

6. Women in Climate Change, Environment and Livelihood

(With special reference to Biodiversity of Central India)

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Abstract

In Indian society, from the point of view of cosmology and esoteric sense, women and nature are inseparable as nature is governed by the feminine principles - life-supporting, sharing and diversity. Thus, the manifestation of energy is called 'Prakriti' - the 'Nature'. Both animate and in-animate are expressions of 'Shakti'. The feminine and creative principles of the cosmos looked at in conjunction with the masculine principles, women are more connected with nature in their roles of providing for basic domestic needs. Women's ability to provide and sustain depended, however, on their direct access to nature's resources and control over technology and their own labour. The process by which the systematic undermining of women's autonomy as producer to dependent took place, was clearly complex and is still being reconstructed and debated. Within poor household, women and female children bear the main burden of this deterioration and decreasing access. As the main gatherers of fuel, fodder, food and water, their working day lengthened. Similar implications for women's time and energy arise with the decline in common grazing land and the acute fodder shortage. Additionally, due to climate change (global warming), the decline in water tables with deforestation and tube-well installation has compounded the problem of drinking water. Against this backdrop, the present paper is based on a study of the mid-Narmada districts of Central India mainly Nimar and Malwa regions of Madhya Pradesh India during the period 2018- 2023 conducted by the author in pursuance of 'Empowerment of Women' being one of the main objects of the Institute of Applied Research. The enabling objective was to study the impact of climate change, environment change on livelihood of women from Natural and land resources in study area. It is supported by secondary data from census, IGIDR, INCCA, SAPCC and GoMP reports. The study further points out that to change perception of the Indian society towards women and to achieve the objective of sustainable development viz. agriculture, forests, livestock's and other natural resources development in the phase of climate change women should be actively involved in decision-making, training and implementation. Her passive role is a major factor determining under-development of the society both socio-economically and ecologically.

Keywords: Women, Environment, Livelihood

Introduction

The cause and effects of environmental degradation are often interwoven in complex web of climatic, social, economic, technological and ecological factors, thereby, leaving no scope for clear delineation of causes and consequences in terms of one-to-one relationships. Form, function and factors of ecosystem are essentially driven by anthropogenic pressures, with technology playing a vital role. The concept of environmental conservation has been interwoven in our tradition from time immemorial but the impact of post war industrialisation/urbanization and overwhelming population growth has led to over and haphazard exploitation of natural resources, over-shadowing our cultural faith in conservation of nature. This resulted in multi-farious environmental problems and climate change.

In Indian society, from the point of view of cosmology and esoteric sense, women and nature are inseparable as nature is governed by the feminine principles - life-supporting, sharing and diversity. Thus, the manifestation of energy is called 'Prakriti' - the 'Nature'. Both animate and in-animate are expressions of 'Shakti'. The feminine and creative principles of the cosmos looked at in conjunction with the masculine principles, women are more connected with nature in their roles of providing for basic domestic needs. Traditionally, women gathered products from trees and other plants, products that provide them with the basic 'three Fs' – fuel, food and fodder, as well as serve a variety of other uses. Whereas men view nature more in terms of commercial potential, women see it as a resource for basic domestic needs. These gender-based divisions further lead to a disproportionate impact of climate change on men and women.

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Situational Analysis of Climate Change in Central India

Madhya Pradesh is a predominantly rural state of Central India and most of its population is dependent on agriculture and natural resource use for sustenance.¹ While the contribution of agriculture to the State's domestic product (SDP) is 36.32% in the year 2022-23, nearly two thirds of its population depend on agriculture and related activities for their livelihoods.

Climate change has the potential to adversely impact forest ecosystems. Probably the climate is the most important determinant of vegetation patterns and has a significant influence on forest distribution, species dominance, plant productivity and the ecology of forests in general (INCCA, 2010)². Madhya Pradesh is rich in biodiversity, but any adverse impact of climate change on forest ecosystems is bound to affect the communities of the 22,600 forest-fringe villages because of their dependence on forest resources.

