. This cultivation is said to have started in 1984-85 and facilitated by some of the influential persons from the state of Andhra Pradesh. Now, 30 hectares have been selected for commercial cultivation of the medicinal plants. High market price has lured many local people to go for its cultivation.

Western Orissa: The Gandhamardan hills RF, Sunabeda plateau, and forests of Thuamul-Rampur are some of the hotspots where medicinal plant resources are abundant in the western tract of Orissa. The Gandhamardan hills RF of western Orissa has been famous for its rich medicinal plant resources since centuries. Out of the total 450 species of plants found here, about 250 (55.55 per cent) have been identified as medicinal plants. A recent survey has mentioned that about 40 years ego 319 species of medicinal plants were found in the Gandhamardan hills RF but the current experiences suggest that the rate has reduced to 115 of medicinal species. Recently, Vanaspati Vana Project has been implemented at Gandhamardal hills RF in order to conserve and promote the medicinal plant species. A notable NGO namely Sabuja Biplab is now working for the conservation of medicinal plants in this region. Since 1997-98 Sabuja Biplaba is a Balangir-based NGO that holds the credit for officially promoting medicinal plant cultivation particular, *Aswagandha* and *Bruhati* on commercial basis in approximately 32 and 100 acres of land respectively. The cultivators are the local people.

Eastern Orissa: The eastern part of Orissa has promoted the conservation of medicinal plants through group or individual initiatives. Many people have reportedly taken attempts for cultivation of medicinal plants around the Chowdar region of Cuttack districts. Some of the women self-help groups of Kendrapara district have also taken

initiatives in cultivating the medicinal plants. The leading districts are Khurda, Cuttack and Angul.

According to floristic surveys of Orissa that records 2727 species, about 350 species are of rich medicinal value (Patnaik 2002). But, according to Ratha (2005), out of the total 2727 plant species identified so far in Orissa, about 1200 species (44 per cent) are in use for medicinal purposes. In addition, out of about 620 medicinal plants in trade in India, about 100 (16.12 per cent) are found in Orissa and out of the top 20 medicinal plant species in trade in the country, about 10 are found in Orissa. Almost all the medicinal plant resources of Orissa are collected from the wild, either from forests, or from waste lands. Traditionally, the local communities (especially the tribal people) are in the charge of preserving such rich heritage of natural resources of medicinal plants and their usage.

The plant products of medicinal use are consumed in the state by ayurvedic pharmacies, individual ayurvedic/herbal practitioners and common people. About 3500 tons of herbal raw materials are collected annually in the state, which is but 40 to 50 per cent of the actual potential; and out of these 3500 tons, about 3000 tons are supplied to other states and fifty per cent of the same returns to Orissa with an added value and higher price (Ratha 2005). The business transaction of the medicinal plants is carried out by a particular community known as '*Putuli Bania'* literally meaning traders with small sacks. Following is a brief description on the legislative frameworks to achieve the conservation of biodiversity of natural resources in Orissa (Table 5.1).

There are number of unique aspects to the governance of biodiversity of forest including biodiversity of medicinal plant resources in Orissa. The biodiversity of forest resources are controlled by two departments – namely, the forest department and the revenue department. Although the forest department is responsible for protecting all

types of forests, it only controls and manages about 45 per cent of forest area categorized as reserved forest and; the undemarcated protected and unclassed forests are under the administrative control of the revenue department (Sarap 2007). Orissa has witnessed various processes and initiatives in the processes of conservation and sustainable management of the biodiversity of forest resources. The following Table 5.1 depicts a historical account of the evolution of the conservation of biodiversity of forest resources in Orissa.

Table 5.1
Evolution of biodiversity conservation initiatives in Orissa

Year	Initiatives	Comment
1936	Orissa created	-
1936	Lapanga village forest protection committee (VFPC) formed in Sambalpur district	First recorded CFM in Orissa
1959	Forest Enquiry Report	-
1960s	Youth clubs take up forest protection as an activity	In context of social mobilization and launching of community development programmes
1970s	Forest protection by self-initiated groups evolved in Puri (Nayagarh) and Balangir, Sambalpur district	Emergence of CFM
1972	Orissa Forest Act	Empowered government to declare any land reserved, protected or village forests. Restricts local access to forest and treats *podu* (shifting cultivation) as inadmissible
1980s	CFM spreading in Nayagarh, Balangir, Dhenkanal and Mayurbhanj districts	Growth of CFM
1983-1985	Start of Social Forestry Project with financial assistance from the Swedish International Development Agency (SIDA)	Promotion of woodlots on village land rather than community involvement in forest management
1985	Orissa Village Forest Rules	Legal recognition of VFPCs and declaration of village forests
1987-1988	National Environmental Awareness Campaign	Sensitizes the people to the need for environmental and forest protection
1988 (August)	Resolution by Government of Orissa (GoO) to involve villages in protection of degraded reserved forest	Formation of self-initiated forest protection groups (SIFPGs). Focus on conservation and subsistence needs of local people
1990 (May)	Government resolution to involve community to protect protected forests	Formal acceptance of JFM approach
1993 (July)	Comprehensive resolutions of JFM and formation of Van Samraksyan Samities (VSS)	Strengthening participatory forest management
1994 (December)	JFM extended to social forestry areas	-
1996 (September)	Further JFM resolutions	More rights to communities by declaring village forests under joint management
1997	Process initiated at GoO level to draft a	-

(November)	new resolution on JFM	
1998 (October)	Massive campaign to form VSS by the forest department	To fulfill the target for desired numbers of VSS
2000	Orissa Forest (Amendment) Bill	More power to forest officials to fight mafias in order to check degradation of forests
2000 (March)	New state non-timber forest product (NTFP) policy	Ownership rights of 67 NTFPs to gram panchayats
2001 (July)	Resolution of state price-fixing committee giving power to panchayat raj institutions to decide NTFP prices	While fixing prices, local conditions to be taken into account
2002 (May)	Forest development agency (FDA) scheme created	All central consolidated forestry programmes to be implemented under integrated village afforestation and eco-developments through FDAs and implemented through VSS
2006	Orissa Forest Sector Development Society created with financial support from the Japan Bank for International Cooperation (JBIC) UK Department for International Development (DFID) Forest-Sector Reform Project approved	To oversee implementation of programmes on restoration of degraded forest and biodiversity conservation and to improve livelihood sources for forest-dependent populations

Source: K. Sarap, 2007, 'Forests and livelihoods in Orissa' in O. Springate-Baginski and P. Blaikie (eds.) *Forests, People and Power: The Political Ecology of Reform in South Asia*, Earthscan, London.

5.II Socioeconomic structure of the study area: the Gandhamardan hills RF

Having discussed, in brief, the overall socioeconomic as well as biodiversity of forest resources and medicinal plant resources in Orissa, the present section attempts to focus on the study area i.e. Gandhamardan[32] hills RF, Orissa. Lying between 20 42' – 20 56' N latitude and 82 41' – 83 65' E longitude, the Gandhamardan hills RF stands as a natural boundary at the border of Balangir and Bargarh districts located in the western tract of Orissa. The hills extend over a length of sixteen km and width of 2.5-3.2 km. on the northern summit of this hills lies a famous spring which gradually descends to the foot of the hills in fine waterfalls embracing the temple Nrusinghanath. On the southern slopes of these hills, there stands the temple of Harishankar. The Gandhamardan hill range is notified as Reserved Forests vide Government Notification No. 17307/D, dated

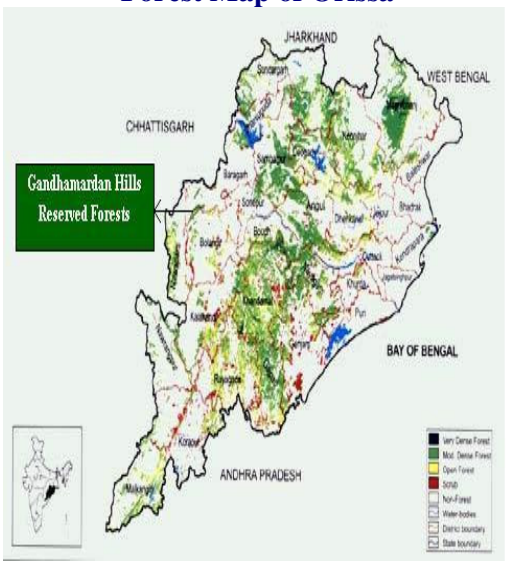
[32] The Gandhamardan hills is a veritable biosphere reserve of medicinal plants, which is mentioned in the epic Ramayan as the natural abode of medicinal remedy which saved the life of Lord Laxman. The Puranic interpretation says that when the life of Laxman was in danger due to 'Sakti Veda', Lord Hanuman was asked by Baidyaraj Sushena to collect 'Bishalyakarani' plant. It is believed that when Hanuman failed to identify the lifesaving 'bishalyakarani' plant and carried the whole mountain from the great Himalayas to Lanka to save Laxman's life, a part of it fell here. That is why, people say, the hills harbour many valuable medicinal species.

17.11.1955. The total area of Revenue Forest is 18629 ha out of which 6512 ha is under Balangir district and 11517 ha Bargarh district.

Location of the study area

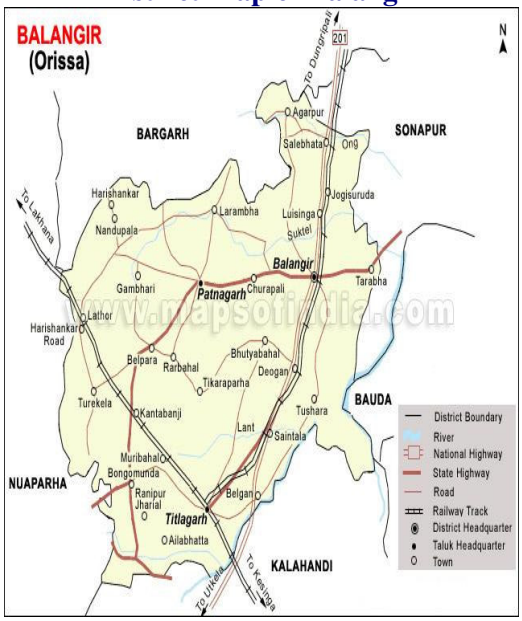
Map: 5.1
Districts Map of Orissa

Map: 5.2
Forest Map of Orissa



Map: 5.3
District Map of Bargarh

Map: 5.4
District Map of Balangir



The Gandhamardan forest block comprises of hilly and undulating area. Metamorphic rocks called Khandoalite occupy the Gandhamardan hill range with laterite within it. Clay and laterite soil are found in the vicinity of the mountainous regions. The higher clay content makes it to crack during summer and sticky during rains. Minerals like bauxite is found in Gandhamardan plateau. The average annual rain fall is 1500 mm. The maximum temperature recording is 42^0 C and minimum is 6^0 C. The relative humidity is higher in the hilly region throughout the year.

The Gandhamardan hills RF comes under the jurisdiction of two Forest Divisions, namely Balangir West Forest Division and Bargarh Forest Division. And, the operation of Vanaspati Vana Project has been implemented in two Ranges i.e. Harishankar Range and Nrusinghanath Range that come under the Balangir West Forest Division and Bargarh Forest Division respectively. The Balangir West Forest Division came into existence in 1st October, 2003. The total geographical area of the district is 6575 Sq. km. The total forest area is 1543.85 Sq. km that constitutes 23.48 per cent. Out of the total forests area, the Reserved Forest is 1105.68 Sq. km. The Division consists of seven Ranges – Saintala, Bongomunda, Titilagarh, Muribahal, Kantabanji, Lathore and Harishankar – that constitute thirty sections and one hundred six beats.

Bargarh Forest Division, consequent upon the reorganization of Forest Department, has come into force with effect from 1st October, 2003 vide Resolution No. 13228 dated 8th August, 2003, Department of Forest and Environment, Government of Orissa. Out of the total geographical area of 5837 Sq. km, the forest covers only 1216.13 Sq. km that constitutes 20.83 per cent of the total geographical geographical area. Out of the total forest area, the Reserved Forest constitutes 583.52 Sq. km. The Division consists of six Ranges – Bargarh, Bhatli, Ghess, Padampur, Paikmal and Nrusinghanath – that consist of twenty-three Sections and seventy Beats.

As mentioned above, the VVP operates in two Ranges i.e. Harishankar and Nrusinghanath of Balangir West Division and Bargarh Division that come under the administrative jurisdiction of Khaprakhol block of Balangir district and Paikmal block of Bargarh district respectively. These two Ranges have involved twenty-five village communities – the Harishankar Range involves ten village communities and the Nrusinghanath range involves fifteen village communities – in the process of conservation of biodiversity of medicinal plants. The village communities under Harishankar Range are: Dudumdarh, Sapmund, Mahulpali, Kandravata, Kuthurla, Nuapali, Nandupala, Chanchanbahali, Turla and Bramhani. These ten villages come under Khaprakhol block. The Nrusinghanath Range involves fifteen village communities – Rasmunda, Majhipali, Lergaon, Magurmal, Ranjitpur, Khandijharan, Georgegarh, Kendubhata, Gurunda, Manbhang, Kuradhiphasa, Laudimal, Patrapali, Motipali and Marjadapali – which come under Paikmal block. Out of these twenty-five village communities, the field study has been conducted on fourteen (14) village communities – six from Harishankar Range: Mahulpali, Kandravata, Kuthurla, Dudumdarh, Nuapali and Sapmund, and eight from Nrusinghanath Range: Rasmunda, Georgegarh, Laudimal, Manbhang, Majhipali, Magurmal, Kuradhiphasa and Lergaon – have been selected purposively to focus on the role of village communities and the Forest Department in the process of conservation of biodiversity of medicinal plants in the districts of Balangir (one of the principal regions of KBK [Kalahandi, Balangir and Koraput]) and Bargarh of Orissa.

The districts of Balangir and Bargarh are located in the western track of Orissa. The Balangir district lies between 82^0 41' to 83^0 42' East longitude and 20^0 9' to 21^0 05' North latitude. The district of Bargarh is situated between 82^0 39' to 83^0 58' East longitude and 20^0 43' to 21^0 41' North latitude. Being the neighbouring districts, the

Balangir district is bounded by the districts of Nuapada, Kalahandi, Kandhamal (Phulbani), Boudh and Sonepur districts whereas the Bargarh district is surrounded by Jharsuguda, Sambalpur and Sonepur districts. The geographical area of Balangir and Bargarh districts is 6575 Sq. km and 5837 Sq. km respectively. The Balangir district consists of 1,794 and 14 community development blocks whereas the Bargarh district includes 1,207 and 12 community development blocks. The Table 5.2 provides a brief profile of these two districts.

Table 5.2
A short profile of Balangir and Bargarh districts

Sl. No.	Categories	Balangir	Bargarh
1	Geographical Area	6575 Sq. km	5837 Sq. km
2	Forest Area	1543.85 Sq. km	1216.13 Sq. km
3	Total Households	3,03,385	2,96,514
4	Villages	1,794	1,207
5	Gram Panchayats	285	248
6	Blocks	14	12
7	**Total Population**	**13,37,194**	**13,46,336**
	Rural	11,82,871	12,42,795
	Urban	1,54,323	1,03,541
	SC	2,26,300 (16.92%)	2,60,719 (19.37%)
	ST	2,75,822 (20.63%)	2,60,691 (19.36%)
8	**Total Workers**	**5,59,750**	**5,93,530**
	Cultivators	1,73,700	2,01,047
	Agricultural Labourers	2,24,216	2,46,397
	Main Workers	3,51,689	3,84,710
	Marginal Workers	2,08,061	2,08,820

Source: Directorate of Economics and Statistics, 2008, *Statistical Abstract of Orissa – 2008*, Government of Orissa, Bhubaneswar, Orissa.

Thus, as stated above, the VVP has constituted twenty-five resource conservation groups at grassroots level that come under the community development blocks of Khaprakhol of Balangir district and Paikmal of Bargarh district in the process of conservation and sustainable development of biodiversity of medicinal plants. The geographical area of Khaprakhol and Paikmal blocks is 448.34 Sq. km and 564.64 Sq. km respectively. The total population of Khaprakhol is 70,112. The population of SCs and STs are 10,050 and 24,173 respectively. The total population in Paikmal block is

1,00,032 where the SCs are 14,638 and STs are 37,553. The total number of household in Khaprakhol is 17,411 living in 133 villages and in Paikmal it is 22,782 inhabiting in 150 villages.

5.III Features of social structure in study area

As stated earlier, the study is based on fourteen village communities: six from Khaprakhol block that comes under Harishankar Range, namely Mahulpali, Kandravata, Kuthurla, Dudumdarh, Nuapali and Sapmund, and eight from Paikmal block that comes under Nrusinghanath Range namely Rasmunda, Georgegarh, Laudimal, Manbhang, Majhipali, Magurmal, Kuradhiphasa and Lergaon. Thus, the study area that includes fourteen habitations, in turn, comes under two blocks. These fourteen village communities consist of 850 households that comprise a total number of 3,730 individuals (1870 males and 1860 females). Many different castes and social groups live in these fourteen forest-fringed villages.

5.III.a Caste and categories

Historically, the caste hierarchy has been strong in Orissa (Mishra 2004; Pantoja 2000). Not surprisingly, the social structure of these fourteen villages has been highly hierarchical. Various households from different caste groups are the characteristic features of these villages. The Table 5.3 depicts the profile of castes in the study area.

Table 5.3

Caste structure in study area

Castes	MP	KV	KT	DD	NP	SM	RM	GG	LM	MB	MJ	MM	KP	LG	Total
Adikandha		13								24				3	**40** (4.71)
Bairagi							5	1		1			2		**9** (1.06)
Banjara								1							**1** (0.12)
Bhulia				5				1						7	**13** (1.13)
Binjhal	2		7	1			12	29		1	20	23		12	**107** (12.59)
Brahmin								13			2	1			**16** (1.88)
Chamara								7							**7** (0.82)
Christian								45				1			**46** (5.41)
Dalakandha	18	17	9												**44** (5.18)

Dhoba								2						8	**10** (1.18)
Gond			8	6				3		8					**25** (2.94)
Ganda	1	2	20	3		23	5	9	6		13		3	14	**99** (11.65)
Gauda		2	19	40		1	4	17	20	1	1		1	7	**113** (13.29)
Gaudiakandha		3													**3** (0.35)
Gudia								1			1				**2** (0.24)
Hatua									4						**4** (0.47)
Kandara						1		1							**2** (0.24)
Kandha		2	10		24	12	1	1	44		15		66	5	**180** (21.18)
Karana						1		1							**2** (0.24)
Keuta								8			2				**10** (1.18)
Khadia								6							**6** (0.71)
Kolha									16						**16** (1.88)
Kulta		3		2			8	15			1			1	**30** (3.53)
Mahar		1													**1** (0.12)
Pandra										10				3	**13** (1.53)
Sabara							1	1							**2** (0.24)
Saura										1					**1** (0.12)
Sunari				3											**3** (0.35)
Sundhi			5					1							**6** (0.71)
Tanti								1							**1** (0.12)
Teli				2			6	14	8					3	**33** (3.88)
Mali													5		**5** (0.59)
Total	**21**	**43**	**78**	**62**	**24**	**38**	**42**	**178**	**98**	**46**	**55**	**25**	**77**	**63**	**850** (100)

Abbreviations: **MP:** Mahulpali; **KV:** Kandravata; **KT:** Kuthurla; **DD:** Dudumdarh; **NP:** Nuapali; **SM:** Sapmund; **RM:** Rasmunda; **GG:** Georgegarh; **LM:** Laudimal; **MB:** Manbhang; **MJ:** Majhipali; **MM:** Magurmal; **KP:** Kuradhiphasa; **LG:** Lergaon.

Table 5.3 shows that various caste groups live in the study villages. There are thirty-two (32) local castes in these fourteen village communities. As shown in table 5.3, all most all villages are multi-castes based except the Nuapali village. As a mono-caste village, Nuapali comprises twenty-four (24) households, which are from the Kandha sub-caste only. The other villages, although multi-castes in nature, are primarily dominated by a singly caste group, for example Mahulpali and Kandravata by Dalakandha; Majhipali, Rasmunda and Magurmal by Binjhal, Laudimal and Kuradhiphasa by Kandha, Dudumdarh by Gauda, Sapmund by Ganda, Laudimal by Adikandha and Kuthurla and Lergaon by Ganda. Georgegarh comprises maximum number of Christian households. The category of Brahmin is completely absent in all villages except in Georgegarh, Majhipali and Magurmal in Paikmal block. Thus, the caste structure of the

study villages are dominated by Kandha (180) and followed by Gauda (113) and Binjhal (107).

For a better understanding, the study has categorized the local or sub-caste structure into five major social categories: General, SC, ST, OBC and Christian. The table 5.4 presents the distribution of households in according with the nature of these social categories.

Table 5.4
Social categories in study

Caste	General	SC	ST	OBC	Christian	Total
Adikandha			40			**40** (4.71)
Bairagi				9		**9** (1.06)
Banjara			1			**1** (0.12)
Bhulia				13		**13** (1.53)
Binjhal			107			**107** (12.59)
Brahmin	16					**16** (1.88)
Chamara		7				**7** (0.82)
Christian					46	**46** (5.41)
Dalakandha			44			**44** (5.18)
Dhoba		10				**10** (1.18)
Gond			25			**25** (2.94)
Ganda		99				**99** (11.65)
Gauda				113		**113** (13.29)
Gaudiakandha			3			**3** (0.35)
Gudia				2		**2** (0.24)
Hatua				4		**4** (0.47)
Kandara		2				**2** (0.24)
Kandha			180			**180** (21.18)
Karana	2					**2** (0.24)
Keuta		10				**10** (1.18)
Khadia			6			**6** (0.71)
Kolha			16			**16** (1.88)
Kulta				30		**30** (3.53)
Mahar				1		**1** (0.12)
Pandra				13		**13** (1.53)
Sabara			2			**2** (0.24)
Saura			1			**1** (0.12)
Sunari				3		**3** (0.35)
Sundhi				6		**6** (0.71)
Tanti				1		**1** (0.12)
Teli				33		**33** (3.88)
Mali				5		**5** (0.59)
Total	**18** (2.12)	**128** (15.06)	**425** (50)	**233** (27.41)	**46** (5.41)	**850** (100)

Table 5.4 shows that all most all villages have maximum number of ST households that constitute fifty (50) per cent of the total households in the study villages. Within the category of ST, the Kandha (180) and Binjhal (107) castes have highest number of households. That apart, the social category of ST is followed by the OBC (27.41 per cent) and SC (15.06 per cent) households. The local castes like Gauda and Ganda have maximum number of households in the categories of OBC and SC respectively. The General category has only 2.12 per cent of total households. The General category includes only two castes such as Brahmin (16) and Karan (2).

5.III.b Class and landholding pattern

The village class structure in Orissa is embedded in caste because whether an individual controls land or not he/she is conditioned by that individual's caste status. Agrarian class structure, refers to the arrangement of groups (classes) determined by access, or denial of access to land, the principal means of production (Pathy 1981). While studying the *Talapatna* village in Ganjam district of Orissa, Jagannath Pathy (1975) provides seven-fold classification of agrarian class structure based on the pattern of land distribution and caste hierarchy: landlords, rich peasants, middle peasants, small peasants, farm workers (*Halia* and *Mulia*), business (for example, goldsmith), and others (small entrepreneurs like weaver). Thus, the land is considered as one of the important factor in determining the individuals' position in the village class structure.

The fourteen village communities consist of 2,090 acres of land: 742 acres under Khaprakhol block and 1348 acres in Paikmal block. The average landholding per household in the study area is 2.46 acres: 2.79 acres in Khaprakhol block and 2.31 acres in Paikmal block. Based on the landholding pattern of the households, the study has classified the households into five major categories: (i) Landless: the households which don't have access to land; (ii) Marginal: the households which have below two acres of

land; (iii) Small: the households which have two to four acres of land; (iv) Medium: the households which have four to ten acres of land; and (v) Large: the households which have ten and more than ten acres of lands. The following Table 5.5 presents the landholding pattern in the study villages.

Table 5.5
Landholding distribution in study villages

Villages	Landless	Marginal	Small	Medium	Large	Total
Mahulpali	14 (66.67)	1 (4.76)	1 (4.76)	5 (23.81)	0 (0)	**21** (100)
Kandravata	16 (37.21)	6 (13.95)	9 (20.93)	10 (23.26)	2 (4.65)	**43** (100)
Kuthurla	41 (52.56)	15 (19.23)	11 (14.10)	4 (5.13)	7 (8.97)	**78 (100)**
Dudumdarh	29 (46.77)	11 (17.74)	10 (16.13)	6 (9.68)	6 (9.68)	**62** (100)
Nuapali	10 (41.67)	2 (8.33)	4 (16.67)	8 (33.33)	0 (0)	**24** (100)
Sapmund	8 (21.05)	8 (21.05)	7 (18.42)	5 (13.16)	10 **(26.32)**	**38** (100)
Rasmunda	26 (61.90)	2 (4.76)	6 (14.29)	3 (7.14)	5 (11.90)	**42** (100)
Georgegarh	129 **(72.47)**	13 (7.30)	26 (14.61)	9 (5.06)	1 (0.56)	**178** (100)
Laudimal	47 (47.96)	5 (5.10)	28 (28.57)	13 (13.27)	5 (5.10)	**98** (100)
Manbhang	11 (23.91)	3 (6.52)	11 (23.91)	13 **(28.26)**	8 (17.39)	**46** (100)
Majhipali	26 (47.27)	5 (9.09)	12 (21.82)	7 (12.73)	5 (9.09)	**55** (100)
Magurmal	14 (56)	0 (0)	6 (24)	5 (20)	0 (0)	**25** (100)
Kuradhiphasa	32 (41.56)	11 (14.29)	25 (32.47)	5 (6.49)	4 (5.19)	**77** (100)
Lergaon	38 (60.32)	0 (0)	2 (3.17)	15 (23.81)	8 (12.70)	**63** (100)
Total	**441** (51.88)	**82** (9.65)	**158** (18.59)	**108** (12.71)	**61** (7.18)	**850** (100)

As shown in Table 5.5, almost all households of the study villages are in the category of landless except the villages of Sapmund and Manbhang which account maximum number of large and medium number of households respectively. In the village Sapmund, the category of large consists of 10 (26.32) households followed by landless and marginal (each 8 households), small (7) and medium (5) households. The village of Manbhang consists of maximum number of households in the category of medium (13), followed by landless and small (each 11 households), large (08) and at last marginal (03). Out of these 14 villages, the village of Georgegarh accounts for highest number of households in the category of landless i.e. 129 households (72.47 per cent) where as the village of Sapmund, as mentioned above, claims maximum number of households in the category of large i.e. 10 households (26.32 per cent). In addition, more than half of the

total households i.e. 441 (51.88 per cent) fall in the category of landless. Thus, it is interesting to point out that the study area consists of 523 (61.53 per cent) in the category of landless and marginal households together. Only 61 (7.18 per cent) numbers of households are large households. The villages of Mahulpali, Nuapali and Magurmal don't have access in the category of large. At this juncture, it is interesting to explore the landholding distribution among different castes in the villages.

