Scientific water management and crop diversification enhanced farm income and ensured livelihood security: An inspiring success story of a tribal farm woman in Keonjhar district of Odisha under Farmer FIRST Project

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Prologue

The Agro-Climatic Zone of Keonjhar district comprises North Central Plateau and North Eastern Coastal Plains. Out of thirteen blocks in the district, Saharpada block is predominantly tribal dominated with tribal population constituting more than 70 percent and the area is predominantly rainfed having undulating topography. It falls under Baitarani river catchment area and the block is categorized as a drought prone block as irrigation facility through any sources is almost negligible. The soils are predominantly red lateritic type with 1488 mm average annual rainfall. The ICAR-IIWM Farmer FIRST Programme (FFP) interventions were designed and implemented since 2016-17 in the Khuntapingu watershed of Saharpada block by selecting a cluster of three contiguous villages namely, *Khuntapingu*, *Jamuda* & *Malarpada* having total geographical area of about 500 hectares, with a broad objective to improve crop & water productivity and to enhance livelihood security in the tribal dominated paddy fallow rainfed agro-ecosystem of the state. The selected cluster comprises of 525 households of which 85% households are marginal and small farmers. Most of the households were schedule tribe, schedule caste and landless.

Profile of the Successful Farmwoman

Smt. Gitanjali Naik, a forty seven year old tribal farmwoman with a small family and having 12th pass educational qualification, comes from the tribal-dominated *Jamuda* village in Saharpada block of Keonjhar district in Odisha. *Jamuda* is characteristically considered as an underdeveloped and downtrodden village having a population of 2170 persons, of whom 1671 are from scheduled tribes (77.0%), 439 scheduled castes (20.23%) and only 60 (2.76%) are from general category. Prior to implementation of Farmer FIRST Programme of ICAR-IIWM in the cluster during 2016-17, Smt. Gitanjali Naik was cultivating only paddy during rainy season using local and indigenous varieties through traditional practices besides some local vegetables in her backyard for her family's own consumption purpose. Due to lack of knowledge in management of rainwater, pest and disease problems and balanced dose of fertilizers at critical stages of crop growth, besides non-availability of irrigation facility, her paddy crop was being damaged more or less every year. Because of these multiple problems, she was getting very poor yield with a total production of only about 75 quintal paddy from an area of 5.0 acres land with a gross income of Rs. 75,000 only, and a net annual income of about Rs. 15,000-20,000 only, while her rest 1.5 acre upland was unutilized. Additionally, she was earning about Rs. 3,500-4,000 per annum by rearing one non-descript indigenous cow, rearing 2-3 desi goats and selling surplus cow milk, totalling a net annual income of about Rs. 19,000-24,000 only.

Turning Point of the Successful Journey

After coming in contact with the project scientists during 2016-17 through attending awareness cum skill training programmes, getting critical agricultural inputs and proper technical guidance, she started growing high yielding and hybrid paddy adopting proper nursery management, line transplanting and SRI method, mechanical weed control through use of cono-weeders and application of balanced fertilizers, her paddy production increased significantly in succeeding years to reach 105 quintals from the same area. With the support and guidance of project scientists, she was able to sell her produce at minimum support price. In this way, her gross income from paddy alone reached to Rs. 2, 14,200, making a net profit of approximately Rs. 1, 24,000 by 2023-24 in 6-7 years period.

Before FFP interventions, she used to grow vegetables only for her family's own consumption purposes. Because of lack of irrigation facilities and technical know-how, she couldn't cultivate commercially. During 2017-18, she was provided with 400 saplings of 'Mahy Green' hybrid variety of brinjal, required quantity of NPK fertilizers and IPM inputs like neem-based pesticides, pheromone traps and yellow sticky traps by the project scientists through Farmer FIRST Programme. Domestic drinking water supply was the only source of water for her, which she used to store in a cement tank. Along with her old mother-in-law, she nurtured 400 brinjal plants with lot of care in her backyard, irrigating each plant with the help of bucket and mug. Lack of resources could not defeat her will-power and she earned over Rs.79, 500.00 net profits that year by selling brinjal from an area of 0.20 acre only in one season, which was the highest profit till then in her entire life. *This was the turning point of her successful journey*. Thereafter, she could realize the strength of scientific vegetable farming with proper crop and water management. She properly utilized that profit money with a suitable long-term investment plan by digging a deep bore well in the year 2019-20 in her backyard that could provide sufficient water for irrigating at least 1.0 acre of land attached to her backyard kitchen garden.

