In search of a canopy:
Tribal Women's Livelihood in Forest-based industries in Rural India

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Abstract:

Tribal women known for their deep association with the forests are an economically active lot but nevertheless, they suffer disproportionately more from illiteracy, poverty and social abuse. Moreover many forest belts in India are becoming centres of militancy and civil strife because of improper designing of development programmes. The paper argues that more inclusive development in the present time of competition could come through formal integration of the tribal people with the forest-based economy at large that could give tribal women access to higher income and empowerment without distancing them from their roots. This would also mean reducing the high level of dependence on agriculture. Secondary data collected from a nation wide survey could provide a comparable and representative picture of the socio-economic states of tribal women in India, their formal dependence on the forest economy and the tendencies shown over time. Official data collected by a nationwide household survey, the NSS (1999-2000), are subjected to cross-tabulation, logistic modeling and indexing to examine the women's economic integration in the forest-based industries. Tribal women are found to be lagging in most development indicators, their occupations largely agriculture based, their integration with the forest related economic activities at low level and their manufacturing enterprises in need of modernization. Filling up these shortfalls through proper training on business and sustainable forestry on the one hand and sensitization of the markets and negotiation processes of their cause could strengthen the deep tie between forests and tribal women while empowering them. The present research also proposes to analyze the subsequent NSS (2004-05) survey data to trace the movements of the tribal women's development status and their integration to the forest economy in the back drop of the high growth rate taken by the Indian economy.

Key words*: Forest based enterprises, Gender, Tribal, Inclusive development*

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About two-thirds of India's forest-cover lies in tribal districts where the incidence of poverty is high, tribal areas in India mostly happen to be the centres of civil strife and remain nearly disintegrated from mainstream polity and development so that 'stern policing' measures are a political imperative (Appendix 1, ET 2006). Of particular relevance is the place of tribal women who live close to nature. They are women born of generations that have lived in deep association with the forests, drawn support and subsistence from forests and in turn learned to nurture and conserve them. Even in modern civilization, the tribal women are victims of illiteracy and poverty more viciously than other women in the country and are additionally vulnerable to militancy in civil society, to family alienation due to migration, exploitation in the labor market and social evils like polygamy, alcoholism and domestic violence. Freedom from poverty and insecurity is viewed as an essential component of women's well-being (Dasgupa, 2001, Sen,2002 , Billson and Fleur-Lobban, 1988) and there can be no two views on the importance of empowerment of tribal women in the development of the nation.

Forests have been seen as an environmental resource of immeasurable value and conservation coming mainly through control on felling has received attention globally and nationally through different policy regimes. Poverty alleviation has inevitably been viewed as an integral part of such conservationist approach. The controls however more often raised conflicts, dilemmas and readjustments (Sundar, 2003) rather than provide a long lasting solution. Micro-studies expose the utter dependence on forests of the local women and the informal nature of the dependence. Yet it is implicitly acknowledged that such dependencies even if economic and market linked do little to help people climb out of poverty and are fast abandoned when other alternatives are available. Although forests also constitute considerable economic resource base and contribute significantly to the economy, the forest activities of the local people can only retain them at a low level of subsistence and can hardly find any place in the modern day economy that gains support from management and physical sciences. The aim of economic development is yet to be integrated with sustainability that has become the corner-stone to any forest policy.

Whether sustainability in a narrow sense of controls and regulations for environmental conservation is meaningful is debatable. In India the aim of resource conservation, for the last many decades even 'fenced off' the tribal people from forests treating them as 'problems' for the environment. With globalisation and economic liberalization, such an approach can only cause uncontrolled depletion of forest rich countries or regions to fulfill import demands of forest-poor ones in the short run but over a longer time horizon may not be able to prevent felling legally or illegally in most developing countries. In India's growing economy demand for wood may increase by two to three times in twenty-five years according to estimates (Lele et. al., 2000a). With the power inequalities that characterize the economy, it may not be unreasonable to expect unrestrainable depletion, unequal distribution and continuance of militant protests unless specific and appropriate policies are directed for the economic development of forest and tribal economies. Forest conservation beyond short-term (Lele et. al. ,2000 b)would require a policy that increases the value of standing forest, the cost of unsustainable logging practices and the incentive for investment in forestation and sustainable forest

management[1]. It is important for any development strategy to examine the economic and social status of women from tribal societies and view how they economically benefit from the forest, the nature of their activities and implications on forest sustainability in the overall context of economic development.

This paper takes up the case of the scheduled tribe (ST) women in India referred to as tribal people, and explores through official data their place in development, their livelihood and the nature of their integration in the forest-based economy in modern India. Usually, survey based micro-studies are undertaken to bring out the forest dependence of women. Such studies are certainly efficient and able to take care of the informalities of the activities that overlap over household and economic chores that large official surveys cannot address. However at the cost of some imprecision a single nation wide survey with one of the best designs possible has its advantage in recording the formal dependencies and the macro picture in a balance and comparable way. The paper argues that there is scope of integrating tribal people, women in particular, in the modern day forest based economy for both economic and ecological gains. The integration of tribal women in forest related industries is studied in two different steps. First, the linkages between the tendency (to work for such an industry) and the tribal origin and gender are quantitatively viewed at through a logistic regression model. Second the dependency itself is measured and indexed. Finally emphasis is given to manufacturing enterprises among tribal women and the paper examines the state of such enterprises with a view to modernity.

Objectives, Data and few Concepts

The analysis essentially uses employment data made available by National Sample Survey Organization (NSSO) of India. A total of over seventy thousand households in rural India are visited in four sub-rounds in the year 1999-2000 (July to June) and canvassed with the questionnaire denoted as schedule 10. The output of this survey is used as data-base for this study. The analysis is conducted at the national level but account is taken of specific states due to the uneven distribution of tribal population. The tribal population is studied by extracting data relating to ST households from the rural sample. This study takes account of the principal and main subsidiary status of the people. Admittedly this would leave out activities of minor nature indulged in by members but not reported as principal or subsidiary activity based on their perceptions.

