

# Tribal development through horticultural plantations under WADI

## Abstract

The tribal population constitutes about 9 percent of the total population in India as per 2011 census. The States of Madhya Pradesh, Chhattisgarh, Maharashtra, Odisha, Jharkhand and Gujarat have more than half of the total tribal population of India. Almost 8.6 percent of the total population of India, known as Scheduled Tribes is in the grip of numerous catastrophes owing to the prevalence of vicious circle of poverty and unemployment with rapid deteriorating common property resources. The Scheduled Tribe population represents one of the most economically impoverished and marginalized groups in India. The fragile eco-system of the upland tribal regions has also been affected by deforestation and rampant shifting cultivation practice, causing extensive soil erosion, reducing the capacity of land to rejuvenate and affecting natural vegetation and water resources. In the light of the above, the study makes an attempt on the basis of both primary and secondary sources of data to examine the role of horticultural plantations under Wadi for the development of tribes.

**Keywords:** horticultural plantations, wadi project, inter-cropping, tribal development

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**SN Tripathy**

Department of Economics, Gokhale Institute of Politics and Economics, India

**Correspondence:** SN Tripathy, Department of Economics, Gokhale Institute of Politics and Economics, Pune, India, Email sn\_tripathy2004@yahoo.com

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## Genesis of 'WADI' as an agro-horticulture development program

Originated from a Gujarati word, "Wadi" implies a 'small orchard' usually covering one or two acres of land, has been initially introduced in the tribal district of 'Dangs' in Gujarat - as an effective tool for tribal development. This program later on has been experimented and replicated in other part of India dominantly inhabited by tribal population with great degree of success. The Wadi may be of any fruit crop suitable to the area or a combination of these tree crops, with forestry species on the periphery of the land holdings. Two or more tree crops are selected in the Wadi model to minimize biological and marketing risks. As the program progresses with Wadi plantation of horticultural crops<sup>1</sup> establishment and income generating activities, to support income generating activities, micro enterprises, water resources development. The main features of a Wadi model are economic betterment of the tribal farmers through sustainable agriculture, social empowerment, improvement in quality of life including health and women empowerment in tribal dominated areas of the country. The broad interventions are in the areas of land use planning, soil and water harvesting measures and improved farming based agro-forestry practices. Therefore, Wadi not only strengthens the agrarian livelihoods of the tribal households, but also increases food and nutritional security.

## Plantations under WADI

Wadi program of is introduced as the strategy to improve horticulture development. Tribal families having less than 5 acres patta land is given one acre Wadi each for raising 60-75 fruit plants suitable to local area and 200-300 forestry plants on the boundary. Other development interventions in the Wadi areas are soil conservation, water resource development, agriculture development; women development, health, income generation for landless etc. are woven around the Wadi. The Wadi model of tribal development is holistic in approach addressing production, processing and marketing of the produce and also other needs. The mango and cashew plants were planted at a spacing of

10m X 10m and 7m X 7m (R-R and P-P) respectively after digging pits of 1m X 1m X 1m and filling with organic nutrients whereas the forest species were planted at 2m spacing linearly along the fence leaving 5m from the main crop. The programme was undertaken with the following sequence of activities in different phases (Table 1). One acre model of Wadi plantation of horticultural crops accommodates around 60 fruit plants (depending on spacing) and 600-800 forestry plants which can provide adequate income and livelihood security under climatic vagaries. In five years, a village gets converted into an orchard of proportionately equal numbers of families and acreage of land producing hundreds of tons of fruits. While the plantation of horticultural crops and fruit plants generate income after 4-5years, the forestry species provide a fence and also act as a shelter belt. The species mix planted meets the families' needs for fuel, fodder and small timbers and helps in reducing the pressure on existing forests.

