



ISSN Print: 2664-9799
ISSN Online: 2664-9802
Impact Factor: RJIF 8.2
IJHER 2024; 6(1): 71-76
www.humanitiesjournal.net
Received: 04-01-2024
Accepted: 08-02-2024

Dr. Prashant Narnaware
Commissioner, Women and
Child Development, Govt. of
Maharashtra, Maharashtra,
India

Om Prakash Shukla
Principal, NDA, Pune,
Maharashtra, India

NABARD empowers tribal livelihoods and environment in Maharashtra through Wadi project

Dr. Prashant Narnaware and Om Prakash Shukla

DOI: <https://doi.org/10.33545/26649799.2024.v6.i1b.74>

Abstract

Constituting approximately 8.6 percent of India's total population according to the 2011 census, the states of Madhya Pradesh, Chhattisgarh, Maharashtra, Odisha, Jharkhand, and Gujarat collectively harbour more than half of the country's tribal population. With traditional means of livelihood increasingly threatened, the issue of tribal livelihoods has assumed paramount significance. However, development strategies employed in tribal areas have failed to impact their livelihoods significantly. Against this backdrop, this paper endeavours to explore, using secondary data sources, the role of the National Bank for Agriculture and Rural Development (NABARD) in fostering the development of tribal farmers through its Farm Sector Development (FSD) Program, particularly in the context of the Wadi Project in Maharashtra.

Keywords: Farm sector development, Wadi project, agro-horticulture development, tribal livelihoods

Introduction

Backdrop

According to the 2011 Census, the tribal population of India is predominantly concentrated in the central and eastern regions of the country. Land alienation, forest legislation, and displacement due to mining and other projects have compounded the challenges faced by tribal communities. Consequently, many projects under the Tribal Development Fund (TDF) have been sanctioned and implemented in states with high tribal populations. Madhya Pradesh, with 93 projects, led the list, followed by Chhattisgarh with 86, Odisha with 69, Rajasthan with 61, and Jharkhand with 55. Moreover, 87 projects have been sanctioned in the Northeastern Region (NER) of the country, with Assam leading with 21 projects, followed by Nagaland with 16, and Meghalaya with 14, showcasing the regional distribution of TDF projects to address the socio-economic needs of tribal communities across India.

Environmental conservation and sustainable resource management are critical for the well-being of communities and ecosystems. In Maharashtra, interventions involving local communities, NGOs, government agencies, and public sector undertakings have been implemented to address environmental degradation and enhance livelihoods.

Plantation Interventions for Environmental Restoration in Maharashtra

Environmental reclamation and restoration are crucial for mitigating the impact of mining activities and promoting biodiversity conservation in Maharashtra. Western Coalfields Limited (WCL), operating coal mines in Chandrapur, Yavatmal, and Nagpur districts, initiated mixed plantation projects to reclaim mined areas. With funding support from Coal India Limited, WCL aimed to restore mined areas and conserve biodiversity. These interventions cover significant regions ranging from 393 ha to 775 ha, contributing to environmental restoration in the mining-affected areas.

In Amravati district, a community-led mixed plantation drive covering 990 ha of village commons land was implemented in collaboration with local communities and the forest department and initially funded through the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). The intervention aimed to increase fodder availability and improve livelihoods. The success of this initiative led to recognition and awards for the participating villages, highlighting the effectiveness of community involvement in conservation efforts.

Corresponding Author:
Dr. Prashant Narnaware
Commissioner, Women and
Child Development, Govt. of
Maharashtra, Maharashtra,
India

TATA Power conducted a mixed plantation drive in Lonavala, Pune district, covering 400 ha of private land—the initiative aimed to increase forest cover to compensate for areas inundated by TATA Power's dam. Collaboration with local communities resulted in increased vegetation cover, soil fertility, and biodiversity, benefiting both the environment and local communities.

Under the Compensatory Afforestation Fund Management and Planning Authority (CAMPA), Maharashtra implemented mixed plantation projects on 25 ha and 22 ha of non-forest land diverted for non-forestry activities. These interventions aim to promote afforestation, assist natural regeneration, and improve wildlife habitats, contributing to environmental conservation efforts mandated by the Forest (Conservation) Act 1980.