In respect of the economic activities NSSO makes it possible to identify the industry engaged in by a person through National Industrial Classification (NIC) 1998 codification. The NIC are standards used for classifying economically active population (NIC, 1998) drawing from the corresponding international classification (ISIC). This study uses the 5-digit codes to identify the industries related to forests as also broader classification such as agriculture, mining and services.

[1] Sustained yield of forest is defined as production of forest products with an approximate annual balance between net growth and harvest. There is some disagreement surrounding what is controlled-sustained yield condition of forest management or what constitutes sustainable forest management although there is consensus on multiple-uses (distinct from only timber production) and location specificity of such practice.

Forests and Development of Tribal Societies

Forests and tribal societies are an intensely researched area a vast and exciting literature readily available in the Indian context with contributions from sociologist, economists and environmentalists. The main centers of interest have been the downsides of Indian forest policy that ran for long years, the dependence of the poor on forests mainly for non-timber forest products (NTFP) and the challenges and prospects of the novel Joint Forest Programme (JFM) now pursued with vigor. Ecologists have dwelt on the symbiotic balances that prevail among humans and the forest eco-system (Chopra and Srivastava, 2005)

The history of Indian tribals constituting some 532 tribes listed in the schedules as per Indian Constitution (see appendix 2) with languages and disparate cultural identities run down centuries of deeply associative co-existence of people and forests. Their cultures celebrating their close bondage with nature and their ties with their soils, their community and kins evolved from their joint economic dependence on forests. Historically whenever the State, its policy and its development strategies encroached into their rights and interests the results have been rebellions, unrests or even political activism in their favour as is evident even currently in the North east, Central India and Andhra Pradesh (Appendix 1).

TABLE 1: TRIBAL POPULATION, FORESTS AND DEVELOPMENT-CORRELATIONS	
Share of ST Population and Share of Forest area	0.760
Share of ST Population and per capita income	-0.200
Share of ST Population and Literacy rate	-0.010

Although the ST people are found all over India, their concentration is high in certain states with Madhya Pradesh and Maharashtra leading while states such as Punjab and Uttar Pradesh hardly have tribal population. Yet many remote and hilly states also remain habitations of tribal people although due to their geography these states are in general sparsely populated as compared to the plain states where the tribals mingle with general category people. Population of states in the North-east Himalayas is constituted to a very large degree of tribals though their shares in national tribal population are small. The dominance of the tribals in the population is therefore measurable by an index obtained by dividing the State's share in tribal population by its share in total population (Table 1A). Corresponding to any 1% share in total population, North-eastern states (such as Arunachal Pradesh, Manipur, Mizoram and Nagaland) house high shares of tribal population. In general as is well known, tribal population is denser in forested states, the correlation between the states' proportions of forested area and tribals in population being 0.7. The tribal dominated states also tend to be less developed, negative correlations with state per capita income and literacy rate being indicative.

At one time the tribal people's relation of accord with the forests was a widely and officially acknowledged fact. India's Government also in principle aimed for the development of tribal people through reservations in education and Government employment and by designing rural development programmers in protective

discrimination for the tribal people. The 1952 Forest Policy of India stressed commercial management of forests for industrial raw materials and government revenue. The demarcation of reserved and protected areas and the command and control system of a centralized power distanced the people from the forests and apparently encouraged an unholy alliance between the Forest Department officials of various levels and commercial interests leading to exploitation and injustice towards the local people and degradation of the forests which further injured their economic interests. In addition, the mainstream development programmes such as construction of dams and mines displaced tribal people from their soils. The watershed in modern history of forests and tribes is said to have come with Forest policy of 1988 that recognized the tribal people as a 'solution' rather than 'problems', talked about the 'meeting the basic needs of the local people', 'generating forest-based employment', and 'people's programme of conservation' while giving top priority to 'poor people's livelihood' and leading the way to JFM where the communities once again take part in conserving the forests (Sundar, 2003). JFM appears as a beginning of the tribal people's reintegration into the forest based economy in the new world era. A Tribal Rights Bill was introduced in the Parliament in 2005 and was referred to the Joint Parliamentary Committee that recommended conversion of the bill into a Forest Dwellers Rights Bill. The distinction between Tribals and Forest dwellers is not the only point of contention. Apprehensions are raised again that giving such power to the Tribals might mean a 'death knell' to forests, encroachment of mafia into forest land and increased poaching. Forest conservation and integration of tribals in the economic growth process are two challenges that call for a compromise.

The tribal people's dependence on the forests is well studied and noted for its intensity and immeasurability. The tribal women spend considerable time, collecting fuel wood, lac, honey, silk cocoon, medicinal herbs and fruits as part of their domestic chore but since they also often sell the surplus if possible, the border between household and commercial motivation becomes extremely porous. This makes it difficult to measure the degree of commercial dependence and relevant information evades official surveys (Arnold 1994). What is well-known is that such dependence also characterizes extreme poverty, low-degree income potential and often market disadvantage vis-a-vis village middlemen[i] .

Yet there is another side of this issue. Forests have a significant place in the country's industrialization, development and growth. Considering both registered and unregistered units the wood based, paper based and leather or fur based industries account for over 10% of net domestic product from manufacturing as computed from National Accounts (EPWRF 2002). Furniture, building and transport materials, several agricultural and industrial implements reading and writing materials boxes and containers and leather or fur articles have their sources in the forests. Pharmaceutical firms draw richly on forest bio-diversity with a number of commonly used and vital drugs sourced from natural vegetation. The growth possibilities of the Pharmaceutical sector further open up prospects of bio-prospecting in which local knowledge is valuable (Kumar and Narui, 2003). Handicrafts and items based not only on wood, but also cane, bamboo, reeds and grasses have urban as well as lucrative export market and are promoted by the Government. Tourism is another forest related area because forests attract tourists with their natural beauty and grandeur, open opportunities to various recreations and services if conducted with a balanced approach (Font and Tribe, 1998). Thus forests provide a resource base that is rich, varied and potent for a growing economy. While activities covering forestry, manufacturing and tourism need all to be designed in the

most sustainable way, it is also desirable that the tribal people with their time proven proximity to the forests be integrated with forest based economy in the modern world in the best possible way.

