

Natural Resource Management

NPTEL Online Certification
Environment and Development
Prof. Ngamjahao Kipgen
Department of Humanities and Social Sciences
Indian Institute of Technology Guwahati

Natural Resources

- ▶ Natural resources are the resources available in a nature like air, water, sunlight, soil, minerals, forests, wild life etc.
- ▶ Natural resources are naturally occurring substances that are considered valuable in their relatively unmodified (natural) form. Any part of our natural materials that man can be utilized to promote the welfare, may be regarded as natural resources
- ▶ Natural resources are the basis of human life (Simmons 1993). We use these varied natural resources in different ways to satisfy our needs and wants.

Types of Natural Resources

- ▶ Natural resources are of two main types - renewable and non-renewable.
 - i) Renewable natural resources - are the resources which can be replenished in a short period of time like air, water, sunlight, forests etc.
 - ii) Non-renewable natural resources - are the resources which cannot be replenished in a short period of time like minerals (coal, petroleum, natural gas, metals etc.) because they take millions of years to be formed.
- ▶ Human activities produce a lot of waste materials which are thrown away into the environment. These wastes cause pollution of natural resources like air, water and soil.

Natural Resource Management

- ▶ Natural resource management (NRM) refers to the sustainable utilization of major natural resources, such as land, water, air, minerals, forests, fisheries, and wild flora and fauna. Together, these resources provide the ecosystem services that provide better quality to human life.
- ▶ Natural resources provide fundamental life support, in the form of both consumptive and public-good services. Ecological processes maintain soil productivity, nutrient recycling, the cleansing of air and water, and climatic cycles.

Cont.

- ▶ The term natural resource management often used interchangeably with resource management or environmental management first appeared in the United States around the early 1960s (Johnston, Gregory, Pratt, & Watts, 2000). [But long before that, natural resource management practices have been used among indigenous peoples for millennia]
- ▶ In Western society, the early seventeenth century saw the introduction of wildlife management through recreational and sport hunting and fishing regulation (Camp & Daugherty, 2002).
- ▶ A century later, two eminent environmental movements emerged: preservation and conservation (Weber, 2000). John Muir, the founder of the Sierra Club, spearheaded the preservation movement (late nineteenth century) to halt the human-caused devastation of the resources.

Problem...

- ▶ It was believed that natural resources were being used too rapidly and political controls should be instituted to conserve resources for future generations.
- ▶ Are we using up more than what is available?
 - Our current global population is 7.2 billion and growing. [Earth's total resources are only good for 2 billion people at the current demand. Let's do the math, and it is obvious that the result is a negative]
 - The way we're living, we are already using 2 to 3 times more of the Earth's natural resources than what is sustainable.

Necessity of Conserving Natural Resources

- ▶ We need to conserve natural resources because there isn't an evidence that these resources are going to last for a long time, considering man's usual consumption of these resources. [There will come a time that there are some natural resources that will be gone]
- ▶ Especially non-renewable ones and ones that are in high demand and humans have to thrive in order to find alternative resources for the ones that have been lost. And that specific task is not an easy one because there may be a possibility of unavailability or scarcity of it.

Cont.

- ▶ Conserving natural resources reduces the rapid depletion of biodiversity and it maintains the balance of the undisrupted ecology.
- ▶ Conservation of natural resources is now usually embraced in the broader conception of conserving the earth itself by protecting its capacity for self-renewal. Current thinking also favours the protection of entire ecological regions by the creation of “biosphere reserves”.

Conservation of Natural Resources

- ▶ The term conservation came into use in the late 19th cent. and referred to the management, mainly for economic reasons, of such valuable natural resources as timber, fish, game, topsoil, pastureland, and minerals, and also to the preservation of forests (see forestry), wildlife (see wildlife refuge), parkland, wilderness, and watershed areas.
- ▶ Conservation of natural resources meant the wise use of the earth's resources by humanity.

Stake holders of forests

- ▶ People who are associated with forests directly or indirectly are:
 - i) People living in and around forests depend on forests for their livelihood.
 - ii) Industrialists who use the raw materials from forests for manufacturing paper, medicines, furniture etc.
 - iii) Forest Department of the Government who owns the forests and controls the resources from the forests.
 - iv) Nature and wild life organisations who want to conserve and preserve forests.

Methods of conserving forests

► For the conservation of forests, following steps can be taken:

(a) Conservation of forest is a national problem so it must be tackled with perfect coordination between forest department and other departments.

(b) People's participation in the conservation of forests is of vital importance. So, we must get them involved in this national task.

(c) The cutting of trees in the forests must be stopped at all costs.

(d) Undertaking social forestry programs like *Van Mahotsav* for planting and protecting trees on a large scale.

Wildlife

► Importance of wildlife

- i) Wildlife helps to preserve biodiversity.
- ii) Wild life helps to maintain food chains and food web.
- iii) We get useful products from wild life like food, medicines, leather, bones, honey, lac etc.