The context of vulnerability of crop productivity is sensitive to climate change, since it varies with the amount of monsoon rainfall and temperature changes within a season. Studies, including one by the Indian Agriculture Research Institute (IARI), have predicted greater losses in the Rabi season crop. Every 1°C rise in temperature reduces wheat production by 4–5 million tonnes in India. Small changes in temperature and rainfall have significant effects on the quality of fruits, vegetables, tea, coffee, aromatic and medicinal plants, and basmati rice. Pathogens and insect populations are strongly dependent on temperature and humidity, and change in these parameters may change their population dynamics. Other impacts on agriculture and related sectors include lower yields from dairy cattle and decline in fish breeding, migration, and harvests. Global reports predict a loss of 10–40% in crop production by 2100 (GOI, 2009:16)³. In this context, Madhya Pradesh is particularly vulnerable to climate change events. The vulnerability of the State is further deepened when we consider the plight of the ethnic groups living there. According to the Indira Gandhi Institute of Development Research (IGIDR, 2009), in Madhya Pradesh (as in most other parts of India) tribal communities are the poorest among all social groups. In rural areas, 58.6% of the tribal population was found to be poor, compared to 42.8% of the scheduled caste (SC) population. The livelihoods of most of these marginalised groups are based on forest and agricultural resources. The conditions of the natural resources governed by these communities are also comparatively poor. So changes in the climatic pattern could exert negative impact on them, causing further deterioration in their present standard of living. There is a need to view climate change through the lens of gender

also. Acknowledging the relatively disadvantaged position of women in the process of development, it is important to put focus on the impacts of climate change on women in Madhya Pradesh.

Forest dependent communities form one of the poorest sections of society that are likely to be adversely impacted due to climate change. Due to poorly developed institutions, markets, technology transfer pathways and lack of financial resources, forest-dependent communities have low capacity to cope with or adapt to adverse impacts. Those with the least resources and the least capacity to adapt such as forest dwellers are the most vulnerable. Climate change impact on the livelihood security of forest-dependent Communities. A large portion of Madhya Pradesh's forest area is accessible to the local communities for the purpose of Non Timber Forest Products (NTFP) collection, under surveillance of the forest department. The key NTFPs collected in the state are: Tendu leaves, Palash, Lakh, Mahua, Bamboo, Honey, medicinal plants and fruits e.g. Mangoes. A large number of villages are situated either inside the forests or at forest fringes. These villages largely depend on the forests for their fuel wood requirements and also for their livelihood security as they extract NTFPs from these woods. Largely, much of the state's population depends on agriculture as their primary occupation; however, livestock rearing and NTFPs provide supplementary livelihood opportunities to majority of the villagers. This diversified source of income, food, timber, fuel wood etc. provides crucial resilience to the communities in the face of different climatic and socio-economic stresses. It is estimated that about 66.4% of the households of MP depend on fuelwood for cooking; and, a total of 16.7 million cubic metres of fuel wood was extracted from the forests of Madhya Pradesh in the year 2010 (ICFRE, 2010). Given a livestock population of 40.7 million, there is a heavy dependence of livestock on the forest land. The Working Plan for one of the districts in MP for the year 2013-2014, estimates the average forest produce requirement per family to be '0.22 Cu. m. Timber', '12.62 bamboos' and '7.93 Quintals of fuel wood'. Additionally, the Working Plan also recognizes that there is 2.9 times more grazing pressure than the carrying capacity of the grazing land (Forest Department, Madhya Pradesh, 2014)⁴. It is estimated from this study that under the influence of increasing CO₂, largely due to CO₂ fertilization effect, the net primary productivity of the forests is rising, which is generally beneficial for the growth of biomass and, in turn, for the supply of various non-timber forest products. However, increasing weather extremes such as droughts and extreme precipitation events pose a serious threat to the sustained supply of various NTFPs.

Weather extremes are known to have a grave impact upon the agricultural produce as well as on the NTFPs, since both the products thrive on a delicate balance of natural factors. There is no systematic assessment in MP about the impacts of weather extremes on the NTFP production and supply. There exists compelling need to undertake such a study. In the future, climate change due to increased CO₂ fertilization may affect the net primary productivity, which is projected to increase under the scenario of good water availability. However, the greatest damage to NTFPs in the future is likely to stem from the extreme weather events. Shifting forest types are also likely to impact the supply of rare plants and herbs along with the production and supply of many of the NTFPs. There is a need to explore the impacts of climate change on NTFPs based on field based long-term observations. Currently, we lack long-term observation plots in the Madhya Pradesh.