Tribal women, Development and Participation: A Relative View

Table 2 finds tribal women constituting a little more than 10% of the total Indian population and unlike in the population, the tribal people hardly show an adverse sex ratio especially in the 1 to 7 years age group reflecting no sign of early sex discrimination. The age wise break-up is comparable with whole population, with 54% in the productive age group while a larger share 40% are children. The mean age is 24.3 years, less compared to their mean in total population. By religion Hindus are majority among tribal people also but Christians constitute a sizable 8% compared to 2% in total population. Seven percent of women belong to female headed households slightly less than 9.5 of the population total. The educational disadvantage is evident from the illiteracy statistics. More than 25% of women belong to completely illiterate households and nearly 50% in households in which no female is literate. These ratios are much higher than total population highlighting the greater illiteracy problem of tribal people.

The worker population ratio brings home the fact that the tribal woman is far more participative in economic life than others and 37% joins the men in the work for a living compared to an overall total of 23%. While that of the working age females (between 15 to 59 years age) is very high at 61%, the participation rate is high among senior women too. However, in spite of their active role not only considerably higher proportion (43%) of tribal women belongs to very low expenditure classes of households than overall women, the share is higher than for tribal men indicating greater concentration of women in poor households and possibly also reflecting their poor economic empowerment.

Table 2: Development and structure of rural scheduled tribe (ST) women population: a relative view

	ST	All-Rural	Ratio
Population in Millions (Census of India)			
Male	39	381	0.10
Female	38	361	0.11
Total	77	742	0.10
Age demography			
0-15 years	40	38	1.05
15-59 years	54	55	0.99
>59 years	6	7	0.79
Mean age	24	26	0.95
Sex ratio age-wise (%Female)			
0-7 years	50	48	1.03
Total	50	49	1.01
Religion			
% Hindu	89	84	1.06
% Christian	8	2	3.41
Social- % women in households			
Female headed	7	10	0.77
No member is literate	26	16	1.65

No female is literate	48	35	1.36
No female above 7 years is literate	51	38	1.35
Work force % in Population			
Male	55	52	1.06
Female	37	23	1.61
Female-15-59 years	61	37	1.63
Female->59 years	27	17	1.60
Economic-monthly per capita expenditure is less than Rs300 in household			
% women	43	27	1.62
% men	40	25	1.63
Economic -land ownership of households(<2 Hectares)			
% women	83	86	0.97
%men	84	85	0.98

Livelihood of Tribal women

Before delving into the livelihood issue it is useful to note that in terms of capability measured by education, the ST woman suffers tremendous disadvantage with 78% women above 15 years not even literate and 13% with rudimentary education despite all the quota in institute of higher education. There is no significant share of higher and technically qualified women (Table 3).

Table 3:-education of tribal women above 15 years

Attainment (%POPULATION)	**Tribal**	**All**
Not literate	78	66
Literate upto primary	13	17
Higher secondary	1	2
Graduate and above in Engg.,Medicine, Agriculture	0	0
Graduate and above in others	0.3	0.9

A predominantly large share 57.6% of adult women however is engaged in some livelihood as workers in the tribal community compared to 34.9% in the entire rural community. Another 18.6% also occupy themselves with household chores that are potentially marketable. These useful activities also include free collection of vegetables, roots, firewood, cattle feed etc and probably incorporate to a degree the dependence on forest products that cannot correctly be commercially evaluated from the data. Women engaged merely in household duty comprise only 16% of the population, close to only half the same share in the total population. Tale 4 based on principal status and industry of occupation, shows that in ST community a very large 91% of the working women are employed in agriculture and forestry while manufacturing absorbs only 3.2%. Construction and public service (including education) follow with 2.3% and 1% shares

respectively. Women workers are also involved in trade (retail only) and health at 8% shares each while mining and travel/tourism have even smaller shares.

The tribal women like the average rural women draws mostly from primary activities, only more so. Not only an overwhelmingly large share of women are trapped in agricultural activities, nearly half the working women are employed merely as casual workers and another 40% work in family enterprise with no formal payment. Only 9% of the women are entrepreneurs and a small 2.6% work in regular and salaried jobs, another area where ST have a minimum quota. In the dominant occupation agriculture and forestry most women are either casual hired labour or labour in family farms. The share of enterprise is more in manufacturing, trade and travel industries. The most coveted salaried employment is dominated by health and public service.

Table 4: livelihood of tribal women workers by industry and principal status

Industry	Entre-preneur	Unpaid family worker	Salaried regular	Public works	Casual Labour	**Share of industry**
Agriculture &Forestry	8.2	41.2	0.7	0.3	49.6	**90.7**
Mining	0	4.8	2.8	0	92.4	**0.4**
Manufacturing	35.1	46.3	1.7	0	16.9	**3.2**
Public administration/Education	0	0	93.0	0	6.9	**1.1**
Trade	57.5	38.9	0.6	0	3	**0.8**
Travel/Tourism	30.3	20.7	7.2	0	41.8	**0.2**
Health	1.6	0	98.0	0	0.4	**0.8**
Construction	0	0.2	0.4	4.2	95.2	**2.3**
All	**9.2**	**39.2**	**2.6**	**0.3**	**48.7**	**100**

Note: Last column gives the share of workers in the industries. Total industry sum does not match 100 as other industries not noted here also engage insignificant shares of women. Other entries are share of each industry workers in different status.

Women and Forest Related Occupations

The tribal women have a heritage of close association with forests. The associations in the form of economic livelihoods are more often informal and unorganized and sometimes a struggle against rangers and forest officials and even illegal according to ill-designed regulations of the state. It is implicitly known that a large section of the beneficiaries from forest based activities are not the women, not even the tribal or the local people and sometimes people with power and money.