► Conservation of wildlife

- i) Preserving the natural habitats of animals.
- ii) Banning poaching of animals.
- iii) Protecting endangered species of animals.
- iv) Setting up of wildlife sanctuaries, national parks, biosphere reserves etc.

Conservation of biodiversity

- ▶ Biodiversity provides the base for the livelihoods, cultures and economies of several hundred millions of people, including farmers, fisher folk, forest dwellers and artisans. It provides raw material for a diverse medicinal and health care systems. It also provides the genetic base for the continuous up-gradation of agriculture, fisheries, and for critical discoveries in scientific, industrial and other sectors.
- ▶ The rapid erosion of biodiversity in the last few decades has impacted on the health of the land, water bodies and people.

Extinction of Species

- ▶ Extinction can be defined as a situation in which a certain kind of species is continuously poached and hunted such that it is no longer available on Earth.
- ▶ Extinction of species can be considered as an important consequence of depletion of resources as if resources get depleted then type of species dependent on that resource would also get depleted along with it.

Water resources

► Uses of water

- Water is a basic necessity for all living things. We use water for our daily needs, for agriculture, transportation, construction of buildings, roads, dams etc. Water is a natural habitat for aquatic organisms.
- Human activities are affecting the availability of water and causing pollution of water bodies

► Reasons for the loss of underground water availability

- Failure to sustain water availability underground has resulted largely from the loss of vegetation cover and diversion for high water demanding crops;
- Pollution from industrial effluents and urban wastes.

Conservation of soil

- Soil conservation measures should aim at preventing or at least minimising the soils loss. In order to do this proper land utilisation coupled with agricultural practices should be adopted.

Some methods of conserving soil:

- Crop rotations: Alternatively growing a cereal and a legume in the same field will not only increase the yield, but also increase the fertility of the soil. They also help in checking soil erosion.
- Mulching: Inter culturing operations will kill weeds and soil mulches help the plants to be rooted firmly in the soil.
- Strip cropping: This is an agricultural practice of growing plants in suitable strips in the field. This is of the following types.
- Dry farming method: This may be practised where rainfall is low, indefinite and variable. In dry farming methods only crops are grown that can sustain even a very low rainfall.

Conservation of Natural Resources

- ▶ As the human population is growing continuously, the consumption of natural resources is also increasing. With the increase of industrialization and urbanization of the modern human society, the use of all these resources is increasing day by day. If these resources are not properly managed and used, there will be a serious scarcity of these resources. So, we need to conserve the natural resources.
- ▶ Conservation is the proper management of a natural resource to prevent its exploitation, destruction or degradation...

Why should we conserve natural resources?

- ▶ As we know that nature provides all the basic needs which are necessary to us but, we are overexploiting or overusing these resources. if we go on overexploiting the nature, there will be no more resources available in the future.
- ▶ So there is an urgent need to conserve the nature. Here are some needs:
 - To maintain ecological balance for supporting life.
 - To preserve different types of biodiversity.
 - To preserve the natural resources for the present and future generations.

Need for Management of Natural Resources

- ▶ Due to increase in population, industrialisation and urbanisation the demand for natural resources is increasing and their availability is limited. So there is a need for proper management of natural resources.
- ▶ The proper management of natural resources consists of:
 - i) Judicious use of natural resources and avoiding wastage of natural resources.
 - ii) Long term planning for the use of natural resources so that it last not only for the present but also for future generations.
 - iii) The exploitation of natural resources should not be for the benefit of a few people but should be distributed equally for all.
 - iv) While extracting and using natural resources we should also plan for the safe disposal of wastes so that no damage is caused to the environment.

Cont.

- ▶ The management of natural resources requires
 1. A long-term perspective so that these will last for the generations to come and will not merely be exploited to the hilt for short term gains.
 2. This management should also ensure equitable distribution of resources so that all, and not just a handful of rich and powerful people, benefit from the development of these resources.
- ▶ Why do you think there should be equitable distribution of resources? Natural resources of the Earth must be distributed among the people uniformly so that each and every one gets his share of the resource. Human greed, corruption, and the lobby of the rich and powerful are the forces working against an equitable distribution of resources.

What is calling for our attention?

- ▶ India as country is blessed with rich natural resources. But from our research on the usage of natural resources in our country, we found that the resources are depleting every day.

For example:

- Forest and arable land is being depleted due to urbanization, overpopulation and overconsumption
- Wild life resources are being lost due to illegal poaching, hunting and industrialization.
- Water resources are being contaminated and drying up due to industrialization.

Conservation of natural resources in India

- ▶ The Government of India has undertaken many measures for the conservation of the resources:
 - Regulations and reforms for proper housing and infrastructure development to avoid land acquisition problems.
 - Mass media public service messages to educate the people on the importance of conservation of resources.
 - Increase the wildlife and forest reserves in the country.
 - Schemes to do a proper inventory of the resources and monitor changes in the environment.
 - Various projects and schemes that promote conservation of resources.