Table 5.6
Landholding distribution among different castes

Caste	Landless	Marginal	Small	Medium	Large	Total
Adikandha	13	7	7	7	6	**40**
Bairagi	7	1	1			**9**
Banjara	1					**1**
Bhulia	4		4	5		**13**
Binjhal	57	8	24	16	2	**107**
Brahmin	12		2		2	**16**
Chamara	5		2			**7**
Christian	43	1	1		1	**46**
Dalakandha	19	5	7	9	4	**44**
Dhoba	3		1	4	2	**10**
Gond	5	6	6	4	4	**25**
Ganda	53	12	16	9	9	**99**
Gauda	62	13	22	13	3	**113**
Gaudiakandha	1		2			**3**
Gudia	2					**2**
Hatua	1	1	2			**4**
Kandara	1	1				**2**
Kandha	83	19	40	22	16	**180**
Karana	1		1			**2**
Keuta	9		1			**10**
Khadia	4	1		1		**6**
Kolha	16					**16**
Kulta	10	4	3	7	6	**30**
Mahar	1					**1**
Pandra	3		3	7		**13**
Sabara	1			1		**2**
Saura	1					**1**
Sunari	3					**3**
Sundhi	3				3	**6**
Tanti	1					**1**
Teli	15	3	11	3	1	**33**
Mali	1		2		2	**5**
Total	**441** (51.88)	**82** (9.65)	**158** (18.59)	**108** (12.71)	**61** (7.18)	**850** (100)

Table 5.6 shows that the category of landless includes households from each caste groups. There are castes which are completely landless: Banjara, Gudia, Saura, Sunari and Tanti. The category of large consists of limited number of castes. There are certain castes that don't have any access in the category of large such as Bairagi, Banjara, Bhulia, chamara, Gaudiakandha, Gudia, Hatua, Kandara, Karana, Keuta, Khadia, Kolha, Mahar, Pandra, Sabara, Saura, Sunari and Tanti. Out of the total number of households in each castes, the castes such as Sundhi, Mali and Kulta have highest number of households in the category of large: 3 (out of 5), 2 (out of 5) and 6 (out of 30) households respectively. For a better understanding, the Table 5.7 presents the distribution of landholding among different social categories.

Table 5.7
Distribution of landholding among social categories

Category	Landless	Marginal	Small	Medium	Large	Total
General	13 (72.22)	0 (0)	3 (16.67)	0 (0)	2 (11.11)	**18** (100)
SC	71 (55.47)	13 (10.16)	20 (15.63)	13 (10.16)	11 (8.59)	**128** (100)
ST	201 (47.29)	46 (10.82)	86 (20.24)	60 (14.12)	32 (7.53)	**425** (100)
OBC	113 (48.50)	22 (9.44)	48 (20.60)	35 (15.02)	15 (6.44)	**233** (100)
Christian	43 (93.48)	1 (2.17)	1 (2.17)	0 (0)	1 (2.17)	**46** (100)
Total	**441** (51.88)	**82** (9.65)	**158** (18.59)	**108** (12.71)	**61** (7.18)	**850** (100)

Table 5.7 describes that the category of landless includes maximum number of households from the households of Christian (43, 93.48 per cent), followed by General (13, 72.22 per cent), SC (71, 55.47 per cent), OBC (113, 48.50 per cent) and at last ST (201, 47.29 per cent). In addition, the category of large is comparatively more in the households of General (11.11 per cent) followed by SC (8.59 per cent), ST (7.53 per cent), OBC (6.44 per cent) and Christian (only 2.18 per cent) as per the total households in the respective social groups.

5.III.c Occupation and livelihood support systems

As stated in the above sections, the fourteen habitations are primarily forest-fringed villages. More than fifty per cent of the households are landless. As a result, the

households of these fourteen villages undertake different activities in order to support their day-to-day livelihood systems. It is very difficult to classify the type of occupations undertaken by the households because most of the households are not engaged in a single occupation. In fact, most of the households are generally multi-occupation-based. However, the study has made a classification of these forest-fringed households into eight categories for a better understanding of the occupation and livelihood systems of these tribal dominated village communities. These are: (i) Agriculture (ii) Agriculture and agricultural labour, (iii) Non-farm wage labour, (iv) Ethno-medicinal practice, (v) business, (vi) Government job, (vii) Agriculture and business, and (viii) NTFP collection. The Table 5.8 presents the division of households according to the occupation and livelihood support systems.

Table 5.8
Occupation in study villages

Villages	A	AA	NF	EP	B	GJ	AB	NC	Total
Mahulpali	6	1	2	2	2	0	0	8	**21**
Kandravata	15	8	10	0	1	0	4	5	**43**
Kuthurla	18	13	21	2	9	1	4	10	**78**
Dudumdarh	18	6	18	0	12	1	6	1	**62**
Nuapali	9	5	7	0	0	0	0	3	**24**
Sapmund	17	11	2	0	0	0	2	6	**38**
Rasmunda	8	5	8	1	8	1	3	8	**42**
Georgegarh	22	14	53	3	25	31	1	29	**178**
Laudimal	32	10	29	1	4	0	8	14	**98**
Manbhang	22	8	5	0	4	0	5	2	**46**
Majhipali	16	12	11	2	6	0	2	6	**55**
Magurmal	6	4	7	0	2	1	1	4	**25**
Kuradhiphasa	16	19	14	2	3	0	10	13	**77**
Lergaon	23	1	11	2	11	2	0	13	**63**
Total	**228**	**117**	**198**	**15**	**87**	**37**	**46**	**122**	**850**
	(26.82)	(13.76)	(23.29)	(1.76)	(10.24)	(4.35)	(5.41)	(14.35)	(100)

Abbreviations: A: Agriculture: **AA**: Agriculture and Agricultural Labour; **NF**: Non-Farm Wage Labour; **EP**: Ethno-medicinal Practice; **B**: Business; **GJ**: Government Jobs; **AB**: Agriculture and Business; **NC**: NTFP Collection

Table 5.8 shows that along with other activities, agriculture is the main occupation in the study area. It reveals that there are 345 (40.58 per cent) number of

households, which been involved in agriculture and agricultural labour, followed by non-farm wage labour (198), NTFP collection (122), business (87), agriculture and business (46), government job (37), and ethno-medicinal practice (15). The Table 5.9 describes the type of occupations undertaken by different castes in the study village.

Table 5.9
Castes and occupations

Castes	A	AA	NF	EP	B	GJ	AB	NC	Total
Adikandha	13	10	7	0	2	0	4	4	**40**
Bairagi	0	1	3	0	3	0	1	1	**9**
Banjara	0	0	0	0	0	0	0	1	**1**
Bhulia	6	0	1	0	3	0	3	0	**13**
Binjhal	30	18	20	4	5	6	1	23	**107**
Brahmin	1	0	3	1	5	5	1	0	**16**
Chamara	0	2	4	0	1	0	0	0	**7**
Christian	1	0	16	0	3	8	1	17	**46**
Dalakandha	17	5	4	2	1	0	3	12	**44**
Dhoba	5	0	0	0	2	3	0	0	**10**
Gond	14	5	3	0	0	0	0	3	**25**
Ganda	23	16	27	1	10	2	4	16	**99**
Gauda	28	10	33	0	30	0	10	2	**113**
Gaudiakandha	0	2	0	0	0	0	0	1	**3**
Gudia	0	0	0	0	1	1	0	0	**2**
Hatua	0	0	0	0	1	0	3	0	**4**
Kandara	0	1	0		0	1	0	0	**2**
Kandha	51	36	41	7	3	0	10	32	**180**
Karana	0	1	0	0	1	0	0	0	**2**
Keuta	1	0	4	0	3	1	1	0	**10**
Khadia	1	1	1	0	0	0	0	3	**6**
Kolha	0	0	9	0	0	0	0	7	**16**
Kulta	13	2	4	0	3	7	1	0	**30**
Mahar	0	0	1	0	0	0	0	0	**1**
Pandra	6	2	0	0	3	0	2	0	**13**
Sabara	1	0	1	0	0	0	0	0	**2**
Saura	0	0	1	0	0	0	0	0	**1**
Sunari	0	0	3	0	0	0	0	0	**3**
Sundhi	3	0	2	0	1	0	0	0	**6**
Tanti	0	0	0	0	1	0	0	0	**1**
Teli	12	4	10	0	4	3	0	0	**33**
Mali	2	1	0	0	1	0	1	0	**5**
Total	**228**	**117**	**198**	**15**	**87**	**37**	**46**	**122**	**850**
	(26.82)	(13.76)	(23.29)	(1.76)	(10.24)	(4.35)	(5.41)	(14.35)	(100)

Table 5.9 shows that out of their total households, the castes such as Adikandha, Bhulia, Dalakandha, Gond, Kulta, Pandra, Sabara, Teli and Mali are involved in agricultural and

agricultural labour occupations. The castes such as Binjhal, Brahmin, Christian and also Kulta households have engaged in government job occupation. Limited castes like Binjhal, Brahmin, Dalakandha, Ganda and Kandha are performing ethno-medicinal activities. Castes such as Binjhal, Christian, Dalakandha, Ganda, Kolha and Kandha are dependent on NTFP products for their daily occupations. For a better understanding, the following Table 5.10 presents occupation and livelihood systems among social categories in the study villages.

Table 5.10
Occupation among social categories

Category	A	AA	NF	EP	B	GJ	AB	NC	Total
General	1	1	3	1	6	5	1	0	**18**
	(5.56)	(5.56)	(16.67)	(5.56)	(33.33)	(27.78)	(5.56)	(0)	(100)
SC	29	19	35	1	16	7	5	16	**128**
	(22.66)	(14.84)	(27.34)	(0.78)	(12.50)	(5.47)	(3.91)	(12.50)	(100)
ST	127	77	87	13	11	6	18	86	**425**
	(29.88)	(18.12)	(20.47)	(3.06)	(2.59)	(1.41)	(4.24)	(20.24)	(100)
OBC	70	20	57	0	51	11	21	3	**233**
	(30.04)	(8.58)	(24.46)	(0)	(21.89)	(4.72)	(9.01)	(1.29)	(100)
Christian	1	0	16	0	3	8	1	17	**46**
	(2.17)	(0)	(34.78)	(0)	(6.52)	(17.39)	(2.17)	(36.96)	(100)
Total	**228**	**117**	**198**	**15**	**87**	**37**	**46**	**122**	**850**
	(26.82)	(13.76)	(23.29)	(1.76)	(10.24)	(4.35)	(5.41)	(14.35)	(100)

Table 5.10 shows that except General and Christian categories, the other categories i.e. OBC, ST and SC are involved in agriculture and agricultural labour occupations. The occupation of agriculture is almost same among OBC (30.04) and ST (29.88) followed by SC (22.66) households. The business occupation is active among General (33.33 per cent) and OBC (21.89 per cent) categories. In comparison to other categories, the General and Christian categories are primarily dominated in the occupation of government job. The Christian and ST categories are mostly dependent on NTFP products occupation in comparison to other social categories.

5.IV Tradition of conservation

As mentioned above, the Gandhamardan hill range is a reserved forest. Hence, the department of forest is legally in-charge of the conservation and sustainable development of biodiversity of medicinal plants. However, the forest-dwelling village communities are voluntarily involved in the processes of protection of this huge natural habitat of medicinal resources. They are voluntarily committed in protecting this natural habit because the communities achieve, to some extent, their livelihood supports from this forest in the form of NTFP products and raw medicinal produces. The village communities inform the local forest officials whenever they encounter any pilferers who are involved in the cases of thieving of forest produces. Hence, the community-level protection in Gandhamardan is completely voluntary in nature.

Concluding remarks

The filed study has been carried in fourteen habitations, situated at the Gandhamardan RF that comes under the territorial jurisdiction of Balangir and Bargarh districts. Situated at the western track of Orissa, these fourteen habitations come under two blocks: Khaprakhol and Paikmal blocks of Balangir and Bargarh districts respectively. The total household in these fourteen villages is 850. Thus, the study is based on these 850 households. The habitations are primarily mixed-castes village communities except the village of Nuapali, Khaprakhol block that comprises households from Kandha caste. In terms of social groups, these fourteen village communities are inhabited by ST households (50 per cent), followed by OBC (27.41 per cent), SC (15.06 per cent), Christian (5.41 per cent), and the General (2.12 per cent). More than fifty per cent (51.88 per cent) of households are landless; only 7.18 per cent of households are in the large category. In addition, all most 40.58 per cent of households are engaged in agriculture and agricultural labour activities. The occupation of NTFP collection is almost carried out by ST and Christian households. The conservation of the Gandhamardan RF is

legally in charge of the forest department. However, the communities are voluntarily involved in the processes of protection of this natural habitat.

CHAPTER – VI

Social Capital and Vanaspati Vana Project in Orissa: Communities, Connectedness and Conservation

The leitmotif of the fourth chapter, that we have discussed earlier, has been two-fold: One, it annunciates various policies, acts and initiatives adopted by India in the interest of biodiversity conservation. Two, as it clearly emerges from the discussion, India's latest approach to the practice of conservation is one of 'participatory intervention' where both the community (and/or non-governmental organizations) and the government department join together to work in tandem in the interest of bio-conservation. This 'participatory conservation' initiative, as we have discussed in fourth chapter, has been analyzed by the theory of social capital. Based on a field work in two districts (Balangir and Bargarh) of Orissa, the present chapter attempts an interpretative understanding of the actual processes and practices of participatory effort to conserve medicinal plants at the grassroot level through the application of the theory of social capital. In other words, the conservation of medicinal plants at Gandhamardan hills RF in the said districts of Orissa constitutes the focus of empirical investigation. The collaborative project i.e. VVP that aims at conservation of medicinal plants in the Gandhamardan zone functions under label of 'Vanaspati Vana Project' (VVP). The study also examines the level of social capital formation that encourages or encumbers in the processes of biodiversity conservation. To be more precise, the present study seeks to critically examine the functioning of VVP based on the theoretical framework of social capital, make sense of the effectiveness of joint venture for the conservation and sustainable development of such plants in Orissa.

In this context, the current study makes an attempt to examine and explicate the practices and processes involved in the functioning of the VVP in Orissa. While doing

so, the study also critically explains the interaction between the communities and the Forest Department (henceforth FD) in carrying out/achieving the target objectives of the VVP. It highlights the interplay between the communities and the FD in the processes of participation and formation of conservation groups at grassroot levels, rapport buildings, awareness campaigns, protection mechanisms and so on. In addition, the interaction between the communities and the FD is analyzed on different sociopolitical and administrative context such as level and type of social structure, common rules and norms, collective action, social bond, connectedness, networking etc.

With this background, the present chapter critically explores the conservation initiatives undertaken jointly by the village communities and the Forest Department (FD) in accomplishing the objectives of the VVP in Orissa. The presentation of this chapter is broadly structured in three basic sections. The first section deals with a systematic analysis of the conceptual inventiveness of VVP in Orissa: its objectives, institutional frameworks, and instruments confined to conservation and protection. The second section thoroughly uncovers the analysis of the processes and practices linked to VVP in conserving and safeguarding the biodiversity of medicinal plants at Gandhamardan RF in Orissa. The third section critically analyzes the presence/absence of antecedent variables that improve/impede social capital formation. This section highlights six major antecedent variables, which are responsible for development of social capital at grassroot levels that ultimately invigorates the processes of conservation and sustainable development of biodiversity of medicinal plants in Orissa. Thus, the chapter under discussion certainly discloses the role of social capital and VVP in conserving biodiversity of medicinal plants in western-tribal track of Orissa.

6.I Conceptualizing Vanaspati Vana project: characteristics, constituents (objective) and conservation methods

The Vanaspati Vana Project, a recent intervention in the processes of conservation and sustainable development of biodiversity of medicinal plants, is an instrument aiming towards introducing and developing participatory conservation practices. The project has been initiated by Orissa State Vanaspati Vana Society (OSVVS), Orissa. As a byproduct of the OSVVS [bearing the Registration No. 21426/4 under the Registration of Society Act XXX of 1860], the inauguration of VVP in Orissa is dated back to 5th April 2002. The VVP operates in Gandhamardan hills Reserved Forest (RF) that comes under the territorial jurisdiction of Balangir and Bargarh districts of Orissa. The project is funded by the Ministry of Health and Family Welfare, Government of India, New Delhi. The Department of Forest, Government of Orissa, Orissa monitors the implementation of the project. The dominant objective of VVP is to establish 'Vanaspati Vana' for the conservation and sustainable development of medicinal species especially medicinal plants, herbs and shrubs.

6.I.a Background

As a storehouse of rich bioresources, the proposed project area of Gandhamardan hills RF that borders/divides the districts of Balangir and Bargarh, embraces immense biodiversity of medicinal plants. The people of this forest-dwelling area mostly depends on the availability of the rich bioresources to support their day-to-day livelihood systems on the one hand, and conventionally to make use of these wealthy medicinal resources for their every day primary healthcare system. As a result, the existing natural resources at Gandhamardan hills RF have been gradually deteriorating leading to either complete extinction or partial intimidation of the available stock of medicinal species. According to ex-divisional forest officer (DFO), Bargarh forest division who is also performing as the current governing body (GB) members of the OSVVS:

Owing to the increasing pressure of the local communities and the lack of concern of the public (including government) over the bioresources available at Gandhamardan hills RF, we have been witnessing continuous diminution of the total stock of bioresources of medicinal species. As a result, the Gandhamardan hills RF, in recent times, is not only moving towards gradual process of bio-medicinal species depletion, but also witnessing an absolute extinction of certain medicinal species.

Of late, the Government of Orissa has realized to undertake necessary action in preserving and conserving these rare medicinal species through the much ambitious programme called Vanaspati Vana Project in and around Gandhamardan hills RF, which has later been approved by the Ministry of Health and Family Welfare, Government of India. The ultimate target of the VVP is to protect, preserve and propagate the medicinal species of Gandhamardan hills RF on the one hand and to boost the socioeconomic condition of the local communities inhabiting in and around the Gandhamardan hills RF. Keeping in view of the diversified nature of agro-climatic and topographical condition of the districts, various tree species as well as herbs, shrubs, creepers, and grass species – with primary emphasis on medicinal and nutritional values – have been considered to plant/cultivate in the approved project area. Moreover, the project also intends to generate employment facilities, livelihood support systems, and development of ethno-medicinal products and practices.

6.I.b Major objectives of VVP

The VVP is based on the following objectives:

- To identify and document the medicinal plant species along with their status in the project area;
- To develop the participation and partnership between the local communities and the Forest Department in undertaking *in-situ* conservation activity;
- To develop *in-situ* preservation, *ex-situ* conservation: nurseries-cum-demonstration, and herbal garden

- To generate employment potential and livelihood support for the forest–fringed dwellers in backward areas;
- To develop and disseminate scientific harvesting, processing and storage techniques relating to selected medicinal plant products; and
- To engender appropriate atmosphere in the processes of the production of ethno-medicines and their appropriate market-linkages between the primary collectors and the pharmaceuticals.

6.II Methods of conservation: formal and informal social capital

The VVP demonstrates two basic methods of conservation for the conservation of biodiversity of medicinal plants at Gandhamardan hills RF in Orissa. These are *in-situ* or on-site conservation and *ex-situ* or off-site conservation. These two major methods of conservation further adopt two forms of conservation techniques. The *in-situ* method of conservation adopts two techniques: *in-situ* preservation and *in-situ* conservation. Similarly, the *ex-situ* method of conservation comprises two techniques, such as *ex-situ* demonstration and *ex-situ* nursery. Thus, the VVP Orissa consists of four major methods of conservation (see Diagram 6.1):

I. *In-situ* preservation
II. *In-situ* conservation
III. *Ex-situ* demonstration
IV. *Ex-situ* nursery

Diagram 6.1
Major components of conservation

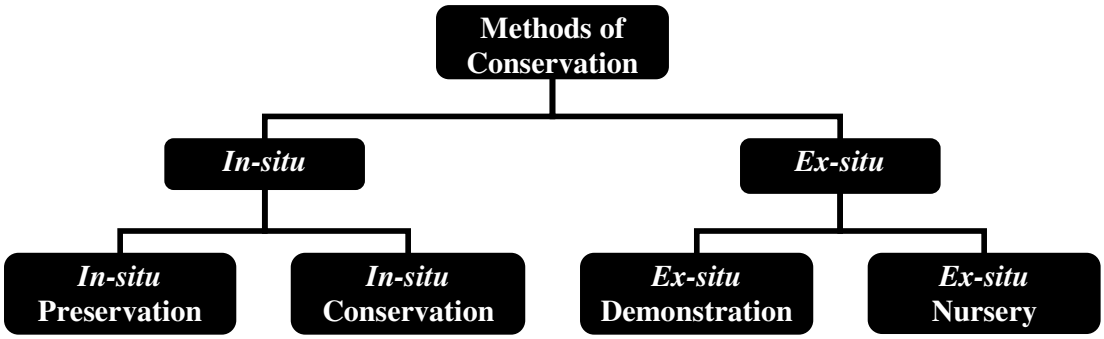


Table 6.1
Component-wise distribution of project area

[Figures in hectare]

Sl. No.	Conservation components	Balangir Division	Bargarh Division	Total
1	*In-situ* Preservation	100	100	200
2	*In-situ* Conservation	1000	2000	3000
3	*Ex-situ* Demonstration	16	16	32
4	*Ex-situ* Nursery	04	04	08
Grand Total		**2,120**	**3,120**	**3,240**

Table 6.1 shows that an area of three thousand two hundred forty hectares (3,240 ha) in and around Gandhamardan hills RF has been demarcated for the preservation, conservation, demonstration and nursery of biodiversity of medicinal species. Out of 3,240ha, 3,200ha belongs to Gandhamardan hills RF and remaining 40ha comes under village forest under Harishankar range (20ha) and Nrusinghanath range (20ha). As mentioned in chapter five, the total area of the Gandhamardan hills RF is 18,029 hectares, out of which 6,512 hectares in Balangir district and 11,517 is in Bargarh district. Thus, an area of 2,100 ha out of 6,512 ha and an area of 3,100 ha of 11,517 ha of Gandhamardan hills RF area from Balangir (west) and Bargarh forest divisions respectively have been selected for the implementation of the various components of VVP. The selection of the total project area of 3,240ha has been decided by the governing body of OSVVS, Orissa. In brief, this entire area of 3,240ha comes under the administrative jurisdiction of the Harishankar range of Balangir (west) forest division and Nrusinghanath range of Bargarh forest division. The operationalization of these four methods conservation is based on the formal/bureaucratic rules and regulations i.e. structural/formal social capital and community-level traditional values, norms and attitudes i.e. cognitive/informal social capital (Krishna and Uphoff 1999; Uphoff 2000; Uphoff and Wijayaratna 2000; Hitt et al. 2002).

6.II.a *In-situ* Preservation

The VVP reserves two hundred (200) hectares of RF area to undertake *in-situ* preservation activity at Gandhamardan hills RF. These two hundred hectares of preserved area is equally distributed among two ranges: Harishankar range (100 ha) of Balangir (west) forest division and Nrusinghanath range (100 ha) of Bargarh forest division. The principal objective of preserving this two hundred hectares is to maintain absolute control and, at the same time, to completely avert all kinds of biotic interferences and pressures. This *in-situ* preservation activity functions as a form of controlled experiment in the natural habitat i.e. Gandhamardan hills RF. And, the purpose of this controlled experiment is to conduct a scientific study on the growth and sustenance of the biodiversity of medicinal plants in this particular natural habitat at the end of the project period. As a controlled natural habitat, the FD has suggested certain activities to protect this preserved area. The study has categories these activities in the form of C^5 activities. These C^5 activities are:

- Confiscation of causes or factors that encumber the growth of natural (re)generation in general and biodiversity of medicinal plants in particular;
- Collection of leaves, flowers, fruits without affecting the natural (re)generation in consultation with the experts;
- Consolidation of the area in fenced boundary with barbed wire, RCC pillars and iron gate;
- Corroboration of soil and water conservation measures such as gully plugging, planting of grass, vegetative bonding, and check dams at feasible points; and
- Continuation of fire protection measures annually till the end of the project period with a view to keep the area undisturbed and undamaged.

The method of *in-situ* preservation is centralized, bureaucratic and department-driven in nature. The FD is exclusively controlled and undertaken the above-mentioned activities relating to preservation. The FD utilizes its authority and performs the

preservation activities according to the norms and regulation of the VVP. The participation of villagers is negligible. The villagers are only participated up to the extent of their wage-labour at various stages in accomplishing target objectives at ground reality. Thus, the village communities are completely excluded in the process of *in-situ* preservation of medicinal species at Gandhamardan hills RF.

6.II.b *In-situ* Conservation

Apart from two hundred hectares of *in-situ* preserved area, the VVP allocates another three thousand hectares (3000 ha) of gene-pool area for *in-situ* conservation at Gandhamardan hills RF. These three thousand hectares of area have been assigned to twenty-five village communities that come under the Harishankar and Nrusinghanath ranges. Out of the three thousand hectares of area, one thousand hectares (1000 ha) come under Harishankar range, which have been allotted to ten (10) village communities. Another two thousand hectares (2000 ha) of area that come under the Nrusinghanath range have been distributed to fifteen (15) village communities. The Memorandum of Understanding (MoU) of the operationalization of *in-situ* conservation is completely based on JFM mode that integrates the synergetic relationship between the participation of the village communities on the one hand, and the facilitative role of the forest department on the other. The central objective of allocating these three thousand hectares of area among twenty-five forest-dwelling village communities is to (re)generate artificially the biodiversity of medicinal plant species inside the natural habitat of Gandhamardan hills RF and, at the same time, to engender the economic wellbeing of these twenty-five forest dwelling communities. The major activities are:

- Surveying and distributing the project area to twenty-five village communities;
- Demarcating the respective project area with green fencing and barbed wire wherever necessary;

- Clearing creepers that interfere in the processes of the growth of medicinal species;
- Removing weeds interfering with the growth of the target species;
- Clearing fire line and engaging watchers for effective protection; and
- Undertaking soil and water conservation activities like check dams and percolation tanks.