Specification of Forest-based industries

The forest based enterprises at the local level revolve mostly around collection an processing of forest products and manufacture of articles of wood, rattan, cane, reeds

etc. catering mostly to rural need (Arnold,1994). Women are more associated with collection and extraction. The forest related economic activities can be defined as those economic activities falling under any industry that uses forests or its products as an essential element. Some of these activities identified in literature relate to wood, bamboo, cane, oil gums that are harvested from forests, woodlands and trees. The paper categorises a set of activities as forest related based on the raw material/inputs they use and the foregoing analysis of data is hinged on this specification. However, it may be admitted that there is a degree of porosity in the specification as these are based on what is apparent from description provided by NIC. It is possible that some activities not included do use directly or indirectly services or products from forests which cannot be confirmed while as already noted many other forest based activities may not have been reported. On the other hand inclusion of certain activities are based on presumption such as a tribal working for a hotel or tour operation is considered forest based although there is some chance that such an operation is not in any way linked to forest. In other word the perception and nature of available data underlie the specification made here.

Agriculture: (1) Raising bees, production of honey or silk (tassar) (2) farming rabbits and other animals (3) hunting, growing, timber, (4) conserving forests, operating tree nurseries, logging and producing wood in the rough (prop, railway tiles), gathering leaves and other forest materials, forestry services, logging services.

Manufacturing: (1) Hydrogenated oils, vanaspati and animal fats and oils cakes and meals and residuals (Oleosearics), (2) Bidi (Tobacco), (3) Textiles, tapes, coir, ropes of fibre, (4) tanning leather work stuffing and products of fur and skin, (5) Sawing wood and processing plywood, wood (flooring, doors, boxes building materials and boards wooden industrial goods and agricultural material, carts, boats, sports goods, toys, decorations, pencils, umbrella, sticks musical instruments), (6) Products of bamboo, cane, reeds, leaves and grass inducting baskets and bins, bags, ornamental boxes, fancy articles, pith and salacity, broomsticks, that thing, (7) Pulp, paper, newsprint, boards and special purpose paper and its products, sacks bags and boxes of paper, hoop cones cups and saucers, Pappier-mache articles, wall paper, file cover, carbon paper, (8) Turpentine and resins, organic acids, cellulose natural polymers, gums all from vegetable origin, (8) Pharmaceutical and botanical products and preparations (9) Matches.

Trade: Wholesale trade in hides, skin, leather, wood and wood products.

Tourism and Recreation: Restaurant, Café, Travel agencies, Tour Operator.

Medicine: Indegenous (Ayurveda and Unani) practicing activities.

Dependency level

Forest based activities vary in nature. Cross-tabulation in Table 5 brings out the varying dependency levels of tribal females on different activities with a comparison with tribal men and the gender disposition. Among the forest related activities going by the principal activity, the tribal woman is found to be most often engaged in manufacturing activities which claim 2% of work force compared to 1% by agriculture, 0.7 by medicine and 0.1% by tourism (Table 6). Medicine also has a comparatively large share of 0.7% and with a greater gender disposition towards women. In agriculture and forestry, the

primary activities in which the women participate are growing timber forest conservation, operation of tree nurseries etc. followed by gather wild forest materials while gathering tendu leaves and forestry services claim 1% share each. In manufacturing making of baskets, bins and containers from of wood, bamboo, reeds, cane, rattan fiber, leaves and other forest materials is the leading manufacturing activity. Similar activities of manufacturing articles, fixtures, thatching and broomsticks from bamboo cane or leaves of palm, khajor or vegetables fibers are also adopted by the women. However second in importance is the manufacture of bidi a tobacco smoking devise which is facing curbs, officially and from consumers own health consciousness and the bidi industrty which involves female workers unevenly more is marked by low returns and poor work conditions(Verma and Rahman, 2005). On the other hand manufacture of utility and handicraft articles made from forest products has the potential of market expansion reaching the urban and possibly overseas households. In particular, the Government of India aims at promoting the Khadi and village industries (KVI) falling under small-scale enterprises. Tassar silk, which has similar properties as mulberry silk but is yet different is reared outdoors mostly by tribal and poor people has made its presence felt in the silk export basket of India (Shlagha, 2000). Collection and selling of Tassar cocoon, a non-wood product of forest is common among Santhals, Hoe Bhil and other tribes in Jharkhand, Chhattisgarh, Maharashtra and Orissa[2]. A 100 metre tassar fabric can ensure sustainable livelihood for one tribal family for a yesr, one spinner family for four months and one weaver for two months. Tourism is an area where women could have a greater role in the hospitability given adequate training in hospitality. The indigenous knowledge of medicinal properties of herbs and forest products is reflected in the significance of the medicinal activities and collaboration of drug companies in the organsed sector could be promoted.

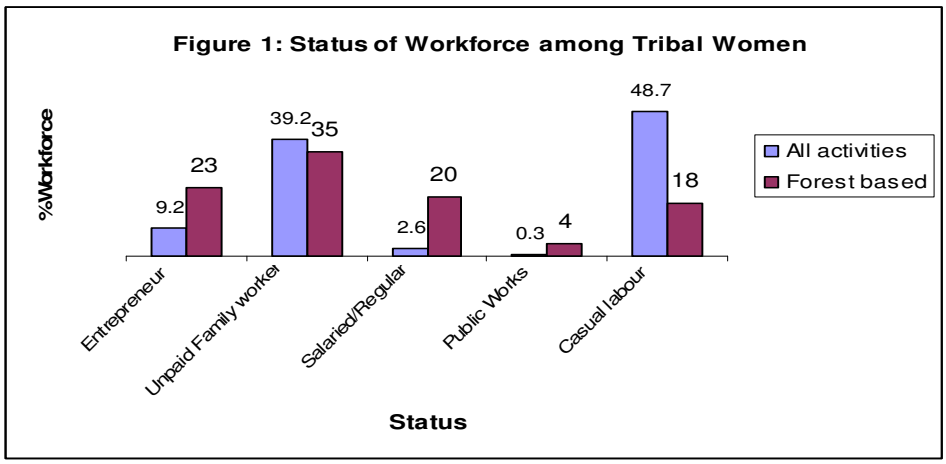
Table 5:-principal economic activities of tribal women related to forests

