Interrelationships between indigenous traditional livelihoods and biophysical environment of Narmada River, India.

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Abstract

Experts opine that indigenous traditional livelihoods get threatened due to degradation of biophysical environments. Biophysical environment of river Narmada has been supporting numerous traditional livelihoods, which are at risk of extinction due to urbanization and other activities such as mining, damming, deforestation etc. This study maps the indigenous livelihoods and identifies how they relate to the biophysical environment.

For this purpose, Narmada river basin has been subdivided into seven physio-geographical zones which are again subdivided into subzones. The diverse livelihoods of the region include communities making Dona Pattal (leaf cup and plates), lacquer toys, weavers etc. with the traditional knowledge of the craft and livelihoods and were dependent on natural resources of the river basin. The three steps of the research included (1). Understanding the biophysical region of the Narmada river through a documentary survey (2). Identification and enlisting of livelihoods of central Narmada sub zone and their spatial relationship with the river, (3). Correlating livelihoods and geo-morphological regions and studying changes in household numbers in relation to change in landscape. The diversity of livelihood in each physio-geographic zone is identified and the present change in their number is studied from old records.

Livelihood in the selected zone was mapped based on secondary sources and field visits. In conclusion, the paper identifies the landscape types supporting the maximum number of livelihoods. It also shows how the livelihood pattern is changing with the environment of the zone.

Keywords: Narmada, traditional livelihoods, biophysical environment, riparian zone, indigenous communities

Introduction

Narmada river is considered the lifeline of Central India as it is a perennial river which provides water to three states in India. Changing natural and social cultural environment is threatening diverse livelihoods of many riverine ecosystems.

A river provides numerous resources for survival and sustenance of communities. As the global water resources deplete due to pollution and reclamation, the associated livelihoods get affected. Riparian areas are dynamic components of the landscape that promote many ecosystem functions vital to the health and productivity of watershed landscapes. They directly and indirectly support the communities by providing them a resource base. A threat or degradation of riparian ecosystem also threatens the multiple livelihoods associated with it. This study discusses these interrelationships in the context of River Narmada in India.

Literature Review:

The river plays a central part in the livelihoods of rural people and is an important resource for food and water security (Piesse, 2016). Globally, some 70 percent of available freshwater supplies are currently used for agriculture. Over a billion people are employed in the fisheries, agriculture and forestry sectors alone, the last two representing some of the sectors most threatened by freshwater disruptions (ILO, 2013a). In addition to jobs in agriculture and industry, sectors with heavily water-dependent jobs include forestry, inland fisheries and aquaculture, mining and resource extraction, water supply and sanitation, and most types of power generation (Water and Jobs, 2016;Narmada Basin, 2014). Many significant researches (Cook, 2016) are trying to study the link between poverty. However, the interrelationship is complex.

Research gaps identified in the symposium of urban stream ecology (SUSE III, 2014) have discussed the need to address socio-cultural impacts on the river basin as there is heterogeneity in urban stream syndrome, which results in stream homogenization. Few studies discuss the connection of the community and the natural resources of their habitat. The health of a river landscape is directly related to the condition of the riparian, which in turn is dependent on the components of the riparian landscape viz. the forests, the point bars, flood plains etc. They also act as a major socio-economic resource to the people living nearby, thereby leading to a complex and region-specific interaction of natural processes with human activities that are driven by economic, social and environmental forces and values. A healthy riparian provide a base for numerous and diverse livelihoods, whereas degraded riparian zones lead to the loss of many livelihoods. Their identification and mapping is essential to conserve them and strengthen the economy.

Rural communities consider the rivers as lifelines or as River deities which provide them with the enormous resource base. Livelihood is defined as a set of activities, involving securing water, food, fodder, medicine, shelter, clothing and the capacity to acquire above necessities working either individually or as a group by using endowments (both human and material) for meeting the requirements of the self and his/her household on a sustainable basis with dignity. The activities are usually carried out repeatedly. [1] For instance, a fisherman's livelihood depends on the availability and accessibility of fish. Traditional occupations are still the chief sources of livelihood of most indigenous peoples in Asia (Tamayo, 2010). These livelihoods have acquired skills and livelihoods based on the biophysical environment. For examples, tribes living in the forest are dependent and have traditional occupational knowledge based on the particular forest.