As mentioned above, the method of *in-situ* conservation adopts integrative/participatory/collaborative approach. This participatory method of *in-situ* conservation integrates the participation of the village communities and their knowledge systems on the one hand, and the forest department and its legal systems on the other in comprehending the target objectives of the VVP in Orissa. This participatory conservation model that aims at conservation and development of biodiversity of medicinal plants at Gandhamardan hills RF is the central concern of the current research, which has been meticulously discussed in the following sections.

6.II.c *Ex-situ* demonstration

Apart from the methods of *in-situ* preservation and conservation, the VVP also undertakes *ex-situ* method of conservation and sustainable development of biodiversity of medicinal plants outside the Gandhamardan hills RF. The VVP carries out *ex-situ* demonstration activity in thirty-two (32) hectares of village forest (VP) area: sixteen hectares (16 ha) each both at Harishankar range and Nrusinghanath range. According to DFO, Balangir,

> This *ex-situ* demonstration activity of VVP is considered as 'model plantation' because of two reasons: One it focuses on the artificial generation of medicinal species in an open (non-RF) area. Two, it provides know-how (technology) on various stages of the medicinal species to the village communities.

The chief objective of *ex-situ* demonstration or 'model plantation' is to demonstrate, document and disseminate technologies to these forest-fringed village communities on

the various stages of plantation/cultivation, conservation and sustainable development of medicinal species. In fact, the main purpose of model plantation is to disseminate technology to the village communities starting from pre-plantation, plantation and post-plantation/harvesting of several varieties and numbers of medicinal tree species along with intercropping species such as herbs, shrubs and climbers.

Barbed with wire fencing, the Harishankar range has selected sixteen hectares of village forest for *ex-situ* demonstration near the village of Nuaplai. The cultivated medicinal species are: Amla, Raktachandana, Ashok, Neem, Bahada, Haldi, Ghrit Kumari, Lemongrass, Kumkum, Brahmi, Bhuni Neem, Safedmusali, Satavari, Tihudi, Bruddhadark. Similarly, the Nrusinghanath range has demarcated an area of sixteen hectare of village forest at the village of Khandijharan for the development of *ex-situ* demonstration. The medicinal species that are demonstrated are: Amla, Nageswar, Ashok, Jafra, Phanaphana, Gheekuanri, Muchukund, Gudmari, Chhatian, Ambada, Bena Grass, Dhamtari, Keo Kanda, Bruddha Darak, Patala Garuda, Palua, Krusna parni, Bidanga, Satabari.

The method of *ex-situ* demonstration is department-driven in nature. The members of the village communities participat externally as 'wage-labourers' to facilitate the demonstration activities. The FD has direct control over this method of conservation. The FD exclusively decides and cultivates the varieties of medicinal species.

6.II.d *Ex-situ* nursery and herbal garden

The VVP has established *ex-situ* nurseries and herbal gardens outside the Gandhamardan hills RF. The establishment of these nurseries and herbal gardens has been developed in eight hectares (8 ha) – four hectares each – of village forest in both the ranges of Harishankar and Nrusinghanath. The Harishankar range has developed a nursery in three

(3) hectares and an herbal garden in one (1) hectare of village forest at Nuapali. Similarly, the Nrusinghanath range has promoted both nursery in three hectares (3 ha) and an herbal garden in one hectare (1 ha) near the forest rest house at Paikmal. Both the ranges have grown medicinal tree species along with the intercropping of medicinal species of creepers, shrubs and herbs. The study finds that the herbal gardens at Harishankar range and Nrusinghanath range have raised one hundred twenty-four (124) and one hundred twenty-five (125) varieties of medicinal species respectively. The basic objective of this nursery and herbal gardens is to develop/cultivate and distribute medicinal seedlings to the village communities at a minimum/low price.

The major tree species are: Raktachandan, Phanaphana, Nageswar, Neem, Paldhua, Agibathu, Bela, Chandan, Chhatian, Harida, Kochila, Ritha, Sweta Kurein, Gambhari, Dalchini, Baula, Gangasiuli, Amla, Bahada, Ashoka, Bagachampa, Kaitha. The major shrub species are: Olat Kamal, Nirgundi, Manjuati, Arakha, Basanga, Kanta Malati, Rama jada, Khirakoli, Guggulu, Dalimba, Danti, Jhapda, Koya. The major herb species are: Bhrungaraj, Bana ada, Tulsi, Mayur chulia, Desi Palua, Palua, Sada bihari, Musuli, Aswagandha, Bana Piaja, Podina, Stevia, Kiakanda, Salaparni, Thalukudi, Jangali Palua, Akarkara, Ayapan, Bacha, Bakuchi, Lajakuli, Raktachitaparu, Swetachitaparu, Tejraj, Gandhasunthi, Dhantari, Brahmi, Bisalyakarani, Bena, Baidanka, Bilati Podina, Somraj, Patala Garuda, Mendhamundi, Brahmajatia, Dengabhaji, Ghritakumari, Ghoda Bacha, Bana Rasuna, Bhuin Limba, Bhuin Amla, Naga Airi, Krushan Parni, Pacholi. The major creeper species are: Gudmari, Prasaruni, Anantamula, Hadajodi, Akana Bindhi, Bana Piazza, Gila, Bhuin Kakharu, Kaincha, Pancha Angulia, Bidanga, Satabari, Rasna, Pepper, Pengu, Panibela, Guluchi, Aparajita, Bhuin Mandara, Bruddha Daraka, Pana Airi.

Like *ex-situ* demonstration, the method of *ex-situ* nursery and herbal garden is centralized in nature. The FD involves the villagers as 'wage-labourers' in generating and trading various varieties and numbers of medicinal seedlings/saplings.

Thus, the VVP Orissa that functions in and around Gandhamardan hills RF fundamentally adopts four methods of conservation and sustainable development of biodiversity of medicinal plants. Out of these four methods of conservation, three methods of conservation – *in-situ* preservation, *ex-situ* demonstration, and, *ex-situ* nursery and herbal garden – are completely centralized and bureaucratic in nature. These are centralized in the sense that the FD controls and employs its authority in implementing various activities at different stages. Based on VVP norms and regulations and official legal systems, the FD undertakes all activities in working out the target objectives of these three methods of conservation and sustainable development of biodiversity of medicinal plants. Thus, the three methods: preservation, demonstration and nursery strongly adopt structural/formal/bureaucratical form of social capital in the processes of conservation of medicinal species. This bureaucratic social capital alienates and excludes the participation of members of village communities in the process of conservation except their 'labour(s)', which are, even though, considered as precondition in carrying out/operationalizing the objectives of these three methods of conservation. The members of the village communities are completely excluded and their inclusion is confined to the form of human labour. Hence, the bureaucratic form of social capital puts into practice the process of 'exclusive inclusion' of the members of the village communities.

The *in-situ* conservation, in contrast, is different from these three conservation methods. The method of *in-situ* conservation is participatory in nature. This participatory *in-situ* conservation integrates/includes both the communities and the officials. The

communities are not treated as mere objects of 'human labour(s)' rather as partners for conservation. This synergetic form of conservation not only focuses on rules and legal system of the department (VVP), but also centers around the communitarian norms and value systems. Thus, the participatory method of *in-situ* conservation adopts both structural/bureaucratical social capital and cognitive/communitarian social capital. The present study is confined to this synergetic relationship of communities and the forest officials in the processes of conservation and sustainable development of the biodiversity of medicinal species. A detailed discussion has been mentioned in the following sections.

6.III Institutional structure of VVP: micro-, meso- and macro-level social capital

The VVP in Orissa, a participatory intervention, is considered as an instrument intending and introducing inventive practices and processes in conservation and sustainable development of biodiversity of medicinal plants. As mentioned above, Ministry of Health and Family Welfare, Government of India, New Delhi acts as the apex institution in providing financial support to this project[33]. In addition, the operationalization of VVP in Orissa is functioning with the active institutional support from the Ministry of Environment and Forest, Government of Orissa, Bhubaneswar. The project is also supported by other allied departments of Government of Orissa: Department of Health and Family Welfare, Indian System of Medicine and Homeopathy, and institution(s) related to Ayurveda. That apart, the project is also collaborated by the participation of the village level social institutions in the form of community based biodiversity conservation and development committees (CBCDCs). Thus, the VVP Orissa is multi-departmental in nature.

[33]The Ministry of Health and Family Welfare, Government of India, New Delhi has initiated a scheme called 'Vanaspati Vana' in response to meet the scarcity of medicinal plants as demanded by the Indian system of medicine. As a result, the Ministry has lunched 'Vanaspati Vana' to augment the availability of medicinal plants in a meaningful manner through the process of plantation of medicinal plants in the form of 'Vanaspati Vana' over wasteland or denuded forest land of 3000-5000 hectares of contiguous area [Ministry of Health and Family Welfare. 2000. *Ministry of Health and Family Welfare: Major Schemes and Programmes*, New Delhi].

Thus, the working of VVP has been facilitated by different institutional structures at various levels – central, state, district, block and village – in order to accomplish its target objectives. Monitored by the Department of Forest, GoO, Orissa; other allied as well as sub-ordinate institutions engaged in working of VVP at various levels are: Ministry Health and Family Welfare, Government of India, New Delhi at central level; Department of Forest (GoO) at state level; Office of the Forest Divisions at district level; Office of the Forest Ranges at block levels and community-based biodiversity conservation and development committees (CBCDCs) at grassroots or village level. However, the VVP in Orissa provides central focus to the village-level social institutions i.e. CBCDCs.

Out of these five levels of institutional arrangements, the present study broadly divides into three broad categories of institutions – macro, meso, and micro (see Figure 6.1) – towards the functioning of VVP in and around Gandhamardan hills RF. The macro level institution constitutes the OSVVS regulated by the Department of Forest where as the micro level institution comprises the CBCDCs at grassroots level. The meso level institutions are Divisional Forest Offices (DFOs) and Range Offices (ROs). These meso level institutions mediate the activities between the macro and micro level institutions. This macro-meso-micro division has been substantiated by the statement contended by the Conservator of Forest, Development Circle, Cuttack who is also the Member Secretary, OSVVS, Orissa:

> The Ministry of Health and Family Welfare, Government of India, New Delhi merely acts like a funding institution; the Department of Forest (GoO) rather provides active institutional support in formulating, implementing and executing, in single word 'monitoring', various components of VVP in and around Gandhamardan hills RF. The CBCDCs are playing crucial roles in developing the conservation of biodiversity of medicinal plants at grassroots levels. The DFOs and ROs are also quite important in translating project components at ground

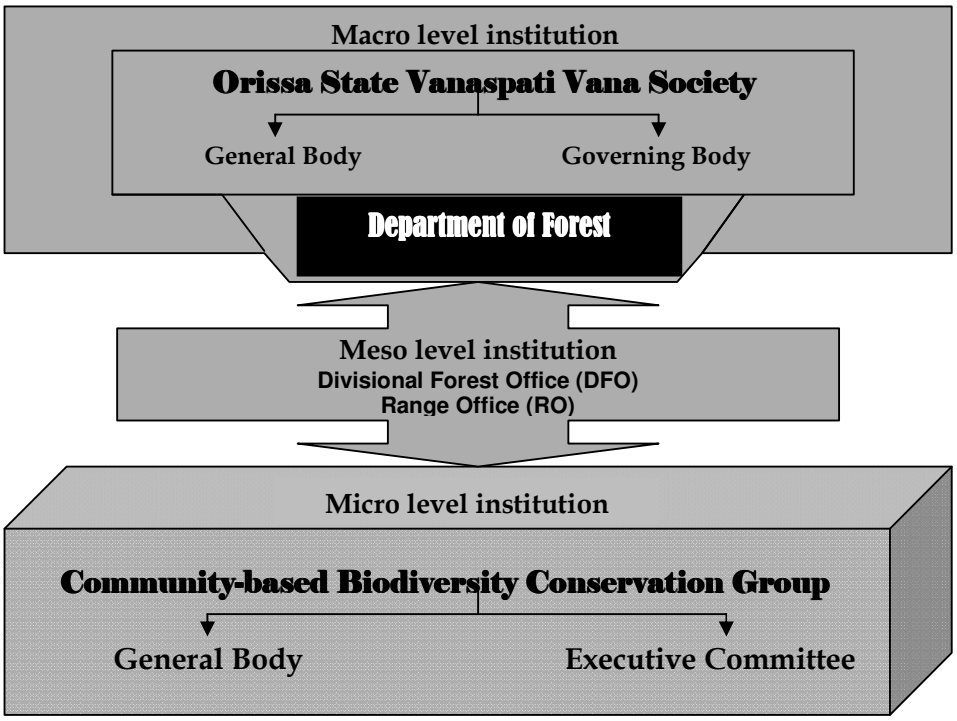
level on the one hand, and are also crucial in coordinating with the apex authorities as well as the CBCDCs on the other.

This tri-structured institutional set-up of VVP is equated with the three levels of social capital i.e. micro-, meso- and macro-level social capital (Turner 2000; Chen 2005). The social capital, at micro level, looks at the formation of CBCDCs at grassroots. Social capital, at this level, focuses on the relationships among individuals, households, neighbours within the village communities. Hence, the social capital at the micro level is understood as the bonding and bridging processes of social capital formation. The social capital, at the meso level, looks at the relationships between the CBCDCs and the ROs/DFOs. This is a form of linking social capital. The social capital, at the macro level, looks at the relationships between the formal/bureaucratic institutions especially at the state level.

6.III.a Macro-level-institutional structure

The OSVVS, Orissa is generally considered as the macro level institutional mechanism for the functioning of VVP. As mentioned above, the Department of Forest (GoO) undertakes all activities of OSVVS. Thus, the OSVVS simply acts like a nominal head; the department of forest (DoF), in practice, controls and provides institutional support to the functioning of OSVVS in general and the VVP in particular. The DoF coordinates with other allied departments as well as institutions. Consisting of eleven members, the Principal Chief Conservator of Forests (PCCF), Aranya Bhawan, Bhubaneswar acts as the Chairman and the Conservator of Forest (CF), Development Circle, Cuttack performs as the Member Secretary of the OSVVS. The OSVVS includes two organs: the general body and the governing body.

Figure 6.1
Institutional structure of Vanaspati Vana Project



As an executive organ of the OSVVS, the general body constitutes all members of the society. The PCCF who is the chairman of the OSVVS also acts as the chairman of both the organs of general body and governing body of the OSVVS. Similarly, the CF, Development Circle, Cuttack who acts as the secretary of the OSVVS is also considered as the secretary of both the organs of OSVVS i.e. general body and governing body. According to the DFO, Bargarh, the secretary of OSVVS acts as 'the chief executive of the OSVVS and discharge all functions relating to the implementation and execution of the VVP'. The governing body consists of chairman and secretary and nine other official and non-official members from different departments along with members from educational institution and civil society-based organization for a period of three years at a time and an extension of one more time, subject to the consent of the discretionary power of the government or society (see Table 6.2).

Table 6.2
The Governing Body

Sl. No.	Governing Members	Designation
1.	Principal Chief Conservator of Forests (PCCF), Aranya Bhawan, Chandrasekharpur, Bhubaneswar	Chairman
2.	Special Secretary, Department of Forest and Environment, Government of Orissa, Bhubaneswar	Member
3.	Director, Indian systems of Medicine and Homeopathy, Orissa, Bhubaneswar	Member
4	Director, Family Welfare, Orissa, Bhubaneswar	Member
5	Chief Conservator of Forest & Director SFP, Orissa, Aranya Bhawan, Chandrasekharpur, Bhubaneswar	Member
6	Principal, Medical College &Hospital At –Nrusinghnath, Paikmal, Bargarh	Member
7	Co-Ordinator, Herbalist Association, Nrusinghnath At- Padampur, Post - Rajbora Sambar, Bargarh, 768036	Member
8	Forest and Environment Department. Bhubaneswar	Member
9	Regional Director, Health and Family Welfare, Government of India, Bhubaneswar	Member
10	Director (Commercial), Orissa Forest Development Corporation Ltd, Satya Nagar, Bhubaneswar	Member
11	Conservator of Forest, Development Circle, Old Secretariat Building, Cuttack	Member Secretary

The GB exercises powers, functions and rights to achieve the objectives of the VVP in and around Gandhamardan hills RF. In brief, the GB especially the Member Secretary is empowered to implement and execute the running of the VVP as formulated in the GB meetings. For the smooth running of the VVP, the GB has appointed a committee namely 'executive committee' to assist the GB in accomplishing the objectives of the project. The EC is consisting of PCCF, Orissa, CCF Afforestation, Department of Forest and Environment, and the CF, Development Circle, Cuttack. Both PCCF and CF act as chairman and secretary of the committee respectively. In short, the CF of Development Circle who is also the secretary of the OSVVS disseminates all the decisions and instructions provided by the GB and EC. In fact, the social capital at this macro level is based on the relation of multiple formal/bureaucratic institutions especially at the state level.

6.III.b Meso-level-institutional structure

The 'subordinate departments' of the parent forest department characterize the meso-level-institutional structure of VVP. These subordinate departments – Divisional Forest Office' and Range Office – are directly involved in facilitating the working of the CBCDCs at grassroots levels. These meso-level-institutions also coordinate the project activities between the macro and micro level institutions. These are the active actors in deploying project objectives in ground reality. The social capital at this level is based on the relation between the communities and the formal institutions. A detailed discussion on the role of these meso-level institutions has been discussed in the following sections.

6.III.c Micro-level-institutional structure

The formation of community-based biodiversity conservation and development committee (CBCDC) at grassroots level is considered as micro level institutional structure of the VVP. As mentioned in the above section, these committees are formed with the help of the divisional forest officers and range officers as well as with the participation of the village communities. There are two broad organs of each CBCDC: the general body (GB) and the executive committee (EC). The constitution of general body comprises two adult members – both male and female – from each household of the village. The executive committee, the representative organ of the general body, is constituted by the general body as well as the FD based on the processes of nomination and election. The social capital at this micro level is based on the relation of individuals, households and the neighbours of the village communities. A detailed discussion on the processes of formation and function of the CBCDCs at the grassroots level has been discussed in the following sections.

6.IV Community's idea of medicinal plants: cognitive dimension of social capital

Before analyzing the functioning of VVP, the present section attempts to understand the village community's knowledge about medicinal plants. It is a fact that the Gandhamardan hills RF is a store-house of medicinal plants. At the outset, it should be made amply clear that no accurate statistics about the total number/varieties of medicinal species is available with the concerned department. Therefore, the researcher had to undertake an exhaustive exercise to identify and collect information about different medicinal species at the site.

With no complete quantified information available on official record about the total number/variety of medicinal species at the site, the researcher had to gather such information from his interaction with eight hundred fifty (850) households. Through his interview with these households in fourteen villages, the researcher has been able to collect information about a list of medicinal plants, which he has secured with his specific queries. In fact, the knowledge of the village communities about the different varieties of medicinal species and their usefulness in everyday life indicates the cognitive dimension of social capital among the members of the village communities. However, it needs to be clarified, the list of medicinal plants documented by the researcher represents only the maximum variety of species collected by him (with the best of his effort) existing at the site. It should not be construed as the total/final variety of species available at the site. The comprehensive list of the names of medicinal species identified and collected solely by the researcher through his individual effort is cited in Table 6.3.

Table 6.3

Names and varieties of medicinal plants available at Gandhamardan RF

Sl. No.	Local Name	Botanical Name	Parts Used	Medicinal Values
1	Aguru	Aquilaria agallocha	Stem	Asthma, Digestion, Nervous Break down
2	Agasti	Sesbania grandiflora	Leaf, Flower, Root	Night blindness, spleen and kidney functioning

				of children, Feats, Cough and cold
3	Ankula	Alangium lamarckii	Fruit	Bite of ferocious animals, pyrrohera
4	Atshi or Alasi	Linum uxsitatissimum	Oil	Piles, Urination
5	Atibisha	Acountium heterophyllum	-	Cough, Indigestion, Acidity, Malaria (some extent) wormcide
6	Aparajita	Clitoria Ternatia	Root-All parts	Anti venom, Hooping Cough
7	Apamaranga	Achranthes aspera	Stem, leaf, root	Hydrophobic, skin disease, Antivenum, conjunctivitis, Periodical bleeding of women, deaf
8	Ambada	Spondias Pinnata	Fruit	Acidity, Indigestion
9	Arakha	Calotropis gigantean	Lated Root, Leaf, Flower	Piles, Pimples and Skin disease, Asthma, Pyorrhoea
10	Arjuna	Terminalia arjuna	Bark leaf	Heart disease, orthopedico problem
11	Alba (Pita lau)	Dioscorea wallichii	Root, Seed, Fruit	Anti vomiting, with oil massage for brain
12	Ashoka	Saraca indica	Bark, Seed	Bedwetting
13	Aswagandha	Withania somnifera	Root, Seed	Asthma, Infertility (women)
14	Aswastha	Ficus neligiosa	Bark, fresh flower of leaf, fruit	Anti vomiting, Anti pimples, Earcutting, mouth disease (children)
15	Asana	Terminalia arjuna	Bark	Leprosy, snake bite
16	Bajra Muli	Sida acordata	Root, Stem	Acidity, scurvy, irregular period of women, orthopaedic problem
17	Akarakara	Anacyclus pyrethrum	Root	Anti Allergic drug in mouth
18	Baidanka	Mucuna pruriens	Root, Seed	Nervous disease, Contraction of reproductive organ of women
19	Amla	Phyllanthus emblica	Fruit, Bark	Pile, Cough, Bleeding from nose, Urination (children)
20	Amba	Mangifera Indica	Bark, Leaf, Fruit and Seed	Bleeding from nose, Anaemic, Spleen, Wormcide, Internal bleeding
21	Sunari	Cassia fistula	Bark, Gum from seed	Cough, Leprosy, Pimples
22	Bana Mali	Jasminus arborescens	Root	Nail infection

23	Kosthuphala	Balanites roxburgi	Seed	Wormcide and Cough
24	Gotha kakudi	Cucumis trigonis	Root	Jaundice
25	Bana dimbiri	Ficus glomerata	Bark, Fruit	Acidity, Appetite, Malaria, Gynachological problem
26	Gandhabena	Andropogon muricatus	Root	Nervous disease
27	Gaba	Ricinus communis	Seed, Root	Reduces fat in belly, skin disease, muscle
28	Katuki	Picrorrhiza kurroa	Root and Tubber	Bile, Fever, Cough, Worm, Leprosy, Asthama
29	Bheji Baigana	Solanum surattense	Flower and Fruit	Cough and Asthama
30	Kadamba	Anthrocephalus cadamba	Bark, Fruit	Bile, Cough, Nervous disorder, Impotency removal
31	Kaintha	Feronia elephantum	Bark, Fruit, Leaf, Flower	Eye disease, Vomiting, Indigestion, Blood in urine, Anti Toxicity
32	Kamalagundi	Mallotus philippenis	Fruit	Wormcide, Cough, Pimples
33	Karanja	Pongania pinnata	Fruit	Oil skin disease, Vomiting, Anti venom
34	Kanjara	Nerium odorum	Root	Leprosy, hair does not turn white, Urine
35	Kakada Shrungi	Pistacia integerrima	Dust inside hollow stem	Asthma, Cough, Vomiting, Throats, Hunger and Sex apetite
36	Kaseru	Scirpus grossus	Root	Soothing effect to Headache
37	Kakagangha	Leea hirta	Root	Induces sleep, Leprosy, Spleen Pyorrhoea
38	Lunilumia saga	Solanum nigrum	Stem	Cough, constipation, eye
39	Kasindi (chakundi)	Cassia sophera	Root, Seed	-
40	Keruan	Holarrhena antidysentrica	-	Acter delivery, Headache
41	Pita	Wrightia tinctoria	Bark, Seed	Malaria, Wormcide, Vomiting
42	Kusa	Desmostachya bipinnata	Root	Cough, Blood vomiting, Gonorrhea, Urinary problrm, Gynachological Problem
43	Kusum	Carthamus tinctorious	Polen flower	Cough, Paralysis and nervous disorder, Chicken pox
44	Koilekha	Hygrophila auriculata	Root, Leaf, Pollen flower	Delivery, Urinary problem, Blood Sugar

45	Kanchan	Bauhinia racemosa	Root, Bark, Leaf, Flower	Wormcide, Leprosy, Cough, Goitre, Pimples
46	Pita Janhi	Luffa amara acutangula	Seed, Leaf	Skin and Kidney problem, Diarrohea, Cough
47	Khaira	Acacia catechu	Stem, Flower	Digestion, Throat, Pyorrhea
48	Khajuri	Phoenix sylvestris	Juice	Asthma, Removal of weakness
49	Agnibatha	Premna spinosa	Root, Bark	Digestion, cold and Fever, Neurology
50	Gambhari	Gmelina arborea	Bark, Leaf, Fruit	Digestion, Enrichment of milk gland, Artificial limb
51	Gokul	Balsamodendron mukul	Gum	Blood and nervous problem, Goitre, Leprosy
52	Kaincha	Abrus precatorius	Fruit, Seed	Anti toxic, Goitre, wormcide, Skin disease
53	Guluchi	Tinospora cordifolia	Stem	Digestion, Leprosy, Nervous disorder, Skin and Jaundice
54	Gokhara	Tribulus terrestris	Fruit	Urinary problem, Impotency
55	Godhapadi	Vitis pedata	Root	Bleeding, Blood in Urine
56	Ghikuanri	Aloes uera	Stem	Kidney function, Wormcide, Sex instinct, Piles
57	Chandan	Santalum album	Wood	Blood vomiting, Increase appetite
58	Pipali	Piper lingum	Root, Fruit	Acidity
59	Chitaparu	Plumbago rosea	Root, Leaf	Abortion, Removal of boils and pimples
60	Khata Palanga	Oxalis corniculata	Stem	Digestion, Bile secretion
61	Jamu Koli	Syzygium cuminii	Seed, Bark	Digestion, Vitamins to children, Pyorrhoea
62	Gaja lembu	Citrus acida	Root, Seed, Fruit, Juice	Uric acid, Scurvey, Skin disease, Acidity
63	Jayanti	Sesbania seasaban	Root,Flower and Seed	Removal of boils, Insect bite
64	Futfukia	Cardiospermumhali cacabum	Root	Chest problem, arthritis
65	Daskerenta	Lera cristata	All parts	Children cough, crack in hand and foot, dental problem
66	Champaneutia	Amaranthus polygamus	All parts, Root	Skin and Urinary problems
67	Bhuinanla	Phyllanthus niruri	All parts, Root and Seed	Gynaecological problem
68	Tala	Borassus flabellifer	Fruit, Root	Tonic, Urinary problem,