Plantation initiatives play a crucial role in Maharashtra's environmental restoration and biodiversity conservation efforts. The National Afforestation Program (NAP), implemented by Forest Development Agencies (FDAs), aims to increase forest cover in India. In Maharashtra, interventions under NAP covered 24,056 ha from 2012 to 2017, focusing on capacity building, soil and moisture conservation, and community involvement. These initiatives contribute to increased forest cover and ecosystem services, with monitoring conducted by both state and central governments.

Private sector companies like ACC Limited, ITC Limited, JSW Group, Tata Motors, and NGOs like BAIF-MITTRA and Tree Public Foundation have undertaken plantation initiatives across Maharashtra. These interventions range from restoring degraded farmland and village pastures to mangrove areas and familiar lands. The species planted include both native and fast-growing varieties, aiming to restore biodiversity, soil health, and water resources in the region.

Wadi Model Implementation by NABARD

Originating from a Gujarati term meaning 'small orchard', "Wadi" initially emerged as a tool for tribal development in the district of Dangs, Gujarat. This program, aimed at enhancing the livelihoods of tribal communities, has since been successfully replicated in various tribal-dominated regions across India. A Wadi typically comprises one or two acres of land planted with fruit crops or a combination of fruit trees and forestry species. The selection of multiple tree crops minimizes biological and marketing risks.

As the program evolves, it encompasses horticultural crop plantation, income generation, micro-enterprise development, and water resource management. Key features of the Wadi model include economic betterment, social empowerment, improved quality of life, and women's empowerment in tribal areas. Interventions focus on land use planning, soil and water conservation, and agro-forestry practices. Thus, Wadi strengthens agrarian livelihoods, enhances food security, and contributes to the nutritional well-being of tribal households.

Over the past 18 years, NABARD's Tribal Development Fund (TDF), initially established with ₹50 crores from profits in 2003-04, has spearheaded 898 tribal development projects, providing grant support totalling ₹2541 crore. These initiatives have positively impacted 5.85 lakh tribal families across 25 states and four union territories, covering 5.53 lakh acres of land and elevating their livelihoods and overall quality of life. NABARD's efforts, primarily centred

around the 'wadi' model, have significantly raised awareness among impoverished tribal communities, offering a comprehensive approach that addresses the production, processing, and marketing of wadi produce, alongside fulfilling other vital livelihood requirements such as fuel and fodder. Beyond the Wadi model, NABARD now promotes various livelihood models like dairy, piggy, goaty, apiary, lac cultivation, and other Non-Timber Forest Products (NTFP), including landless beneficiaries under the TDF umbrella.

Table 1: Summary of Project Metrics and Impact in Maharashtra

Metric	Value
Total projects sanctioned	55
Ongoing	22
Completed	28
Families benefitted	48,347
Area covered (acre)	43,878
Amount sanctioned (Rs. crore)	₹188.35
Amount disbursed (Rs. crore)	₹154.81

Source: NABARD, 2022

Table 1 provides an overview of the Wadi projects in Maharashtra. Out of the total 55 projects sanctioned, 28 have been completed, benefiting a substantial number of families (48,347). Currently, 22 projects are ongoing, indicating ongoing efforts in rural development. The area covered by these projects is significant, totalling 43,878 acres. In terms of financials, a substantial amount of Rs. 188.35 crore has been sanctioned for these projects, out of which Rs. 154.81 crore has been disbursed. This highlights a significant investment in rural development and livelihood improvement initiatives. Overall, the data suggests active engagement and investment in promoting sustainable livelihoods and improving the quality of life in rural Maharashtra through Wadi projects.

Table 2: Overview of Wadi Project in Dhadgaon, Nandurbar District (Maharashtra)

Metric	Value
Project location	Dhadgaon, Nandurbar district
Total beneficiaries	1100 tribal farmers
Implementing agency	TATA CInI
Outcome	
Income from intercropping	Rs. 50,000 per year
Income from orchard	Expected soon
Linked wadi farmers with FPOs	Yes
Marketing of products	Yes, in local markets and blocks
Interventions	
Developed wadi of mango and guava	Yes
Goat rearing for landless beneficiaries	Yes
Intercropping	Yes
Water resource development	Through CSR collaboration