Table 1: Landscape components of riparian and associated livelihoods: Source: Author 1

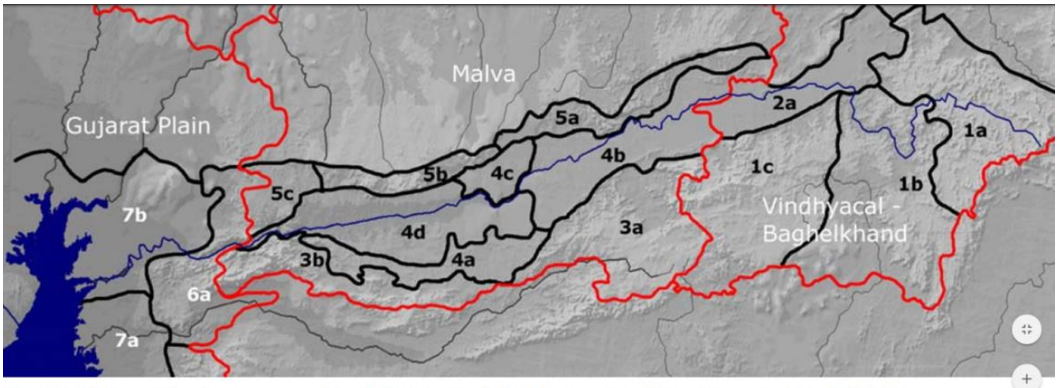
No	Types of Landscape	Associated Livelihood
1	Riparian forest	Fuel wood collectors, wood toymakers, honey collectors, lac collectors, medicinal herbs, toy makers
2	Grasslands	Grazers, Basket weavers
3	River	Fishermen, Ferries, sand mining, divers, Dyeing, potters
4	River edges	Temples, Cremation activities, Recreation, Religious activities, restaurants, fire wood sellers, fruit sellers, bead ornaments sellers, stone craft sellers, tea stalls, sugarcane juice stalls etc.
5	Point bars	Farming of watermelons, cucumbers etc.
6	Stony edges	Mining, sculptors
7	Plateaus	Farming of rice, wheat, pulses, vegetables etc.
8	Slopes	Forests and farming
9	Flood plains	Farming (Intensive agriculture, plantations), weaving, leather workers and other different communities

Methodology:

The research was carried out in three steps as follows. Livelihood oriented surveys were conducted to identify the current status and stress on individual livelihoods. Samples were selected from different districts on the river basin based on different ecological regions of the Narmada river.

A survey questionnaire was prepared to identify the diverse livelihood in the region. A geographic sampling was done which led to the identification of study areas viz Mandla from Upper Narmada region, Jabalpur from Middle Narmada and Barwani from Lower Narmada valley. The survey was carried out in the villages on the banks of the river Narmada. The change or shift in livelihood practices was also identified by these surveys. A total of 30 respondents were surveyed which practiced different livelihoods in the region. Numerous visits to the site during different periods between 205 to 2018 were conducted by the authors. Further, households were identified form the villages neighboring the river.

1. The characteristics of Narmada basin were identified by a documentary review and field visits. Visual and field studies led to the identification of features of the study areas. Photographic documentation of the area was done.
2. Primary data was collected from various field visits and secondary data from Government departments. The traditional livelihoods are identified by extensive documentary survey of historical documents, Gazetteer's, books etc. This was followed by the identification and mapping of livelihoods: These were then mapped and studied on their lateral and longitudinal positioning in the watershed.
3. Correlating livelihoods and geomorphological regions and studying changes in household numbers in relation to change in landscape: The geo-morphological zones were mapped with different livelihoods. The diversity of livelihood in each zone was identified and the present change in their number was studied from old records.