**Table 1**

Phase-1	Phase-2	Phase-3
Site Selection	Forestry, Live Hedge, After care	Organic Farming
Lay out	Basin preparation , Soil loosening	Vermi-composting and vermin wash.
Pit Digging	Mulching, irrigation	Green Manuring
Pit Filling	Staking (H-type), Shading	Floriculture and vegetables as inter-crop and source of livelihood
Plantation		
Fencing	Bordeaux paste application	
Water Management	Pruning & training	
Soil Conservation	Mortality analysis	

## Profile of the study area

Odisha is the poorest state in eastern India, with 46 percent of people living below the poverty line in 1999-2000, as against 26 percent for the entire country. As per the recent report of the expert group constituted by the Planning Commission, Government of India, under the chairmanship of Dr. C Rangarajan estimated that 45.9 percent of Odisha's population and 47.8 percent of its rural population continue to live below poverty line.<sup>1</sup> Tribes constitute about 23 percent of total population of Odisha; a backward state located in eastern India. The district Koraput situated in the south-eastern region of the state of Odisha is one of the most backward districts in India with high incidence of poverty. The state has many geo-physical and ecological advantages of growing a number of horticultural crops. The district Koraput even with availability of abundant natural resources is virtually cut off from the mainstream of development. Shorter cycles in shifting cultivation, weaker linkages between forest and agriculture production systems, increasing fragmentation of land holdings etc. pose a threat to the subsistence agriculture practiced by the rural communities. Dasmantpur is a tribal block in Koraput district of Odisha. Here, on the hilly and denuded land, the tribal communities have been traditionally practicing shifting cultivation of subsistence crops like millets and pulses supplemented by collection of forest fruits, roots, honey etc.

## Objectives of the study

In the light of the above-back drop, the prime objective of the study is to examine the role of horticultural plantations under Wadi in enhancing the income, employment and livelihood of tribes; consequently paving the way to their development.

## Methodology of the study

The methodology adopted in the study is both historical and non-participant observation; based on both primary and secondary sources of data. The various quantitative changes have been analysed on the basis of sample data obtained by employing quick appraisal techniques like rapid rural appraisals (RRA) and focus group discussions with the beneficiary households in three simple randomly selected villages of Dasmantpur block in Koraput district. Three villages namely Bonasil, Marchiguda, Giriliguma in which horticultural plantations under Wadi are in operation have been selected. Twenty tribal households adopting Wadi project from each village aggregating 60 households from three villages were selected on the basis of random sampling method in order to collect the primary data. Different socio-economic and environmental parameters have also been considered to assess the role of to examine the role of horticultural plantations under Wadi in enhancing the income, employment and development of tribes in the study regions. The socio- economic impact of watershed has been examined by comparing the present status of different indicators during 2016-17 (Post project periods) with the corresponding figures in the year 2006-07 (Pre-project period). The marginal changes have been calculated through percentage changes and analysed accordingly.

## Livelihood for tribes of dasmantpur block

It is found the focus group discussion that a survey was conducted prior to the initiation of project by NABARD in collaboration with Agrabamee – an NGO located at Kashipur in Koraput district The survey included the indicators of agricultural production and economic value, existing trees and their productivity, cattle population, farm practices and fodder production. On the basis on these inputs, the results of livelihood interventions were estimated. Such interventions

usually support to:

1. Land and water management.
2. Participatory forest management to regenerate degraded forest land and to develop Non-timber forest produces (NTFP) processing and marketing enterprises.
3. Improvements in agricultural productivity.
4. Improvements in animal husbandry.
5. Improved access to rural financial services through the promotion of self-help savings and credit groups and linking them with formal financing institutions to augment their capital base; and
6. Development of community infrastructure to fill critical gaps in the provision of key rural infrastructure (e.g. drinking water, village link road upgrading).