Source: NABARD, 2022

Table 2 outlines the integrated farming systems approach implemented in the wadi project located in Dhadgaon, Nandurbar district. The project has reached 1100 tribal farmers and is executed by TATA CInI. The project's outcomes include generating income through intercropping, with an average of Rs. 50,000 per year, while revenue from orchard cultivation is expected to contribute soon. Moreover, the project has successfully linked Wadi farmers

with Farmer Producer Organizations (FPOs) and facilitated the marketing of products in local markets and blocks. Critical interventions involve the development of wadi orchards comprising mango and guava, goat rearing for landless beneficiaries, intercropping practices, and water resource development through Corporate Social Responsibility (CSR) collaboration. Overall, the project demonstrates a holistic approach towards enhancing livelihoods and promoting sustainable agriculture among tribal communities in the region.

The activities under the Tribal Development Fund (TDF) primarily focus on establishing orchards of horticultural crops suited to the agro-climatic conditions of the respective regions. Various types of wadis have been developed across India, including mango, cashew, guava, aonla, sapota, orange, banana, litchi, pomegranate, apple, apricot, walnut, peach, pineapple, coconut, cardamom, passion fruit, among others. Moreover, certain plantation crops like coffee and rubber have been incorporated into select wadis. Forestry plants such as teak, drumstick, casuarina, bael, mulberry, willows, glyricidia, sesbania, leucaena, etc., are utilized as border plants in these orchards. Furthermore, various non-timber forest products (NTFPs), such as medicinal plants, bamboo, and lac, are also integral components of many TDF projects. To cater to landless tribal families, non-wadi projects have been sanctioned, offering livelihood activities such as apiary, animal husbandry, apiculture, sericulture, and lac cultivation, among others.

The Tribal Development Programme, initiated in Gujarat and Maharashtra in the 1990s, focuses on sustainable livelihoods for tribal communities through small orchard-based models known as wadis. Supported by the Adivasi Development Programmes (ADPs), externally aided by KfW, Germany, these efforts have positively impacted 33,500 tribal individuals. To expand this successful model nationally, NABARD established the Tribal Development Fund (TDF) in 2003-04, initially with ₹50 crore, which has since grown to support 898 projects. The Fund aims to create replicable integrated development models, strengthen tribal institutions, and empower communities through various interventions such as setting up wadis, soil conservation, water resource development, micro-enterprise development, training, healthcare, and women's empowerment initiatives.

As of March 31, 2022, the Tribal Development Programme has made significant strides, with 898 projects sanctioned under the Tribal Development Fund (TDF), benefiting approximately 5.85 lakh tribal families across an area spanning 5.53 lakh acres. A cumulative grant of ₹2541.00 crore has been sanctioned, with ₹1802.00 crore already disbursed. Of these projects, 452 have been successfully completed, while the rest are in various stages of implementation. The TDF's financial position stands at ₹1342 crore, further supported by interest differentials from the Rural Infrastructure Development Fund (RIDF) and earnings from unutilized balances. The programme operates in collaboration with 508 Project Implementing Agencies (PIAs) and has facilitated the establishment of 143 Farmer Producer Organizations (FPOs), benefiting 0.43 lakh families through various income-generating activities. Moreover, 14 non-wadi projects have been sanctioned, aiding 4572 landless tribal families with financial assistance totalling ₹33.91 crores. Notably, approximately 2.77 crore trees have been planted in sanctioned wadis, potentially

sequestering 6.08 lakh tons of carbon dioxide annually, reflecting the programme's commitment to environmental sustainability alongside socio-economic development.

The wadi agroforestry model, initially developed in Gujarat in the 1980s and later scaled up under programs like the Adivasi Development Programme Gujarat (ADPG) and Adivasi Development Programme Maharashtra (ADPM), has garnered significant support from national and international donors. By 2012, over 180,000 families across nine states had participated in BAIF's wadi development initiatives, with further expansion facilitated by NABARD's Tribal Development Fund (TDF), poised to benefit an additional 320,000 families in 21 states. The Wadi program, encompassing components like agro-horti-forestry, soil and water conservation, water resource development, agri-business, allied livelihoods, and social mobilization, aims at food security and poverty alleviation through wasteland development. Agro-horti-forestry, the core component, involves planting multipurpose trees around field boundaries and fruit/nut trees within fields, supporting soil and water conservation while allowing continued annual crop cultivation.

