

### Sub Zone F

This zone, on an average, receives 1,000 mm rainfall annually, but due to undulating terrain, the surface run off is high. Consequently, improved water control strategies through in-situ water management and watershed management can provide a major livelihood fillip. The zone also possesses numerous Government Lift Irrigation schemes and tanks, which, upon renovation, can enhance capacity utilisation and increase irrigation coverage. The region shows some potential for developing an integrated river basin plan for ensuring efficient water management. Maize is the dominant crop in this



Improved cultivation practices for enhancing maize productivity



Farmers detasselling maize crops

area. However, in recent years, there has been a gradual shift in cropping pattern towards cotton cultivation. Thus, yield enhancement of maize, coupled with improved animal husbandry, has considerable potential towards livelihood enhancement in the area.

### Cross Cutting Livelihood Strategy

#### Build on community knowledge

An interesting aspect found in different regions within the state is the community's own initiatives of water management based on indigenous knowledge. Numerous water harvesting and water conveyance structures have been created by the communities themselves. Integration of these traditional technologies with modern techniques of water management would ensure robust, community-oriented and contextual resource management. Two prominent traditional irrigation structures are *Dongis* and *Pats*, which need to be explored through exploratory studies and subsequently promoted.

#### Promote village level organizations and local leadership

Various successful interventions indicate that strong and vibrant community based organizations with committed leadership are imperative. Thus, these organisations need to be promoted and strengthened through a process of trainings, exposures and cross learnings. Subsequently, these community based institutions can be linked to the market through diverse institutional arrangements.

#### Involve the landless

Strengthen Forest Based Livelihoods: In most areas, the landless constitute the poorest of the population, majorly prone to migration in search of their livelihoods. This vulnerable segment should be involved in both, planning and implementation stages. The emphasis should be laid equally on generating labour employment, as well as creation of long-term assets. The state is rich in numerous NTFP like aonla, mahua, lac, chironzi, mahul leaves, etc. A substantial proportion of the rural population, particularly the landless, are dependent on different NTFPs for their livelihood. There are diverse institutional patterns that dominate the NTFP market in the state. The villagers in general and the landless villagers in particular, depend on this common property resource. Strengthening forest based livelihoods through proper processing, value addition and strengthening the existing market linkages will have important equity implications.

### Strengthening market linkage

Livelihoods can only be improved if farmers are able to sell their produce at fair prices. Imperfections in the forward supply chain do not allow the farmers to fetch fair prices against their produce. Lack of appropriate and timely information results in traders making profit at the cost of the producers. To ensure that the farmers reap the benefits from agriculture and forest based livelihoods, strengthening of market linkages needs to be addressed on a priority basis.

### Convergence with government and bank initiatives

Convergence and mainstreaming of different interventions currently being tried out by Civil Society Organisations (CSOs) with different governmental programmes like Madhya Pradesh Rural Livelihood Project (MPRLP), Rajiv Gandhi Watershed Mission (RGWM), Swarna Jayanti Swarojgar Yojana (SGSY) and institutions like National Bank for Agriculture and Rural Development (NABARD) need to be promoted. This would ensure that the programmes undertaken by different CSOs complement the endeavours and efforts undertaken by the state.



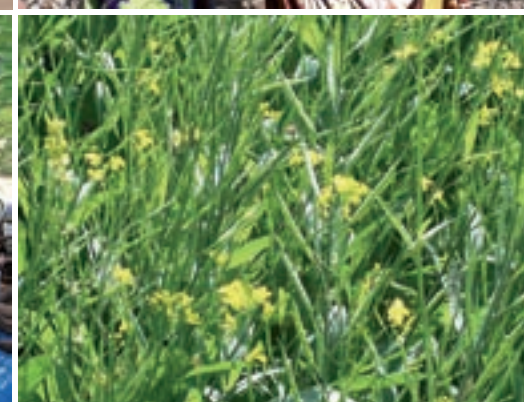
(L) A woman threshing Ashoka 200F paddy variety



(R) JVM 421 maize variety cobs



(L) NABARD official having meeting of community for WADI project



(R) Oil seed crop mustard introduction



(L) Ashoka 200F variety Paddy being transplanted in CINI project area



(R) Soyabean seed plot visit by CINI and ICRISAT team



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## Natural Resource Management Strategies to enhance Tribal Livelihood in Madhya Pradesh under the Central India Initiative



A tribal in desolate surroundings

The state of Madhya Pradesh (MP), is spread over an expanse of 3.07 million hectares and has 48 administrative districts with a total population of approximately 60 million. The tribal population in the state is over 12 million and out of 131 Scheduled Tribes recognized by the Constitution of India, 46 are in Madhya Pradesh. Out of 48 administrative districts, there are as many as 21 districts wherein the Scheduled Tribe population is at least 20 per cent. Gonds in eastern MP and Bhils in western MP are the two major tribal clans residing in the state.