Map 6: Major and minor geographical divisions of the Narmadā valley. (Source: Singh 1979)

(Regions 6/7)	(Regions 3-5)	(Regions 1/2)
6: Eastern Hilly Region	**3: Western Satpuras**	**1: Chindvara-Maikal Plateau**
6a: Narmada-Tapti-Tract	3a: Kalibhiti-Betul Region	1a: Maikal Plateau
	3b: Rajpipla-Asirgarh Region	1b: Balaghat-Mandla Region
		1c: Chindvara Plateau
7: Khambhat Region	**4: Narmada Trough West**	**2: Narmada-Son Trough**
7a: Khambhat South (Surat)	4a: Nimar Upland	2a: Narmada Trough
7b: Khambhat North (Vadodara)	4b: Hoshangabad Plain	
	4c: Dhar Upland	
	4d: Nimar (Maheśvar Plain)	
	5: Western Vindhyas	
	5a: Kanar-Sindhore Tract	
	5b: Uri-Kanar Tract	

Fig. 1: Major and minor geographical divisions of Narmada Valley
Source: Author 1

Findings: Biophysical character of river Narmada

River Narmada is the lifeline of Central India. It is a major perennial source which provides drinking water, fishes, water for irrigation of farms, dense forests, rich plains and plenty of other sources which are the means of survival and sustenance for the people living in the region. The entire length of the river is considered sacred and holy and has many myths and stories associated with it. Agriculture and fishing are the most common occupations in the valley region (Baviskar, 1995).

Narmada valley: The valley lying between Vindhyans and Satpura is much wider often extending to 250 km. The Deccan trap lava outpoured into the basin during the Mesozoic era consists of alluvium (Sankhyan1, 2012). The deposits in the upper part consists of Clay, Gravel and `Kankar' and calcareous concretions. The mean height of Narmada Valley is 300 m. Geologically, the valleys of the Narmada flows through the only real Rift valley of India running from East to West along the course of these rivers. The rift valley has the oldest rocks in the world belonging to Precambrian and Paleozoic age (Badam, 2007) .

Narmada basin extends over an area of 92,672.42 Sq.km and lies between east longitudes 72° 38‘ to 81°43’ and north latitudes 21° 27’ to 23° 37’ which is nearly 3% of the total geographical area of the country. The basin is bound on the North by the Vindhyas, on the East by the Maikala range, on the South by the Satpuras and on the West by the Arabian Sea. Narmada basin has been divided into physiographic divisions. These are (1) the upper Narmada basin (2) the Central highlands (3) Broach-Baroda plains (4) the Satpura range and (5) the Vindhyan range. (Buch, 1991)

The alluvial track up to the cast of Handia (Dist. Hoshangabad) is spread over 320 km length and 80 km wide to the West of Hoshangabad. Near Handia, Narmada enters the intensely rocky area up to 65 km length. The second part of the Narmada valley is called the Nimar plains or Mandleshwar plains. In the middle of the Mandleshwar plains at Maheshwar the river loses height by 6.7 in at Sahasradhara falls. Narmada Estuary from Rajpipla down to Broach the plains have a gentle slope and the river drips 15 m height over a distance of 135 km of its flow at this stretch. It divides into two branches before joining the Gulf of Cambay.

Findings: Identification and mapping of livelihoods:

Traditional livelihoods practiced in the region were identified from the primary surveys and secondary literature. The Narmada valley civilizations had a unique community-based livelihood system, which was dependent on the landscape and centered on River Narmada. The mapping of these livelihoods was done in watershed with respect to the river (Zone 1: The river and flood plain, Zone 2: The adjacent land, Zone 3: Uplands). Agriculture and fishing are the most common occupations in the valley region. Some of the livelihoods (farming, fishing, ferrying etc.) directly harnessed the natural resource while some others such as barber serve the human resource of the region.

Community specific livelihood traditions are common to this region whose nomenclature varied regionally. Following are common livelihoods.

Baretha (a washer man),
Bhoyar (Bhoi or bearer),
Rawat (herdsman),
Barhai (carpenter),
Malia (Mali or gardener),
Dhakar (Vidur or illegitimate Brahman),
Bhandari (barber),
Pardhan (Gond),
Mankar (title of various tribes),
Sahara (Saonr),
Kanderi (turner),
Agri (Agarwala Bania),
Baghel (a sect of Rajputs),
Elmia (from Velama, Telugu cultivators),
and Chalki and Ponwar (Chalukya and Panwar Rajputs) Rawats (herdsmen)
((Baviskar, 1995)Russell, 1916).