Cont.

Legislation for conservation

▫ Various laws and acts have been passed in Indian constitution for the protection and conservation of various natural resources.

Some of them are:

- Wildlife (Protection) Act, 1972
- Water (Prevention and Control of Pollution) Act, 1974
- Forest Conservation Act, 1980
- Air (Prevention and Control of Pollution) Act, 1981
- Environment Protection Act, 1986 (Environmental Impact Assessment)

The Three R's to save the environment

- ▶ The three R's to save the environment are Reduce, Recycle and Reuse.
- i) Reduce - means using less of natural resources and avoiding wastage of natural resources.
- ii) Recycle - means the materials like paper, plastic, glass, metals etc. used for making things can again be used for making new things instead of synthesising or extracting new paper, plastic, glass or metals.
- iii) Reuse - means using things again and again like the plastic bottles in which we buy jams, pickles etc. can be again used for storing things in the kitchen.

Advantages of sustainable natural resource management

- ▶ It is controlling the use of resources in such a way so as to provide for its equitable and continuous availability not only to the present generation without any harmful impact on the environment.
- ▶ Four advantages: Equitable distribution, controlled exploitation, minimum wastage, disposal of waste

NPTEL Online Certification
Environment and Development
Prof. Ngaminiro P. N. N.
Department of Economics and Social Sciences
Indian Institute of Technology Guwahati

Cont.

- ▶ Natural resource management approaches can be categorised according to the kind and rights of stakeholders
- 1. Private property regime - Individual owned
- 2. Common property regime - property rights arrangement in which a group of resource users share rights and duties towards a resource
- 3. Non-property regime - Lake fishery
- 4. State property regime - National forest, National park

Community-based Conservation

- ▶ Involves people who directly affect and are affected by conservation decisions in conservation planning and stewardship
- ▶ Provides direct economic and social benefits to resource users while improving or maintaining biodiversity and land health

[Western, D. & M. Wright. 1994. Natural Connections. Washington, D.C.: Island Pres..]

Community-based Natural Resource Management (CBNRM)

- ▶ “A process by which landholders gain access and use rights to, or ownership of, natural resources; collaboratively and transparently plan and participate in the management of resource use; and achieve financial and other benefits from their stewardship.”

[B. Child & M.W. Lyman. 2005. Natural Resources as Community Assets, Lessons from Two Continents. Madison, WI: The Sand County Foundation]

Cont.

- ▶ The community-based natural resource management (CBNRM) approach combines conservation objectives with the generation of economic benefits for rural communities. In other words community-based natural resource management refers to the collective use and management of natural resources in rural areas by a group of people with a self-defined, distinct identity, using communally owned facilities.

Key Assumptions of CBNRM

- ▶ Locals are better placed to conserve natural resources
- ▶ People will conserve a resource only if benefits exceed the costs of conservation
- ▶ People will conserve a resource that is linked directly to their quality of life. When a local people's quality of life is enhanced, their efforts and commitment to ensure the future well-being of the resource are also enhanced.

Co-management

- ▶ Institutional arrangement for natural resource management in which decision-making authority is shared between local people and local, regional, or national government.

[Pinkerton, E., ed. 1989. Cooperative Management of Local Fisheries: New Directions for Improved Management and Community Development. Vancouver: University of British Columbia Press]

Proposed Benefits of CBNRM

- ▶ Increased social legitimacy and likelihood of implementation of management decisions
- ▶ Application of diverse knowledge sources to management-local knowledge and science
- ▶ Improved on-the-ground resource management
- ▶ Increased monitoring and adaptive management
- ▶ Decreased conflict over resources

WFL Online Certification
Environment and Development
Prof. Nandini Vengalil
Department of Humanities and Social Sciences
Indian Institute of Technology Guwahati

Cont.

- ▶ Increased trust and strengthened relationships within the community
- ▶ Improved livelihoods
- ▶ Greater community capacity □ □ Improved environmental conditions
- ▶ More resilient social-ecological systems

Common Property vs. Private Property

NPTEL Online Certification
Environment and Development
Prof. Ngamjahao Kingdon
Department of Humanities and Social Sciences
Indian Institute of Technology Guwahati

The Tragedy of the Commons

- ▶ “The Tragedy of the Commons” published by American ecologist Garret Hardin (1968)
- This is an economic problem brought about by the over use of common resources such as water, land, pastures etc. In which every individual tries to reap the greatest benefit from a given resource.
- It is a situation that happens when two or more activities that produce results depend for their success on some limited resources.

Cont.