There is clear increase in temperatures in the state in recent years but the summary decadal trends in rainfall suggest below average rainfall trends. During discussions, senior civil servants in water resources and forest departments commented on their perceptions of increased and intense droughts, and erratic rains during the monsoon. In addition an increase in temperatures in groundwater in the state has been observed. Staff within the MP Health Technical Assistance Support team were very concerned about the complex issues around droughts, when food grain production was disrupted, particularly those which were very important for food security. There is considerable temporary urbanisation during drought periods despite food for work programmes, and their estimates are that drought affects around half of the Districts each year. These issues were mirrored with discussions with the Japan International Cooperation Agency (JICA) staff on the reproductive health project who commented how much temporary migration disrupts monitoring of pregnancies and births.⁵ The forest and environmental resources in the state are also under continual pressure and severe pollution of rivers/wetlands, degradation of forests and biodiversity loss has been reported. Poverty environment linkages are impacting on the health indicators and disease burden in the state. Inadequate sanitation and unsafe drinking water has been reported from most of the districts in the state⁶

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Technologies, such as the digging stick (used to dig out tubers and wild plants and precursor to the plough), hoe, the saucer shaped stones for grinding grain, baskets and vessels for grain

storage, jars, jugs, strainer and baskets for holding water and fermented liquor, the Chula for backing rice, chapati, dal and the loom are all attributed to women, as are techniques such as hoeing, winnowing, making food (involving some knowledge of bio-chemistry), spinning and weaving, and the chemistry of pot making. Food gathering itself demanded an elaborate knowledge of the food and medicinal properties of the plants, roots and trees – including wide reserve knowledge of edible plants not normally used, but critical to tide over prolonged storage of other foods during climatic disasters. Women collected edible seeds of wild grasses, ancestral to our wheat and barley, and to them are attributed the decisive step of deliberately sowing such seeds on suitable soil, and cultivating the sown land by weeding and other measures. Indeed, it is women's daily activities that are assessed to have sustained the family. Anjali Chavhan (2003)⁷.

Women's ability to provide and sustain depended, however, on their direct access to nature's resources and control over technology and their own labour. The process, by which the systematic undermining of women's autonomy as producer to dependent took place, was obviously complex and is still being reconstructed and debated.

Observations Based on Micro study by IAR in Mid Narmada Region

Based on study by IAR nearly forty percent of the mid Narmada district villages are either forest villages or are situated close to forests and forests play a significant role in the livelihoods of people in such villages. The regime governing forests and people's rights over forests is highly regulated and governed by national acts. In study area, the large population that depends on forests for income and consumption has had to contend with such laws, but there has also been a gradual shift on part of the Government to grant more rights to people with regard to basic needs from forests, and to bring women more and more into management of forests. Despite efforts such as rent of nistari rights, and the JFM program, the relation between people and forest management and regulatory regime under the act has sometimes led to conflict between villagers and forest authorities.

Food security is a major concern for Forest dependent Communities (FDCs) in central India, as it directly impacts their well-being. In the study, although most households reported dependence on forest-based livelihoods, their income from forest products was relatively

low. Wage and cultivation income are more prominent sources of income in these communities.

One of the notable findings of the study was that most of the households were found to be food insecure, despite having acceptable levels of diet diversity. The average income of FDCs was also found to be lower.

It is difficult to estimate the exact number of women dependent to some extent on forests, since data captured by either census operation or NSS do not reflect employment sources that give support for brief periods to women. In case of women collecting NTFP, the period of direct person's days of employment is not very significant, say ten to fifteen days to a month or so at maximum over all in a year. But the forest produce play a significant role in peoples' lives, which is clearly evident from the study of mid Narmada districts of Madhya Pradesh. A list of some of the main NTFPs collected is presented in the Annexed **Table 1**.

The Deterioration and Privatization of CPR

Given their limited access to private resources, the rights to community resources especially for the gathering of essential items for daily use have always provided rural women a source of subsistence. Traditional practices relating to natural resource use – the gathering of firewood and fodder or shifting agriculture – were typically not destructive of nature. For instance, firewood for domestic use in rural HHs was and still is usually collected in the form of twigs and fallen branches which does not destroy trees.

Village commons and the country's forests have traditionally provided and continue to provide (although decreasing so) a wide variety of essential items such as food, fuel, fodder, fibre, small timber, manure, bamboo, medicinal herbs, oils, material for house building and handicrafts, resin, gum, honey, spices, etc. - for personal use and sale. A study on the food habits of tribals in Madhya Pradesh lists 165 types of trees, shrubs and climbers that they use as food in various forms. 19 provide roots and tubers, 35 petals and leaves cooked as vegetables, 63 provide fruits, 17 yield juice that is taken fresh or fermented, in addition to nuts, figs, honey, etc. However, the availability of this means of sustenance is being seriously eroded by two parallel trends;

- a) a growing deterioration in the productivity of available communal resources.
- b) a growing privatisation of these resources and their concentration in the hands of a few.