Poojara lead the prayers that involves nature worship of Kalm (Kadamb) and Sal (teak) pillars as well as the grains. Mining and iron smithy: The iron of the weapons is forged from the native ores in the hills by a tribe called as Agariyas. They made the axes, sickles and other iron instruments.

Figure: 1 Budni Ghat, The Budni craftsmen, have been practicing the craft for generations, belong to the Vishwakarma community.

Figure 4,5 Narmadeshwar Shivling , prakritlingam sellers Narmada Stone are Swayambhu Shiva Lingas that have taken shape in theSacred Narmada River collected by Kevat community

3. 3. Correlating livelihoods and geomorphological regions and studying changes in household numbers in relation to change in landscape:

There used to be more than 100 indigenous livelihoods in the Narmada basin as discussed in Gazetteers, and records of the region. The biophysical region, soil type, vegetation type, and transport networks affected the nature of livelihoods in a region. The nature of indigenous economy was primarily subsistence hence sustainable. A detail description of livelihood zones, vegetation types and major livelihoods found is discussed in table 2. It is seen that the forested areas and hill spurs of Vindhyas and Satpuras were mainly covered in forests and were occupied by the tribal communities.

Table 2: Livelihood and their location in riparian zone;
Source: author 1

No	Livelihood	Community/ caste	Lateral	Longitudanal	Number of households
1	Fishermen	Kevat/ Kachar	Zone 1		
2		Fresh water fishes		Upstream, Midstream	Decreasing
3		Salt water fishes		Lower stream	Decreasing
4	Boatmen, ferry to cross the river (reduced livelihood after construction of cross over bridges)	Kevat	Zone 1	Upstream, middle stream, lower stream	Decreasing
5	Milk products, dudh, ghee, mawa	Ahir, Yadav	Zone 2, 3	Middle stream, lower stream	Increasing
6	Tribal agriculture (utera, bewr, nevad)	Baiga, Gond, Patel, Bhariya, Korku	Zone 2, 3	Up, Middle, and lower	Decreasing
7	Malis (flowers and other crops)	Mali community	Zone 2,3	Middle, and lower	Decreasing
8	Collectors of forest produce	Teak sal and Salai forest	Zone1, 2	Upper, Middle and lower	Decreasing
9	Collectors of Mangrove produce	Mangrove		Lower Narmada	Decreasing
10	Intensive Agriculture		Zone 2	Middle	Increasing
11	Rawat (herdsman)		Zone2, 3	Middle and, lower Narmada	No change
12	Baiga vadiya	Baiga	Zone 3	Upper Narmada	Decreasing
13	Bhumkas (local vaidya)	Bhariya	Zone 3	Middle Narmada	Decreasing
14	the Ojhas or soothsayers		Zone 3	Middle and lower Narmada	Decreasing
15	Nai		Zone 3	Up, Middle, and lower Narmada	No change
16	Chamar	Chamar	Zone 3	Up, Middle, and lower Narmada	Decreasing
17	Kumhar potters		Zone 3	Up, Middle, and lower Narmada	Increasing
18	Banskar (make bamboo baskets, etc.)	Banskar reside in banskhedis	Zone 3	Up, Middle, and lower Narmada	Decreasing
19	Baretha (a washerman)		Zone 3	Up, Middle, and lower Narmada	Decreasing
20	Budni Lacquer Craft	Vishwakarma	Zone 2	Up, Middle, and lower Narmada	Increasing
21	Bamboo craft	Baiga, Mandla		Up, Middle, and lower Narmada	
22	Solahas				Decreasing