Bharatiya Agro Industries Foundation (BAIF)

The wadi agroforestry practice, as extended by Bharatiya Agro Industries Foundation (BAIF), proved highly attractive to most farmers, who continued to maintain their agroforestry plots well beyond the five-year post-establishment support period, defying the trend of technology abandonment often observed among smallholder farmers. While BAIF's data indicates a low abandonment rate of fewer than 10 percent of wadi plots once established, subsequent expansion and farmer-to-farmer diffusion remained limited, highlighting the critical role of external support in influencing adoption behaviour (BAIF Annual Report, 2022-23).

Despite the complexity of the Wadi practice, its widespread adoption among poor smallholder farmers remains intriguing, challenging conventional theories of technology adoption. Unlike many natural resource management innovations, Wadi's success lies in its multi-purpose orchards' high future economic value, a strategic choice made by BAIF to prioritize long-term sustainability over simplicity.

Agri-horti-forestry, commonly known as Wadi, serves as a multifaceted initiative aimed at carbon sequestration and the enhancement of livelihood opportunities for small and marginal farmers, with overarching goals including the establishment of sustainable livelihoods for impoverished Scheduled Tribe (ST) families, restoration of ecosystems and biodiversity, carbon sequestration, and both adaptation to and mitigation of climate change. This initiative has reached significant milestones in terms of outreach, encompassing 3112 hectares cumulatively across 12 states, benefitting 7779 tribal and impoverished families in 382 villages. The tangible benefits derived from Wadi implementation are manifold, encompassing food and nutrition security, and a substantial additional income totalling INR 1421 crores annually for 200,000 families, thereby reducing distress migration while concurrently augmenting green cover and sequestering an impressive 2 million tons of carbon. Notably, the Wadi model's success has led to its replication in 25 states with the support of NABARD, showcasing its potential for widespread

adoption. Furthermore, new climate-resilient interventions within the Wadi framework have been introduced, encompassing diverse fruit crops such as mango, cashew, and citrus alongside innovative approaches like low-cost bamboo poly houses, high-tech crops, and high-density plantations, all aimed at bolstering resilience, diversifying income streams, and enhancing agricultural sustainability through integrated approaches to nutrient and pest management, soil improvement, and the utilization of agro-wastes (BAIF Annual Report, 2022-23) [1].

Prof. Tripathy's studies provide insights on tribals' problems and their livelihoods. Tripathy (2018a) [6] emphasizes how deforestation, exploitation, and natural calamities exacerbate the plight of tribal farmers, often without their consultation. Tripathy's (2018a) [6] study in Odisha examines the emergence of problems in tribal areas and explores alternative livelihood programs, including microfinance interventions. Through quantitative analysis based on rapid rural appraisals and focus group discussions, Tripathy (2018a) [6] concludes that the Wadi Program has positively impacted the socio-economic conditions of tribal people. Tripathy (2018b) [7] further investigates the role of horticultural plantations under the Wadi Project for tribal development. Despite numerous studies on tribal livelihood programs, research on NABARD's role in tribal development through the FSD Program, especially about the Wadi Project, remains limited, necessitating further investigation. Tripathy (2020) [8], in his study, underlines the importance of holistic policy programs and diversified livelihood opportunities, facilitated by NABARD's support, to mitigate distress migration and improve the socio-economic condition of tribal communities.

Objectives

The study's objectives include assessing tribal livelihood challenges and examining NABARD's role in implementing the Wadi Project. It aims to inform policy with insights into income, employment, and livelihood impacts.

Methodology

The Wadi model, implemented in Mawal Taluka of Pune district, Maharashtra, covers 360 ha and involves mixed plantations of mango, amla trees, and crops. Local tribal communities and NABARD are significant actors aiming to improve livelihoods and access to forest products. A study conducted in Aundha block of Hingoli District in May 2022 examined Wadi's adoption and retention determinants among tribal households who participated in Adivasi Development Programme Maharashtra (ADPM). Located in Maharashtra state's Hingoli district, the CD block Aundha (Nagnath) boasts a population of 198,476 individuals. Among them, 101,999 are male, while 96,477 are female. This vibrant community thrives across approximately 955.7 square kilometres of land. The study area is characterized by hilly terrain intersected with deep ravines, where migration is expected due to limited local employment opportunities during the long dry season.