Within poor household, women and female children bear the main burden of this deterioration and decreasing access. As the main gatherers of fuel, fodder and water, their working day has lengthened. Similar implications for women's time and energy arise with the decline in common grazing land and the acute fodder shortage. Additionally, due to climate change (global warming) the decline in water tables with deforestation and tube-well installation has compounded the problem of drinking water.

On livelihoods dependent on agriculture, the quality and productivity of land has a significant effect. Besides working as wage labour, women also render labour service on family farms, which is usually overlooked. As part of other unpaid work, women perform activities crucial to family. These includes daily domestic work comprising of cooking, fetching water, collecting fuel wood, child care, rearing livestock, kitchen gardening and working on family farm. Through their work on family farm, women contribute directly towards agricultural production and productivity. Through browsing and collecting in the forest and from fallow areas they provide firewood and medicine for family. The subsistent farmers have to complement the agricultural yield with wage labour (local as well as migratory), gathering residuals (from harvested fields) and other subsidiary non-farm occupations (e.g., service, pottery, hair-cutting, carpentry, fishing, etc. depending on castes and available choices). Fishing is an important livelihood source for communities (especially kevats or dhimars) living near water reservoirs. (Researcher, 2010; 2-6)⁸ Another activity undertaken by such farmers is collection and sale of NTFP and sale of head loads of fuel wood in the nearby markets. Households belonging to this category (especially the SC/ST ones) are often bound in exploitative relationships (as reflected in low wage payments, harassment of women and harassment of school-going children) with the dominant segments i.e., the bigger farmers.

Considering the high percentage of female workers in primary sector as key agro-forest stakeholders, the extension system has traditionally overlooked their specific needs.⁹ The Madhya Pradesh government has initiated moves towards mainstreaming gender concerns, but this will be hard to achieve unless there is improved understanding of how gender issues can be identified and effectively incorporated into development programs and projects. Social customs imposed the greatest barriers in achieving gender equity, education and training for women empowerment. Over the past decade there has been a huge growth in Self-help / Micro-finance group programs, in the study area, implemented by government, donor agencies as well

as local NGOs and micro-finance companies. This has become the primary mechanism to empower women.

It took almost half a century after independence to amend (2005) the Hindu Succession Act (HAS 1956), giving Hindu women equal inheritance rights to agricultural land and overriding the state tenure laws. Daughters, including those married, also became co-partners in joint family property. However, legal changes remain a vision, as ground realities and the diverse forms and levels of infringement on women's land rights suggest. Though modern legislation has given women equal rights to individually own, use and dispose-off land, more critical are the factors which restrict their ability to exercise their legal claims and to control and independently farm the land where they do get access (IAR Study 2014). Successful self-management of land by women is constrained too by restrictions to their access to agricultural technology imposed by their limited control over cash for purchasing modern implements, gender biases in extension services, lower literacy levels than men, and rituals, taboos against women doing some essential activities. Furthermore, without access to support from the National Bank for Agriculture and Rural Development, commercial banks, and cooperative societies, women are excluded from information, making their production more difficult to sale in the agricultural markets.

Conclusion

Indeed what is at issue today is the entire developmental paradigm-with its particular product and technological mix, its forms of exploitation of natural and human resources, and conceptualisation of the future climate change. However, the recognition that there are deep inequalities and destructiveness inherent in our processes of development would not be enough, if policy continues to be relief-oriented towards both nature's ills and people's welfare, if the solution to nutrient-depleted soils is seen to lie in externally-added chemical nutrients, to depleting forests in monoculture plantations, to drought starvation in food-for-work programmes, to gender inequalities in ad-hoc income generating schemes for women, and so on. These solutions are ultimately neither curative nor preventive.

The realistic posing of an alternative (quite apart from its implementation) is of course not easy. What is clear so far are its broad contours: that it needs to be transformational rather than being welfarist, where development, redistribution and ecology link in mutually regenerative ways

and that we would need to go beyond the demand for a mere redistribution the loafs very composition (e.g. moving from eucalyptus to deciduous trees and from monoculture tree plantations to mixed forests);

- the technologies used to produce it (e.g. migrating from purely chemical to more organic farming, from monoculture HYVs to mixed farming with indigenously produced varieties and from large-scale irrigation projects to a combination of tanks, small dams, etc);
- It is necessary to recognise non-timber forest products (NTFP) as a source of income at par with agriculture in the case of tribal communities and facilitate them to improve the practices of gathering minor forest produce.