- ▶ The Tragedy of the commons explains the reason why growth stops or declines after a period of time, because of limited resources shared among groups or individuals. [Environmental issues such as overgrazing, over fishing, etc.]
- ▶ Tragedy of the commons occurs because the actors do not pay attention to the effects of their actions. Therefore, they continue their undesirable behaviour until it's too late to undo or fix the resource. [Sometimes actors may be aware of the situation, but take less concern to slow down if they recognize that others will reap all the benefits]

Cont.

- ▶ Example - Shared common grazing pasture
 - Let's say there's some land that people use as pasture for their animals. No body owns so its open to anyone to come and graze their livestock on the land. In this scenario, everyone has rights to the pasture to grazes as many animals as possible, acting in self-interest for the greatest short-term personal gain. Eventually, they use up all the grass in the pasture; the shared resource is in the end depleted and no longer useful.
 - Other similar real life scenarios are, over fishing, pollution, deforestation etc. Over grazing on common grazing pasture

Governing the Commons

- ▶ Although open-access resource systems may collapse due to overuse (such as in over-fishing, over-grazing), many examples have existed and still do exist where members of a community with regulated access to a common resource co-operate to exploit those resources prudently without collapse, or even creating "perfect order".
- ▶ Elinor Ostrom in her book *Governing the Commons* (1990), included examples of how local communities were able to do this without top-down regulations or privatization.

Debate over Private vs. Common Property

- ▶ Private property is considered by most economists to be an essential ingredient in economic development due to the incentives associated with diverse kinds of property relationships (see, for example, Welch, 1983).

Common property regimes are, presumed by many economists to be inefficient. There are three sources of inefficiency:

1. One is rent dissipation, because no one owns the products of a resource until they are captured, and everyone engages in an unproductive race to capture these products before others do (Knight, 1924; Gordon, 1954; Scott, 1955; Schaefer, 1957)

Cont.

2. The second is the high transaction and enforcement costs expected if communal owners were to try to devise rules to reduce the externalities of their mutual overuse (Demsetz, 1967; Coase, 1960).

3. The third is low productivity, because no one has an incentive to work hard in order to increase his or her private returns (North, 1990).

Cont.

- ▶ Common property resources are seen to be equitably and sustainably managed resources by the community of users as opposed to the 'free-riding' common resources.
- ▶ Deforestation often results from social injustice and political inequalities. Forests have great economic value and are a sustained source of income to many people. So, they can be seen as a contested resource over which many different sectors of the society seek to assert control.

Cont.

- ▶ Environmental problems like degradation of forests are property rights problems. Most conflicts in forests arise because of difficulties in clarifying the property regimes (Bromley, 1991).
- ▶ Then the question arises as to what form of property rights should be adopted - private property rights, state property rights or common property rights. The situation of no property right is ruled out, as this leads to in Hardin's parlance "tragedy of commons".

Cont.

- ▶ In a common property, the members of a clearly demarcated group have a legal right to exclude non-members of that group from using a resource (Bromley, 1991). In the absence of such a right, if the resource generates highly valued products, there will be no incentive system to conserve their use for anyone; misuse and over-consumption will follow leading to the situation called open-access regimes (*res nullius*).
- ▶ Ostrom (1990) argued that common property regimes controlling access and harvesting from forests had evolved over long periods of time in all parts of the world, but were rarely given formal status in the legal codes of developing countries.

Cont.

- ▶ Common property is a way of privatising the rights to use a resource without having to divide the resource into individual holdings (McKean, 1995).
- ▶ There has been a failure in recognising 'common property' as a regulated form of resource tenure and use, managed by a group of users with exclusive rights to do so.

Common Property Theory

- ▶ Forests have been and continue to be central to human survival, livelihoods, and prosperity. The study of forests as commons has been one of the central sources of stimulus to the development of scholarship on common property.
- ▶ The relationship between indigenous peoples and forests
- ▶ How ownership rights in relation to forests are broadly distributed in different parts of the world.

Forests and common property

- ▶ Most of the world's forests are owned by governments - but private and other forms of ownership are increasing, and governments often set aside areas for use by communities.
- ▶ The importance of forests in relation to two of the most important global environmental threats - climate change, and biodiversity loss - is hard to overstate. [They have long been recognised as the reservoir and source of much of the species biodiversity on the planet (Wilson 1988)]
- ▶ Forests play a significant role in the livelihoods of the rural poor in the context of competing claims from multiple parties

Forest-based commons

- ▶ Forests are an important source of livelihoods to the poor (Bray et al. 2004; Jepson et al. 2002)
- ▶ Community based governance in forests- common property arrangements are far more *common* in the developing rather than the developed world [forest-based commons].
- ▶ Scholars of forest-based commons address concerns about equity and livelihoods, as well as sustainable forest management. [A number of scholars question the extent to which non-wood forest products can be important in alleviating poverty, and are typically a form of safety net that is relevant mostly for the really poor]
- ▶ Scholars interested in issues of gender equity have discussed how non-wood forest products (NWFPs) are critical for the livelihoods in much of the developing world.