23	Narmadeshwar Shivling		Zone 1	Middle Narmada	Increasing
24	Soap Stone sculptures		Zone 1	Middle Narmada	Increasing
25	Orange/red Vermilion, sandal powder		Zone 1		Increasing
26	Pujari / Panda Bramhin , Naramdev Brahmin	Religious ceremony Mundan Abhishek	Zone 1	Up, Middle, and lower Narmada	No change
27	Bramhin	Hindu cremation	Zone 1		No change
28	Tribal heads				
29	Teer Kaman	Bhil community	Zone 1,2,3		Decreasing
30	Nandna printers			Lower Narmada	
31	Bagh printers		Zone 2,3	Middle Narmada	
32	Maheshwari cotton, silk		Zone 2,3	Middle Narmada	Increasing
33	Silk weavers		Zone 2,3	Middle Narmada	Increasing
34	Hunting/ gatherers, farmers	Korku, baiga, gond, Bhil, Bhilala	Zone 1,2,3	Up, Middle, and lower Narmada	Decreasing
35	Lohar shilp, wrought iron	Muria	Zone 2,3		Decreasing
36	Gakkad bharta, tea stalls, samosa kachori		Zone 2	Up, Middle, and lower Narmada	Increasing
37	Pooja samgri		Zone 2	Up, Middle, and lower Narmada	Increasing
38	Fruit sellers, sugar cane juice, lemon juice		Zone 2	Middle, and lower Narmada	Decreasing
39	Dhanmurti			Middle, and lower Narmada	Decreasing
40	Jute craft			Up, Middle, and lower Narmada	Increasing
41	Wood craft			Up, Middle, and lower Narmada	No change

Analysis and Discussion

Agriculture and terrain:

Agriculture is carried out differently in the various regions owing to soil type, climatic variations and topographic variations. The traditional tribal agriculture is followed in many parts of the basin. There are indigenous systems, which responded to the terrain developed in these regions, namely;

(1)Utera in Hoshanagbad;
(2) Benwar in Dindori by Baiga tribe;
(3).Nevad in Anjanwara and many more.

The farm lots were planned parallel to the flow of water to the river. These farms are edged with embankments, which hold water during rains and allow it to percolate. Traditional farming was done with the help of bullock carts or iron plows, which did not require levelled farms. Changing of agricultural equipment's to tractors and mechanical devices require the land to be flattened. Farming is generally done for Dhan, Jowar, Maize,

Tuar dal, Kondu, Kutki, and Moong which are less water intensive crops,(Dogra, 1983). The farming pattern is changing towards intensive farming and cash crops. (Bharat Dogra, 2016)

Table 3: Physio-geographic regions and the prominent livelihoods.
Source: author 1

Regions	Types of forest	Livelihoods
Chhindwara Maikal plateau		
Maikal plateau	Sal forests	Forest based livelihoods (hunters, Tusser silks, farmers, herb collectors and sellers etc, Fishermen etc.
Balghat Mandla region	Grasslands	Grazers, pastoralists, Potters, herb sellers, Artists, metal crafts etc
Chhindwara plateau	Grasslands and forests	Grazers, pastoralists, Potters, herb sellers, Artists, metal crafts etc
Narmada trough	Riparian forest, grasslands	Fishermen, Eco tourism, stone crafts, pastoralists etc.
Kalbhiti Betul region	Forest	Forest produce, potters, dhokra craftsellers
Rajpipla Asirgarh region		Pastoralists
Nimar upland		Pastoralists
Hoshangabad plain	Farmlands	Farmers, forest produce collectors, toy makers etc.
Dhar upland	Scrubland	Dyers, block printers
Nimar (Maheshwar plain)		Weavers, dyers

Hills known as (syn, Dongur, Mata, Bulla) were forests and had thin soil not suitable for agriculture. Tribal communities resided in these regions and had rural settlements with subsistence economies. Forest-based economy flourished in this region. Forest produces such as the riparian forests (Teak, Sal, Salai) have been used for extraction of medicinal plants, from forest resources such as Bauchinia lanzan, fuelwood, Anjan, wax, Mahua, Bahunia vahili etc.

Valley or low ground (Neechwas, Daab, Borro) were planted with flood tolerant species and plantations (sugarcane, banana).

Ravines (Khudda, Kori, Lor) resulted in degraded alluvial tracts devoid of natural grasslands and scrublands and eventually transformed to wastelands. Plains (Khalotee, maidan, Sehwan) and Plateau (Mal, Dadur, Tor) had farms with rich alluvial soils and brought great produce of wheat, dals and eventually were heavily converted to intensive farming areas.