The study comprised 146 farmers selected via stratified random sampling, of wadi adopters and 58 non-adopters. Utilizing a mixed methods approach, quantitative and qualitative data were collected. Through brief interview, insights into the reasons for adoption or non-adoption, as well as the retention or abandonment of the wadi innovation. The study is supplemented by secondary sources of information collected from research papers and published sources.

Table 3: Principal reasons for adoption or non-adoption of wadi technology (N=146)

Wadi Technology and its reason for adoption	Number and % of Adopters	Reasons for Non-Adoption	Number and % of Non-Adopters
Expectation of future income from the wadi	80 (54.79)	Land tenure issues	20 (34.48)
BAIF's development approach	30 (20.55)	Household migration	24 (41.38)
Fruit yields can enhance HH consumption	36 (24.66)	Lack of information	14 (24.14)

Source: Field study

The wadi project provides comprehensive support to participants, encompassing technical guidance over a five-year period, free planting and construction materials, financial compensation for opportunity costs incurred during establishment and aftercare, and marketing assistance through farmer cooperatives and an overarching producer company. While Terminalia arjuna, locally known as sadada, is utilized for fuelwood through pollarding, the program aims to mitigate distress migration in tribal communities, though this objective was not significantly realized in the study. Interestingly, factors influencing adoption were primarily intrinsic, such as aspirations and attitudes, with the anticipation of future income being a key motivator for 54.79% of adopters, followed by the influence of BAIF's approach (20.55%), and household consumption (24.66%). Non-adoption was largely attributed to land tenure issues (34.48%), dependency on seasonal migration (41.38%), and difficulty accessing program information (24.14%). Despite adoption, farmers encountered challenges such as pest infestation (65%), lack of irrigation water (48%), livestock damage (39%), and weather-related crop damage (19%) (Table-3).

Table 4: Utilization of Wadi Technology Among Farmers: Percentage Breakdown

Utilization of Wadi Technology	Percentage of Farmers
Income generation from fruit yields	58%
Household consumption of fruit	35%
Using forestry trees for fuelwood and poles for house construction/renovation	33%

Source: Field study

The adoption of wadi technology positively impacted farmers' livelihoods, with 58% reporting income generation from fruit yields, 35% indicating household fruit consumption, and 33% utilizing forestry trees for fuelwood and construction materials (Table-4).

Concluding Remarks

Plantation interventions are vital in restoring degraded landscapes, conserving biodiversity, and enhancing ecosystem services in Maharashtra. Collaboration between multiple stakeholders, including government agencies, private sector entities, and NGOs, is crucial for the success

and sustainability of these initiatives. By restoring forest cover, improving soil health, and conserving water resources, plantation interventions contribute to environmental resilience and sustainable development in the region. Ongoing monitoring, evaluation, and community engagement are essential for ensuring the long-term success of plantation initiatives and promoting ecological sustainability in Maharashtra.

Mixed plantation interventions play a vital role in Maharashtra's environmental reclamation and restoration efforts. Collaboration between public sector undertakings, local communities, private sector entities, and government agencies is essential for the success of these initiatives. By reclaiming mined areas, increasing forest cover, and promoting biodiversity conservation, these interventions contribute to sustainable development and environmental resilience in the state. Ongoing monitoring and evaluation are necessary to assess these interventions' long-term impact and effectiveness in achieving their objectives.

The most common reason for adoption is the expectation of future income from the wadi, followed by the belief in BAIF's development approach and the potential enhancement of household consumption through fruit yields. On the other hand, the main barriers to adoption include land tenure issues and household migration, suggesting that socio-economic factors play a significant role in adoption. Lack of information also seems to be a notable barrier, indicating a need for increased awareness and education about Wadi technology and its benefits.

Several important learnings have emerged from the implementation of horticulture-based livelihoods within tribal communities:

It has become evident that such models can effectively augment the income of smallholder farmers while concurrently resolving issues related to migration, thus highlighting their potential as a sustainable development strategy.