				Spleen disorder
69	Kendu	Diospyros embryoptris	Fruit and Bark	Removal of scar, digestion
70	Kochila	Strychnos nuxvomica	Seed	Nervous, Paralysis, Healing the wound
71	Tulasi	Ocimum sanctum	All parts	Cough
72	Tihudi	Ipomoea turpethum	Root and bark	Paralysis, Leprosy, Nervous disorder
73	Dhantari	Baliospermum momtanum	Root, Bark	Constipation, Helps in vomiting
74	Daruhaladi	Berheris asiatica	Root, Bark and Wood	Digestion and skin problem, Eye problem
75	Gaishphul	Leucas aspera	Leaf and Flower	Cough expectorant, jaundice
76	Dhataki	Woodfordia fruiticosa	Flower	Gynaecological problem, Antiseptic
77	Dudura	Datura alba	Root, Leaf, Seed	Beladona, Neurology, Citica, Skin disease
78	Nageswar	Mesua ferrea	Flower	Piles, Oil message
79	Neem	Azadirchta indica	Bark, Leaf, Flower, Seed	Skin disease, wormcide
80	Parpata	Olsenlandia herbacea	All parts	Fever
81	Palas	Butea monosperma	Seed	Anti termite, gynaecological problem, Wormcide, Stomach problem
82	Paladhua	Erythrina indica	Bark	Fever, Wormcide, Gynaecological problem
83	Khirkoli	Carissa spinarum	Fruit	Snake bite
84	Atikapodi	Boerhavia diffusa	Root	Digestion, Urinary problem including Kidney, Insect Bite
85	Krushnaparni	Uraria logopoides	All parts	Weakness, Cough and Fever
86	Prasaruni	Paederia foetida	Leaf	Wormcide
87	Jida (Jari)	Ficus infectoria	Bark, Leaf	Spleen, Pimples, Bleeding
88	Bacha	Acorus calamus	Root	Acidity, Cough, Blood sugar, Throat
89	Bara	Ficus Benghalensis	Bark, Leaf, Fruit	Crack in skin, Blood sugar, Impotency
90	Barakoli	Ziziphus mauritiana	Fruit, Bark, Leaf	Insect bite, Energetic fever
91	Baruna	Crataeva religiosa	Bark, Root	Digestive, Urination, Bile secretion
92	Babul	Acacia Arabica	Gum, Bark, Seed	Blood sugar, Cold cream, Urinary problem
93	Baunsa	Bambusa arundinacea	Leaf, Root	Hydrophobia, Cold fever, Gynaecological problem

94	Basanga	Adhatoda vasica	Bark, Leaf, Flower	T.B. and all the Respiratory diseases
95	Bidanga	Embelia robusta	Seed	Urinary track problem including Kidney, Skin, Acidity
96	Bhuinkakharu	Ipomoea Digitata	Root	Gynaecological problem, Acidity and Weakness
97	Bahada	Terminalia Bellerica	Seed and Bark	Constipation, Cough, Throat infection
98	Bela	Egle Marmelos	Bark, Fruit	Digestion, Constipation, Asthma
99	Brudhajarak	Argyreia Speciosa	Root, Seed	Nervous disorder, Boil

6.V Functioning of VVP: bonding, bridging and linking social capital

This section seeks to examine the functioning of the VVP at Gandhamardan hills RF. It describes the implementation VVP at Gandhamardan hills RF and demonstrates how different processes and practices vary depending upon the local conditions that lead to variation in outcomes. The operation of the VVP involves the following activities: demarcating the site for plantation; formation of social groups (CBCDCs) at the community level to work in collaboration; transferring certain rights and responsibilities to these groups; delegating financial and other support; and access to forest produces. For analytical convenience, present study has classified the functioning of VVP into four broad stages i.e. I^4 stages: Introductory stage; Institutive stage; Implementing stage; and Invigorative stage. The analysis also makes use of various conceptual categories of social capital theory in order to substantiate the argument of the study.

6.V.a Introductory stage: foundation for social capital formation

Prior to the formation of CBCDCs at grassroots levels, it is important to uncover the preparatory initiatives. Introductory stage is a stage where the FD's prime endeavour is to spread awareness among local communities about the importance of VVP. By providing incentives, it tries to persuade them to work for the project. This preparatory

stage attempts to underpin the formation of social capital among and between the members of the community and the FD for conservation of medicinal species.

(i) Selection and demarcation of conservation area

An area of three thousand and two hundred (3200) hectares, as mentioned earlier, has been selected and demarcated for the purpose of both *in-situ* preservation in two hundred hectares and *in-situ* conservation in three thousand hectare of Gandhamardan hills RF area. Whereas the area for *in-situ* preservation is similar in both the ranges – each one hundred hectare – the allotment of *in-situ* conservation, in contrast, with regards to twenty-five village communities in both the ranges is quiet dissimilar especially in Nrusinghanath range (see Box 6.1). It is very interesting to illustrate the logic/criterion of distribution of project area among the village communities. On the one hand, the Harishankar range has distributed one thousand hectares of project area equally among ten village communities, on the other hand, the Nrusinghanath range has allocated its two thousand hectare of project area among fifteen village communities based on the criterion of number of households inhabiting in a particular village.

Box 6.1
Allocation of area to twenty-five villages

Harishankar Range

Sl. No.	Village Name	Area Allotted
1	*Dudumdarh*	100 ha
2	*Sapmund*	100 ha
3	*Mahulpali*	100 ha
4	*Kandravata*	100 ha
5	*Kuthurla*	100 ha
6	*Nuapali*	100 ha
7	Nandupala	100 ha
8	Chhachanbahali	100 ha
9	Turla	100 ha
10	Brahmani	100 ha
Total		**1000 ha**

Villages in italics are selected for present study.

Nrusinghanath Range

Sl. No.	Village Name	Area Allotted
1	*Rasmunda*	75 ha
2	*Georgegarh*	300 ha
3	*Laudimal*	50 ha
4	*Manbhang*	100 ha
5	*Majhipali*	75 ha
6	*Magurmal*	75 ha
7	*Kuradhiphasa*	100 ha
8	*Lergaon*	75 ha
9	Ranjitpur	50 ha
10	Khandijharan	200 ha
11	Kendubhata	300 ha
12	Gurunda	300 ha
13	Patrapali	100 ha
14	Motipali	100 ha
15	Marjadapali	100 ha
Total		**2000 ha**

In regards to the identification and selection of villages, the FD has used the 'logic of proximity'. In fact, the FD has selected and allocated project area for *in-situ* conservation to those communities which are proximity to the target project area of 3000ha of *in-situ* conservation. According to the ROs of both the ranges, this criterion of selection of communities is decided in the governing body meeting of the OSVVS. Though interest and motivation among the community members, as per the guideline, is the central criterion, in most of the cases, the communities have agreed upon after constant persuasion of the FD officials. Thus, the process of selection and demarcation of project area as well as the identification and selection of village communities have been completely determined by the FD. Later on, an area of forty (40) hectares has been allotted for *ex-situ* demonstration and nursery and herbal garden activity in village forests. The study visualizes that the village communities residing in and around Gandhamardan RF are not consulted while identifying and demarcating of this entire area of 3240 hectares of project area. Hence, the participation of village communities is nil since the FD has exclusively decided and demarcated, the allocation and distribution of area. Thus, the processes of selection and demarcation of *in-situ* is bureaucratic in nature.

(ii) Awareness building and community mobilization

The forest officials have carried out several awareness campaigns in the form of personal discussion and public meetings in the fourteen human habitations in order to convince the village communities about the meaning, nature and significance of the VVP at Gandhamardan hills RF. Reflecting on the reasons for these campaigns, the DFO, Balangir (west) forest division, says:

> The dominant objective behind these campaigns are: to instigate awareness building among members of the communities about main features of the VVP, to draw commitment from communities before launch of the project in/around the respective villages, to organize communities into new institutional structures, to maintain social auditing and transparency, and at last, to make necessary efforts for capacity building for participatory conservation and sustainable development of biodiversity of medicinal species.

As a result, the DFOs of both Balangir (west) and Bargarh divisions and the ROs of both Harishankar range and Nrusinghanath range as well as foresters and village forest workers (VFWs) have performed constant visits to these village communities. The primary objectives of these grassroots visits are: to convene village-wise meetings; to make aware and sensitize about the 'Vanaspati Vana' concept and the guidelines of VVP; to establish CBCDCs at community levels; and ultimately to propagate the idea of participatory conservation model among the members of the village communities. The numbers of meetings that have been held at the fourteen village communities for the purpose of awareness building and community mobilization are mentioned in the Table 6.4. Explaining the significance of awareness building and community mobilization campaigns, the DFO, Bargarh Forest Division asserts:

> These awareness campaigns and capacity building processes for the village communities on relevant aspects are crucial for operationalizing and institutionalizing this new approach of people-centred natural resource management. In order to implement the objectives of the VVP at ground reality based on participatory approach new social groups/committees needs to be formed at village level. The formation of these committees is facilitated by the FD. Under this new paradigm, all stakeholders have to play new roles and undertake new functions, which entail a change in the existing institutional and organizational structure of the society. The community mobilization is equally important for those who have to change i.e. villagers and for those who have to play the role of change agents i.e. FD. The FD is just like a facilitating agency.

Enquiring about the usefulness of these meetings, the president of CBCDC, Sapmund, Harishankar range says:

> These public awareness campaigns at village level meetings have facilitated villagers to understand 'Vanaspati Project' and its various components clearly in safeguarding the lost 'paradise' of medicinal plants (i.e. Gandhamardan hills RF) as well as in suggesting alternative approaches in conserving medicinal plants at Gandhamardan hills RF'.

Table 6.4

Number of meetings held for awareness building and community mobilization

Sl. No	Name of Villages	Number of Meetings	Officials Attended		
			DFO	FRO	Forester
1	Mahulpali	2	No	Yes	Yes
2	Kandravata	3	No	Yes	Yes
3	Kuthurla	1	Yes	Yes	Yes
4	Dudumdarh	1	Yes	Yes	Yes
5	Nuapali	2	No	Yes	Yes
6	Sapmund	1	Yes	Yes	Yes
7	Rasmunda	1	Yes	Yes	Yes
8	Georgegarh	1	Yes	Yes	Yes
9	Laudimal	2	No	Yes	Yes
10	Manbhang	1	Yes	Yes	Yes
11	Majhipali	3	No	Yes	Yes
12	Magurmal	1	No	Yes	Yes
13	Kuradhiphasa	2	No	Yes	Yes
14	Lergaon	3	No	Yes	Yes

Initially, the awareness building and community mobilization campaigns were not a smooth affair. Apathetic attitude was shown by certain village communities towards government schemes and officials especially during the initial stage of the operation of VVP. To be precise, these campaigns had faced stiff resistance from the villages of Nuapali, Mahulpali and Kandravata of Harishankar range and Rasmunda, Laudimal Kuradhiphasa and Lergaon of Nrusinghanath range. While alluding to the reasons behind the apathetic attitude of the villagers towards FD, the president of CBCDC, Nuapali, Harishankar range claims:

> There is often lack of connection between the villagers and forest officials. The officials are very casual in their daily duties/activities. For example, we have

been frequently witnessing and informing thievery and firing in Gandhamardan hills RF, but there is hardly any follow-up exercise by the officials; forget about the mechanism of feedback or reinforcement. As a result, the villagers have started realizing the non-committal, insincere/careless, nonchalant and the lackadaisical attitude of the forest officials. The sudden visits of the forest officials, according to villagers, might be a perfunctory act of the officials in order to document their official records. As a result, the villagers initially had started showing lack of interest towards VVP.

However, it was only after repeated visits, requests and persuasions that it was possible for FD to form CBCDCs at village level social institutions to implement VVP in and around the Gandhamardan hills RF. These campaigns were eventually started to provide participatory conservation mechanisms through the formation of village-level social institutions i.e. CBCDCs.

(iii) Entry point activity (EPA)

This is an important activity designed to accomplish the confidence of village communities and motivate them for collective action in the form of CBCDCs at village level. As part of the EPA, the VVP has sanctioned an amount of forty thousand to each CBCDC for the purpose of development of physical works for the village communities. With the help of the EPA fund, some of the villages – Mahulpali, Nuapali and Sapmund under Harishankar range and Georgegarh, Laudimal and Kuradhiphasa under Nrusinghanath range – have constructed 'yards' 'concrete yards'. These concrete yards are used for drying forest produces: leaves, seeds and fruits. Other villages have used this EPA amount in purchasing 'social function accessories (for example, tents, sound systems utensils etc.)' to attend various social functions on rent basis. By attending regular social functions (marriages, public meetings, village-level dramas etc.) the villages earn regular profits. In both the cases, decision has been taken by the president

of the concerned CBCDCs except the villages of Sapmund and Georgegarh where the decision has been taken at the village level general body meeting.

Thus, through these preparatory/introductory activities, the FD intends to build up a foundation for the formation of collective consensus/solidarity i.e. social capital among and between the members of the village communities and the FD in the process of conservation and sustainable development of biodiversity of medicinal species.

6.V.b Institutive stage: building of social capital

This section examines the formation of institutional structure of CBCDCs at community level, especially their constitutional arrangements and the manner in which they are formed. As mentioned earlier, the formation of CBCDCs is completely based on JFM Resolution. These institutions have been formed in the year 2004. However, it may be mentioned that prior to the emergence of VVP, community-initiated forest protection committees (CIFPCs) were very active in certain village communities at Gandhamardan hills RF. These CIFPCs were mostly formed informally/voluntarily by the forest-dwelling village communities with a view to protect forest resources. For instance, the villages of Mahulpali and Sapmund in Harishankar range and that of Rasmunda, Georgegarh and Laudimal in Nrusinghanath range were already having CIFPC-centred conservation activities.

(i) Formation of CBCDCs: bridging/horizontal social capital

According to JFM Resolutions, 2000, the communities are considered as key social units, which are formed for conservation of biodiversity. These 'village communities', as JFM Resolution 1990 anchors, must be organized into 'village institutions' under the banner of VSSs for conservation and development of bio-resources. The CBCDC (which is the central focus of the research) is known as Vana Samrakshyan Samiti (VSS) in Orissa. As the term indicates, the CBCDC is an independent, formal, democratic community-level

(village-level) social institution comprising of households of a village is constituted for the purpose of conservation, regeneration and development of medicinal plants. The salient objective of CBCDCs is to plant/cultivate, grow and protect various species of medicinal plants. Therefore, it needs to be clearly understood that CBCDC is a village-level plant-growing/protecting body. It has two parts: the general body (GB) and the executive committee (EC).

The CBCDC as a social cohesion is a form of social capital. It denotes ties connections or ties among individuals, households and neighbours of a particular village community. Thus it is based on the process of bonding social capital (Putnam 2000; Woolcock 2001). This bonding process of social capital promotes communication and relationships among the members of the village community to pursue common goal i.e. to conserve and sustain medicinal species. This village-level connectedness is in Granovetterian terminology refers to strong ties since it is based on the close, persistent and binding relationships that exist among the members/households of a particular village community (Granovetter 1985). In addition, this bonding social capital/horizontal tie is also referred as horizontal social capital because it is based on a relationship which is based on the connection of individuals/households from a particular village community (Woolcock and Narayan 2000).

(ii) Constitution of CBCDC-general body

Prior to the formation of EC, a GB is constituted in each CBCDC. The GB consists of one male and one female member from each household of the village. The GB must account more than fifty percent of total households of the village. Generally, the headman and his wife from the household are chosen as CBCDC members. However, the absence of the headman of the family or his unwillingness for attending the meeting, the

eldest son of the family is considering as the member of the CBCDC. Similarly, the headman's wife or the daughter-in-law is regarded as the member of the CBCDC.

As mentioned above, the in-charge forester with the support of the higher authorities, namely in-charge DFOs and in-charge ROs (wherever necessary) has convened the meetings at the village level in which almost all adult members of the village are present. Some of the village level meetings have also been attended by DFOs especially in the villages of Nuapali, and Kandravata in Harishankar range and Rasmunda, Laudimal and Majhipali in Nrusinghanath range since the villages were not interested to work as 'partners' with the local forest officials and the ROs. The quorum of the meeting for every village has been fixed at minimum fifty (50per cent) per cent of the total households of the concerned village. The number of households participated during the constitution of GB for the fourteen CBCDCs have been mentioned in Table 6.5.

Table 6.5
Number of households participated in the formation of CBCDCs

Sl. No	CBCDCs Villages	Attended	Absent	Total
1	Mahulpali	16 (76.2) 1.9%	5 (23.8) .6%	21 (100) 2.5%
2	Kandravata	27 (62.8) 3.2%	16 (37.2) 1.9%	43 (100) 5.1%
3	Kuthurla	52 (66.7) 6.1%	26 (33.3) 3.1%	78 (100) 9.2%
4	Dudumdarh	46 (74.2) 5.4%	16 (25.8) 1.9%	62 (100) 7.3%
5	Nuapali	19 (79.2) 2.2%	5 (20.8) .6%	24 (100) 2.8%
6	Sapmund	33 (86.8) 3.9%	5 (13.2) .6%	38(100) 4.5%
7	Rasmunda	33 (78.6) 3.9%	9 (21.4) 1.1%	42 (100) 4.9%
8	Georgegarh	110 (61.8) 12.9%	68 (38.2) 8.0%	178 (100) 20.9%
9	Laudimal	67 (68.4) 7.9%	31 (31.6) 3.6%	98 (100) 11.5%
10	Manbhang	35 (76.1) 4.1%	11 (23.9) 1.3%	46 (100) 5.4%
11	Majhipali	42 (76.4) 4.9%	13 (23.6) 1.5%	55 (100) 6.5%
12	Magurmal	16 (64) 1.9%	9 (36) 1.1%	25 (100) 2.9%
13	Kuradhiphasa	45 (58.4) 5.3%	32 (41.6) 3.8%	77 (100) 9.1%
14	Lergaon CBCDC	39 (61.9) 4.6%	24 (38.1) 2.8%	63 (100) 7.4
Total Households in CBCDCs		**580 (68.2) 68.2**	**270 (31.8) 31.8%**	**850 (100) 100%**

Table 6.5 shows that Sapmund represents highest number of households (86.8 per cent) followed by Nuapali (79.2 per cent) and Rasmunda (78.6 per cent) in participating in the

process of constitution of GB for the CBCDCs. The absentee households provided a couple of reasons for not attending the meetings: lack of trust towards local forest officials, disinterestedness towards the VVP, and lack of time due to intense engagement in their primary occupations. But it is interesting to witness the willingness of those households who have attended the meeting. The reasons behind the participation of such substantial number of households, according to the EC members of these fourteen village communities are as follows:

- The inspiration of their village-level charismatic leaders, who are having sound ecological knowledge systems, qualities of trustworthiness, transparency and good networking with public agencies i.e. FD
- The influence of existing political leader(s) especially the 'Sarapanchas' (politically chief of the Gram Panchayats) and the traditional landowning individuals
- The presence of premier/higher authority of the FD i.e. the DFOs
- The interest for achieving immediate gain from the operation of VVP in and around their village communities.
- Finally, the fascination towards the project which is committed towards the conservation and protection of medicinal plants available at Gandhamardan hills RF.

(iii) Composition of executive committees (EC): norms of selection

The EC is a representative body, elected to execute the CBCDC works. According to JFM Resolution, 2000, the EC members are elected at the GB meeting attended by the villagers in the presence of the forest officials. The villagers are completely responsible in selecting their EC members. To be precise, the norm of the selection of EC members is based on consensus among the members of the village community. However, the practice of the 'community-consensus' in choosing EC members at ground reality is often found in a different manner. In ten out of the fourteen CBCDCs, the foresters and ROs have played a vital role in either selecting all EC members (choosing their preferred

candidates) or selecting an individual who is socially/economically/politically very active. This particular individual, later on, is in-charge-of deciding/selecting other members of the EC. These ten CBCDC villages are Dudumdarh, Kandravata, Kuthurla, Mahulpali and Nuapali in Harishankar range and Magurmal, Majhipali, Manbhang, Kuradhiphasa and Lergaon in Nrusinghanath range. Thus, the norm guiding the selection of the EC members is coercion/authoritative/department-driven in nature. As a result, the internally generated community-consensus-based EC selection is destroyed by the externally imposed authoritative norm of the FD. In fact, horizontal ties among the members of the village communities are destroyed by the FD. In remaining four CBCDCs, the people have proposed a list of members as their EC representatives in the presence of villagers and the FD officials. The CBCDE-wise EC members have been mentioned in the following Table 6.6.

Table 6.6
CBCDC village-wise EC members

Sl. No.	CBCDC Villages	EC Members	Male	Female
1	Mahulpali	10	8	2
2	Kandravata	14	11	3
3	Kuthurla	12	9	3
4	Dudumdarh	12	10	2
5	Nuapali	15	12	3
6	Sapmund	12	9	3
7	Rasmunda	12	9	3
8	Georgegarh	15	12	3
9	Laudimal	12	10	2
10	Manbhanga	12	10	2
11	Majhipali	12	10	2
12	Magurmal	10	8	2
13	Kuradhiphasa	12	9	3
14	Lergaon	12	9	3
Total		**172 (100)**	**136 (79.07%)**	**36 (20.93%)**

Table 6.6 shows that the total EC members differ from village to village. The total number of EC membership in all the CBCDCs is varying from ten to fifteen. It also shows that out of the total EC members in fourteen CBCDCs, about 79.07 per cent are

men and only 20.93 per cent are women. Hence there is poor representation of women members. The selection of these EC members is from different castes and social categories/groups. Table 6.7 mentions the village-wise EC members and their respective social/administrative groups.

Table 6.7
EC members in various social categories

Sl. No.	CBCDC Villages	General	SC	ST	OBC	Total ECs
1	Mahulpali		1	9		10
2	Kandravata		1	11	2	14
3	Kuthurla		3	6	3	12
4	Dudumdarh			3	9	12
5	Nuapali			15		15
6	Sapmund		7	5		12
7	Rasmunda		2	5	5	12
8	Georgegarh	1	3	8	3	15
9	Laudimal		2	6	4	12
10	Manbhang			9	3	12
11	Majhipali	1		11		12
12	Magurmal			10		10
13	Kuradhiphasa		2	9	1	12
14	Lergaon		3	7	2	12
Total		**2 (1.17)**	**24 (13.95)**	**114 (66.28)**	**32 (18.6)**	**172 (100)**

Table 6.7 shows that the category of ST has maximum representation i.e. 66.28 per cent followed by OBC (18.6), SC (13.95), and finally the general (1.17). The Christian households do not have a single representation in EC. Thus, the social category of Christians is completely excluded in getting membership in EC of CBCDCs. It is observed that the numerically dominant social category in each village is generally represented more in EC except the villages of Rasmunda where the representation of ST and OBC are equal although the number of OBC households is more. Similarly, the villages of Georgegarh and Lergaon have more representation of ST category although their number is relatively less in regards to total number of households in the village(s): the categories of OBC and SC are dominant in the villages of Georgegarh and Lergaon respectively (refer chapter five for details). Explaining the reason behind such

representation, the presidents of these three CBCDCs who are primarily from general and OBC categories argue that the category of ST has sound knowledge about the medicinal plants, which are available at Gandhamardan RF. However, this knowledge of the ST category hardly takes into account when it comes to the question of acquiring key office positions (or leadership) which is explained in the following sections. Thus, the cognitive social capital of the members from the socially marginalized group i.e. ST is declined. The study also examines the composition of EC membership by taking into account the landholding structure of the concerned EC members (refer Table 6.8).

Table 6.8
Landholding pattern of the EC members

Sl. No.	CBCDC Villages	Landless	Marginal	Small	Medium	Large	Total ECs
1	Mahulpali	8	1		1		10
2	Kandravata	6	1	1	4	2	14
3	Kuthurla	5	2	1	1	3	12
4	Dudumdarh	4	2	1	1	4	12
5	Nuapali	6		4	5		15
6	Sapmund	1	4	2		5	12
7	Rasmunda	5	2	2	2	1	12
8	Georgegarh	10		3	2		15
9	Laudimal	4	3	3	2		12
10	Manbhang	2	2	1	4	3	12
11	Majhipali	5	3		2	2	12
12	Magurmal	4		6			10
13	Kuradhiphasa	3		6	2	1	12
14	Lergaon	6		1	2	3	12
Total		**69 (441) (15.64)**	**20 (82) (24.39)**	**31 (158) (19.62)**	**28 (108) (25.92)**	**24 (61) (39.34)**	**172 (850) (20.23)**

The Table 6.8 shows that more than forty (50) per cent of the total EC households are either from landless or marginal category followed by large (39.34 per cent), medium (25.92 per cent) and small (19.62 per cent). However, it is interesting to examine the representation of categories out of the total number of corresponding households in the fourteen villages. As mentioned in chapter four, according to the total number of households (850) in different social categories of landholding pattern – 441 (landless), 82

(marginal), 158 (small), 108 (medium) and 61 (large) – in the study area, the study finds that the category of large, though limited in number (only 61), finds maximum representation in the EC. In fact, out of the total households in various categories, the category of large (39.34 per cent) has high level of participation in the EC membership followed by medium (25.92 per cent), marginal (24.39 per cent), small (19.62 per cent), and, at last, the landless (only 15.64 per cent). The membership is strongly determined by the landholding/economic condition of the households. The category of landless has been almost excluded in accessing the EC membership. Furthermore, apart from EC membership, the category of large has also controlled the key office positions, which is mentioned in the following sections.