Cont.

- ▶ Significant research on forest-based commons suggests that the economically and politically better-off group members are often likely to gain a larger share of benefits from a resource (Agrawal 2001)
- ▶ Poverty directly relates to the ability of users to generate the necessary resources and capacity to protect and regulate common pool resources.
- ▶ The politics of gender and indigeneity has been especially prominent in this regard in the contribution of scholars of forest of commons (Larsen 2003)

Institutional Arrangements

‘Rules should be locally created and enforced’

- ▶ The import of the insight lies in the recognition that:
 - a) local users and their organizations have comparative if not absolute advantage when it comes to knowing about the resource, other users, and environmental conditions, and
 - b) local users are best equipped to use this knowledge to create institutional arrangements more suited to governing forests effectively.
- ▶ The effects of different ways of thinking about forest use, conservation, and management among those subject to governance are likely central to the possibility of effective governance (Agrawal 2005).

Decline in Common Pool Resources

- ▶ State assertion of control first over the forest resources and then over the land has widely reduced access and rights of usage. [At the best people were left with usufruct rights]
- ▶ Privatization and encroachment as well as government appropriation, have been the main processes taking resources out of common use.
- ▶ Traditional methods of access control, usufruct allocation, and conflict resolution have widely become ineffective or have disappeared, undermined by political, economic and social changes within the village and nation.

Cont.

Arguments that common property resources are likely to become degraded under the following conditions:

- ▶ Absence of individual ownership and management results in unpriced access and hence overuse;
- ▶ Each individual gains by increasing his or her use level, while the costs of that increase are borne by the group as a whole (the 'tragedy of the commons' argument);
- ▶ Individuals lack assurance as to the outcome for themselves of competing within a management system that would benefit (the 'prisoner's dilemma' argument). (Arnold 1993: 157-161)

Cont.

- ▶ However, these arguments fail to take into account the factors which encourage collective action, even under situation of increasing stress on the common resource and its users, and the self regulating capabilities of groups of users.
- ▶ They also overlook reasons why the alternatives to communal management of privatization or state control may themselves not be sustainable (Ostrom 1990).
- ▶ The longstanding trend towards expropriating or privatizing common property resources has been increasingly challenged on the grounds that these alternatives are not necessarily more efficient and appropriate.

Livelihoods, Forests, and Conservation

NPTEL Online Certification
Environment and Development
Prof. Ngamjahao Kipgen
Department of Humanities and Social Sciences
Indian Institute of Technology Guwahati

Background

- ▶ Rural households generate high “environmental incomes,” i.e., cash- or subsistence-based contributions from non-cultivated lands such as natural forests, bush, mangroves, rivers, or other wildlands. Most forest income is environmentally sourced (i.e., a “subsidy from nature” with low management intensities), but plantation forestry is by definition excluded.
- ▶ Forests and wildlands are particularly important as resources to rural dwellers for avoiding falling into (deeper) poverty, not only as safety nets in response to (unforeseen) shocks such as bad harvests, family illness, etc. (e.g., McSweeney, 2004; Pattanayak & Sills, 2001)

Cont.

- ▶ Extraction of environmental resource can degrade the resource base, biodiversity, and environmental services. First, this can produce trade offs between current and future extractive incomes, and rural households' asset-building strategies can help understand poverty dynamics (Nielsen, Pouliot, & Kim Bakkegaard, 2012). Second, degradation can create negative externalities for society at large; even low extractive incomes could go hand in hand with disproportionate damage to threatened habitats and species (Arnold & Ruiz-PeAlrez, 2001).
- ▶ If natural forest and other environmental resources from wildlands are so important to households in their everyday livelihoods, and even more essential in periods of income shortfalls, has the gradual uncovering of this “hidden harvest” (Scoones, Melnyk, & Pretty, 1992) also attracted the attention of development practitioners?

Cont.

- ▶ *Livelihood* comprises: “. . . the assets (natural, physical, human, financial, and social capital), the activities, and the access to these (mediated by institutional and social relations) that together determine the living gained by the individual or household” (Ellis 2000, p. 10)
- ▶ *Forest conservation* — the successful protection, improvement or creation of specific forests, and/or specific forest functions and services. [Forest conservation can be motivated to protect, improve, or create functions and services that benefit people living in a given forest, or people living far from forests, or it might presuppose the right to survival of threatened life forms and habitats and not presume human benefit at all.]

Cont.

- ▶ The survival of households depends upon their access to crucial resources and also the utilisation of these resources, both of which are deeply embedded in the local social and institutional structures.
- ▶ In the context of livelihood improvement, forest conservation is conflictual because the interests of forest stakeholders are frequently at cross purposes.
- ▶ Can forests be used to effectively generate income and employment that will make poor people better off?