Activity	**Workforce share%**		**Gender share%**
	Female	**Male**	
Agriculture and forestry	**1.0**	**0.9**	**40**
Growing of timber, forest conservation and operation of tree nurseries	0.3	0.4	33
Logging and producing wood in rough (e.g. props, poles, pickets)	0.1	0	62
Gathering tendu leaves	0.1	0	56
Gathering other wild forest materials like balata, gums cork, lac resin, balsam, eel grass, acorns, mosses.	0.4	0.4	42
Forestry services, forest management including afforestation and deforestation	0.1	0.1	31
Manufacturing	**2.0**	**1.6**	**46**
Manufacturing Bidi (tobacco product)	0.5	0.1	77
Silk and other fibre based products	0.1	0.2	76
Manufacturing basket, storage bins, containers	0.8	0.5	54

[2] Temperate Tassar feeding on oak trees is found in sub-Himalayan areas of Manipur, Assam and Uttar Pradesh, China being a major producer.

of wood bamboo, reeds, canes, ratton, fibre, leaves etc			
Manufacturing of bamboo and canes articles and fixtures thatching, broomstick from reeds grasses etc	0.3	0.1	46
Manufacturing of articles from palm leaves , screw pine leaf khajor leaf, vegetable fibre	0.3	0.1	66
Tourism	**0.1**	**0.3**	**24**
Restaurant café, Travel agencies, Tour operator	0.1	0.3	23
Medicine	**0.7**	**0.1**	**84**
Activities related to indigenous Ayurveda and Unani	0.7	0.1	24

Considering the principal status of the women worker (Figure 1), entrepreneurship is more a characteristic of forest-based occupations in particular and unpaid family workers and casual workers are less the nature of women workers compared to the overall picture. Salaried jobs and government-regulated public works are also more amenable with forest-based occupations. Most of the activities identified are found either gender neutral or disposed towards women. Some women also work in subsidiary status. In fact subsidiary involvement is more observable in only agriculture and manufacturing. Considering both principal and subsidiary workers in forest related activities (table 7) agriculture and manufacturing employ 1.7% and 2.3% of workforce and as a whole the forest related activities engage less than 5% of total workforce. In the total workforce 3.2% are engaged in forest related industries in principal capacity and 1.5% in subsidiary capacity.



Since principal and subsidiary statuses reflect differing degrees of involvement an index of integration (IIF) is computed by counting all workers, giving a weight of 1.0 for principal status and 0.5% for subsidiary status and scaling by multiplying with 100 i.e.,

$IIF = (\sum PFi + 0.5\sum SFi) X\ 100$

Where PFi=1 if the individual i is employed in any forest related industry in principal status and PFi=0 otherwise and PSi=1 if the individual i is employed in any forest related industry in subsidiary status and PSi=0 otherwise. Intuitively this is the average person's intensity (times 100) of involvement with forest related earning activities.

In table 8, the all India average IIF is found to be 2.7 for women, slightly more than men. Ranked by women's computed IIF, the indices presented for states with sizable tribal population are found to vary from 6.5 in Orissa to 0.4 Rajasthan with Orissa, Madhya Pradesh and Andhra Pradesh being the top three states. The Himalayan states of the east are not among the highest ranking ones. In most states the index is not much different between men and women. However it is significantly higher for women in Orissa, Madhya Pradesh Chhattisgarh and lower in Karnataka, Jharkhand and Gujarat.

TABLE 6: INTEGRATION OF TRIBAL WORKING WOMEN IN FOREST RELATED ACTIVITIES

Industry	**Primary activity (principal workforce) %**		**Subsidiary activity (subsidiary workforce) %**		**Total (total workforce) %**	
	Female	Male	Female	Male	Female	Male
Agriculture	0.90	0.9	6.00	5.5	1.70	1.0
Manufacturing	2.00	1.6	3.50	1.9	2.30	1.6
Trading	0.00	0.0	0.00	0.0	0.00	0.0
Tourism/Recreation	0.10	0.3	0.00	0.0	0.10	0.3
Medicine	0.70	0.1	0.00	0.2	0.60	0.1
All	3.80	2.9	9.50	7.6	4.70	2.9
All (in total workforce)	3.20	2.9	1.50	0.1	4.70	2.9

Note: Principal and subsidiary workforces constitute respectively 89 and 0.8 percentages in men and 58 and 11 percentages in women.

TABLE 8: INDEX OF INTEGRATION OF TRIBAL MEN AND WOMEN WORKFORCE IN FOREST BASED ACTIVITIES:STATE WISE

State	Male	Female
Orissa	4.0	6.5
Madhya Pradesh	2.6	4.6
Andhra Pradesh	4.4	4.5

Karnataka	4.1	2.9
Chhattisgarh	1.0	2.6
Bihar	1.7	1.5
Jharkhand	3.5	1.7
Maharashtra	1.8	1.6
West Bengal	1.8	1.8
Sikkim	2.3	1.6
Meghalya-Nagaland-Mizoram	1.0	1.1
Gujarat	3.5	1.1
Tripura	0.6	0.6
Rajasthan	1.0	0.4
All India	2.6	2.7
Note: Arranged by women's Integration index.		

Linkages: Logistic regression results

In this exercise we have tried to identify the various socio-economic attributes that can be associated with the tribal people's forest-based employment. Such attributes can be related to the individual members or their households. The member's sex, age-group and education and the households economic class, sex of head and literacy level are viewed as possible influencing characters. The member's education and household literacy are used as variables in separate specification of models to avoid over-specification since member's literacy is implicitly included in household literacy. Given the informal character of forest dependency as opposed to organized sector employment and the poverty of the tribal population the household characteristics are possibly more relevant than corresponding individual attribute. Between specifications 1 and 2 in which member education character and household literacy are respectively considered our preference is for the specification 2. This is also confirmed by the predictive ability of specification 2 in general. For the tribal population additional models are also used to explain employment in forest-based agricultural activities and forest based manufacturing activities and the results reported for specification 2. The exercise is also conducted over the entire rural sample as a comparison and to bring out the association of the tribal people with forest-linked employment.