The concerned forester of the allocated project area acts as the secretary in the concerned CBCDC. The tenure of the EC is usually for three years. The same ECs are still occupying their respective positions till now. So far as meeting is concerned, it is obligatory to conduct GB meeting in every six months and EC meeting in every two months. But, soon after the formation of EC, there is complete negligence of GB meetings in these CBCDCs except the villages of Sapmund and Georgegarh. The EC meeting is very irregular in nature. The president with the association of other EC members on the one hand, and the active forester-cum secretary of the CBCDC on the other undertakes various activities relating to *in-situ* conservation in its sanctioned project area. This has been critically analyzed in the following sections. As far as the role and responsibility is concerned, the EC takes the responsibility of day-to-day affairs of the *in-situ* conservation activity of VVP on behalf of the GB. Thus, the EC, on the one hand, represents the interests of the village communities in regards to the operation of VVP and the interest of the FD on the other. Furthermore, the EC has the major responsibilities in conserving and protecting the medicinal plant species against

encroachment, grazing, fire, poaching and ultimately illegal marketing of the medicinal raw materials or the forest produces. The members of EC are accountable to both the GB as well as the FD.

(iv) The selection of CBCDCs leaders

Apart from the composition of EC members, the study also makes necessary attempts in critically examining the selection of the respective group leaders. In fact, it is important to understand the politics of the selection of group leaders i.e. presidents in these fourteen CBCDCs. The process of selection/election of the president(s) hardly follows the community-consensus-based norms as prescribed by the JFM Resolution. Prior to the composition of EC, the local forest officials (Forest Guard, Forester and also RO) identify key persons of the concerned village to initiate the process of institution building. The FD has identified those individuals who have significant socioeconomic and political attributes. In fact, the FD prefers such individuals as leaders who are socially or ritually from upper caste (especially Brahmin), economically advanced (landlord), politically dynamic (ex-word members or ex- Sarpanchas), and finally, expertise in herbal knowledge system. These key individuals are expected to build up confidence among the members of the village and to organize the community members for *in-situ* conservation and development activities. Explicating the reasons behind such logic of nomination/selection of these individuals (CBCDC leaders), the RO, Nrusinghanath Rang says:

> We encourage and elect young energetic individuals as the leaders of the committees. There are four important reasons: First, these young individuals can better understand various components of VVP; second, they can efficiently undertake the day-to-day activities relating to *in-situ* conservation; third, they are also very competent enough to interact with the higher authorities as well as with other external agencies; and fourth, they can maintain good rapport with Department.

Thus, the FD nominates such individuals who are young and energetic and who are also capable of maintaining expected understanding with the FD. Thus, by choosing their preferred candidates, the selection of the CBCDC leaders are mostly determined by the forest officials i.e. foresters and ROs. The study finds that out of fourteen CBCDCs, the FD has selected presidents for ten CBCDCs: five in Harishankar range: Dudumdarh, Kuthurla, Kandravata, Mahulpali and Nuaplali; and five in Nrusinghanath range: Manbhang, Majhipali, Magurmal, Kuradhiphasa and Lergaon. Out of these ten, the president of Majhipali is relatively old since he is the only landlord and propertied individual of that village (also in the concerned block). Remaining nine presidents are young and energetic. Thus, apart from the selection of EC members, the selection of leaders/presidents of CBCDCs is also mostly externally imposed, department-driven and finally authoritative in nature.

The presidents for other four villages are unanimously selected by the villagers. These villages are Sapmund, Rasmunda, Georgegarh and Laudimal. The villagers have primarily selected those group leaders who are relatively matured (aged) and are also trustworthy, approachable and expert in local herbal practices though their primary occupation is agriculture. The Table 6.9 presents socioeconomic background of the CBCDC leaders or presidents.

Table 6.9

Socioeconomic profile of CBCDC Presidents

Villages	Age	Sex	Education	Caste	Category	Occupation
Mahulpali	37	Male	Matriculation	Binjhal	ST	Agriculture
Kandravata	42	Male	Matriculation	Dalakandha	ST	Agriculture (Ex-Sarpanch)
Kuthurla	35	Male	Intermediate	Sundhi	OBC	Agricultural Business
Dudumdarh	37	Male	Matriculation	Gond	ST	Agriculture and Agricultural Labour
Nuapali	35	Male	Matriculation	Kandha	ST	Agriculture

Sapmund	45	Male	Intermediate	Kandha	ST	Agriculture and herbal practitioner
Rasmunda	64	Male	Intermediate	Kulta	OBC	Agriculture
Georgegarh	40	Male	Graduation (BHMS)	Brahmin	General	Homeopathy and Herbal Practitioner
Laudimal	58	Male	Intermediate	Teli	OBC	Agriculture Ethno-medicinal Practice
Manbhang	38	Male	Matriculation	Adikandha	ST	Agriculture
Majhipali	62	Male	Graduation	Brahmin	General	Agriculture and Business (Landlord)
Magurmal	36	Male	Matriculation	Binjhal	ST	Wage Labour
Kuradhiphasa	38	Male	Intermediate	Kandha	ST	Agriculture and Business (Ex-Sarpanch)
Lergaon	35	Male	Graduation	Pandara	OBC	Business

The Table 6.9 shows that not a single woman candidate has been selected for president in any of the villages. Out of the six CBCDC presidents in Harishankar range, five are from the category of ST and only one i.e. the president of Kuthurla CBCDC belongs to OBC category. But, the presidents of CBCDCs in Nrusinghanath range are relatively different. In fact, out of eight CBCDC presidents, two are from the category of General (Georgegarh and Majhipali), three from OBC (Rasmunda, Laudimal and Lergaon), and again three from ST category (Manbhang, Magurmal and Kuradhiphasa). Hence the representation of ST category as president is more in Harishankar range than in Nrusinghanath range. Furthermore, almost all leaders are young except the presidents of Rasmunda, Majhipali and Laudimal.

(v) Types of leadership in CBCDCs

Based on the socioeconomic and political aspects of the CBCDC leaders, as mentioned in the above sections, the current section engages in categorizing the types of leadership, which are functioning in the CBCDCs. The leadership in the CBCDC has two dimensions: individual and collective. The presidents provide individual leadership and the EC provides the collective leadership. The EC, which is composed of 10 to 15

members, is mainly responsible for the day-to-day affairs of the CBCDCs. The EC, in fact, is supposed to represent the collective characteristics of CBCDC leadership. In addition, the functional responsibilities have been divided between the president and the EC members. According to the collective norm decided at the village level (GB) meeting, the EC members look after the village level conservation activities whereas the president mostly deals with the FD and other external agencies. In fact, maintaining contact with the external agencies, bargaining and negotiating on behalf of villagers, getting large amount of funds for CBCDC, and overall village development facilitate the president to achieve the leadership status. Apart from these external activities, the president acquires his leadership status by offering unbiased decision, equitable distribution of benefits, negotiating conflicting interests among members in the CBCDCs at village level.

A detailed analysis of the CBCDC performances has been mentioned in the next section of this chapter. Thus, whether selected by the FD or GB (villagers), the CBCDC presidents are basically selected on the basis of their status in the community. This status is either in the form of ascribed or in the form of achieved. The ascribed status is basically linked to an individual who is traditionally respected either because of his higher social and ritual position or huge landholding structure. The achieved status is, in contrast, mainly associated to an individual because of his professional excellence either though education, politics, business etc. Thus, by taking into account their personal features and nature of functioning; the present study has divided the CBCDC presidents into four categories: traditional leaders, land-owning leaders, semi-educated youth leaders, herbal practitioners or professional leaders and political leaders. The first two categories of leaders are referred to ascribed leaders whereas the remaining two types of leaderships are completely achieved leaders.

- **Traditional leadership**

In the category of traditional leaders, the source of authority and legitimacy of the leader comes from the traditionally owned authority structure. This type of leadership relates to the village headman or his belongingness to the headman's family. This type of authority is prevailing in village of Rasmunda. The president of the CBCDC is an elderly person who is also the head of the village. He is from the sub-caste of *Kulta* (OBC). He plays crucial role in the decision-making process of the village. The leader has also fifty years of association with the Gandhamardan hills RF. The villagers find him very efficient who can handle the activities of the VVP and the interaction between the villagers and FD.

- **Land-owning Leaders**

Certain families of the village often influence the decision-making process of the village because of their possession of wealth in the form of land, money and other properties. The majority of poor households depend upon these rich families at the time of need or emergencies. Thus, any matters relating to the village gradually come into the hands of these rich class families. This form of leadership is found in the village of Majhipali. The president of this village belongs to higher caste i.e. Brahmin who is also a big landlord in that concerned block. He has more than forty acres of land. The poor households of this village have been working as wage labourers in his land. As a result, the FD officials have requested and convinced him to form a CBCDC in his village and nominated him as president. Since half of the village households depend on him for their day-to-day livelihood, the villager out of compulsion accepted the nomination and selection of his candidature for the position of president.

- **Political Leaders**

Though the constitution of CBCDC is supposed to be apolitical as per the provision of VVP, political interference is inevitable in certain villages. The local panchayat-level politicians either directly or indirectly influence the process of selection of the leaders and also the activities of the CBCDCs. The villagers depend on these political leaders for various development programmes in the village. There have been instances where such grassroots leaders across political parties have tried to politicize the operation of VVP to gain confidence among the village communities in general and to get elected in the election in particular. The FD has selected such leaders as CBCDC presidents to easily achieve the target objectives of the project because these leaders easily motivate and form EC with the help of their followers. The study has come across two villages i.e. Lergaon and Kuthurla where the FD has elected two ex-sarpanchas as presidents of those CBCDCs.

- **Semi-educated youth leaders**

The youth leaders are playing very active part in the constitution of CBCDCs. In recent times, the youths form a major powerful group cutting across caste and class category, particularly in the tribal villages. Most of them are with little formal education but aware of the social and political environment in and around them. The individuals who are relatively more educated become the leaders of the groups or committees. The FD has strongly encouraged them to form CBCDCs. It is observed that out of fourteen villages, youths have formed CBCDCs in eleven villages except the villages of Rasmunda, Majhipali and Laudimal in Nrusinghanath range. According to FD officials, they are encouraged because they are educated enough to understand various components of the VVP. However, these youth leaders sometimes neglect community's consensus on development activities and blindly follow the instruction of the FD officials. These

youths have almost depended upon the FD since they don't have any knowledge about the medicinal plants.

- **Herbal practitioners/professional leaders**

The CBCDC leaders with domain knowledge on medicinal plants are often encouraged because they have better ability to motivate and organize and lead the group/committee at grassroot level. These leaders are well-versed in ethno-medicinal practices. They command respect among the villagers and could effectively communicate with other outside agencies. They are efficient in maintaining records and undertaking follow-up actions. The FD is heavily dependent upon such leaders. The villagers have nominated and elected two leaders having domain knowledge on medicinal species in the villages of Sapmund in Harishankar and Georgegarh in Nrusinghanath range. These leaders are very impressive in carrying out the objectives of *in-situ* conservation activities especially before higher authorities and in discussions and workshops. They have been helping other CBCDC members in understanding and translating different activities relating to *in-situ* conservation of medicinal plants.

These are the major forms of CBCDC leaders or presidents. Their roles in implementing the objectives of the *in-situ* activities have been discussed in the following sections. Furthermore, the effectiveness and the efficiency of the constitution of CBCDC institutions as well as their leaders have been examined in the following sections.

Thus, the community-level institutional building in the form of CBCDCs is a form of bonding social capital, which is based on the relationships among the members, households and neighbours of a particular village. However, the collective connectedness of the village communities has been monopolized by the authoritative/department-driven power structure. The social capital is gender-biased when it comes to the question of leadership in the CBCDCs. Furthermore, the community-level social capital is not only

conditioned to collective consensus based on communitarian ties but also determined by the political, economic and educational structure of village communities especially when it comes to the selection of EC members as well as the leaders/presidents.

6.V.c Implementing stage: linking social capital

This section attempts to examine the processes and practices involved in the conservation of medicinal plants at Gandhamardan hills RF. In fact, it critically explicates the operationalization of various aspects of *in-situ* conservation of VVP with specific reference to selection, plantation (cultivation) and protection of various medicinal species in respective target area allotted to fourteen CBCDCs. The CBCDCs are considered as the genuine leaders in the processes of conservation and sustainable development of biodiversity of medicinal plants. The FD only acts as a facilitator in monitoring the conservation activities. It also provides know-how to the village communities in various stages of conservation of medicinal plants. Thus, the functioning of VVP is based on linking social capital (Woolcock 2001). It is based on the hierarchical relations between the community-level CBCDCs and the FD. This hierarchical relation is also considered as vertical social capital where the communities in the form of CBCDCs are located in one extreme and the FD on the other extreme in jointly undertaking collective conservation activities (Woolcock and Narayan 2000). Based on this linking social capital, the study provides contrasting characteristics about the participation of these CBCDCs and the FD in the process of conservation and development of biodiversity of medicinal plants at grassroots level.

According to the objective of VVP, the conservation of medicinal plants is local and context-specific. It is also flexible enough during the operational/implementing stage of VVP. In order to achieve the overall objective to maximize the conservation of medicinal plants, the VVP advocates 'participatory approach' that links FD on the one

hand, and the active participation of the village communities on the other. In addition, the VVP not only emphasizes the participation of local communities but also their knowledge systems while taking decisions regarding (re)generation of various types of medicinal plants. In fact, the VVP strongly promotes local-scientific knowledge systems in conserving and developing medicinal plants at Gandhamardan hills RF. Based on this participatory approach, the present study makes an attempt to understand the processes involved in the conservation and sustainable development of biodiversity of medicinal plants at Gandhamardan hills RF. As mentioned earlier, the VVP is also interested in protection of existing stock of medicinal species, re(generation) or artificial plantation of medicinal plants and model cultivation based on the methods of cultivation *ex-situ* conservation, *in-situ* conservation and *ex-situ* demonstration respectively. However, the current study especially focuses on *in-situ* conservation since it captures collaborative approach of conservation.

The *in-situ* conservation of biodiversity of medicinal plants is broadly undertaken through the process of artificial (re)generation to enrich natural regeneration of the availability of medicinal species at Gandhamardan RF. This process of artificial regeneration is broadly carried out in three major stages i.e. P^3: Pre-plantation, Plantation and Post-plantation. The pre-plantation stage refers to the preparation of site and the establishment of nurseries. The plantation stage covers the cultivation of target species or saplings. And, the post-plantation stage relates to the socio-physical measures or most appropriately protection measures that enhance the growth of cultivated species. Thus, taking into account these three stages of plantation of species, the VVP has undertaken the conservation and development of medicinal species in five major stages i.e. S^5 stages: Site preparation, Setting of nurseries, Sapling plantation, Soil and water management activities, and Stick rotation for the protection of project area

(i) Site preparation

Initially, the FD demarcated the target project area for twenty-five village communities. The FD with the help of the EC of all CBCDCs has conducted 'site preparation' activities in order to improve and enhance the target project area for better growth and productivity of the target medicinal species. This site preparation includes activities related to climber cutting, pruning, removal of dead and dried trees etc. The site-preparation activity for the entire target area was finished in two phases. Out of total 1450 hectares allotted to these fourteen CBCDC villages, the site preparation in first phase had covered 725 hectare during 3rd March to 18th March, 2005 and remaining 725 hectare was finished during 18th February 2nd March 2006. Almost half of the total allocated area for each CBCDC was finished in first phase and remaining area was finished in second phase. The number of wage-labourers employed in site preparation has been mentioned in Table 6.10

Table 6.10
Number of persons participated in site preparation (paid work)

Sl No	CBCDCS Villages	2006-2007			2007-2008		
		Total Labourers	Male	Female	Total Labourers	Male	Female
1	Mahulpali	15	10	5	15	8	7
2	Kandravata	15	8	7	15	7	8
3	Kuthurla	15	12	3	15	9	6
4	Dudumdarh	12	3	0	15	11	4
5	Nuapali	15	12	3	15	10	5
6	Sapmund	15	11	4	15	10	4
7	Rasmunda	12	10	2	10	8	2
8	Georgegarh	45	32	13	45	34	11
9	Laudimal	8	6	2	8	5	3
10	Manbhang	15	8	7	15	11	4
11	Majhipali	12	9	3	10	8	2
12	Magurmal	12	7	5	10	7	3
13	Kuradhiphasa	15	12	3	15	12	3
14	Lergaon	12	10	2	10	6	4

Table 6.10 shows that there are more numbers of men in comparison to women who participated in the process of site preparation. The labourers are hired from the concerned villages. However, the selection of these 'hired labourers' was completely decided by the president of the CBCDCs. The president hardly takes into account the economic condition of the households rather he selects either from his own caste group or from his followers. This has been featured from multi-caste villages especially where the president is from higher castes i.e. a non-ST. However, the village of Georgegarh is exceptional because though the president is a Brahmin but the village consists of only thirteen Brahmin households out of 178 total households in the village. In addition, the selection of wage labourers for paid work in Sapmund and Georgegarh has been decided by the EC members collectively.

(ii) Setting up or establishment of nurseries

The VVP has developed several nurseries in both the ranges to meet the demand of the CBCDCs to plant medicinal species in the target site. The setting up nurseries was also undertaken in two phases in 2005 as well as in 2006. The nurseries were developed in six sites for these fourteen CBCDCs: three nurseries had been developed at the villages of Dudumdarh (for the villages of Kuthurla, Kandravata, and Dudumdarh), Nuapali (for Nuapali and Mahulpali), and Sapmund (for Sapmund) in Harishankar range and three nurseries at the villages of Magurmal (for Rasmunda, Majhipali and Magurmal), Georgegarh (for Lergaon and Georgegarh) and Kuradhiphasa (for Laudimal, Manbhang and Kuradhiphasa) in Nrusinghanath range in 2005 as well as 2006. The development of these six nurseries was under control of the FD. Two persons were paid for each nursery towards the up-growing of species as well as the management of the nursery. Those two individuals were selected by the concerned foresters except the nurseries developed in

Sapmund and Georgegarh where the president and the EC members together of these two villages nominate certain individuals as wage labourers towards nursery development.

However, it is interesting to examine the selection of medicinal saplings which were raised at these four nurseries. The VVP clearly emphasizes the selection of medicinal species based on quantum of collection, market value, and current status of the species. In addition, the species to be developed at nurseries should be decided at the village level CBCDC meetings. Thus, the choice of selection of seedlings depends on the peoples' preference and depends on the basis of clear cut objective of VVP. Site quality, suitability of species for the region, maturity period of plants etc. need to be considered while deciding different seedlings for the nurseries in CBCDCs areas. There was conflict of interests in selecting the varieties of medicinal saplings in the proposed nurseries. The FD officials prioritize certain seedlings which are having market demand although such species are frequently available at Gandhamardan hills RF. The villagers, in contrast, prefer such medicinal species which are declined and threatened from Gandhamardan hills RF. The preferred species of CBCDCs are Gudamari, Chhatian, Sweta Musli, and Talmuli because, for them the existence of these species is threatened or vulnerable. Finally, the FD has raised its preferred seedlings in these nurseries without considering the views of the village communities. The seedlings which were developed were Neem, Phanphana, Bahada, Harida, Anla, Karanja, Jamu, Bela, Khaira, Jaamu, Tihuli, and Pasaruni. Thus, the collective consensus is once again destroyed by the authoritative attitude of the forest officials.

(iii) Sapling (gap) plantation

The VVP advocates gap plantation to augment the availability of medicinal plants at Gandhamardan hills RF. The space for gap plantation or artificial plantation depends upon the 'gaps' available at Gandhamardan hills RF. So far as the number of saplings for

gap plantation is concerned, the VVP strongly affirms that hundred (100) saplings need to be cultivated or planted in one hectare of project area. Like site preparation and nurseries, the gap-plantation for total project area for these fourteen CBCDCs has been completed in two consecutive years i.e. in the months of August and September in 2005-2006 and 2006-2007. The varieties as well as number of saplings planted at fourteen CBCDCs have been mentioned in Table 6.11.

Table 6.11
Number of medicinal plants planted during 2005-07

Sl. No	CBCDCS Villages	Number of Saplings Planted		TOTAL
		2005-2006	2006-2007	
1	Mahulpali	3000 (50 ha)	3000 (50 ha)	6000 (100 ha)
2	Kandravata	3000 (50 ha)	3000 (50 ha)	6000 (100 ha)
3	Kuthurla	3000 (50 ha)	3000 (50 ha)	6000 (100 ha)
4	Dudumdarh	3000 (50 ha)	3000 (50 ha)	6000 (100 ha)
5	Nuapali	3000 (50 ha)	3000 (50 ha)	6000 (100 ha)
6	Sapmund	23000 (50 ha)	23000 (50 ha)	46000 (100 ha)
7	Rasmunda	4000 (40 ha)	3500 (35 ha)	7500 (75 ha)
8	Georgegarh	15,000 (150 ha)	15,000 (150 ha)	30,000 (300 ha)
9	Laudimal	2500 (25 ha)	2500 (25 ha)	5000 (50 ha)
10	Manbhang	5000 (50 ha)	5000 (50 ha)	10000 (100 ha)
11	Majhipali	4000 (40 ha)	3500 (35 ha)	7500 (75 ha)
12	Magurmal	4000 (40 ha)	3500 (35 ha)	7500 (75 ha)
13	Kuradhiphasa	5000 (50 ha)	5000 (50 ha)	10000 (100 ha)
14	Lergaon	4000 (40 ha)	3500 (35 ha)	7500 (75 ha)
Total		**81,500 (735 ha)**	**79,500 (715 ha)**	**1,61,000 (1450 ha)**

Table 6.11 shows that the number of medicinal saplings planted at the *in-situ* project areas under Harishankar range is not according to the norm of the VVP. Whereas the number of saplings planted at Nrusinghanath range is strictly followed the norm of the VVP, the plantation of saplings in Harishankar is not identical. The CBCDC Sapmund has planted/cultivated maximum number of saplings in its target *in-situ* project area. According to the plantation norm of the VVP, each CBCDC developed under Harishankar range was supposed to plant 10,000 samplings. However, according to the official source from Harishankar range, nine CBCDCs except the CBCDC Sapmund

have planted 54,000 saplings – each CBCDC planted 6000 saplings – whereas the CBCDC Sapmund was promoted to plant 46,000 numbers of plants. Thus, about forty-six per cent (46per cent) of total saplings were planted only in CBCDC Sapmund. Explaining the reason behind this maximum number of saplings planted at CBCDC Sapmund, the range officer (RO), Harishankar range says:

> The target area proposed for the Sapmund village had number of gap spaces. In addition, what is more important is that the villagers are very much impressed with the nature and function of VVP. They are very active in initiating various activities at several stages, starting from formation of the village level institution to the plantation of saplings. They are also very active in the process of post-plantation activities including the protection of the target project area.

It is interesting to observe how these enormous numbers of saplings are planted in two successive years. As shown in Table 6.11, about 1,61,000 saplings have been planted in 1,450 hectares of project area. This massive plantation requires large manpower, which is mentioned in Table 6.12. According to the norm of the project, the labourers have to be hired from the respective village communities. As the labour activity directly derives wage, there is often competition among the villagers, especially among the poor households of the village(s) to get enrolled as wage labourers in plantation activity. It is the task of the EC or the head of the CBCDCs to select these wage labourers from his village. The decision to hire wage labourers varies from village to village. The role of FD also is not exception in imposing its authoritative attitude in selection of the wage labourers. With the help of the head of the CBCDCs of all the villages except the CBCDCs Sapmund and Georgegarh, the concerned foresters were in charge of selecting individuals in the process of both site preparation and plantation of medicinal species. The heads of these CBCDCs nominate those names who are either from his own caste group or those who are their supporters/followers. As a result, the participation of the

large number of poor households of the villages is excluded in getting opportunity to work as wage labourers. The CBCDCs of Sapmund and Georgegarh, in contrast, take decision at their EC meetings to give equal opportunity to all sections on rotation basis based on the economic condition.

Table 6.12
Number of wage labourers paid in gap plantation of saplings

Sl No.	CBCDCS Villages	2006-2007			2007-2008		
		Number of wages	Male	Female	Number of wages	Male	Female
1	Mahulpali	100	85	15	100	68	32
2	Kandravata	100	77	23	100	66	34
3	Kuthurla	100	80	20	100	55	45
4	Dudumdarh	100	75	25	100	72	28
5	Nuapali	100	90	10	100	77	23
6	Sapmund	767	412	355	767	427	340
7	Rasmunda	133	92	41	117	55	62
8	Georgegarh	500	365	135	500	315	185
9	Laudimal	84	46	38	84	34	50
10	Manbhang	166	94	72	167	87	80
11	Majhipali	133	112	21	117	75	42
12	Magurmal	133	70	63	117	53	64
13	Kuradhiphasa	167	132	35	167	82	85
14	Lergaon	133	121	22	117	74	43

Table 6.12 shows that about 5369 wages are paid – 2716 wages in 2005-06 and 2653 wages in 2006-07 – in planting 1,61,000 number of saplings in 1450 hectare of project area. According to the norm of the VVP, one wage labour is asked to plant thirty saplings per day. The table also reveals that there are more number of women participated in plantation activity in the year 2006-07 in comparison to the year 2005-06 except in the villages of Sapmund and Georgegarh. In fact, there is a sharp decline in the participation of men wage labourers. The basic reason behind their withdrawal from plantation work is due to the lack of payment or irregular payment which especially happened during first phase of gap plantation in 2005-06.

With the exception of villages of Sapmund and Georgegarh where the payment is undertaken by the head of the concerned CBCDC, the forester, in contrast, is in charge of paying hired wage labourers in other twelve villages. There are cases of nonpayment of wages to the village-based hired labourers by the forester as well as the CBCDC leaders. Out of these twelve village communities (excluding Sapmund and Georgegarh), the EC members and the presidents of two villages – Rasmunda and Laudimal – claim for nonpayment of 37 and 25 wages during 2005-06 respectively. However, the concerned foresters of these two villages assert that they have paid each wages of these two villages soon after the completion of plantation work in 2005-06. As a result, there was low level of participation of the members from the villagers in gap plantation during 2006-07. The FD had relied upon other neighbouring villages – where the VVP is not operating – for wage labourers in order to complete its target gap plantation.

Other ten villages, in contrast, strongly allege their nonpayment of wages to the forester as well as their leaders. The hired labourers either have received fragment of their wages or have not been paid for number of days during the first phase plantation work in 2005-06. They were compelled to come forward to work for the second phase because they do not have any other labour work available in and around their villages at that time. Furthermore, the villagers had participated in plantation work out of compulsion since their leaders - who are usually either from their caste/tribe or the head of the villages – provide wage works through out the year at their household level or at village level or panchayat level or block level. If they won't participate in VVP plantation activity, they would be deprived in getting other wage works in remaining days. As a result, the villagers were forced to work for the second phase of plantation work.