Socioeconomic development, livelihoods, and forests

- ▶ In hunting and gathering populations, the characteristic main type of forest use is as a source of food (capture and collection of forest fauna and flora).
- ▶ With the turn to swidden cultivation, forest lands serve as a source of agricultural lands whose fertility is maintained and restored by forest ecosystems in a system of rotational fallow.
- ▶ With the turn to permanent agriculture at the forest frontier, forest lands tend to serve as a source of new agricultural lands that are not part of forest fallow systems.

Social and political characteristics of forest-dependent people

- ▶ Forest-dependent people who live in or near forests tend to be politically weak or powerless. There is a history of competition with more powerful outsiders for access to the forest resources they depend on. The competitors include:
 - (1) The national governments seeking to nationalize natural forests, often in contravention of customary or traditional law;
 - (2) Forest concessionaires (often with ties to the military or national or local legislators);

Cont.

(3) Agroindustrialists or other commercial farmers seeking land for expansion;

(4) Entrepreneurs seeking to appropriate high-value NTFPs; and

(5) Operators of mining concessions. In addition, infrastructure projects compete for the land natural forests stand on even if they do not involve direct competition for timber or other forest resources.

Principal forest uses

In most developing countries, forests continue to be used for swidden cultivation, and forests continue to be converted to permanent agriculture.

- ▶ First, the poor are often statutorily excluded from access to timber wealth because of its high value and because they lack power to compete for access to high value natural resources.
- ▶ Second, timber extraction and tree growing tend to be capital and skill intensive, and are sometimes aimed at specialized consumer markets. Tree growing for timber requires secure land tenure, which the poor often do not have (if they have access to land). It also represents a long-term, high risk investment whereas low-income people need short-term income and want to avoid risk (Wunder, 2001).

Nontimber forest products (NTFPs)

- ▶ There is a wide variety of NTFPs that are used for fuel, food, medicine, forage, fiber that have valuable chemical components or that are used for ritual purposes.
- ▶ The majority of NTFPs are consumed directly by collectors and their families. Some are important mainstays in the household economy. Others are used infrequently, but can be critically important as sources of food when other sources are unavailable. Such emergency foods can make a difference between life and death.

Cont.

- ▶ Following an influential study on the potential high economic value of tropical forest to indigenous communities (Peters et al. 1989; see Sheil and Wunder 2002 for a critique), the extraction of non-timber forest products (NTFPs) by local communities was widely proposed as a strategy to stem the rate of deforestation while enhancing livelihoods (Nepstad and Schwartzman 1992; Panayatou and Ashton 1992).
- ▶ As a result, this good extractivism. approach, one that preserves natural resources while enhancing income. (Almeida 1996), has spawned much research on the role of NTFPs in forest conservation (Peters 1996) and livelihoods (Godoy et al. 1995).

NTFPs, Livelihoods, and Conservation

- ▶ Forest resources have always been an important part of subsistence as well as livelihoods for forest dwellers and rural communities. [Livelihoods and conservation connected with nontimber forest products (NTFPs)]
- ▶ Following colonisation and postcolonisation, the states attempted to restrict the use of these resources by the communities mainly through establishment of protected areas, the argument being “humans would destabilise forest ecosystems by their unsustainable and destructive use” (Saberwal et al 2001).

Cont.

- ▶ New strategies (participatory approach) – participation in natural resource management including the role of local institutions, property rights, the nature of power relations between the state and the local institutions, between the rich and the poor resource users, the heterogeneous nature of communities and the multiple stakeholder rights over resources and corresponding challenges (Ostrom 1990; Agrawal and Gibson 1999; Ribot, Agrawal and Larson 2006) are initiated.
- ▶ For example, in India, the National Forest Policy was amended in 1988 (Lele et al 2010) followed by the establishment of joint forest management in the 1990s (Gadgil 2001).
- ▶ More recently, in response to indigenous rights to property and access, the Forest Rights Act 2006, was implemented (MoEF) and is an ongoing activity.

Cont.

- ▶ The NTFPs have subsistence value, protecting communities from extreme poverty along with cultural values thus affirming the complex and multi-use values associated with the NTFPs (Shiel and Wunder 2002).
- ▶ Even the more recent studies looking at the potential of the NTFPs to meet livelihood and conservation goals indicate challenges (Shackleton et al 2011a; Sunderland et al 2011), raising the question as to why despite new incentive-oriented mechanisms, there is a continued state of degradation of forests and increasing poverty.
- ▶ Some arguments suggest that the NTFPs can support rural livelihoods only if alternative options are not available (Gubbi and MacMillan 2008) and/or when market access and basic infrastructure are missing (Sunderland et al 2011).

Cont.