While tribal communities in the region earlier had a forest resource based livelihood, large-scale deforestation forced them to shift to farming activities on a sloping land and caused degradation. Continued and damaging run-off resulted in the loss of agricultural land along the stream course and led to an adverse effect on the ground water conditions in the district. The villages selected were from the Dasmantpur block; which is a tribal block in Koraput district of Odisha. Here, on the hilly and denuded land, the tribal communities have been traditionally practicing shifting cultivation of subsistence crops like millets and pulses supplemented by collection of forest fruits, roots, honey etc. However, destruction of forests due to commercial over-exploitation over the last 3 to 4 decades has decreased the productivity of the soil. This has severely threatened the well-being of the tribal community which depends on agriculture and forest, forcing them to be bonded and migrant labour; increasing their indebtedness; and exploitation of forest produce for income. The fragile eco-system of the upland tribal regions has also been affected by deforestation and rampant shifting cultivation practice, causing extensive soil erosion, reducing the capacity of land to rejuvenate and affecting natural vegetation and water resources.

Considering the extreme poverty, land and climatic conditions, NABARD sanctioned a Wadi project in 37 villages covering 1116 tribal families of Dasmantpur block generating empowerment and income / capacity building for tribal farmers. It has been seen from the Table2 that because of crop demonstration program farmers have adopted new vegetables. It has been revealed that in terms of cropping pattern during pre-project period only four crops were produced namely paddy, brinjal, lady finger, cabbage. But after the Wadi project implemented with the micro finance delivered to the SHGs households; there has been remarkable change in the cropping pattern and there are 11 crops namely paddy, brinjal, lady finger, cabbage, potato, radish, tomato, sunflower, peanut, maize, and beans are produce. Thus, the changes in terms of number of crops have been from 4 to 11 which comes to 175 percent. Similarly, spectacular increase in gross revenue per acre has increased as been estimated between pre and post project is from Rs. 6000/-to Rs. 8000/, the yield rate of paddy has increased by 115.38 percent; cropping intensity has made a record increase of 119.4 percent. There has been no reported case of out-migration and hunger from the micro finance supported households. Out of the 60 SHGs sample households, prior to the implementation of Wadi project there were only 8 households having income only one cashew produce to a limited extent; which has been drastically changed after the implementation of the project; climaxing in continuous increase

of income due to production of cashew, lemon, orange and mango by all the 60 sample households. The socio-economic impact of Wadi program has been depicted in the Table 3. It has been revealed that due to intervention of Wadi Program, there has been crop shifting from traditional cereals and vegetables to high value off season vegetables. The advantages accrued from the Wadi project to the tribal households can be summarized as

- a. Sustainable income from orchard every year.
- b. Till plants starts fruiting, inter cropping provides earlier return to family.
- c. Due to assured irrigation, farmer can take 2-3 crops in a year.
- d. Ensuring food security to the family.
- e. Minimizing the cost of production.
- f. Collective marketing and processing of all produce because of bulk availability for sale.

The focus group discussion revealed that in order to optimize land use and cater to short-term needs, intercropping is used to cultivate a range of crops like grams, millets and vegetables like tomato, brinjal, beans, pumpkin and various pulses are grown by the farmers which provide rich nutritional food to their family while the sale of the surplus crops supplements their income. As revealed from the focus

group discussion that special attention has been given to 157 landless households by providing them support for animal husbandry, a multi-purpose utility shop, tailoring unit, vegetable vending unit, and cycle repair shop. Under the Wadi project the essentially distress migration in the region reduced by 30 percent. It is further revealed that, on average, each farmer is able to earn Rs 10, 000 to Rs 12, 000 per year from his Wadi, which has given him funds to invest in repairing their houses and purchasing other household needs. In each acre fruit trees like cashews, mangoes, lemons etc. are planted with the agricultural crops. Prior to the implementation of Wadi, the socio-economic conditions of the tribes in the study villages were disheartening. After the advent of Wadi, in these villages with the active cooperation of Agramamee, the initial task was to develop land through earth and stone bonding; priority was accorded to fencing for protection from cattle. After the land was developed and fenced, provision of water facilities was created for extensive use of fruit saplings and intercropping which consequently transformed the rocky and uncultivable land into green Wadi plots. On its conclusion, the project was expected to make the target tribal households “drought-proof” with better nutritional resources and increase per hectare unit yield of different crops. The Wadi program empowered the sample tribal households of the villages namely Bonasil, Marchiguda, Girliguma have expressed that Wadi has ameliorated rather transformed their living condition through a dependable micro-finance driven rewarding livelihood options.