(iv) Soil and water conservation (SWC)

Soil and water management is one of the measures related to post-plantation activity. The forester as well as the village forest worker (VFW) with the support of the concerned EC as well as president identify the plantation areas needing soil and water conservation measures and locate the places, areas and extent of such treatment. They also identify sources of stream in upper region in order to construct check dams to conserve water as well as soil for better growth of the newly planted saplings/species. In addition, they also establish percolation tanks during rainy season to conserve water, which provide water for the rest of the seasons of the year. The number of check dams as well as percolation tanks established for soil and water conservation is mentioned in Table 6.13.

Table 6.13
Number of check dams and percolation tanks for SWC

Sl No.	CBCDC Villages	Check dams				Percolation tanks			
		05-06	06-07	07-08	08-09	05-06	06-07	07-08	08-09
	Mahulpali	1	1	2	2	1	2	2	1
	Kandravata	0	2	1	2	1	2	1	2
	Kuthurla	1	1	1	2	1	2	1	2
	Dudumdarh	0	1	1	2	1	2	1	3
	Nuapali	0	1	1	2	1	1	1	2
	Sapmund	1	3	4	4	4	3	3	6
	Rasmunda	1	1	2	1	1	2	1	1
	Georgegarh	1	3	4	5	3	5	4	4
	Laudimal	1	2	2	1	2	1	0	1
	Manbhang	1	1	2	1	1	2	1	1
	Majhipali	0	1	1	1	1	1	1	0
	Magurmal	0	1	1	1	1	1	0	1
	Kuradhiphasa	0	1	1	1	1	1	1	1
	Lergaon	1	1	2	1	1	0	1	0
Total		8	20	25	26	20	25	18	25

Table 6.13 reveals that there are more number of check dams and percolation tanks for the villages of Sapmund and Georgegarh. The establishment of these dams and tanks are initiated and completed by the FD except the villages of Sapmund and Georgegarh where the participation of CBCDC general members and the EC members with the support

from the FD have constructed these tanks and dams. The FD didn't find support from these remaining twelve leaders of CBCDCs. The EC members and their leaders of these twelve CBCDCs show disinterestedness towards these post-plantation activities.

(v) Stick rotation for the protection of project area

The participation of the village communities in the process of protection of the *in*-situ project area is one of the important measures especially during post-plantation stage. The VVP has demarcated a boundary line with barbed wire and cement pillars for each *in-situ* conservation sites sanctioned to these fourteen CBCDCs. According to the memorandum of understanding (MoU) between the CBCDCs and FD, the village communities have to protect their *in-situ* areas from grazing, poaching, illegal marketing of medicinal and non-medicinal forest produces on a regular basis. Only two villages i.e. Sapmund and Georgegarh are protecting their project area on regular basis, which is mentioned below. The participation of the members of these twelve village-level CBCDCs is low protecting the *in-situ* conserved areas since the members are antagonistic either towards their leaders or towards the forest officials, Hence, the protection of the *in-situ* areas of these twelve villages has completely failed.

Apart from the MoU, the VVP also has the provision of 'paid watcher system' for every CBCDC for the protection of *in-situ* area from fire. For this purpose, the FD has appointed a forest watcher purely on a temporary basis especially only for three months in a year: March, April and May. These forest watchers are usually nominated by the presidents of the concerned CBCDCs, however, the payment is usually done by the concerned foresters except the villages of Sapmund and Georgegarh. Since the paid watchers are only for three months for a year, the project areas are completely open for pilferers for rest of the months. The CBCDCs of Sapmund and Georgegarh are not following the paid watcher system. The villagers are rather collecting the entire amount

sanctioned for paid watcher and are saving for the village development or community-level activities. They have adopted an alternative method of long-persisting community-based protection method.

As mentioned above, the villages of Sapmund and Georgegarh have devised an alternative method of protection for their project area. The villagers commonly take the responsibility of protecting the *in-situ* conservation site. This collective protection method has been decided in the village level general body meeting. The villagers adopt the practice of household-based protection method, which is commonly known as *Thengapali*, a symbol of community's authority that involves rotation of a stick (bamboo stick) from household to household to guard their own 'resources'. Explaining the system of *Thengapali*, the president of CBCDC Sapmund says:

> The stick used to be placed in front of the house of a person, who is responsible for the protection of the forest on that particular day. After the duty of that household is over, it is the responsibility of that household to place that stick at the next door. In this year, the stick rotates around each and every doors of the village.

This practice of 'stick rotation' in Sapmund and Georgegarh is not confined to the months of March, April, and May. Rather, it operates through out the year. Arguing against the practice of paid watcher system, the president of CBCDC Georgegarh says:

> We are following the tradition of community-based protection method through the operation of *Thengapali*, which operates throughout the year. The paid watcher is serving only for three months a year. The newly planted site remains opened for the remaining months of the year. All the households of our village are directly or indirectly depending upon this huge resource-base of Gandhamardan hills RF for their day-to-day livelihood support. Hence, it is our common concern to protect our own resources. Moreover, the villagers are not interested towards the temporary recruitment of paid watcher since it creates factional interest among the households especially among the poor households in getting registered for this temporary appointment for the post of watchman.

The implementing stage which is appropriately based on linking social capital – that integrates community on the one hand, and the forest department on the other – has failed in majority of CBCDCs in accomplishing the objectives of the VVP on conservation and sustainable development of the conservation of medicinal species. Except the villages of Sapmund and Georgegarh, the EC members and the leaders of other twelve CBCDCs and also the forest officials are responsible for the lack of community participation at various stages of the plantation activities. While performing activities relating to *in-situ* conservation, the forest officials are authoritative in nature especially while choosing varieties of saplings for the plantation. In addition, the EC members and the CBCDC leaders along with the forest officials were taking discriminatory decisions especially in the selection of wage-labourers for paid work in the processes of plantation. They are also deeply involved in corruption relating to the payment of the wages.

As a result, the participatory conservation based on linking social capital has failed in achieving its target objectives in majority of CBCDCs. The collective conservation has also failed in achieving the participation of the members of the village communities. Hence, the CBCDCs that is based on the principle of 'collective consensus' has sharply adopted the process of 'inclusive exclusion'. The members included in these community-based CBCDCs have been excluded by the leaders and the forest officials. In addition, the general members of the these CBCDCs have also been excluded not only in representing CBCDC-EC members or leaders but also in achieving economic benefits (in terms of wage labourers) from the VVP. The CBCDCs of Sapmund and Georgegarh are quite successful because of their community-level involvement in every activities relating to *in-situ* conservation and protection.

6.V.d Invigorative stage: the emergence of federations – bridging social capital

Another important stage of engaging with the process of conservation of biodiversity of medicinal species of the VVP is the invigorated disposition of community level social institutions i.e. CBCDCs towards the formation of larger social institution at range or block level. In fact, initiated by the presidents of CBCDCs of Sapmund and Georgegarh, the twenty-five CBCDCs have established two 'federations' i.e. 'Gandhamardan Surakshya Samiti (GSS)' and 'Gandhamardan Vanaspati Vana Society (GVVS)' at the ranges of Harishankar and Nrusinghanath respectively in the year 2008. The GSS comprises ten CBCDCs whereas the GVVS consists of fifteen CBCDCs. The development of these federations is based on bridging social capital as these federations are based on the relationships or social ties across different village communities in enabling to attain common objective (mentioned below). The dominant mission of these federations is to invigorate the activities relating to the processes of conservation and development of biodiversity of medicinal species. The major aims and objectives of both GSS and GVVS are:

- To execute *in-situ* conservation activities as initiated by the village level CBCDCs;
- To increase productivity primarily of medicinal and nutritional species;
- To increase production of leaves, pots, fruits, seeds etc. of medicinal values;
- To develop employment or economic base for the villagers;
- To preserve local knowledge system relating to the conservation of medicinal species.

(i) Formation of federations

The in-charge division forest officer (DFO) and the in-charge range officer act as the ex-officio chairman as well as member secretaries respectively in these two range level federations. That apart, these two federations have constituted working committees under the name of 'executive bodies' (EB). The constitution of these EBs in GSS and GVVS

consists of fifteen members each – eight men and seven women – based on electoral representation by the members of the concerned federation. The key function of these EBs is to carry out the objectives of the society. The GSS and GVVS have also elected their society leaders in the form of presidents and secretaries. The president and secretary of GSS are from Kulta (OBC) and Adikandha (ST) respectively. The president and secretary of GVVS are from Kulta (OBC) and Brahmin (General) respectively. In addition, there is not a single woman elected as the leader(s) of these federations. Hence the federations are gender-biased and mostly higher caste-biased in nature. The participation of the minorities (SC, ST, and Christian) is very low in getting access to office positions.

The secretary of the executive body is in charge of dealing with the financial aspects although joint saving accounts of president and secretary have been registered. Each CBCDC has paid an amount of two thousand rupees as a form of their membership fee to the GSS and GVVS. These two federations are supposed to meet in every two months. Till September 2009, the EB, GVVS has conducted eight meetings whereas the EB, GSS has conducted only three meetings. Thus, the EB members as well as the leaders of GSS are very irregular in conducting meetings to discuss/decide various activities of the federation.

(ii) Functions of federation

It is claimed by the presidents of these two federations that the emergence of federations under the banner of GSS and GSSV is considered as the latest instrument to invigorate the processes and practices involved in conserving the biodiversity of medicinal plants and products. Although their central concern is to conserve and protect the medicinal species available at Gandhamardan hills RF, the field observation, however, witnesses a different story altogether. The study reveals that although such federations are

constituted, based on the above objectives, yet there is a noticeable chasm between the constitutional objectives and their actual practice. The federations are completely engaged in collecting several medicinal raw produces from Gandhamardan hills RF and trading those raw produces both in the form of raw products and processed products. The federations receive raw materials from the grassroots level CBCDCs as well as the members of the village communities.

With the initial balance (as deposited for membership fee) of rupees twenty thousand (collected as a part of membership fee), the GSS, Harishankar has earned a profit of thirty thousand (30,000) and twenty-five thousand (25,000) in the year 2008 and till September 2009 by selling medicinal products. Similarly, the GVVS, with the balance of rupees thirty thousand, has earned rupees seventy-five thousand (75,000) and sixty-five thousand (65,000) in 2008 and till September 2009. Thus, the GSS and GVVS have gained profit of rupees fifty-five thousand (55,000) and one lakh forty thousand (1,40,000) respectively. They have developed such amount by selling medicinal products at the local market as well as state level exhibition fairs. That apart, the federations have also opened two regular separate selling counters at both the ranges to sell the medicinal products directly to the consumers. These counters have been provided/established by the forest department. In fact, the GVVS is getting more profit than the GSS because of its efficient leaders who maintain transparency in conducting regular meetings to discuss the collection, preparation and marketing of medicinal products. In addition, the president of GVVS is an herbal practitioner. The leader of this federation with his domain knowledge on herbal medicine not only collects the raw produces but also prepares processed medicinal products. Furthermore, the GVVS has also been facilitated by the range officer. The range officer has sanctioned certain machinery as well as other necessary physical assets in order to process the medicinal products. Thus, the success of

GVVS depends on the efficient leadership as well as the close networking with the FD. Explaining the merits of the federation, the president of GVVS says:

> The establishment of *Mahasamiti* (federation) has, to some extent, empowered the economic condition of the villagers. Earlier, the villagers were selling the raw materials to outsiders at a minimal price. Now, they are selling the raw products to the *Mahasamiti* since it is paying the actual market price of the raw material to the villagers. In addition, the *Mahasamiti* also temporarily recruits certain poor people to process the raw materials as collected from the villagers. Moreover, our products have been relatively more demanded by the customers since they are getting better price as well as better quality in comparison to other aurvedic products available in the market.

The GSS, Harishankar, in contrast, suffers from effective leaders. As mentioned above, the leaders (both president and secretary of EB) are very irregular in conducting meetings and are not accountable, especially in financial matters, to its members. As a result, other members of EB are not cooperating with them. The members are trying to change/re-elect their leaders for the development of GSS.

Thus, the above interpretation of the functioning of federations at range level clearly indicates that the institutional restructuration of CBCDCs in the form of 'federation' is enthusiastically engaged in profitable business activity instead of protecting and conserving the biodiversity of medicinal plants. Of course, as a blessing in disguise, the establishment of such federations, developed by the CBCDCs, provides marketing facility of medicinal raw materials for the village communities; the federations are proactive in selling/trading medicinal products (both raw and processed) to gain enormous profits. To conclude, the study argues that the constitution of such federations, which are clearly based on bridging form of social capital, consolidates the process of (re)invigoration of bio-business than bio-conservation.

6.VI Participation of CBCDC members in working of VVP: a summary

The establishment of the community-level social institution – in the form of 'community-based biodiversity conservation and development committees (CBCDCs) – is a necessary condition in the process of formation of social capital in/between village communities and the forest department in the process of conservation of biodiversity of medicinal plants. However, the constitution of these CBCDCs and their social capital has not equally provided identical results at these grassroot levels. There are certain factors, which have facilitated the participation of the members of the CBCDCs and there are also some other significant factors, which have impeded the participation of the members of the village communities in the processes of conservation and sustainable development of the biodiversity of medicinal plants. The study has described these factors in the following lines.

6.VI.a Factors contributing to low level of participation of the members of CBCDCs

- The participation of members/villagers as 'labourers'/wage labour, hence no ownership of conservation
- The low level of representation of women and SCs, STs and Christians in office-bearer positions
- Irregularity in conducting general body/EC; 'closed-door meetings' between a few EC members and forester in-charge who is also the secretary of CBCDC
- The excessive interference of forest officials at various stages of the project
- Favouritism of the CBCDC leaders especially at the time of selection of individuals for paid work
- Ignoring the community knowledge systems and their collective decision especially in the process of selection of the species for the development of nurseries of medicinal species

6.VI.b Factors contributing to high level of participation of the members of CBCDCs

- The community involvement in the process of decision making especially in the villages of Sapmund and Georgegarh to decide various activities of the VVP;
- The selection of persons with domain knowledge as the team leaders i.e. president of the CBCDCs;
- The democratic process of selection of leaders for the CBCDCs;
- The practice of 'Thengapali' (stick rotation) especially during post-plantation stage to protect the *in-situ* area from thieves and fire in which every household is involved; and
- The keenness of the leaders in maintaining link between the community on the one hand and the forest department on the other (linking social capital) in the operation of various activities of *in-situ* conservation.

The study finds that even if the BDA, 2002 that has been implemented since seven years, the biodiversity management committee (BMC) at grassroot level has not been formed in this area. As a democratic platform, the formation of BMC could have promoted more participation from the weaker/marginalized sections of the village communities. Moreover, it could have maintained the biodiversity record i.e. people's biodiversity register – in terms of maintaining the record of the biodiversity of medicinal plants and the related knowledge system of the village communities. Biodiversity heritage sites have not been demonstrated by the state biodiversity board, Orissa. As a result, because of this the VVP is not linked to the Panchayati Raj Institutions (PRIs) at grassroot levels in any way. This disconnects between the political institution at the village level and the currently involved conservation institutions (CBCDCs) and their efforts towards conservation.

6.VII Social capital and conservation: major conditions/antecedents

After a critical analysis of the functioning of VVP in general and the participation of CBCDCs in particular based on the theoretical framework of social capital, the current section seeks to analyze the major conditions/antecedents responsible for the formation/erosion of social capital that ultimately determine the level of participatory conservation and development of biodiversity of medicinal plants in Orissa. The study explains that small, relatively isolated tribal communities under the banner of community-based biodiversity conservation and development committee (CBCDC) are based on face-to-face interactions. However, these institutions clearly exhibit an absence of local Putnamean elements of social capital – trust, norm, and cooperation – among the members of the village communities in undertaking collective conservation. As a result, the study also clearly explains that the VVP has failed majority of the CBCDCs in achieving its target objectives except in the villages of Sapmund and Georgegarh. In this context, the present section makes a critical attempt to understand the major conditions/antecedents towards social capital formation that ultimately determine the success/failure of VVP in Orissa.

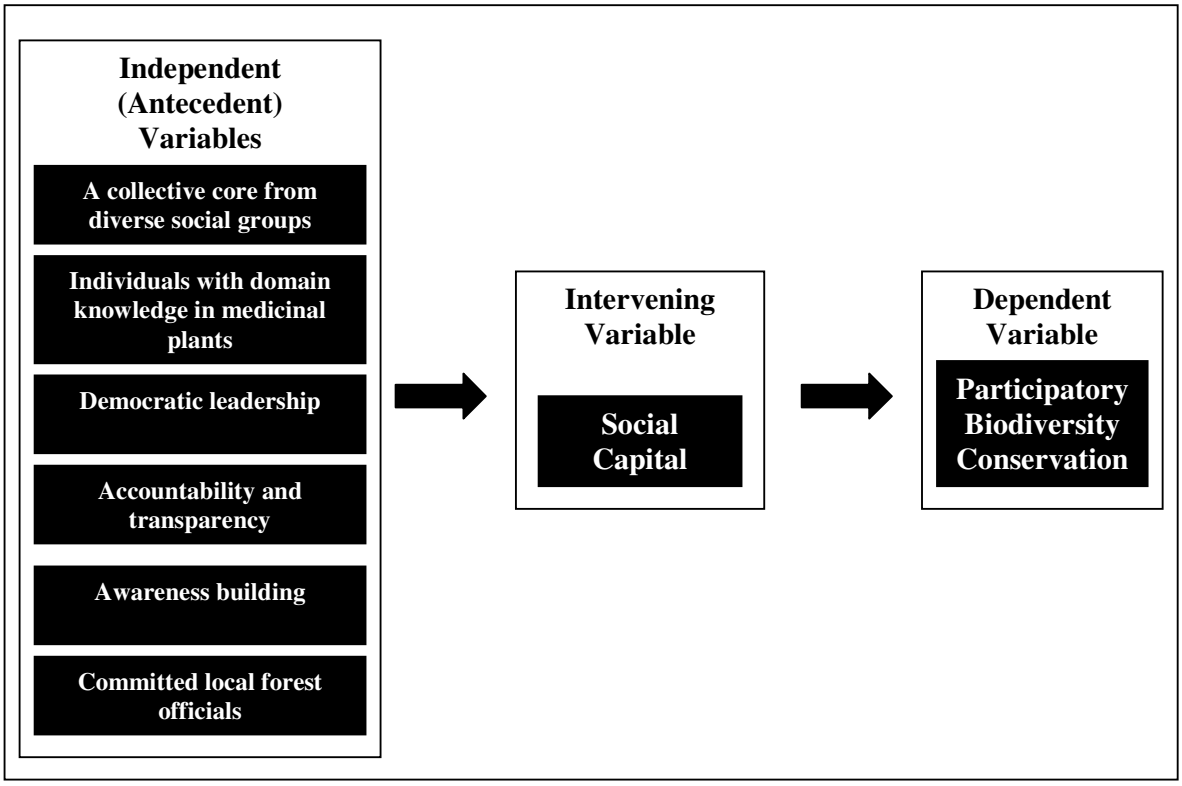
The study broadly identifies three interrelated conditions/antecedents to explain the success of conservation activity in Sapmund and Georgegarh. The first is the social context in which the VVP is introduced. In Sapmund, higher levels of bonding social capital emerged from a sense of 'community feeling' among the tribal population. As literature suggests, the tribals have a long history of community action for preservation of natural resources. This bonding social capital in other tribal dominated communities is quite absent due to the authoritative domination of FD and the non-committed attitude of the CBCDC leaders. The second condition is the presence of 'synergy' (considered as linking social capital) between the CBCDC leaders and their networking with the forest

officials. The leaders of Sapmund and Georgegarh have succeeded in building networking i.e. linking social capital (with in-charge ranger, forester and village forest worker), which has facilitated the existing level of social capital in the village communities that promoted the collective action for conservation. The third important condition for the success of conservation is local leadership and their expertise in herbal knowledge system (cognitive social capital). This leadership is responsible for the effective functioning of the CBCDCs as well as the range-level federations (GSS and GVVS) within and outside the village communities. In Sapmund and Georgegarh, the presence of innovative leaders – who are having domain knowledge on medicinal plants – has been responsible for the successful management of their respective CBCDCs on the one hand and the successful management of the *in-situ* project area on the other. Likewise, the federation of GVVS (which is based on bridging social capital) at Nrusinghanath range is accruing more profits/returns due to the selection of leader who is an ayurvedic practitioner by profession.

The analysis of the current study shows that there are six major conditions/antecedents that account for the formation/erosion of social capital and its role in participatory conservation of biodiversity of medicinal plants. These six major conditions and antecedents are: (i) A collective core from diverse social groups; (ii) Individuals with domain knowledge in medicinal plants; (iii) Democratic leadership; (iv) Accountability and transparency; (v) Awareness building; and (vi) Committed local forest officials. These six antecedents facilitate in the formation of social capital that ultimately leads to conservation and sustainable development of biodiversity of medicinal plants. The analysis of the data shows that presence of these antecedents engenders and enhances the processes of social capital formation and biodiversity (medicinal species) conservation. The absence of these factors leads to failure of social

capital that ultimately leads to failure in participatory biodiversity conservation. Thus, by taking into the triangular relationship of these antecedents, social capital and biodiversity conservation, the study categorizes three categories of variables namely antecedent variable, intervening variable and dependent variable respectively in the entire process of collective conservation.

Diagram 6.3
Interacting variables in participatory conservation



Thus, the following section critically delineates these six major antecedent variables and their corresponding impact on social capital formation and conservation and sustainable development of biodiversity of medicinal plants.

(i) A collective core from diverse social groups

Village studies in India especially in post-independence period have witnessed two significant features: traditional ascriptive hierarchies based upon caste and endemic

factionalism (D'Silva and Nagnath 1999). As literature suggests, dominant caste/class groups have been able to capture most of the benefits of government welfare and development programmes. Studies have also shown that these features have destroyed forms of social capital in villages making collective action more difficult (Pai 2001). In addition, there is also an argument that homogenous communities promote better collective conservation than heterogeneous communities (D'Silva 2002). However, the current study exemplifies contrasting features of existing literature on social structure and their corresponding effect on the formation of social capital that leads to collective conservation.

As mentioned earlier in this chapter, the selection of CBCDC leaders is based on both ascribed and achieved criterion. In fact, the selection of the leader in certain CBCDCs is based on ascribed criterion (for example caste/economic domination in village social structure), whereas in other villages the leaders are completely based on the 'achieved' criteria i.e. education, business, politics and expertise in ethno knowledge systems of medicinal plants.

That apart, the selection of the CBCDC leaders is also from non-dominant social groups of the village. Out of fourteen villages, fifty per cent villages – Kuthurla, Dudumdarh, and Sapmund in Harishankar and Georgegarh, Laudimal, Majhipali, and Lergaon in Nrusinghanath range have CBCDC leaders from non-dominant castes or social categories (see Table 6.14). The leaders of these villages are very inactive in maintaining coordination among their members except the presidents of Sapmund and Georgegarh.

Table 6.14
Dominant social categories and the category of CBCDC leaders

Sl no.	CBCDC villages	Dominant Social Category	Category of Leaders
1	Mahulpali	ST	ST

2	Kandravata	ST	ST
3	Kuthurla	ST	OBC
4	Dudumdarh	OBC	ST
5	Nuapali	ST	ST
6	Sapmund	SC	ST
7	Rasmunda	OBC	OBC
8	Georgegarh	OBC	General
9	Laudimal	ST	OBC
10	Manbhang	ST	ST
11	Majhipali	ST	General
12	Magurmal	ST	ST
13	Kuradhiphasa	ST	ST
14	Lergaon	SC	OBC

However, out of fourteen CBCDCs, only two villages, namely Sapmund and Georgegarh - 14.28 per cent of total CBCDCs - have been performing regular activities related to *in-situ* conservation with active participation of the members of the village communities. In remaining twelve CBCDCs i.e. 85.71 per cent, the conservation activities have completely failed due to the conflict among the members of the community on the one hand, and the contradiction between the community and the FD officials on the other.

The two successful villages are primarily multi-castes in nature. Both the leaders are from non-dominant social groups of the villages. These two leaders have established strong relationship among their respective EC members. In addition, these leaders have also maintained close networking with the officials of FD. Thus, with the support of the EC members as well as well-organized leadership, the CBCDCs of Sapmund and Georgegarh perform regular activities at various stages of *in-situ* conservation. The practice of *Thengapali* towards protection of *in-situ* conservation area in these two villages clearly explains the kind of community-solidarity among the members of these villages. In fact, the presence of 'natural hierarchies' – based on caste, class and power – hardly makes any difference in promoting the process of collective conservation of biodiversity of medicinal plants. Thus, the constitution of EC forms 'a collective core

from diverse social groups' is playing a crucial role in building community solidarity as well as synergy between the community and the FD towards the process of conservation and development of biodiversity. Thus, the argument of homogeneity and heterogeneity is sidelined while discussing about collective conservation. This collective core in these two villages, in contrast, has formed and developed social capital, which engenders the process of participatory conservation.

(ii) Individuals with domain knowledge in medicinal plants

Education has been described as an important means for building social capital in a society as it provides socialization and creates common values and ideas (Fukuyama 2001). However, the present study disproves that mere educational attainment by the leader does not provide any form of social capital among the members of the CBCDCs. Because, the study reveals that the educational attainment of all CBCDC leaders that varies from matriculation to graduation has produced disproportionate results in the process of social capital formation and collective conservation.

The present study, instead, explores the significance of domain knowledge i.e. expertise in herbal medicine that plays an important condition in social capital formation and conservation and development of biodiversity of medicinal plants. The study finds the appropriateness of this aspect especially from the leaders of the CBCDCs Sapmund and Georgegarh in this category. The two CBCDCs are herbal practitioners. People of their villages as well as their neighbouring villages rely upon these practitioners at the time of their health problem. In addition, these leaders have influenced the members of their respective communities about the significance and usefulness as well as the need for conservation and protection of biodiversity of medicinal species. Thus, the selection of these practitioners of herbal medicine as CBCDC leaders have gradually motivated common villagers to come forward and cooperate with their leaders towards the process

of conservation. This community-based participation and cooperation symbolizes the building of social capital that successfully enhances in undertaking participatory biodiversity conservation.