- ▶ In India, the NTFPs are integral to the livelihoods as well as for subsistence use by communities near or in the forests, broadly referred to as the “forest-dwelling tribal communities” (Lele et al 2010: 87) and a significant source of revenue to the state government as well (Tewari and Campbell 1995; MOEF 2001).
- ▶ Medicinal plants are NTFPs that are of particular importance to the rural poor, who harvest these from the wild to meet their primary healthcare needs as well as their livelihood needs.

[The commercial value of the NTFPs in India is currently estimated at an average of \$11 billion but the NTFP trade distortions and poor marketing account for 70% average loss in returns to these communities (Choudhury 2007)]

- ▶ The cultural importance of the NTFPs is often not given enough weightage despite its significance. For example, traditional ecological knowledge (TEK) and the usefulness of combining it with scientific knowledge to develop effective management plans has been suggested (Posey 1999; Ticktin 2004).

Poverty Alleviation and Forest Conservation

- ▶ Some authors have argued that, due to a number of intrinsic characteristics of forests and forestry, the real scope for reconciling the two objectives is inevitably quite limited (Levang et al., 2003; Wunder, 2001). In the course of the last several decades, rural incomes have on average increased in developing countries, yet natural forests have been disappearing at a high rate. [The various site-level solutions that have been tried have fallen well short of their goals]
- ▶ While there have been some positive outcomes in community and social forestry (Antinori & Bray, in this issue; Fomete & Vermaat, 2001), there have been many failures (e.g., Malla, 2000; Mekonnen, 2000).

Gender, forests and livelihoods

- ▶ The resources that individuals (and households) can have access to, depends not only on the local economy and ecology, but also on the political economy of resource sharing and distribution among various groups of claimants.
- ▶ Gender relations are deeply embedded in the economy and the politics of control over resources – a dimension which is often neglected in the mainstream discussions on economic development and change.
- ▶ Changes in land use and agricultural practices are undermining the relevance of women's knowledge.

Cont.

- ▶ The changing nature of ownership and control over forests having significant gendered implications – as forest products get commercialized, the way forests and forest-related activities are viewed by the forest dependent population also change.
- ▶ The shift from family and community labour to wage labour for extraction of forest products for market use as well as the interdependencies between farming and forest related activities alters the intra-family distribution of work as well as opportunities for men and women.
- ▶ The impact of deforestation and commercialisation of forest products on women's work burden.

Forests and livelihoods in Northeast India

- ▶ Forest has always been a significant source of sustenance in north-east India.
- ▶ The significance of the forest resources lies in the centrality of forest-based resources as an additional and dependable source of livelihood, particularly for smoothening consumption.
- ▶ Various studies on the livelihoods and employment diversification processes in the region suggests that the crucial drivers of diversification include the natural resource endowments and the institutional structures defining and differentiating the access and utilisation of such resources, the connectivity status and infrastructural development in the locality, access to education and also the pattern of state intervention in the local economy (Mishra 2007).

Cont.

- ▶ Livelihoods in the north-eastern region are critically dependent upon 'environmental entitlements'. [Environmental entitlements refer to 'alternative sets of utilities derived from environmental goods and services over which social actors have legitimate effective demand and which are instrumental in achieving well-being' (Gasper 1993).
- ▶ These environmental entitlements play a crucial role in different aspects of livelihood security at the household level, viz. economic security, food security, health security, and empowerment, particularly in fragile ecological contexts (Jodha 2001).

Cont.

- ▶ Forest plays a central role in livelihoods diversification – in the first one as a source to mitigate risks and smoothening consumption during seasonal short falls, and in the second as a source of consumables as well as marketable products like timber, and a range of non-timber forest products including medicinal plants.
- ▶ Consumption expenditure (for their survival) of relatively poor households was derived from community forests; better off households operate more in the products that are marketed. [Mitra and Mishra (2006) find that the consumption of relatively poor households consisted more of fuel wood and bamboo, leafy vegetables, etc., whereas consumption of timber was much higher among the rich households.]

Cont.

- ▶ The commercial extraction of timber and other forest resources played an important role in transforming the local economy, particularly in fastening the process of monetisation of the exchange process and commercialisation of production relations, even in the relatively accessible areas of the state (Mishra 2001). [Exploitation of forest resources, particularly timber, has weakened the ethos of collective management.]
- ▶ However, the entire north-eastern region in general has witnessed a phenomenal degree of environmental degradation over the last few decades (Husain 1996). [Deforestation has been going on at an alarming speed]
- ▶ Apart from the environmental impact of deforestation, induced by the wanton exploitation of the 'common' forest for private gains, the institutional impact was that the traditional rules of resource-use.

Cont.

- ▶ Forest plays a significant role in both the survival-induced and accumulative diversification (Mishra 2003) and loss of access to forests has accelerated the process of proletarianisation in certain contexts.
- ▶ The contribution of females in the collection of marketed forest products like timber, bamboo and medicinal plants was negligible, women contribute more labour than men in the collection of firewood, grass, leafy vegetables, fruits and roots. In the collection of house building materials men contribute more than that of women (Mishra 2005).