- the processes by which decisions on its composition and its production technology are arrived at (from top-down to participative, from gender-unequal to gender-egalitarian);
- women's work situation (by reduction of women's labour and workload through research and development and use of women-friendly technology)
- the knowledge through which it is produced (from laboratory-based, expert-dependent to interactive with women, poor peasants and tribals) and building awareness and capacity among women, especially poor and marginalised women, in rural and urban areas, on climate change adaptation in all sectors
- the form by which nature's resources are appropriated (violent, exploitative to nonviolent, regenerative) and its very size
- role of women (women forest managers' role should be widely expanded to improve the health of the forests, using appropriate adaptation strategies to assist the dependent villagers)
- asset-creation for women (land titles, livestock ownership, leases on forest land, biogas facilities and water tanks, so that women can take decisions regarding optimum and efficient use of these resources in the face of climate change)
- earmarking public resources (e.g. gender based budgeting in proportion to the number of women engaged in specific sectors, especially agriculture and related sectors)

The transcreation of this into specific policies and programmes remains the major development task ahead. To change perception of the Indian society towards women and to achieve the

objective of sustainable development viz. agriculture, forests, livestock's and other natural resources development in the phase of climate change women should be actively involved in decision-making, training and implementation. Her passive role is a major factor determining under-development of the society both socio-economically and ecologically.

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Table 1

Non Timber Forest Product in Madhya Pradesh			
Name of NTFP	Botanical Name	Uses	Month of Collection
Mahua	Madhuca indica	Commercial, Medicine, oil	June- July
Kanji	Pongamia pinnata	Non edible oil	Jan - Mar
Mahua Phool	Madhuca latifolia	Beverage	March - April
Areetha	Sapindus emarginatus	Soap	Feb - April
Aonla	Embelica officinalis	Medicine/ Trifala component, fruits very rich in Vitamin C.	Nov - Jan
Baheda	Terminalia bellerica	Medicine	Mar - May
Gond Dhawra	Anogeissus latifolia	Gum	Feb - June
Gond Salar	Boswellia serrata	Gum	Mar - June
Gond Karaya	Sterculia urens	Gum	Mar - June
Gond Babul	Acacia nilotica	Gum, medicine	Mar - June
Gond Khakra	Butea monosperma	Gum, dye	Mar - June
Kali Musli	Curculigo orchoides	Medicine	Sep - Oct
Safed Musli	Cholrophytum tuberosum	Medicine	Sep - Oct
Satavari	Asparagus racemosus	Medicine	Sep - Oct
Kemach Beej	Mucuna purita		Oct-Dec
Ghat Bor	Zizyphus xylopara	Fruits edible	Mar - Apr
Bel Guda	Aegle marmelos	Diarrhoea, heat -stroke	Apr - Jun
Gond Godal	Lannea comondolica	Gum	Mar - Jun
Shahad	Apis dorsata	Medicine/ Food	All year
Mom	Apis dorsata	Commercial	All year
Gond Khair	Acacia catechu	Gum	Mar - Jun
Lac	Tachardia lacca	Jewellery, sealing	Mar - Jun
Baheda chhal	Terminalia bellerica	Medicine	Mar - May
Adusa	Adhatoda vasica	Medicine	Jan - Jun
Gokharu	Tribulus terrestris	Medicine	Sep - Oct
Ratanjot	Jatropha carcus	Medicine, Oil	Sep - Oct
Aswagandha	Withania somnifera	Medicine	All year
Marorphali	Helecteres isora	Medicine	Oct - Dec
Sankh Pushpi	Evolvulus aisiniodes	Medicine	Sep - Nov
Tendu Patta	Diospyros melanoxyton	Bidi making	Apr - May
Chironji	Buchanania lanjan	Food/ Dry Fruit Nuts	May - June
Bark of Khakra	Butea monosperma	Fibre for ropes	June - July/All the year
Kosa/tassar	On Terminalia tomentosa	Cocoons for tassar silk	March - May
Mangoes	Mangifera indica	Edible Fruits	June - July
-	Betul Oil	Exported for Scent Making	-
Jamun		Edible Fruits	May - June
Head-loads of wood	Many species of trees	Fuel-wood.	Throughout the year