(iii) Democratic leadership

Democratic and effective community leadership, along with a favourable social environment, has been responsible for building social capital and ensuring collective conservation, which has been observed in the villages of Sapmund and Georgegarh. As mentioned above, within the SCs and OBCs dominated villages of Sapmund and Georgegarh, the leaders who are primarily from the ST and general (Brahmin) social groups respectively are respected and listened to carefully and their directions and requests are undertaken. These CBCDC presidents who have played a central role in successful collective conservation activities of CBCDC Sapmund and Georgegarh are not confined to simple leader of the concerned CBCDC. Several other related 'outlooks/attributes' have been identified in their successful actions that have made Sapmund and Georgegarh as model CBCDC villages of VVP. The present study has categorized these outlooks into four major headings.

First, the leaders are very knowledgeable about the objective of VVP and activities of the FD and have also clear understanding about various components of the project as well as its benefits. Second, they have built strong networking between the community and the local forest officials as well as the other higher authorities of FD i.e. DFOs. Moreover, these leaders were also the founders of the federations founded both at Harishankar and Nrusinghanath. This has increased the villagers' respect and affection for them. Third, these leaders who are very close to senior forest officials who consider these leaders as model leaders through whom the officials put many programmes into actions. In fact, the senior forest officials have often treated these two leaders as 'model

leaders' in other CBCDC villages to speak about the success of CBCDCs and their action towards conservation.

The FD has also conferred state level award for the efficient leadership towards successful collective conservation and protection of medicinal plants. In fact, these leaders of CBCDCs Sapmund and Georgegarh have been awarded as 'Prakruti Bandhu'/friend of nature in 2007 and 2008 respectively by the Department of Forest, Government of Orissa, Orissa for their immense contribution by organizing the village communities as well as by maintaining strong networking with the FD in the process of *in-situ* conservation especially the plantation and protection of medicinal plants in the target project area. The state level awards have built more self-confidence and commitments towards. Fourth, these leaders initiate every action for conservation by taking the confidence of their respective village communities. They never go against the collective decision of the villagers. Every decision in the process of conservation is decided at the village level meetings. These four features of efficient leadership attributes of the leaders at grassroots levels have facilitated in the direction of social capital formation in the villages of Sapmund and Georgegarh.

In other 85.71 per cent of less successful CBCDCs, the leaders have not been able to gain trust of the villagers and provide them democratic leadership in conserving and protecting the respective *in-situ* conservation areas. These leaders, especially the leaders of CBCDC Rasmunda and Laudimal often complain about the negligence of the local forest officials who, these leaders allege, are involved in financial misappropriation during the operation of several stages of the project. They also allege that these local forest officials do not visit their village as well as the *in-situ* areas. Other villages have complained about the obscurity in part of their leaders. The villagers complain that these leaders perform closed door meetings and do not provide regular information about the

funds flow and their expenditure. Since the leaders have strong economic base, deep-seated political background and close contact with the local forest officials, the villagers do not go against their leaders. The members of these CBCDCs villages need an alternative ECs and also their leaders.

(iv) Accountability and transparency

The present study also explores that accountability and transparency are necessary to create mutual trust among and between the members of the community and the FD. It is a pre-condition for building effective community participation and partnership i.e. the partnership of CBCDCs and the FD. In order to achieve this aspect, the VVP has introduced two major features i.e. the pass book and the village register to provide democratic and transparent methods of functioning and to check the powers of ECs and the forest officials who work together.

Like other JFM programmes, the pass book is a joint account of the community and the FD. The pass book is supposed to be placed in the villages to ensure the local communities about access to and information about expenditure and savings. The funds devolved to the CBCDCs for various activities are transferred into joint bank account operated by the president of the concerned CBCDCs and the forester. However, except the CBCDCs of Sapmund and Georgegarh the pass books are retained by the concerned foresters who are acting as the member secretaries to the CBCDCs. This action of the forester has compelled the members of the communities to contemplate the misappropriate mentality of the forester. It also forced them to visualize the inefficiency of their CBCDC leaders.

Another important feature is the maintenance of village register. While initiating the process of formation of CBCDC a 'memorandum of understanding (MoU)' between the village community and the FD was signed and placed in village register. This MoU

symbolizes the initial record of the functioning of CBCDCs as part of the VVP. The village record also keeps information about the all activities related to *in-situ* conservation and protection. However, these village records have been retained by the in-charge forester except the villages of Sapmund and Georgegarh. The researcher has made several efforts to locate these village records to find out the number of meetings held both at village and EC levels especially in connection to the activities relating to *in-situ* conservation. However, he has been often advised by the forest officials from time to time that the village register is not with us. As a result, without being disheartened, the researcher had to completely rely and believe the opinion of the villagers as well as the EC members to know the number/proceedings of the meetings of the GB and EC for various activities at various stages of conservation (Table 6.15).

Table 6.15
Number of meeting held for VVP activities

Sl. No.	CBCDC Villages	GB Meetings	EC Meetings
1	Mahulpali	2	10
2	Kandravata	3	12
3	Kuthurla	2	12
4	Dudumdarh	2	16
5	Nuapali	2	10
6	Sapmund	12	28
7	Rasmunda	4	15
8	Georgegarh	10	26
9	Laudimal	4	14
10	Manbhanga	3	10
11	Majhipali	2	8
12	Magurmal	2	6
13	Kuradhiphasa	3	12
14	Lergaon	2	14

Table 6.15 clearly shows that there is complete absence of general body meetings and occasional EC meetings in all CBCDCs except Sapmund and Georgegarh. According to the norm of the project, the GB has to meet in every six months whereas the EC has to meet in every two months. While interviewing the members of ECs except Sapmund and

Georgegarh about the irregularity of the meetings, they responded that during the beginning of the project the EC meetings were quite regular, but, in course of time, the leader and the forester manage everything relating to the functioning of the *in-situ* conservation. Sometimes the forester is taking some signature from certain members of the executive committee. In fact, the forester and the president determine all decisions and, thereafter collect signatures from other EC members.

The villages of Sapmund and Georgegarh, in contrast, conduct regular GB and EC meetings to discuss various aspects of the project. The villagers are engaged and involved in various activities due to their clear information about the functioning of the project through regular meetings. Consequently in Sapmund and Georgegarh, there is greater trust among the members of the EC and between the EC and the village community. Thus, accountability and transparency on the part of the leaders and EC members facilitate in forming social capital among and between the members of the village and the forest department.

The fourteen villages in the study area belong to six Panchayats. The office bearers of these Panchayats are not involved in the activities of VVP.

(v) Awareness-building

Awareness building is considered as one of the important features of any project. Awareness doesn't confine to the simple introduction of any project in the target area rather it refers to the process of sensitization of its various components as well as the participation of target individuals/village communities. The study observes that though the VVP has been functioning since five years, the level of awareness has been differently indicated from the village-level households. In fact, the households have not uniformly shown their interest towards the operation of VVP in their respective villages. In this context, the present study systematically analyzes the level of awareness among

the households in the fourteen village communities in four major categories: fully aware, partially aware, least aware and unaware.

The fully aware are those households who are not simply acquainted with the operation of VVP in their respective villages rather they are familiar with the various components of the VVP. In fact, they know the objectives, nature and scope of the operation of VVP. The partially aware households are those who are completely informed about the functioning of the project in their respective villages but their familiarity is limited to certain aspects or components of VVP. The least aware households are those who are only familiar with the title of the project. In fact, they know the operation of VVP under the name of '*Jungle Surakshya*'. The unaware households are neither acquainted with the operation of VVP nor are involved in any activities of VVP in their respective villages.

Table 6.16
Level of awareness of the operation of VVP

Sl. No.	Name of Village	Unaware	Least Aware	Partially Aware	Fully Aware	Total
1	Mahulpali	2	15	3	1	21
2	Kandravata	9	23	10	1	43
3	Kuthurla	19	38	20	1	78
4	Dudumdarh	11	31	19	1	62
5	Nuapali	5	13	4	2	24
6	Sapmund	5	18	10	5	38
7	Rasmunda	9	16	15	2	42
8	Georgegarh	33	86	48	11	178
9	Laudimal	6	56	35	1	98
10	Manbhang	5	24	16	1	46
11	Majhipali	9	29	16	1	55
12	Magurmal	9	13	2	1	25
13	Kuradhiphasa	18	47	11	1	77
14	Lergaon	14	35	12	2	63
Total		**154**	**444**	**221**	**31**	**850**

Table 6.16 shows that out of total households of 850, only 3.65 per cent of households are well-aware with the operation of VVP as well as its various components. More than fifty per cent of households (52.23 per cent) belong to the category of 'least

aware'. Their connection is only limited to wage labour at the time of plantation of various medicinal species. Around 18.11 per cent of households are completely unaware about the functioning of the VVP. Hence, awareness-building being one of the indicators of social capital is considered as an important feature that provides an individual to become a part of the 'project' as well as a part of the process collective action. In fact, it provides in strengthening one's belongingness not only towards the operation of project but also towards the members of the same community.

(vi) Committed local forest officials

Officials of the FD in economically backward regions i.e. western track of Orissa, need to play a proactive role and also a 'mediating agency' in enhancing/building social capital and that promotes collective community participation. The management of participatory development demands special skills and sensitivity on the part of officials involved, particularly in the villages where the existing stock of social capital is as low as: Mahulpali, Kandravata, Kuthurla, Dudumdarh and Nuapali of Harishankar and Rasmunda, Laudimal, Majhipali, Magurmal, Manbhang, Kuradhiphasa, and Lergaon of Nrusinghanath. With the retreat of the state from direct management of the bioresources to joint management with the local inhabitants, its role has been shifted to that of a facilitator and regulator. This needs to be reflected in the role of the forest officers and staff at the grassroots level. The RO, forester and VFW are expected to help in the formation of the CBCDCs and to explain the concept of VVP and its benefits to villagers. In fact, they are expected to develop close contacts and function as advisers to local communities.

The role of local forest officials is crucial because our sample villages are very weak in understanding the spirit or ethos of the democracy. They do not have within them a 'civil society' based upon notions of democracy and equity. There is widespread

acceptance among these tribal dominated villages of the rules of community life and need for collective functioning for survival, but not notions of equity or democratic functioning. Rather it is democratic leadership and the guidance of forest officials that has made collective conservation possible, which is completely absent in the above mentioned twelve villages. The villagers hardly participate in village meetings as well as in the decision-making processes. Since the meetings are irregular and indoor-based in nature, the villagers show least concern towards the activities of the VVP. They also develop a tendency of distrust towards their leaders as well as the forest officials.

The present study explores that the merits of forest officials have been clearly indicated from the two successful CBCDCs of Sapmund and Georgegarh. The EC members as well as the presidents of these CBCDCs give importance to the forest officials in successful running of their CBCDCs. In Sapmund, around 46,000 medicinal saplings have been planted as the forest officials are very helpful in guiding the members of EC at various stages of the plantation. Similarly, the emergence of GVVS, a federation developed under Nrusinghanath range also gives credit to the FD. While the president of CBCDC Georgegarh who has taken the initiative in establishing the federation, the range officer has provided necessary machinery and other physical supports in producing several processed medicinal products.

Thus, the above analysis clearly indicates that the local forest officials play a crucial role starting from the initial nurturing to the gradual effective functioning of the CBCDCs. The experiments of CBCDC Sapmund towards collective conservation as well as the development of GVVS federation towards marketing of medicinal products are burning examples. In contrast, no close relationship has been crystallized between the local forest officials and the twelve CBCDCs leading to less success in undertaking various activities of collective conservation.

To sum up, the present study argues that an effective networking with the forest officials is important for two reasons: institutional builder and know-how facilitator. The first reason relates to the need of local forest officials in nurturing and maintaining village-level social institutions (for example, CBCDCs) as the people are not familiar with the concepts and nuances and also the functioning of such institutions. The second reason relates to the role of local forest officials as facilitators or advisors on technical matters relating to methods and techniques of conservation of biodiversity of medicinal plants at various stages. Hence, the effective networking of the CBCDCs with local forest officials, as a form of lining social capital is extremely important.

Concluding remarks

To conclude, the present chapter focuses on the operation of VVP in Orissa. The working/functioning of VVP in Orissa has been analyzed by the theory of social capital. The study also makes necessary attempts in correlating the activities of the VVP at various stages and the theory of social capital. The study finds that the presence of social capital is crucial for the successful functioning of participatory programme such as VVP in Orissa. The VVP that intends to intensify the participation and cooperation of the village communities towards achieving collective conservation is very much dependent upon the availability of social capital. It highlights that the collective conservation is successful where an underlying tendency of community-level participation and collection action i.e. social capital exists.

The study also examines major antecedents in the processes of social capital formation/erosion that ultimately determine the high/low levels of participation in the conservation and development of biodiversity of medicinal plants. These six major antecedents are: a collective core from diverse social groups; individuals with domain knowledge in medicinal plants; democratic leadership; accountability and transparency;

awareness building; and committed local forest officials. The success/failure of these antecedents that constitute antecedent (independent) variable determines the success/failure of social capital (intervening variable) and ultimately, participatory conservation and development of biodiversity of medicinal species (dependent variable).

CHAPTER – VII

Summary of Findings and Conclusion

There has been a rapid growth of interest in the study of social capital in recent years. Broadly, the notion of social capital is centred on social relationships. The major elements of social capital include social networks, civic engagement, norms of reciprocity, and generalized trust. Broadly speaking, it is defined as a collective asset in the form of shared norms, values, beliefs, trust, networks, social relations, and institutions that facilitate cooperation and collective action for mutual benefits.

This theory of social capital has gained significant attention in the current discussion on 'participatory development', 'community participation', 'empowerment' and, nonetheless 'participatory/collective conservation'. According to Harriss and de Renzio (1997), the theory of social capital helps in explaining the 'social factor' and the 'social processes' of contemporary participatory development: mobilization, participation, empowerment and conservation. It has been employed in different social contexts at different levels. In recent times, the theory of social capital has been linked to the processes of participatory conservation and sustainable development of biodiversity.

The concept of biodiversity (or natural capital) refers to the numbers and varieties of living organisms on the earth. It is defined as 'the diversity of life forms'. There are three major components of biodiversity: species, gene and ecosystem. The species diversity refers to the variety of species within a region. The genetic diversity refers to the variation of genes within a species. The ecosystem diversity refers to a set of life forms with one another and with non-living elements. It is estimated that the earth's genes, species, and ecosystems have evolved over 3,000 million years (McNeely 1994). While the total number of species is not known, biologists estimate that there are between five millions to thirty millions species on our earth, and out of these, only 1.5

millions have been identified. There are 3,00,000 species of green plants and fungi; 8,00,000 species of insects; 40,000 species of vertebrates; and 3,60,000 species of micro-organisms (WRI 1992).

This rich natural resource base is considered as a precious prerequisite for the survival of human society as it (directly and indirectly) offers several benefits to the human beings. The multiple uses or values of biodiversity are: consumptive use value, productive use value, social value, ethical value, aesthetic value, optional value and ecosystem value. However, this natural capital, in recent times, has been deteriorating due to nature-induced and human-induced factors. The present study has grouped these factors as C^{10} factors. These are: climatic change; climbing of human population; constriction of poverty; conversion; commercialization; commodification; colonization; communication; contamination; and corrosion of traditional knowledge system. As a result, several initiatives at multiple levels have been initiated to conserve and develop biodiversity.

In recent times, the conservation of biodiversity, as a form of socio-scientific process and also a form of (sustainable) development, aims at conserving and sustaining the development of biodiversity. The latest instrument in realizing conservation of biodiversity is universally observed at Rio de Janeiro in 1992 i.e. Convention on Biological Diversity (CBD). The CBD, 1992 recognizes the preservation and maintenance of knowledge, innovations and practices of indigenous and local communities as well as the emphasis on cooperation for the technology development and transfer/dissemination (Article 8[j], CBD 1992). India, considered as one of the megadivisity countries and signatories to CBD, has implemented a national legislation i.e. Biological Diversity Act 2002 in accordance with the CBD, 1992. The central objective of BDA 2002 is to reformulate and restructure the 'processes and practices'

relating to conservation and development of biodiversity by highlighting the central role of local communities. It also emphasizes on the restructuration of biodiversity-based institutions i.e. National Biodiversity Authority, State Biodiversity Boards and Biodiversity Management Committees at national, state and community or grassroots levels.

One such experiment has been operating under the banner of Vanaspati Vana Project (VVP) at Gandhamardan hills RF, situated in the territorial jurisdiction of Balangir and Bargarh districts of Orissa, India. Funded by the Ministry of Health and Family Welfare, Government of India, the fundamental objective of VVP is to cultivate/conserve and care for (protect/preserve) the biodiversity of medicinal plant species available at the 'natural habitat' of Gandhamardan hills RF through the techniques of *in-situ* conservation, *in-situ* preservation, *ex-situ* demonstration and *ex-situ* nursery and herbal garden. However, the present study specifically focuses on *in-situ* conservation component of VPP since it integrates the village communities in the form of village-level institutions i.e. CBCDCs and the forest department. Thus, the *in-situ* conservation is participatory/collective/collaborative in nature. With this background, the present study intends to understand this participatory conservation and sustainable development of biodiversity of medicinal plant species based on the theory of social capital.

7.I The argument, objectives and location of the study

The current study is based on the argument that the participatory conservation process is linked to the social capital framework in the sense that theory of social capital is an antecedent variable and the participatory conservation is a consequent variable. Based on this argument the study delineates various processes and levels of social capital and their relevance in the context of institutional structures, cultivation/plantation of medicinal

species, protection of medicinal species and finally, the process of collective conservation and sustainable development of biodiversity of medicinal plants. Sociologically, the study intends to explain the processes and practices involved in the functioning of VVP in Orissa based on social capital framework. The study is based on the following research questions: How do the process of social capital formation – bonding, bridging and linking – provide in understanding the participatory conservation of biodiversity of medicinal pants? How do the intra and inter community levels of social capital facilitate the collective conservation actions of the communities and the government (forest) department? What are the major components of Vanaspati Vana Project in accomplishing the agenda of conservation of biodiversity of medicinal plants? How do the synergetic relations – as guided by the social capital framework – between the village community and the forest department and their dynamic interaction work in tandem in the interest of conservation of biodiversity of medicinal plants? What are the factors that influence the formation and erosion of social capital, which ultimately determine the participatory conservation at grassroots level?

Based on these research questions, the study broadly focuses on the five objectives. These are: (i) to review the development of social capital framework and its applicability in understanding biodiversity conservation; (ii) to review the major principles and practices as well as the institutional arrangements in conserving biodiversity with specific reference to India; (iii) to understand the methods adopted by the Vanaspati Vana Project in the process of conservation of biodiversity of medicinal species; (iv) to systematically use social capital theory as a guiding framework to understand the actors and institutions involved in the conservation and sustainable development of biodiversity conservation and the dynamic interaction among them; and

(v) to explain the factors influencing the formation and erosion of social capital and its corresponding impact on the processes of participatory conservation at grassroots level.

Based on the perspective of sociology of development especially its latest theoretical framework i.e. social capital, the empirical investigation of the current study has been conducted in Gandhamardan hills RF and its dwelling village communities in Balangir and Bargarh districts of Orissa. Out of twenty-five community-based biodiversity conservation and development committees (CBCDCs) formed by VVP in Harishankar range and Nrusinghanath range, the present study has purposively selected fourteen CBCDCs: six from Harishankar range and eight from Nrusinghanath range. These fourteen CBCDCs belong to fourteen village communities: Mahulpali, Kandravata, Kuthurla, Dudumdarh, Nuapali and Sapmund in Harishankar range, and Rasmunda, Georgegarh, Laudimal, Manbhang, Majhipali, Magurmal, Kuradhiphasa and Lergaon in Nrusinghanath range. The tools and techniques used for data collection are household census of the fourteen village communities (CBCDCs); personal interviews with in-charge forest officials and general body of CBCDC report card on the functioning/activities of the executive committee members; and focused group discussions with the EC members and general members of the CBCDCs. These constitute the primary source of the current study. That apart, the study is also based on secondary source of information collected from books, articles and conference proceedings. The community-level CBCDC constitutes the unit of analysis of the present study.

7.II Summary and findings

Based on the first objective, the study presented a detailed exposition of the development of the theory of social capital and the application of its several elements to understand the process of conservation and sustainable development of biodiversity. The study showed that the notion of social capital has been noticed in classical sociology especially in the works of Karl Marx, Ferdinand Tonnies, Emile Durkheim, Max Weber and George Simmel. However, social capital as a complete theoretical framework has been developed by Pierre Bourdieu (1986), James Coleman (1988, 1990) and Robert D Putnam (1993, 1995), Francis Fukuyama (1995), Michael Woolcock and Deepa Narayan (2000) and the World Bank (2000). The fundamental difference among the social scientists on social capital is that they treat social capital as either 'personal resource' or 'social resource'. For a common understanding, social capital is broadly defined as social relations based on social norms, values, beliefs, trusts, obligations, relationships, networks, memberships, connectedness, civic engagements and institutions that foster collective action. The major conceptual elements of social capital are: bonding, bridging, linking, horizontal ties, vertical ties, strong ties and weak ties. The levels of social capital are: individual and collective. It also operates at micro-, meso-, and macro-levels. Operationalizing the theory of social capital, the chapter relates four broad features that facilitate participatory conservation. These are: relations of trust; reciprocity and exchanges; common rules, norms, and sanctions; and connectedness, networks and groups.

Pursuing the second objective, the study makes a critical understanding of the trajectory of biodiversity conservation with specific reference to India. The conservation of biodiversity in India has been presented in two phases: the colonial and the post-colonial. The study finds that colonial conservation initiatives were primarily centralized

and department-driven and were focused on accruing maximum benefits in the name of forest protection. The post-colonial India also inherited and practiced the tradition of colonial conservation initiatives, which have been reflected in her various legislative actions especially till the emergence of National Forest Policy (NFP), 1988. The NFP, 1988 emphasizes the role of village communities in the process of conservation and protection of forest resources. Hence, it symbolizes the beginning of the model of participatory conservation.

India has explicitly enacted its first legislation on conservation biodiversity i.e. Biological Diversity Act, 2002 in accordance with the CBD, 1992. Subsequently, India has also released couple of legislative measures – Biological Diversity Rule, 2004 and National Biodiversity Action Plan, 2008 – in conserving biodiversity. These legislative actions have gradually started to give emphasis to the local communities and their knowledge systems in the process of conservation and sustainable development of biodiversity. These legal provisions provide provisions relating to institutional structurations (NBA, SBB and BMC), maintenance of the record of the biodiversity i.e. people's biodiversity register and the demarcation of the rich biodiversity area under the name of biodiversity heritage site.

In pursuing the third objective, the study analyzes four methods of conservation as adopted/operationalized by the VVP in and around the Gandhamardan hills RF of Balangir and Bargarh district of Orissa. As mentioned in chapter five, the project deals with four methods of conservation: *in-situ* preservation, *in-situ* conservation, (in 3200 hectares of Gandhamardan hills RF area), *ex-situ* demonstration and *ex-situ* nursery and herbal garden (in 40 hectares of village forest). The study specifically focuses on *in-situ* conservation since it integrates the communities and the forest department in performing collaborative conservation. Out of the total RF-area of 3000 hectares as approved for *in-*

situ conservation that have been distributed to twenty-five village communities, the current study focuses on 1450 hectares of RF-area that have been distributed to fourteen village communities: six in Harishankar range and eight in Nrusinghanath range.

Based on the fourth, fifth and sixth objectives, the study critically explains the formation and erosion of social capital and its corresponding impact on the processes of conservation and sustainable development of biodiversity of medicinal plants. In fact, based on the conceptual framework of social capital, the study explains the functioning/operation of VVP in and around the Gandhamardan hills RF in Orissa. The study describes the functioning of VVP in and around Gandhamardan hills RF into four broad stages i.e. 'I^4 stages': Introductory stage; Institutive stage; Implementing stage; and Invigorative stage. The introductory stage focuses on the preparatory activities for implementing the VVP in Gandhamardan hills RF. The major activities are selection and demarcation of conservation area, awareness building and community mobilization and entry point activity. These activities have been carried out by the forest department officials especially by the in-charge divisional forest officer, range officer and forester. This preparatory phase tries to mobilize the village communities for participatory conservation. Hence, this is also a preparatory phase for social capital formation among and between the members of village communities and the forest department (FD).

The second stage of VVP i.e. institutive stage focuses on the establishment of village-level social institutions in the form of CBCDCs. The CBCDC is a form of social capital based on social relationships among the members, households and neighbours of a particular village. It is based on bonding as defined in social capital framework. However, this bonding form of social capital has been undermined except the villages of Sapmund and Georgegarh due to the active interference of the external agency i.e. FD especially at the time of selection of EC members and the leaders for the CBCDC. In

fact, the study finds that the villagers are least consulted in the processes of selection of the EC members as well as the office-bearers i.e. the presidents of the CBCDCs. The selection has been completely determined by the FD officials by taking into account the political, economic and educational features of the individuals. Hence, the collectedness (bonding social capital) of the village communities has been weakened due to the externally imposed authority of the FD.

The third stage i.e. implementing stage is considered as crucial because it operationalizes the method of *in-situ* conservation at ground level. This stage consists of four major phases i.e. S^5 phases: site preparation, setting up/establishment of nurseries, sapling (gap) plantation, soil and water conservation, and stick rotation for the protection of the project area. This stage is completely based on the concept of linking as defined in social capital framework. In this stage, the CBCDCs undertake activities in close networking with the FD. This linking has seemed to have failed in achieving collective conservation except in the villages of Sapmund and Georgegarh due to the authoritative domination of the forest officials and the corrupt and non-committed EC members and the leaders of the CBCDCs. In fact, the presidents of the remaining twelve CBCDCs are not accountable while taking decisions at different phases of *in-situ* conservation activities. They do not call regular village-level meeting. The meetings, which are basically 'indoor in nature', are confined to couple of EC members and the in-charge forester who is the secretary of the CBCDC. In addition, the community-level cognitive social capital i.e. the knowledge about the medicinal plants is absolutely ignored by the FD. It is because the cognitive social capital of the village communities, according to the forest officials, does not include economic dimension/market value which is proved especially at the time of selection of sapling-varieties for setting of nurseries. The members of CBCDCs prefer to plant/cultivate 'threatened species' – the species which

are being completely depleted or are in the process of depletion – whereas the FD prefers such species which are having market demand. And, ultimately the FD without considering the opinion of the village communities has planted its preferred medicinal species. As a result, the villagers have become uninterested in the processes of participatory conservation. Hence, the linking social capital between the members of CBCDCs and the FD has seemed to be failed in majority of villages in achieving collective conservation.