Political economy of forest use and changes

- ▶ The nature of forest use has been observed to change significantly as a 'market' for the products develops and the gender implications of this change in forest use gets manifested in gender differences in terms of the volume of forest products collected, the composition of forest products collected, the marketisation of the products and also access to the cash income earned through selling of such items.
- ▶ Gender implications of the changes - the generally collective ownership of land under *jhum* is gradually being replaced by permanent cultivation and, by implication, individual property rights over land, women tend to turn into 'disinherited peasants'.
- ▶ Further, as forests vanish and the 'nature-based' economy gets integrated into the larger market economy, the gender division of work tend to change, mostly resulting in greater work burden of women.

Cont.

- ▶ Commercial extraction of forest products has meant that traditional subsistence activities have been turned into income-generating occupations.
- ▶ Commercialisation has also meant greater interaction with traders and dealers and travel to market places. This has led to a situation where either the entire activity has been turned into a predominantly male activity or a division of labour has emerged where women and children join in collecting the forest products and male members take over the responsibility of selling the products. In either case the cash flows get concentrated in male hands.

Deforestation and Implications on Women

- ▶ The implications of such privatisation of forest resources for rural women, particularly those belonging to the tribal communities, are multilevel and substantial.
- ▶ Many observers (anthropologists) have noted that women in the 'traditional' community management systems had a greater degree of participation in economic activities and hence enjoyed greater freedom than the women of the caste Hindu societies (Elwin 1957; Haimendorf 1939: 101).
- ▶ However, the breakdown of collective management of natural resources under the mutually reinforcing impacts of state and market forces as well as the 'elite capture' of institutional structures of collective control over resource use has left women as a group impoverished, although individual women belonging to richer sections might have benefited to some extent.

Cont.

- ▶ As in many other forest-dependent societies, women and children in the hill economies of north-east India play an important role in gathering forest resources for domestic consumption as well as for commercial use. The declining forest cover, particularly the degradation of forest closer to the settlements has meant extra work for many of them. If environmental conditions deteriorate, women pay more in terms of higher work burden both because of shrinking opportunities to work as well as longer working hours within and outside the home.
- ▶ Women share a relatively higher burden in activities like fetching water, feeding domestic animals, collection of firewood and crop farming.

Cont.

- ▶ As relatively isolated, forest dependent economies get integrated to the larger economies of resource extraction and commercial exploitation, the modes of resource use gets transformed from a need-based system to a commercial system. Such a transformation, often leading to differentiation of the peasantry, does not leave the traditional institutions determining access to resources unchanged. Such changes have been transforming the hill economies of north-east India in profound ways.
- ▶ As collective institutional structures are being gradually disintegrated women as a group are facing challenges on diverse fronts. Deforestation and commercialisation of forest products are undermining their use and ownership rights.

Rethinking Community-Based Conservation

- ▶ Community-based conservation (CBC) is based on the idea that if conservation and development could be simultaneously achieved, then the interests of both could be served. [It has been controversial because community development objectives are not necessarily consistent with conservation objectives in a given case.]
- ▶ Conceptual shifts—toward a systems view, toward the inclusion of humans in the ecosystem, and toward participatory approaches to ecosystem management—that are interrelated and pertain to an understanding of ecosystems as complex adaptive systems in which humans are an integral part.

Including Humans in the Social-Ecological Systems

- ▶ One of them is the dwelling perspective of Ingold (2000), which refers to the “ . . . Practical engagement of humans with others of the dwelt-in ecosystem.”
- ▶ This practical engagement, building knowledge and ecological relationships, is the basis for putting humans back into the ecosystem. It involves the “skills, sensitivities and orientations that have developed through long experience of conducting one’s life in a particular environment” (Ingold 2000:25).

Cont.

- ▶ In the case of community-based conservation, there has often been a mismatch between what conservationists have thought of as community benefits (e.g., the sharing of financial benefits from ecotourism) and what multiple stakeholders in communities may have considered benefits (Brown 2002).
- ▶ Community-based conservation projects need to pay more attention to equity and empowerment - (political ecologists) questions such as: What is the distribution of benefits and costs? How do different actors relate to the resource in question? How do power relations at the local level derive from differences of class, ethnicity, and gender? (Brosius et al. 1998; Brosius & Russell 2003).

Cont.

- ▶ If equity and empowerment issues can be addressed, livelihoods can drive conservation rather than simply being compatible with it (Brown 2002).
- ▶ Conservation has become participatory for two reasons:
 - (1) First, there has been a rise of stakeholders and civil society in general throughout the world. Some would say this is an inevitable development of the postmodern age, like globalization.
 - (2) Second, participatory approaches have come to dominate management because the very nature of complex environmental problems requires a different, participatory approach; as Ludwig (2001) puts it, the age of management is over.