**Table 2** Socio-Economic impacts of WADI program on the tribes of Koraput

Sl. No.	Indicators	Pre-project	Post-project	% of deviation
1	Cropping pattern (Number of crops)	Only four crops (Paddy, brinjal, lady finger, cabbage)	(Paddy, brinjal, lady finger, cabbage, potato, adish, tomato, sunflower, peanut, maize, and beans) 11 crops	175
2	Yield rate of paddy In quintals/acre	26	56	115.38
3	Gross revenue per acre	Rs. 6,000	Rs.14,000	133.33
4	Cropping intensity (Gross cropped area as percentage to land holding)	56.66	124.33	119.43
5	Incidence of out-migration (No of persons reporting in a year)	10	Nil	-100
6	Incidence of hunger ( no of households remaining hungry for some days in a year)	15	Nil	-100
7	Continued income from orchard every year	08 (cashew)	60 (cashew, lemon, orange, mango)	750
8	Extent of multiple cropping in a year	Nil	60	100
9	collective marketing and processing of produce	6	60	1000

**Table 3** Abstract of the NABARD funded WADI Project in Koraput

District	Koraput	Total beneficiaries	1119
Block	Dasmantpur	Border plantation	1000 acres
Total villages	37	Supply of diesel pump for the irrigation purpose	36
Name of Panchayats (four panchayats)	Dasmantpur Chikamba Girliguma Dumbaguda	Check dam	2

Table Continued

District	Koraput	Total beneficiaries	1119
Project period	2009 to 2017	No of landless beneficiaries	101
Total area covered	1000 acres	Funding agency	NABARD

Source: Agrabamee, Annual Report-2014-15, Kashipur, Koraput, Odisha

## Concluding remarks and suggestions

A perusal of the above analysis reinforces the ground reality that forest dependent tribes are highly impoverished community in India. They are constrained to migrate to urban settlements in subhuman living conditions without basic requirements. Deforestation, exploitation and recurring droughts and other natural calamities drive them into relentless grip of disease, suffering and starvation. Further, it is conceived from the study that the diffusion of Wadi program is an appropriate intervention relating to agriculture and allied enterprises for the enhancement of productivity in terms of employment, augmenting income and ensuring livelihood to the sample tribal households of the villages who expressed that Wadi has ameliorated their living conditions.

In the light of above, we can forward some suggestions for better policy implications of the study:

- A. Tribal people's participation could be evoked only by creating and sustaining their interest in horticultural plantations and only by utilizing their indigenous knowledge systems and preserving forest resources.
- B. In order to reduce the exploitation of natural forests, scientific management of forest resources is the imperative need of the hour which would require plantations of mixed species and recycling of forest products for better avenues of tribal livelihood.

## Notes

Horticultural crops as per International Society for Horticulture Science are:

- a) Tree, bush and perennial vine fruits.
- b) Perennial bush and tree nuts.
- c) Vegetables (roots, tubers, shoots, stems, leaves, fruits and flowers of edible and mainly annual plants).
- d) Aromatic and medicinal foliage, seeds and roots (from annual or perennial plants).
- e) Cut flowers, potted ornamental plants, and bedding plants (involving both annual and perennial plants).
- f) Trees, shrubs, turf and ornamental grasses propagated and produced in nurseries for use in landscaping or for establishing fruit orchards or other crop production units.
- g) Honey and Cultivated or gathered mushrooms (edible fungi).

## Acknowledgements

None.

## Conflict of interest

Authors declare that there is no conflict of interest.

## References

1. Report of the Expert Group to Review the Methodology for Measurement of Poverty, Planning Commission, Government of India; 2014.
2. Agrabamee, Annual Report-2014-15, Kashipur, Koraput, Odisha.