Table 4: Livelihoods and their occurrence in different geomorphological regions of Narmada basin in Madhya Pradesh
Source: Author 1

	Upper Narmada valley		Middle Narmada valley		Lower Narmada valley	
	Anupur, Mandla, Dindori	Jabalpur, Seoni, Narsinghpur	Chhindwara, Hoshangabad	Harda, Sehore, Raisen, Indore	Khandwa, Khargone, Barwani, Dhar	Alirajpur
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Agriculture						
Rice	1	0	1	1	1	1
Tribal farming	1	0	0	0	1	1
Dal (pulses manufcturing)	1	1	1	1	0	0
Tel ghani (sarson, til etc)	0	0	1	1	1	1
Milk products	0	1	1	1	1	1
Dehusking and crop processing	0	1	1	1	1	1

Phool kheti (Marigold farming)		1	1	1	1	0
Vegetable farming	1	1	1	1	1	0
Kachar kheti	0	1	1	1	1	1
Wheat cultivation	0	1	1	1	0	1
Plantation	0	0	0	1	1	1
Chilli farming	0	0	0	1	1	1
Banana Plantations	0	0	0	1	1	1
Sugarcane plantations	0	0	0	1	1	1
Pappaya farming	0	0	0	1	1	1
Sunhemp rope	1	1	1	1	1	1
Jaggery factory	0	0	1	1	1	1
Total	5	8	11	16	15	14
Forest dependent livelihoods						
Bans Daliya (baskets of bamboo)	1	1	1	1	0	1
Bidi rolling	0	1	1	1	0	0
Forest produce	1	0	1	1	0	1
Jewellery bead making	1	0	1	1	1	1
Elephant care takers (Mahawat)	1	0	1	0	0	0
Snake charmers	1	1	1	1	0	0
Madari	1	1	1	1	0	0
Ayurvedic drug manufacture	1	0	1	0	1	1
Dona Pattal (leaf plates)	1	1	1	1	0	0
Wooden furniture	1	1	1	1	0	1
Wood sticks	0	1	0	0	0	0
Bullock cart wheels	1	1	1	1	1	1
Wooden toys	1	1	1	1	0	1
Lac angles production	1	0	1	1	0	1
Cotton ginning	0	0	0	1	1	1
Cotton farming	0	0	0	1	1	1
Teer Kaman	0	0	0	0	1	1
Comb preparation	1	1	1	1	1	1
Jhadu, Chatai,Tokri	1	1	1	1	1	1
Lac bangles production	1	0	0	1	1	1
Rope , broom manufactuing, Bamboo and cane works	1	1	1	0	1	1
Chatai , baskets	0	0	1	0	0	0
Total	16	12	17	16	10	15
Weavers, dyers, cotton ginning						
Weavers	0	1	1	1	1	1
Dyers (Rangrez)	0	1	1	1	1	1
Tusser and Kosa silk production	0	1	1	1	1	1
Lacquer wood work	0	0	1	0	0	0
Natural color preparation	1	0	0	1	1	1
Cotton weaving and blankets	1	1	0	0	0	0
Total	2	4	4	4	4	4
Earthwork, metallurgy, mining, wood craft						
Wheels of Bal gadi (Bullock cart)	1	1	1	1	0	0
Broom making	1	1	1	1	1	1
Earthen pot making (Kumhar)	1	1	1	1	1	1
Roof tile making	1	1	1	1	1	1
Terracota artifacts	1	1	0	1	1	1
Structural clay products (bricks, tiles)	1	1	1	1	1	1

Leather shoes	1	1	1	1	1	1
Livestock rearing	0	1	0	1	1	0
Sheep	0	1	0	1	1	0
Goats	0	1	0	1	1	0
Leather and leather products	1	1	1	1	1	1
Agricultural implements	1	1	1	0	0	0
Lime production	0	1	0	0	0	0
Ironsmithy	1	1	1	1	1	1
Cement factory	0	1	1	1	0	0
Silver and goldsmithy	1	1	1	1	1	1
Brass work, Kaskut (Brass and Zinc) Bronze Kaansa utensils	1	1	0	0	0	0
Mining	1	1	1	1	1	1
Sandstone Quarrying	0	1	1	1	0	0
Iron implements (Tonga axle, sarota, kisni,safa)	0	0	0	0	0	0
Bell metal ornaments	0	0	0	1	0	0
Banduksaji	0	0	0	1	0	0
Fishermen	1	1	1	1	1	1
Water dependent						
Panda pujari	1	1	1	1	1	1
Snake charmers	1	1	1	1	1	1
Soap industry	0	0	0	1	1	
Lacquer craft (polished wood, toys, ornamental wood work	0	0	0	1	1	
Jewellery boxes	0	0	0	1	1	
Gota kinari manufacture	0	0	0	1	1	
Lac bangles				1	1	0
Bead work	1	0	0	0	1	1
Total	40	46	48	61	50	47

The Upper Narmada valley has the maximum diversity of indigenous livelihoods because of hills and forests. The river-based livelihoods are also abundant. However less commercial farming is practiced due to undulating terrain and numerous tribal settlements.