Thus, Binary logistic regressions using SPSS package estimated over the entire rural (adult member) data set and also controlling for tribal population. The dependent variable is binary, yes or no signifying whether member is employed in the forest dependent activity. Employment is based on principal status only in the regressions. . The percentages of correct predictions are reported as a measure of goodness of fit. This is obtained by setting the cut-point for probabilities at the median values since the data on dependent variables are highly unbalanced. Fifteen major states are used as additional control variables in estimating the equations, serving as proxy for the distance from the forest. Table 7 reports the coefficients with respect to the base categories, all the coefficients being significant. The exponentials in the parentheses signify the odds of occurrence which are more meaningful than the coefficients.

DEP= F-ALL, F-AG, F-MFG
F-All=1 if individual is worker in any forest based industry
=0 otherwise
F-AG=1 if individual is worker in forest based agricultural activity
=0 otherwise
F-MFG= 1if individual is worker in any forest based manufacturing activity
=0 otherwise
AGE=1 if age of member is equal or less than 59
=0 otherwise (above 59)
ILTHH=1 if no member in household is literate
=2 otherwise
LCLASS=1 if household owns no land
=2 if household owns land 2 hectares or less
=3 if household owns land more than 2 hectares
HSEX=1 if head of household is male
=2 if head of household is female
MEMSEX=1 if member is male
=2 if member is female
MEDU=1 if member is not literate
=2 if member is literate (non-formal) but not schooled
=3 if member is schooled
CAST=1 if household is scheduled tribe
=2 otherwise

Table 7:Logistic Regression for Linkages between Forest Based Employment and Socio-economic Attributes

Population			**All**		**Tribal**			
Dependent	**Particular**	**Base**	**F-ALL**	**F-ALL**	**F-ALL**	**F-ALL**	**F-AG**	**F-MFG**
Model			**1**	**2**	**1**	**2**	**2**	**2**
CAST (1)	Tribal	Non-tribal	.29(1.33)	.25(1.29)				
MEMSEX (1)	Male	Female	.34(1.4)	.39(1.5)	-0.19(0.83)	-.19(0.83)	-.31(.73)	-.03(0.97)
HSEX (1)	Male	Female	-.18(0.83)	-.19(0.83)	-0.07(0.93)	-.05(0.95)	.0.16(1.17)	-.07(0.93)
AGE (1)	15-59 Yrs	>59years	.57(1.8)	.61(1.8)	0.47(1.060)	.49(1.63)	.82(2.29)	.15(1.16)
LCLAS (1)	Land Less	Med/Larg.	1.9(6.7)	1.90(6.7)	1.17(3.21)	1.12(3.1)	-.35(0.71)	2.11(8.27)
LCLAS (2)	Small/ Marg	Med/ Large	1.4(3.9)	1.34(3.8)0	1.2(3.3)	1.18(3.2)	.61(1.85)	2.00(7.39)
HH1LT(1)	All	At least		-0.00(0.1)		0.31(1.37)	0.83(2.29)	.18(1.2)

	members Illiterate	one literate						
MEDU(1)	Illiterate	Schooled	-- .09(0.92)		.29(1.34)			
MEDU(2)	Non-formal	Schooled	.27(1.31)		.57(1.76)			
CONSTANT			-4.84	-4.9	-4.74	-4.84	-7.72	-5.84
% Predicted Correctly								
	Not dependent		50.4	53.8	52.0	51.9	51.9	50.4
	Dependent		75.3	70.9	73.3	76.6	86.1	85.1
	Overall		51.1	54.3	52.6	52.6	52.3	50.9

Note: Entries are coefficients and are all significant at .1%. Figures in parentheses are exponentials.

From the first two equations it is evident that tribal origin makes an individual likely to be employed in any of the forest based activity as specified. Considering other variables and the four sets of equations the results vary to an extent. It is interesting to find that women are less likely than men to be in any forest based activity for the entire population but among the tribal people gender implication is reverse.

For the tribal population the women are more likely to employed in forest activities and a man is only 0.83 times as likely as a woman. A member of any sex belonging to a woman headed household is also more likely to be employed in a forest-linked activity though the difference made by this household attribute is small. Members from medium and large land holding households prefer other alternatives but among the others members from households owning some land has a greater likelihood than a landless one. Although the landless and the small/marginal class member shows similar tendency there is thus some evidence of a positive influence of holding some land as opposed to none. Understandably the age between 16 and 59 has a greater likelihood than the senior ages. Specification 1 suggests that the activity is less common to schooled people but some education is desirable since the illiterate member has a lesser likelihood. Similar tendency was marked when the entire rural population was considered. However, more importantly, household illiteracy is associated positively with this involvement among the tribal people. Between agricultural and manufacturing type activities there is a great deal of variation. Age, sex, sex of household head, and household illiteracy make less difference in degree to the employment status in case of manufacturing than for agricultural and the direction is reverse in case of landholding of household. The small/marginal holders are the most likely in forest-based agro-employment while landless are actually least likely candidates but for manufacturing both landless and marginal/small holder show positive influence and though the likelihood as against base is similar, the landless has a higher coefficient.

Tribal women and manufacturing Enterprises

Women in India today will benefit in most cases from gainful employment both for economic betterment of their standard of living and more importantly as a way out of poverty and insecurity as also for their empowerment and recognition in home and society. Women's commitment to home such as caring of children and other constraints as also their ties to the soils may come in the way of their movement away from their

roots. With agriculture yielding little employment and income expansion opportunity their utter dependence on primary occupation is a matter of concern. Forests, if sustainably managed, can provide a materials for a wide range of activities from which tribal women could benefit as entrepreneurs.