The final stage i.e. invigorative stage indicates the emergence of a larger institutional restructuration of village-based CBCDCs. At this stage, the community-based CBCDCs have come forward and have formed federations at forest range levels. These federations are considered as bridging social capital based on social relationships across communities. However, this bridging at federation level is more active in marketing of medicinal products i.e. bio-business rather than the conservation of biodiversity of medicinal species. The bridging social capital facilitates inter-community level interaction/participation in the processes of collection and marketing of the medicinal produces. The bridging social capital of these inter-community level CBCDCs is very active since it provides instant benefits to the members of the federations. Hence, the benefit-seeking/oriented attitude of the members of the federations has ultimately undermined the processes of conservation and sustainable development of the medicinal plants.

Finally, the study delineates major conditions/antecedents in explaining the processes of formation/erosion of social capital at the grassroots levels and their impact on the collective conservation. The antecedents are: a collective core from diverse social groups; individuals with domain knowledge in medicinal plants; democratic leadership; accountability and transparency; awareness building; and committed local forest

officials. The study categorizes these antecedents as antecedent/independent variable, social capital as intervening variable and conservation of biodiversity of medicinal plants as dependent variable. The study observed that the presence and absence of the antecedent variables correspondingly influence the formation and erosion of social capital and, finally, the low and high levels of community participation in the processes of conservation and sustainable development of biodiversity medicinal species. To sum up, the study witnessed that out of fourteen CBCDCs empirically examined; only two CBCDCs – Sapmund and Georgegarh – are successful because the study finds that these two communities are successful in achieving these antecedent variables that facilitate the formation of social capital (the intervening variable) and that ultimately leads to high level of community participation and collective action in the processes of conservation and sustainable development of the biodiversity of medicinal plants (the dependent variable).

After critically examining the functioning of VVP in Orissa, the study comes to the conclusion that the establishment of community-level institutions i.e. CBCDCs as form of social capital is a necessary precondition for participatory biodiversity conservation. Based on the theory of social capital, the institutionalization of conservation of biodiversity is linked to community-based biodiversity conservation i.e. the process of communitization. The communitization broadly refers to the partnership between the formal/bureaucratic institutions and the community-level institution in achieving collective conservation. It is based on three broad principles: the cooperation/connectedness of village community, the networking of the community with the public institution, and the dissemination of know-how (technology) and responsibilities at the various stages of conservation and development of biodiversity. However, the success of communitization of biodiversity conservation is limited in

nature. Out of fourteen villages, only two are successful. Hence, the process of communitization of biodiversity conservation has failed majority of CBCDCs in translating collective conservation at ground level due to two major factors: internal and external.

The internal factors constitute the socioeconomic and political features of the village social structure. The external factors comprise the authoritative domination of the facilitating agency i.e. forest department especially its grassroots level forest officers. The numerically majority of the marginal social groups (SCs and STs) are alienated from the process of decision-making as well as benefit-sharing arising out of the conservation. The formal/official inclusion of women is completely excluded when it comes to the leadership position in the village social institutions. As a result, the dynamic interaction i.e. the linking social capital between community-level actors and the formal/bureaucratic actors has failed in majority of CBCDCs in achieving collective conservation.

That apart, the communitization of biodiversity conservation has not only excluded the inclusion of the members of the marginalized communities of the villages but also has ignored their local knowledge systems at various stages of the conservation and sustainable development of the medicinal plants. As a result, the formation of the social capital is at best partial, which also simultaneously leads to partial success in conservation and sustainable development of biodiversity. To conclude, the success of the inclusive / participatory / integrative / collaborative / community-level biodiversity conservation necessarily depends on the socioeconomic, cognitive, political, administrative factors since that account for the formation/erosion of social capital that ultimately enhance/endanger the participation of village communities in the processes of biodiversity conservation.

The study has also marked severe flaw i.e. lack of the implementation of the provision of BDA, 2002, especially its provisions relating to the constitution of BMC at grassroot levels, maintenance of people's biodiversity register and also the establishment of biodiversity heritage sites. The active implementation of these provisions in the study area could have enhanced greater participation of the village communities in the process of conservation and sustainable development of biodiversity of medicinal plants. The FD is bypassing the provisions of BDA, 2002 and the political administrative institutions (PRIs) at grassroot levels since these institutions are central concern for the establishment/functioning of BMC at community level. Hence this creates a situation in which the conservation efforts are not accountable to grassroot PRIs. The PRIs must be involved more directly in conservation efforts. This will ensure participation of marginalized sections in the various activities of VVP.

7.III Policy recommendations

Based on the outcomes of the present research, the study suggests the following suggestions for future policy formulation in the process of social capital formation, and conservation and sustainable development of biodiversity.

- The internal social capital, in other words, institution building at the community-level should not be interfered by the externally imposed department-driven actions.
- The community level cognitive elements social capital – norms, values, belief systems, knowledge, social customs etc. – should not be constrained by the formal legal systems.
- The government (forest department) should work as a 'facilitator'. The community-level social institutions (for example VSSs or CBCDCs) and their knowledge systems should be recognized/respected in operationalizing various components of conservation and sustainable development of biodiversity.
- The community-level local knowledge system and the scientific knowledge system of the formal institutions should work in tandem in the interest of

biodiversity conservation. The conservation initiatives should provide a democratic platform to execute the working of local knowledge system not only during policy formulation but also during policy implementation at the grassroots level.

- An independent marketing agency should be developed/established to collect, process and ultimately market the medicinal produces available in and around the Gandhamardan hills RF. In essence, the complete value-chain has to be created.
- There is also a necessity of developing an unambiguous/straightforward division of roles/tasks for the village communities and the facilitating agencies.
- Greater involvement of PRIs in VVP must be undertaken to ensure accountability and transparency in decision-making and promotion of the participation of the members of the marginalized communities like SCs and STs.
- An independent social audit of the VVP has to be carried out to see/check the role of the FD and the productive activities of the VVP.
- Finally, the biodiversity conservation initiatives should involve the 'third sector' i.e. civil society organizations as they mediate the interaction between the government on the one hand and the community on the other.

7.IV Limitations of the study

The study is conducted in fourteen tribal-dominated village communities of two district of Orissa. Hence, the findings can not be generalized. The study is completely qualitative in nature. It has not used any quantitative measures in quantifying the formation of social capital and conservation of biodiversity. In addition, the study is confined to the working of VVP in these fourteen village communities. It has not focused on the impact of the VVP i.e. an impact-analysis of VVP.

7.V Scope for further research

As mentioned above, the study is limited in nature. This is just a benchmark study for future research in the area of social capital and sustainable development of bioresources. At a higher level, a comparative study could be undertaken between the tribal and non-tribal village communities and their knowledge systems in the processes of biodiversity

conservation. In addition, a future study would be conducted in exploring the functioning of the village level institutions and their capacity in handling the issues of network-building/negotiation, upper caste/class domination, conflict management and access to benefit-sharing. Furthermore, a study could be carried out in exploring the role of community connectedness in the area of biodiversity conservation and development, and its impact on livelihood system of the village communities at an all India level.

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SOCIAL CAPITAL AND CONSERVATION OF BIODIVERSITY:
A STUDY OF VANASPATI VANA PROJECT IN ORISSA

SYNOPSIS

DOCTOR OF PHILOSOPHY

IN

SOCIOLOGY

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Social Capital and Conservation of Biodiversity: A Study of Vanaspati Vana Project in Orissa

Synopsis

The theory of social capital has enjoyed a metamorphic rise across the human and social sciences over the last two decades. In recent times, 'social capital' has drawn the attention of many development practitioners and academicians. A normal definition of social capital is 'the institutions, relationships, attitudes, and values that govern interactions among people and contribute to economic and social development' (Grootaert and van Bastelaer 2002). The major elements of social capital include social networks, civic engagement, norms of reciprocity, and generalized trust. Broadly speaking, it is defined as a collective asset in the form of shared norms, values, beliefs, trust, networks, social relations, and institutions that facilitate cooperation and collective action for mutual benefits.

This theory of social capital has gained significant attention in the current discussion on 'participatory development', 'community participation', 'empowerment' and, nonetheless 'participatory/collective conservation'. According to Harriss and de Renzio (1997), the theory of social capital helps in explaining the 'social factor' and the 'social processes' of contemporary participatory development: mobilization, participation, empowerment and conservation. It has been employed in different social contexts at different levels. In recent times, the theory of social capital has been linked to the processes of participatory conservation and sustainable development of biodiversity.

The concept of biodiversity (or natural capital) refers to the numbers and varieties of living organisms on the earth. It is defined as 'the diversity of life forms'. There are three major components of biodiversity: species, gene and ecosystem. The species diversity refers to the variety of species within a region. The genetic diversity refers to the variation of genes within a species. The ecosystem diversity refers to a set of life forms with one another and with non-living elements. It is estimated that the earth's genes, species, and ecosystems have evolved over 3,000 million years (McNeely 1994). While the total number of species is not known, biologists estimate that there are between five millions to thirty millions species on our earth, and out of these, only 1.5 millions have been identified. There are 3,00,000 species of green plants and

fungi; 8,00,000 species of insects; 40,000 species of vertebrates; and 3,60,000 species of micro-organisms (WRI 1992).

This rich natural resource base is considered as a precious prerequisite for the survival of human society as it (directly and indirectly) offers several benefits to the human beings. The multiple uses or values of biodiversity are: consumptive use value, productive use value, social value, ethical value, aesthetic value, optional value and ecosystem value. However, this natural capital, in recent times, has been deteriorating due to nature-induced and human-induced factors. The present study has grouped these factors as C^{10} factors. These are: climatic change; climbing of human population; constriction of poverty; conversion; commercialization; commodification; colonization; communication; contamination; and corrosion of traditional knowledge system. As a result, several initiatives at multiple levels have been initiated to conserve and develop biodiversity.

In recent times, the conservation of biodiversity, as a form of socio-scientific process and also a form of (sustainable) development, aims at conserving and sustaining the development of biodiversity. The latest instrument in realizing conservation of biodiversity is universally observed at Rio de Janeiro in 1992 i.e. Convention on Biological Diversity (CBD). The CBD, 1992 recognizes the preservation and maintenance of knowledge, innovations and practices of indigenous and local communities as well as the emphasis on cooperation for the technology development and transfer/dissemination (Article 8[j], CBD 1992). India, considered as one of the megadivisity countries and signatories to CBD, has implemented a national legislation i.e. Biological Diversity Act 2002 in accordance with the CBD, 1992. The central objective of BDA 2002 is to reformulate and restructure the 'processes and practices' relating to conservation and development of biodiversity by highlighting the central role of local communities. It also emphasizes on the restructuration of biodiversity-based institutions i.e. National Biodiversity Authority, State Biodiversity Boards and Biodiversity Management Committees at national, state and community or grassroots levels.

One such experiment has been operating under the banner of Vanaspati Vana Project (VVP) at Gandhamardan hills RF, situated in the territorial jurisdiction of Balangir and Bargarh districts of Orissa, India. Funded by the Ministry of Health and Family Welfare, Government of India, the fundamental objective of VVP is to cultivate/conserve and care for (protect/preserve) the biodiversity of medicinal plant species available at the 'natural habitat' of Gandhamardan

hills RF through the techniques of *in-situ* conservation, *in-situ* preservation, *ex-situ* demonstration and *ex-situ* nursery and herbal garden. However, the present study specifically focuses on *in-situ* conservation component of VPP since it integrates the village communities in the form of village-level institutions i.e. CBCDCs and the forest department. Thus, the *in-situ* conservation is participatory/collective/collaborative in nature. With this background, the present study intends to understand this participatory conservation and sustainable development of biodiversity of medicinal plant species based on the theory of social capital.

Research Questions of the Study

The study is based on the following research questions:

1. How do the process of social capital formation – bonding, bridging and linking – provide in understanding the participatory conservation of biodiversity of medicinal pants?
2. How do the intra and inter community levels of social capital facilitate the collective conservation actions of the communities and the government (forest) department?
3. What are the major components of Vanaspati Vana Project in accomplishing the agenda of conservation of biodiversity of medicinal plants?
4. How do the synergetic relations – as guided by the social capital framework – between the village community and the forest department and their dynamic interaction work in tandem in the interest of conservation of biodiversity of medicinal plants?
5. What are the factors that influence the formation and erosion of social capital, which ultimately determine the participatory conservation at grassroots level?

Objectives of the Study

Based on these research questions, the study broadly focuses on the following objectives:

- To review the development of social capital framework and its applicability in understanding biodiversity conservation;
- To review the major principles and practices as well as the institutional arrangements in conserving biodiversity with specific reference to India;
- To understand the methods adopted by the Vanaspati Vana Project in the process of conservation of biodiversity of medicinal species;
- To systematically use social capital theory as a guiding framework to understand the actors and institutions involved in the conservation and sustainable development of biodiversity conservation and the dynamic interaction among them;
- To explain the factors influencing the formation and erosion of social capital and its corresponding impact on the processes of participatory conservation at grassroots level.

Argument of the Study

The current study is based on the argument that the participatory conservation process is linked to the social capital framework in the sense that theory of social capital is an antecedent variable and the participatory conservation is a consequent variable.

Methodology

Based on the perspective of sociology of development especially its latest theoretical framework i.e. social capital, the empirical investigation of the current study has been conducted in Gandhamardan hills RF and its dwelling village communities in Balangir and Bargarh districts of Orissa. Out of twenty-five community-based biodiversity conservation and development committees (CBCDCs) formed by VVP in Harishankar range and Nrusinghanath range, the present study has purposively selected fourteen CBCDCs: six from Harishankar range and eight from Nrusinghanath range. These fourteen CBCDCs belong to fourteen village communities: Mahulpali, Kandravata, Kuthurla, Dudumdarh, Nuapali and Sapmund in Harishankar range, and Rasmunda, Georgegarh, Laudimal, Manbhang, Majhipali, Magurmal, Kuradhiphasa and Lergaon in Nrusinghanath range. The tools and techniques used for data collection are household census of the fourteen village communities (CBCDCs); personal interviews with in-charge forest officials and general body of CBCDC report card on the functioning/activities of the executive committee members; and focused group discussions with the EC members and general members of the CBCDCs. These constitute the primary source of the current study. That apart, the study is also based on secondary source of information collected from books, articles and conference proceedings. The community-level CBCDC constitutes the unit of analysis of the present study.

Major findings

Based on the first objective, the study presented a detailed exposition of the development of the theory of social capital and the application of its several elements to understand the process of conservation and sustainable development of biodiversity. The study showed that the notion of social capital has been noticed in classical sociology especially in the works of Karl Marx, Ferdinand Tonnies, Emile Durkheim, Max Weber and George Simmel. However, social capital as a complete theoretical framework has been developed by Pierre Bourdieu (1986), James Coleman (1988, 1990) and Robert D Putnam (1993, 1995), Francis Fukuyama (1995), Michael Woolcock and Deepa Narayan (2001) and the World Bank (2005). The fundamental difference among the social scientists on social capital is that they treat social capital as either ‘personal

resource' or 'social resource'. For a common understanding, social capital is broadly defined as social relations based on social norms, values, beliefs, trusts, obligations, relationships, networks, memberships, connectedness, civic engagements and institutions that foster collective action. The major conceptual elements of social capital are: bonding, bridging, linking, horizontal ties, vertical ties, strong ties and weak ties. The levels of social capital are: individual and collective. It also operates at micro-, meso-, and macro-levels. Operationalizing the theory of social capital, the chapter relates four broad features that facilitate participatory conservation. These are: relations of trust; reciprocity and exchanges; common rules, norms, and sanctions; and connectedness, networks and groups.

Pursuing the second objective, the study makes a critical understanding of the trajectory of biodiversity conservation with specific reference to India. The conservation of biodiversity in India has been presented in two phases: the colonial and the post-colonial. The study finds that colonial conservation initiatives were primarily centralized and department-driven and were focused on accruing maximum benefits in the name of forest protection. The post-colonial India also inherited and practiced the tradition of colonial conservation initiatives, which have been reflected in her various legislative actions especially till the emergence of National Forest Policy (NFP), 1988. The NFP, 1988 emphasizes the role of village communities in the process of conservation and protection of forest resources. Hence, it symbolizes the beginning of the model of participatory conservation.

India has explicitly enacted its first legislation on conservation biodiversity i.e. Biological Diversity Act, 2002 in accordance with the CBD, 1992. Subsequently, India has also released couple of legislative measures – Biological Diversity Rule, 2004 and National Biodiversity Action Plan, 2008 – in conserving biodiversity. These legislative actions have gradually started to give emphasis to the local communities and their knowledge systems in the process of conservation and sustainable development of biodiversity. These legal provisions provide provisions relating to institutional structurations (NBA, SBB and BMC), maintenance of the record of the biodiversity i.e. people's biodiversity register and the demarcation of the rich biodiversity area under the name of biodiversity heritage site.

In pursuing the third objective, the study analyzes four methods of conservation as adopted/operationalized by the VVP in and around the Gandhamardan hills RF of Balangir and Bargarh district of Orissa. As mentioned in chapter five, the project deals with four methods of

conservation: *in-situ* preservation, *in-situ* conservation, (in 3200 hectares of Gandhamardan hills RF area), *ex-situ* demonstration and *ex-situ* nursery and herbal garden (in 40 hectares of village forest). The study specifically focuses on *in-situ* conservation since it integrates the communities and the forest department in performing collaborative conservation. Out of the total RF-area of 3000 hectares as approved for *in-situ* conservation that have been distributed to twenty-five village communities, the current study focuses on 1450 hectares of RF-area that have been distributed to fourteen village communities: six in Harishankar range and eight in Nrusinghanath range.

Based on the fourth, fifth and sixth objectives, the study critically explains the formation and erosion of social capital and its corresponding impact on the processes of conservation and sustainable development of biodiversity of medicinal plants. In fact, based on the conceptual framework of social capital, the study explains the functioning/operation of VVP in and around the Gandhamardan hills RF in Orissa. The study describes the functioning of VVP in and around Gandhamardan hills RF into four broad stages i.e. 'I^4 stages': Introductory stage; Institutive stage; Implementing stage; and Invigorative stage. The introductory stage focuses on the preparatory activities for implementing the VVP in Gandhamardan hills RF. The major activities are selection and demarcation of conservation area, awareness building and community mobilization and entry point activity. These activities have been carried out by the forest department officials especially by the in-charge divisional forest officer, range officer and forester. This preparatory phase tries to mobilize the village communities for participatory conservation. Hence, this is also a preparatory phase for social capital formation among and between the members of village communities and the forest department (FD).

The second stage of VVP i.e. institutive stage focuses on the establishment of village-level social institutions in the form of CBCDCs. The CBCDC is a form of social capital based on social relationships among the members, households and neighbours of a particular village. It is based on bonding as defined in social capital framework. However, this bonding form of social capital has been undermined except the villages of Sapmund and Georgegarh due to the active interference of the external agency i.e. FD especially at the time of selection of EC members and the leaders for the CBCDC. In fact, the study finds that the villagers are least consulted in the processes of selection of the EC members as well as the office-bearers i.e. the presidents of the CBCDCs. The selection has been completely determined by the FD officials by taking into

account the political, economic and educational features of the individuals. Hence, the collectedness (bonding social capital) of the village communities has been weakened due to the externally imposed authority of the FD.

The third stage i.e. implementing stage is considered as crucial because it operationalizes the method of *in-situ* conservation at ground level. This stage consists of four major phases i.e. S^5 phases: site preparation, setting up/establishment of nurseries, sapling (gap) plantation, soil and water conservation, and stick rotation for the protection of the project area. This stage is completely based on the concept of linking as defined in social capital framework. In this stage, the CBCDCs undertake activities in close networking with the FD. This linking has seemed to have failed in achieving collective conservation except in the villages of Sapmund and Georgegarh due to the authoritative domination of the forest officials and the corrupt and non-committed EC members and the leaders of the CBCDCs. In fact, the presidents of the remaining twelve CBCDCs are not accountable while taking decisions at different phases of *in-situ* conservation activities. They do not call regular village-level meeting. The meetings, which are basically 'indoor in nature', are confined to couple of EC members and the in-charge forester who is the secretary of the CBCDC. In addition, the community-level cognitive social capital i.e. the knowledge about the medicinal plants is absolutely ignored by the FD. It is because the cognitive social capital of the village communities, according to the forest officials, does not include economic dimension/market value which is proved especially at the time of selection of sapling-varieties for setting of nurseries. The members of CBCDCs prefer to plant/cultivate 'threatened species' – the species which are being completely depleted or are in the process of depletion – whereas the FD prefers such species which are having market demand. And, ultimately the FD without considering the opinion of the village communities has planted its preferred medicinal species. As a result, the villagers have become uninterested in the processes of participatory conservation. Hence, the linking social capital between the members of CBCDCs and the FD has seemed to be failed in majority of villages in achieving collective conservation.

The final stage i.e. invigorative stage indicates the emergence of a larger institutional restructuration of village-based CBCDCs. At this stage, the community-based CBCDCs have come forward and have formed federations at forest range levels. These federations are considered as bridging social capital based on social relationships across communities. However, this bridging at federation level is more active in marketing of medicinal products i.e. bio-

business rather than the conservation of biodiversity of medicinal species. The bridging social capital facilitates inter-community level interaction/participation in the processes of collection and marketing of the medicinal produces. The bridging social capital of these inter-community level CBCDCs is very active since it provides instant benefits to the members of the federations. Hence, the benefit-seeking/oriented attitude of the members of the federations has ultimately undermined the processes of conservation and sustainable development of the medicinal plants.

Finally, the study delineates major conditions/antecedents in explaining the processes of formation/erosion of social capital at the grassroots levels and their impact on the collective conservation. The antecedents are: a collective core from diverse social groups; individuals with domain knowledge in medicinal plants; democratic leadership; accountability and transparency; awareness building; and committed local forest officials. The study categorizes these antecedents as antecedent/independent variable, social capital as intervening variable and conservation of biodiversity of medicinal plants as dependent variable. The study observed that the presence and absence of the antecedent variables correspondingly influence the formation and erosion of social capital and, finally, the low and high levels of community participation in the processes of conservation and sustainable development of biodiversity medicinal species. To sum up, the study witnessed that out of fourteen CBCDCs empirically examined; only two CBCDCs – Sapmund and Georgegarh – are successful because the study finds that these two communities are successful in achieving these antecedent variables that facilitate the formation of social capital (the intervening variable) and that ultimately leads to high level of community participation and collective action in the processes of conservation and sustainable development of the biodiversity of medicinal plants (the dependent variable).

After critically examined the functioning of VVP in Orissa, the study comes to the conclusion that the establishment of community-level institutions i.e. CBCDCs as form of social capital is a necessary precondition for participatory biodiversity conservation. Based on the theory of social capital, the institutionalization of conservation of biodiversity is linked to community-based biodiversity conservation i.e. the process of communitization. The communitization broadly refers to the partnership between the formal/bureaucratic institutions and the community-level institution in achieving collective conservation. It is based on three broad principles: the cooperation/connectedness of village community, the networking of the community with the public institution, and the dissemination of know-how (technology) and

responsibilities at the various stages of conservation and development of biodiversity. However, the success of communitization of biodiversity conservation is limited in nature. Out of fourteen villages, only two are successful. Hence, the process of communitization of biodiversity conservation has failed majority of CBCDCs in translating collective conservation at ground level due to two major factors: internal and external.

The internal factors constitute the socioeconomic and political features of the village social structure. The external factors comprise the authoritative domination of the facilitating agency i.e. forest department especially its grassroots level forest officers. The numerically majority of the marginal social groups (SCs and STs) are alienated from the process of decision-making as well as benefit-sharing arising out of the conservation. The formal/official inclusion of women is completely excluded when it comes to the leadership position in the village social institutions. As a result, the dynamic interaction i.e. the linking social capital between community-level actors and the formal/bureaucratic actors has failed in majority of CBCDCs in achieving collective conservation.

That apart, the communitization of biodiversity conservation has not only excluded the inclusion of the members of the marginalized communities of the villages but also has ignored their local knowledge systems at various stages of the conservation and sustainable development of the medicinal plants. As a result, the formation of the social capital is at best partial, which also simultaneously leads to partial success in conservation and sustainable development of biodiversity. To conclude, the success of the inclusive / participatory / integrative / collaborative / community-level biodiversity conservation necessarily depends on the socioeconomic, cognitive, political, administrative factors since that account for the formation/erosion of social capital that ultimately enhance/endanger the participation of village communities in the processes of biodiversity conservation.

The study has also marked severe flaw i.e. lack of the implementation of the provision of BDA, 2002, especially its provisions relating to the constitution of BMC at grassroot levels, maintenance of people's biodiversity register and also the establishment of biodiversity heritage sites. The active implementation of these provisions in the study area could have enhanced greater participation of the village communities in the process of conservation and sustainable development of biodiversity of medicinal plants. The FD is bypassing the provisions of BDA, 2002 and the political administrative institutions (PRIs) at grassroot levels since these institutions

are central concern for the establishment/functioning of BMC at community level. Hence this creates a situation in which the conservation efforts are not accountable to grassroot PRIs. The PRIs must be involved more directly in conservation efforts. This will ensure participation of marginalized sections in the various activities of VVP.

Limitations of the study

The study is conducted in fourteen tribal-dominated village communities of two district of Orissa. Hence, the findings can not be generalized. The study is completely qualitative in nature. It has not used any quantitative measures in quantifying the formation of social capital and conservation of biodiversity. In addition, the study is confined to the working of VVP in these fourteen village communities. It has not focused on the impact of the VVP i.e. an impact-analysis of VVP.

Scope for further research

As mentioned above, the study is limited in nature. This is just a benchmark study for future research in the area of social capital and sustainable development of bioresources. At a higher level, a comparative study could be undertaken between the tribal and non-tribal village communities and their knowledge systems in the processes of biodiversity conservation. In addition, a future study would be conducted in exploring the functioning of the village level institutions and their capacity in handling the issues of network-building/negotiation, upper caste/class domination, conflict management and access to benefit-sharing. Furthermore, a study could be carried out in exploring the role of community connectedness in the area of biodiversity conservation and development, and its impact on livelihood system of the village communities at an all India level.