Incorporating processing and value-addition activities into horticulture-based produce has been identified as a critical component in further enhancing the economic prospects of tribal families, thereby ensuring long-term viability and resilience within these communities.

It has been recognized that special considerations need to be given to hilly and challenging terrains, particularly in terms of adjusting cost norms and other parameters to accommodate the unique circumstances of these regions. This would ensure equitable access to opportunities for all segments of the population.

A pressing need exists to diversify and develop non-wadi models within these communities to promote inclusive growth, especially targeting landless farmers who may not directly benefit from traditional agricultural practices, thus fostering a more comprehensive and sustainable approach to rural development.

Way Forward

Collaboration between government agencies, private sector entities, and NGOs is essential for effective environmental restoration and biodiversity conservation.

Plantation initiatives contribute to increased forest cover, enhanced ecosystem services, and improved livelihoods for local communities.

Monitoring and evaluation mechanisms ensure the success and sustainability of plantation interventions, facilitating

adaptive management and continuous improvement. Restoration of degraded landscapes, including mining areas, farmland, and mangroves, contributes to ecological resilience and mitigates the adverse impacts of human activities on the environment. Community participation and engagement are critical for the success of plantation initiatives, fostering a sense of ownership and stewardship among local communities towards natural resources.

Several strategies can be implemented, to enhance the effectiveness and sustainability of Tribal Development Fund (TDF) projects.

Standardizing non-wadi models such as Lac, Non-Timber Based Forest Products (NTFPs), and Honeybee could diversify income sources for tribal communities.

Undertaking Geographical Indication (GI) mapping of tribal products and integrating them with TDF projects would enhance their market value.

Integrating agroecological principles into the wadi programme could promote environmental sustainability.

Facilitating convergence with Government of India schemes like the Agriculture Infrastructure Fund, PM Formalization of Micro Food Processing Enterprise Scheme (PMFME), and Mission on Integrated Development of Horticulture (MIDH) could enhance project scalability and impact.

Promoting Farmer Producer Organizations (FPOs) in clusters of Wadi projects could empower tribal communities economically.

Developing Banking Plans in TDF project areas in line with NABARD's existing concessional refinance schemes for Natural Resource Management (NRM) Projects would improve financial access.

Geotagging TDF wadis and overlaying them with geotagged post-harvest infrastructure could streamline logistics and utilization of resources.

Conducting assessments of carbon sequestration in WADI projects could highlight their environmental benefits.

Encouraging the utilization of innovative and traditional technical knowledge in WADI projects would enrich project outcomes.

Strengthening the health component under TDF by incorporating food and nutritional security, including establishing Poshak Vatika/Nutritional Gardens, could improve community well-being.

Undertaking impact evaluation studies of completed Tribal Development Projects would provide insights into their effectiveness and inform future interventions.

References

1. BAIF Annual Report, Pune: BAIF Development Research Foundation; c2022-23.
2. National Bank for Agriculture and Rural Development. Farm Sector Development Department, Tribal Development Programme - A Snapshot. Committed to Rural Prosperity. 2022 Jul 12.
3. Tripathy SN. Evaluating the role of micro-finance in mitigating the problems of distress out-migrants: a study in KBK districts of Orissa. *Microfinance Rev.* 2015;8(2):16.
4. Tripathy SN. Social and economic life of Didayi primitive tribe of Odisha. In: Chaudhury SN, editor. *Primitive tribes (PVTGs) of Central India: then and now.* New Delhi: Concept Publishing Company; c2016.
5. Tripathy SN. Microfinance in empowering tribal women: evidence from the villages of KBK districts

- (Odisha). *J Land Rural Stud.* 2017;5(2). Centre for Rural Studies, LBSNAA, SAGE Publications.
6. Tripathy SN. Improving livelihoods of tribal community through micro-finance: the experience of Wadi Project in Koraput (Odisha). *J Centre Micro Finance Res.* 2018;10(1):20-35.
 7. Tripathy SN. Tribal development through horticultural plantations: the experience of Wadi in Odisha. *Hortic Int J.* 2018;2(3):25-35.
 8. Tripathy SN. Role of NABARD in the development of tribal farmers: with special reference to Wadi Project. *Splint Int J Prof (A Peer Rev Q Ref Int J).* 2020;7(4):143-151.