Table 9:- Profile enterprises in forest related manufacturing run by tribal women	
Operating from own dwelling	92.7
Proportinatory or partnership with household members.	86.1
Keep no written account	91.3
Employing total of less than 6 workers	92.1
Employing higher labour	0
Using electricity for manufacture	0
Working under specification	42.9
Working under oral contract	77.2
Credit supplied	77

Considering manufacturing activities alone, the women are found to be operating in extremely informal ways with little support from elsewhere. Though women do operate as entrepreneurs in this activity, Table 9 shows that 93% of women entrepreneurs operate from own home without any demarcated work place, mostly in a proprietary or household based organization, 91% keep no written accounts, 92% employ less than 6 workers paid or unpaid and in fact no notable section employs hired labour. Electricity is not used for manufacturing activities. Contracts with more organized firms who provide specification however characterize 43% of the enterprises. Properly harnessed this could be a route by which modern ideas and information can flow in and in fact 77% of such enterprises get credit from the external agency too although majority of such contracts are oral activity.

Inclusive development, Gender balance and Sustainability

The high growth rates attained by the Indian economy can translate into development only if different marginalized sections get their shares of the gains from progress and take part in the economic transition in progress. The tribal people constituting approximately 10% of the total population make up some of the most deprived sections of India. The distinctive feature about the tribal people is their nearness to nature, specifically forests. Economic development not sensitive to the ecologies of their habitations and their special ties with the environment has alienated these people from main stream development and in many cases become cause of militancy and civil strife. Another marginalized category now a centre of global concern is comprised of women who disproportionately bear the responsibilities of home and earning in conjunction with social evils of exploitation and poverty in majority cases. The Indian government has now turned its attention to the development of women heeding their special needs and concerns.

Development of economic conditions can only be acceptable if the livelihoods are pursued in an ecologically prudent way. In other words, sustainability is an integral part of development particularly relevant when the resource base is forest. Women's

economic involvement has a crucial place not only because they spend their incomes with thrift and attention to families' welfare and sustenance but they are also likely to operate with caution against eroding the resources that sustain them.

Forests provide important benefits to the earth not only from timber and other products but by their ecological impacts on weather, soil, water, their carbon sequestering role and their function as a storehouse of biodiversity. Not of less importance is their natural beauty attracting tourists. Yet, short sighted exploitation of forests for current gains and clearing for agricultural uses have depleted forest cover in many parts of the earth. Although the local poor is benefited in the short run with paltry wage incomes or low productivity agriculture, deforestation, often irreversible, hurts their interests more seriously even in the medium term.

This study based on nation wide macro data on Scheduled Tribe people of India, find tribal women in India lagging in most indicators of development as are the states they dominate but occupied in high work participation in economic life. Unfortunately, like the average rural women in India and more so, they are engaged intensely in primary activities and almost entirely informally and often as unpaid family workers and worse still, as casual wage laborers who lack any security of earning. Women's role in their homes could be the practical reason for this limited orbit of their activity while the more mobile men migrate to earn. It is also disheartening to find that despite their physical and emotional proximity to forests they have a low level of formal integration with the industries related to forests that flourish anyway even in the modern economy. Even where they are, the activities are found to be managed in primitive ways. Other studies have found forest based activities by local people to be usually supplementary to cultivation, seasonal. catering mostly to local markets and linked to external markets through a complex system of intermediaries. With the expansion of market, transport and the progress of globalization, these enterprises are likely to face the risk of extinction due to competition from superior products that symbolise higher productivity and profitability. On the other hand there is a chance that some of the local enterprises, given the right opportunities and information will gain advantages from the changes to expand and reach markets in urban and perhaps overseas areas in a bigger way.

The joint forest management and recognition of the necessity for women's empowerment could be a starting point to integrate women's economic life moiré formally with the forests. This would ask for the creation of excellence in activities that use the existence of the forests and their products as ingredients. As of now, less than a paltry 5% of tribal women workers are found working in forest based sectors as identified from the list of industries reported and among them manufacturing seems dominant. Here women even have an edge over their male counterparts. This paper also identifies some of the industries in which the women are involved. The viability of these industries could be judged by the social and economic values of the time and those with promise could be promoted further while the activity range could be broadened with some replacements by improving opportunities. Women could be encouraged to build up enterprises in their areas of expertise and generate employment and this could go a long way transfer access to earning and ownership of productive assets to women in a sustained manner.

To build up enterprise as also to induct more women into quality employment on the merit of their expertise in the area there is need for a strong extension service. Modern satellite based communication technology and coordinated interactive sessions within

and across communities could be used to impart technical and managerial up-gradation in a specialized way relevant to their circumstances and advantages. Adequate access to power, credit, marketing facilities as well as better property rights could supplement the information based training to bring out the entrepreneur in this hard working community. Above all, awareness of the value of forests should be relentlessly fostered and strengthened for the sustainability of natural resources and their tribal women's own development.

Many of the activities found to be taken up by women by this study are based on forest products but do not require felling. Silk, medicine, crafts and tourism are industries that can make gainful use of forests, thrive on their sustainability, provide economic opportunities in modern market economy and need not demand felling or damage. In fact successful integration into such forest dependent activities would motivate the tribal families to desist from selling fire wood and cutting trees. Even involvement in timber or wood based industries can be run with sustainable techniques know. Since the tribal people's own future welfare is connected with the conservation, more than traders and entrepreneurs from outside the regions who might move on, involving them directly in the management and ownership supplemented by training and awareness programmmes could be a prudent strategy. Besides, products from tribal women's sustainable enterprises are likely to face favourable treatment from investors and consumers if appropriate certification and labeling are designed (World Bank 2003). Above all, the national and international negotiation processes need to be sensitized of the need for development of the women and the tribal people and for a market with a special the place for the products of hard work and eco-sensitive enterprises of the people aspiring for development in a beautiful world.

Concluding remarks

The Tribal population constituting 10% of India's rural population lives closer to the forests and is more likely to gain economically from the forest resources than the rest of the populace. While the forest policy debates world over is a subject concerned with environmental conservation, the integration of conservation with the aim of modern economic development can help to promote inclusive growth, gender empowerment, social harmony and above all also provide necessary incentive for sustainable forest management. There is a need to consider various wood based and non-wood based activities, their demands on forests and best practices for sustainable management and ways to make economic and long term gain through modern management, technology and marketing techniques.

Appendix

1. The growing threat of militarism is tribal pockets of India in the times of economic positivism has much to do with the development and access to forest resources. Some recent reports in the reputed new papers highlight the seriousness of the problems and the remedial attempts.