The state is a watershed for numerous river basins, including Narmada, Tapi, Son, Wainganga and Chambal. Mean Annual Rainfall (MAR) in the state varies from 1,300 mm in Shahdol, Balaghat and Mandla in the east to 700 mm in Jhabua, Ratlam, Dhar, Barwani, Khargone and Khandwa in the west. In spite of high rainfall and presence of numerous rivers and rivulets, only 20 per cent of the agricultural area is under some form of irrigation. The state shows a spatial pattern in terms of dependence on various sources of irrigation. While the rain rich eastern tract is more dependant on surface water for irrigation, groundwater dependence is found to be high in the western tract in general and Malwa Plateau in particular. Around 20 per cent of the total dry land districts of the country fall within Madhya Pradesh, reflecting the predominance of dry land agriculture in the state. In recent years, there has been a gradual shift in the cropping pattern towards cash crop cultivation like cotton and soyabean.



Extensive Soyabean cultivation by farmers

Madhya Pradesh is endowed with rich and diverse forest resources. The forest area of the state is 95,221 km<sup>2</sup>, constituting 31 per cent of the geographical area of the state. The forest type shows predominance of Teak (*Tectona grandis*) and Sal (*Shorea robusta*) mixed with other species like Haldu (*Adina cardifolia*), Dhaora (*Anogeissus latifolia*), Salai (*Boswellia serrata*), Aonla (*Embllica officinalis*), Amaltas (*Cassia fistula*), Gamhar (*Gmelina arborea*), etc. Of the total 52,739 villages in the state, 22,600 villages are located in or near forest areas. Most of the villagers residing in the forest fringes are dependent on them for their livelihood. Host of items like leaves, flowers, fruits, bark, seeds, roots etc., commonly referred to as Non-Timber Forest Products (NTFP), contribute significantly to rural livelihoods. Some prominent NTFP in the state include Tendu leaves (*Diospyros melonoxylon*), Sal Seed (*Shorea robusta*), Harra (*Terminalia chebula*), Gum, Chironji (*Buchanania lanzan*), Mahua flowers and seeds (*Madhuca indica*). Among the various NTFP, the nationalized forest produce, which includes Tendu leaves, Sal seed and Kullu Gum, are collected and traded through the Government's Minor Forest Produce Federation, whereas non-nationalized NTFP are collected and traded by the community through a diverse supply chain.

## Regions

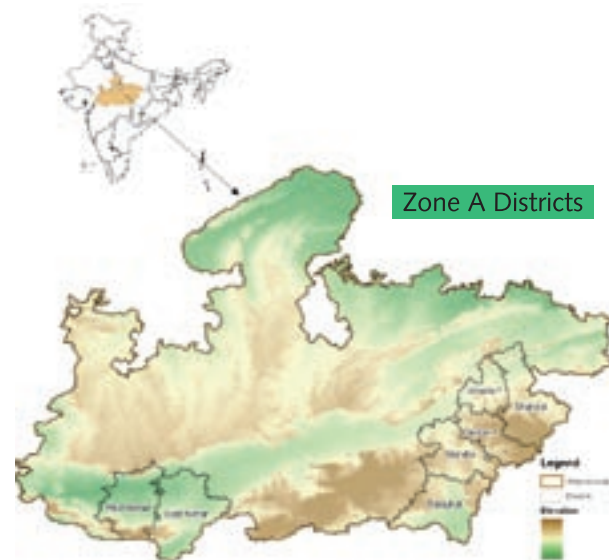
For devising an appropriate livelihood strategy for Madhya Pradesh, the entire state has been divided into six zones. These zones are specific constellations of agro climatic and geographic parameters, exhibiting some homogeneity across variables like cropping pattern, rainfall, soil types, irrigation coverage, forest cover, status of groundwater development, landholding size and fertilizer consumption. These six zones comprise of 18 districts, where the scheduled tribe population is more than 20 per cent of the district's population.

### Sub Zones in Madhya Pradesh

Sub Zone	Districts	Mean Annual Rainfall (mm)	Major Crop	Groundwater Development (in per cent)	Forest area in per cent of Geographic Area (in per cent)	Net Irrigated Area to Net Sown Area (in per cent)	Doubled Cropped Area to Net Sown Area (in per cent)	Average Land-holding (Hectares)
A	Shahdol Dindori Mandla Balaghat Umaria Anuupur	1,200-1,600	Rice	11.3	46.76	15.55	28.93	1.83
B	Katni Seoni	1,000-1,400	Wheat Rice	38.5	28.4	30.4	33.1	1.74
C	Harda Chindwara Betul Sheopur	1,000-1,200	Wheat Jowar	31.7	44.8	47	26.1	2.23
D	Khargone Khandwa Barwani Burhanpur	800-1,000	Cotton Jowar	65.07	38.26	35	18.5	2.77
E	Dhar Ratlam	800-1,200	Soyabean Cotton	114.65	20.55	35.6	44.1	2.55
F	Jhabua	800-1,000	Maize Soyabean	29.6	27.75	15.1	18.5	2