The middle Narmada valley because of plains has been greatly exploited for farm based livelihoods. The shrinking of forests has resulted in migration of livelihoods of families dependent on forest resource. Access to transportation routes was also one of the causes why certain livelihoods thrived more than others in the region. Proximity to urban areas like Indore and Mumbai led to a diverse economy in this region.

The lower Narmada valley has hills and arid climate and hence less water intensive agriculture are practices. The hills are bare without soil and no more can support forests.

Table 3: Summary of livelihood types and threatened livelihoods
Source: Author 1

Livelihood types	Number	Threatened
Farm land based	21	3
Forest and scrubland dependent	24	13
Cotton ginning and weaving	6	1
Miscellaneous related to leather work, earth work, and mining and metal work	36	12
Service providers (Pujari, panda, barber, well diggers, fuel wood collectors etc.)	11	4
Total number	98	34

The rich forests give rise to forest-based livelihoods and tribal sustenance. The soil in the slopes is thin and is barely able to support forests. The shrinking forests are threatening the livelihoods associated with them. There existed around more than 100 different livelihoods in the basin out of which farming-based livelihoods were around 21 in number owing to different cropping styles. The rich forest base supported around 24 different livelihood types (Lacquer toy makers, dona pattal makers etc). The forest-based livelihoods suffer from the reduction of the forest-base and the lack of new technology to compete with new products. Due to urbanization and fast development, the traditional knowledge on the use of forest resources by the tribes is dwindling. (Islami,2015). The unsustainable extraction resources from forests are another resource, which has affected the resource base of forest-based livelihoods. The river-based livelihoods are also affected by polluting water and decreased water flows.

The causes of decrease of forest-based livelihoods included

1. Lack of knowledge of indigenous species;
2. Exclusion of local communities in development;
3. Lack of modern technology;
4. Lack of storage facilities for finished products.
5. Increase in wasteland area as a result of deforestation, intensive agriculture.
6. Ineffective Government policies is one of the reasons,
7. Reduction in area of Nistar (village owned forests is one of the reasons).

Conclusion:

The livelihood culture is directly dependent on landscape resources. People of Narmada valley greatly respected the river and the landscape and built and worked in harmony with the environment, thereby creating a rich livelihood culture. A change in the landscape resources also threatens the numerous livelihoods associated and the intangible heritage. The increasing ravinous lands, and decreasing forests have greatly affected the forest based livelihoods. The centuries-old forests safeguarded different communities and livelihoods. Excessive degradation of forests and scrublands have affected around 45 forest-based livelihoods adversely. The causes need to be identified individually. The remaining households should be conserved. There are more than 100 traditional indigenous livelihoods in the Narmada river basin. A third of traditional livelihoods are on the verge of extinction or already extinct. Hence, efforts to conserve landscape and the livelihoods should be done.

The findings suggest a need for the development of the region–cum-ethnic specific strategy for restoration of the sustainable usage mechanisms, which have become unbalanced due to the burgeoning livelihood demands, leading to precarious conditions of some preferred species.

In the light of the present study, following recommendations are made.

1. Development of region-specific community biodiversity registers (CBR) to make people aware of the culturally significant species,
2. Evolving participatory strategies for multiplication of the species, which have shown recessions in their qualitative and quantitative status, using hi-tech tools and techniques.
3. Empowerment of households with adequate capacity building for eco-friendly sustenance on natural resources.
4. Betterment of storage facilities with improvement in value addition process for improving the returns from the harvest of forest resources.
5. Reacquisition of wastelands and farmlands with improved forest density and species. Development of better co-ordination between villagers and state forest department, to encourage conservation campaigns of state government.

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