Excerpts

Economic Times Friday 14 April 2006

'The Government admitted that its writ no longer ran in parts of 160 districts affected by .. extremism… States like Chhatisgarh demanded special attention to these areas to

drive away the feeling of alienation of locals. Interstingly Mr Singh (the Prime Minister) called for stern policing to reign in the menace but he sounded a word of caution against 'brutalisation of the state'… local tribals themselves could be involved in these (development) schemes and not only should they be given the rights to use forest produce but also some kind of certificate of ownership should be handed out..'

Hindustan Times May 14, 2006
'All inclusive and Sustainable. There are the new catchwords which will dominate the industrial policy .. The contours of the new industrial policy are being prepared by bringing key stateholders into the equation. The industrial associations have approved the government's new look affirmative action plan for a more sustainable manufacturing led growth strategy. At the kernel of the new policy is employment generation.

Hindustan Times May 14, 2006.

'Gradually the crowd swells in the clearance amid the Dandyakaranya forst-then comes the song of rebellion – the audience: 600 odd tribal men, women and children breaks into applause ..Naxal guerillas armed with self loading guns and 303 rifles are sprinkled in gathering… they showcase the evils of mining planned by the Chhattisgarh government. The fear of displacement is spreading among tribal population … fear new roads and railway links will lead to displacement.. spoil the fragile ecology of the region.'.

**

2. The British had faced rebellions when they curbed tribal people's access to forests. They subsequently delineated special 'Scheduled Areas' for the Tribals. The Government of India in 1935 categorised the Tribal as those belonging to the North east and others. After independence 532 Tribes were put down on a scheduled list and special rights of protection were given to prevent erosion into their culture and identity and special provisions were made for their development under the Indian Constitution. It may be noted that there are other non-schedule and de-notified tribes in various regions raising questions of exclusion. In general the Himalayan tribes such as the Nagas, Mizos and Bodos stand out in respect of their geography and their remoteness from mainland India while the tribes of central India in Madhya Pradesh, Bihar and West Bengal that include the Santhals, Gonds, Oraons and the tribes of Karnataka, Maharashtra and Andhra Pradesh are plain tribes with different economic and social identities.

3. Sample sizes (members) in NSS data for analysis
All (Rural) 3,72661
All Adult 2,29754
Tribal (ST) 52078
Tribal Adult 31,298
Tribal Adult manufacturing entrepreneurs 169

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[i] Note : The market systems evolved around rural forest based activities involving tribals and middlemen, may be inefficient and unsustainable in view of the risks, product perishability and scattered sources but need not be exploitative in favour of the intermediaries in the sense of exorbitant profits for middlemen .

APPENDIX

TABLE 1A: FORESTS, TRIBAL POPULATION AND DEVELOPMENT IN INDIAN STATES								
	Total	ST	ST	Forest	ST	Forest	Per capita	Literacy
STATES	Population	Population	Dominance	Area	Population	in Geog. Area	Income-ratio	rate
	State share (%)		index	State share (%)	inState(%)	(%)	to India %	%

MADHYA PRADESH	5.86	14.52	1.93	11.31	20.23	25.08	108.90	58.10
MAHARASHTRA	9.42	10.24	0.74	6.95	8.88	15.44	211.73	70.80
ORISSA	3.58	9.64	2.00	7.14	22.01	31.34	81.80	60.40
GUJRAT	4.93	8.93	0.45	2.21	14.79	7.70	175.02	58.50
JHARKHAND	2.61	8.45	1.27	3.31	26.39	28.36	86.39	
RAJASTHAN	5.49	8.45	0.44	2.40	12.57	4.79	122.20	55.90
CHHATTISGARH	2.02	7.86	4.08	8.26	31.73	41.72	97.46	
ANDRAPRADESH	7.41	5.95	0.88	6.53	6.56	16.21	139.36	55.30
WEST BENGAL	7.79	5.24	0.20	1.57	5.49	12.06	139.51	64.10
KARNATKA	5.13	4.17	1.06	5.42	6.63	19.29	155.99	59.70
ASSAM	2.59	3.93	1.57	4.05	12.41	35.33	91.05	60.90
MEGHALYA	0.23	2.38	9.79	2.28	83.33	69.64	113.18	57.00
NAGALAND	0.19	2.14	10.02	1.95	90.00	80.12	117.97	63.00
TRIPURA	0.31	1.19	3.34	1.04	31.25	67.62	123.59	70.20
JAMMU KASHMIR	0.97	1.19	3.19	3.10	9.99	9.54	115.90	48.20
MIZORAM	0.09	0.95	29.29	2.56	88.89	82.94	139.65	80.50
BIHAR	8.07	0.90	0.10	0.83	0.92	6.05	45.08	44.40
ARUNACHAL PRADESH	0.11	0.83	93.11	9.95	63.64	81.24	125.07	48.30
MANIPUR	0.21	0.83	11.57	2.47	31.82	75.78	119.16	65.30
TAMILNADU	6.06	0.71	0.52	3.15	0.96	16.54	174.44	66.70
KERALA	3.09	0.48	0.74	2.28	1.26	40.10	165.88	90.10
UTTRANCHAL	0.83	0.36	2.43	2.01	3.53	5.69		62.00
HIMACHAL PRADESH	0.59	0.24	3.56	2.11	3.28	25.85	166.60	74.40
SIKKIM	0.05	0.13	8.93	0.47	20.37	45.07	138.17	67.70
UTTARPRADESH	16.15	0.12	0.22	3.50	0.06	44.67	87.33	53.70
GOA	0.13	0.00	2.43	0.31	0.00	56.76	417.88	79.60
HARYANA	2.05	0.00	1.21	2.49	0.00	38.46	201.86	63.80
PUNJAB	2.36	0.00	0.15	0.35	0.00	4.76	217.82	65.20
INDIA	100.00	100.00	1.00	100.00	8.16	20.55	100.00	59.20
Data are arranged by State share of Scheduled Tribe (ST) Population.								