### Sub Zonal Strategy for Natural Resource based Livelihood Enhancement

#### Sub Zone A



Sub Zone A is characterized by steep slopes, coupled with high rainfall and high surface run off. Construction of rainwater harvesting structures, using traditional know-how and technical expertise can enhance water control in the region. In order to enhance the cropping intensity, improved dry land farming using residual moisture can be promoted in this region. With better water control strategy, the focus in this area should be on yield enhancement of food grains, coupled with promotion of vegetable cultivation. This would enhance the food security and curb the distress migration.

#### Sub Zone B



of food grains and promotion of vegetable cultivation, thereby augmenting food security and nutritional diversity, besides resulting in enhancement in income. Combining water related activities with other agricultural and economic activities and creating seed banks will curb forced migration and increase food security. There are instances where farmers with improved water control have moved towards vegetable cultivation and increased cropping intensity which could be replicated across the region.

#### Sub Zone C



This zone is characterised by an average rainfall of 1,000 mm and undulating topography, coupled with gradual thinning of forest cover, resulting in high surface run off. Consequently, efforts towards superior water control through rainwater harvesting by proper soil and water conservation measures, are necessary within this area. The region has already recorded cases where soil and water conservation measures through creation of stop dams, check - dams, percolation tanks, diversion of numerous streams through construction of earthen canals, etc. have resulted in increased water retention and a higher water table. This has resulted in enhancement of cropping intensity through increased vegetable cultivation and increase in productivity of food grains like wheat, maize and jowar. The region also exhibits construction of traditional irrigation structures for conveyance of water over undulating land terrain, including an age old technique, involving the construction of wooden pipes called *Dongis*. The region has a lot of scope for superior water control strategies with improved agriculture and replication of successful interventions.



Group wells in lowland providing assured irrigation to community

The Mean Annual Rainfall (MAR) in the region is between 1,000 mm to 1,400 mm and harnessing this rain water through various on-farm and off-farm water harvesting structures can contribute in development of agriculture based livelihoods in the area. Currently, apart from rice and wheat, jowar, maize, pulses and soyabean are mostly grown in the area. Various water harvesting structures like percolation tanks, ponds, stop dams and small open wells can be constructed to enhance moisture retention and provide irrigation to the crops. The superior water control can then gear towards enhancing productivity



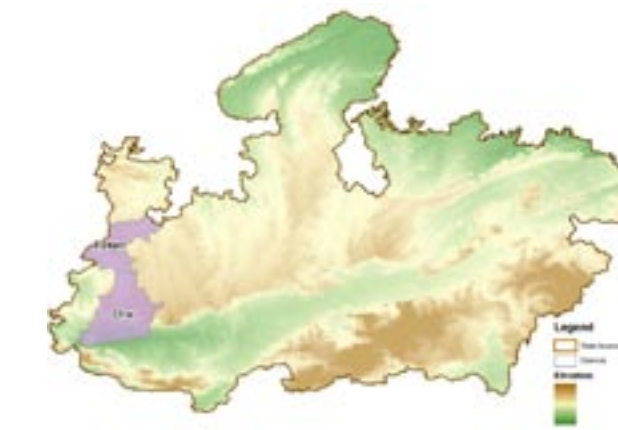
Check dam construction for promoting groundwater recharge and irrigation

#### Sub Zone D



An unmanaged irrigation canal system (L) and A well managed canal irrigation system under Participatory Irrigation Management (R)

#### Sub Zone E



for strengthening of market linkages through formation and strengthening of village level institutions. Piloting and replicating successful market linkages by involving the corporate sector and food processing industries can enhance the livelihoods of the tribal poor. There are already some successful pilots involving building up linkages with food processing companies like Indian Tobacco Company (ITC) and opening of e-choupals in many villages.

This zone, traditionally known as the Nimar region, portrays a cropping pattern dominated by cotton, followed by wheat in winter. In recent years, soyabean cultivation has increased in some districts. The pattern of agriculture based livelihoods in this region calls for better utilisation of water through increasing irrigation efficiency and adoption of various technological and institutional reforms. Optimal utilisation of water through promotion of drip irrigation and group well schemes emerge as highly potent technological interventions. The major focus in this region should be on institutional reforms through promotion of Participatory Irrigation

Management on numerous canal systems in the region, promotion of the indigenous water transport channels or *Pats* and strengthening of village level institutions and farmers collectives. The village level institutions and farmers collectives would ensure better sustainability to various interventions through strong market linkages.



Soyabean trials for yield enhancement



Field bunding to retain soil moisture



A multipurpose irrigation tank