Adoption of New Technologies

With the support of this deep bore well, proper irrigation scheduling and limited recourses, she could be able to cultivate vegetables in a commercial scale adopting proper crop diversifications and crop rotations with brinjal, tomato, chilli, okra, cowpea, cabbage, cauliflower and seasonal greens etc. She grew vegetables mostly organically using poultry manure, cow dung and neem oil in her farm. Presently, she is able to get continuous harvest of marketable surplus based on seasons and is able to send vegetables to the local as well as district level market. She used to transplant the tomato and brinjal seedlings on raised beds with poly-mulch films laid with proper irrigation. She follows package of practices with fertigation and plant protection recommendations as per the suggestions given by the scientists of ICAR-IIWM. The practice of mulching helped her in cost-saving in the form of moisture conservation, weed suppression and maintenance of soil health. Mulches also improved the use efficiency of applied fertilizers and use of reflective mulches minimized the incidences of pests and viral diseases. Farmers of surrounding villages were very impressed by the results of this innovative technological intervention of plastic mulching with proper irrigation scheduling. As per her opinion, by following these technologies, she could reduce the wastage of water and fertilizers and also increase the water use efficiency. The incidence of pests and diseases has come down. The number of seedlings required for planting one acre area is also less because of the decreased seedling mortality. The fruits obtained are of better quality and colour, which fetches better prices in the market. As the land area is small, Gitanjali herself, her husband and her mother-in-law could do all farm activities on their own saving the entire labour cost.

Smt. Naik attended several farmers' training programmes and exposures visits organized by the Institute, where she learned how to prepare vermi-compost pits, mushroom cultivation beds, and raising pro-tray seedlings etc. She also adopted drip irrigation technology with the support of the project using her bore well water. It helped her in providing lifesaving irrigation, because timely irrigation during stress period and nutrient replenishment through fertigation helps in improving quality of fruits. The drip irrigation has also helped in saving labour charges involved in irrigation, weeding and fertilizer application. She started cultivating tissue culture banana (var. *Grand Nain*) provided by through the project in a 0.10 acre fenced land. Soon her backyard farm became site for other farmers' field demonstrations under the project in Jamuda village. Since then, she has never looked back. Her backyard vegetable field has been a site for demonstrations of sprinkler irrigation, polythene mulching, crop diversifications, and tapioca and yam tuber crops along the boundary. She has also been producing vermi-compost after receiving training and vermi-beds from Farmer FIRST Project. She also uses sprinkler set provided by the project for irrigating the vegetable crops.

Impact: Economics of Production and Accrued Benefits from Multi-enterprise Farming

On account of year round hybrid vegetable production by the innovative farmwoman Smt. Gitanjali Naik, her gross annual income gradually increased from a meagre Rs. 81,300 in 2016-17 to a inconceivable

Rs. 6,08,300, i.e., over seven times in 2023-24 by adopting various new and innovative farm enterprises like HYV & hybrid rice varieties, hybrid vegetables on a commercial scale, tissue culture banana, tapioca & yam tuber crops, backyard poultry, and improved management of non-descript desi cows and goats. Her annual net profit during 2020-21 reached about Rs. 2, 24,300, which was slightly affected due to corona pandemic, but recovered in the succeeding years and increased to Rs. 4,13,100 in 2023-24.

Linkages and Recognitions

Smt. Gitanjali has shown keen interest in horticulture related activities and thus has developed good linkages with different public development departments like ICAR-IIWM, Bhubaneswar; KVK, Keonjhar; District Agriculture Office, District Horticulture Office and State Mission Shakti Office. Within 2-3 years, she could learn the skill of growing offseason vegetable cultivation and started disseminating the knowledge and skill to other farmers. Motivated by the successes of Smt. Gitanjali Naik, other fellow farmers of the village stared cultivating off-season vegetables in their crop fields and it helped them immensely for improving their livelihood status. In recognition of her efforts and contributions in the field of vegetable cultivation, Smt. Gitanjali was honoured with the "**IARI Innovative Farmer Award 2025**" by Honorable Union Minister for Agriculture and Farmers' Welfare, Govt. India during the "Pusa Krishi Vigyan Mela" organized at ICAR-IARI, New Delhi from 22-24 February, 2025. Besides, Dr. Trilochan Mohapatra, the then Secretary, DARE & DG, ICAR has also honoured her with the 'Best Farmwoman Award' during the 35th Institute Foundation Day on 12th May, 2022. Now she is a successful farmer and has become a role model for other farmers and farmwomen in the village as well as neighbouring villages. Out of the saving money, she has completely renovated and expanded her house and made pucca house adding some comfort facilities. Now-a-days, she is much more confident in facing life's challenges and more happy with her small family than ever before.

Conclusions:

The beneficiary farmwoman Smt. Gitanjali Naik used to get a meagre annual income of about Rs. 19,000-24,000 only by growing local rice varieties and rearing one desi cow before the FFP was implemented in 2016-17. She was facing major problems like low crop and water productivity, poor irrigation facilities, no crop diversification, no crop rotation and lack of knowledge in farming etc. With doubling farmers' income (DFI) interventions like high yielding and hybrid rice varieties, line transplanting, partial farm mechanization, hybrid vegetable cultivation, use of polythene mulching, irrigation management, rearing of backyard poultry and addition of two more desi non-descript cattle, she could be able to multiply her annual income over seven times to get Rs. 6,08,300 per annum in just six to seven years. In addition, there is cost saving of about Rs. 50,000 annually in the production of rice and vegetables on account of adoption of proper management practices with respect to irrigation scheduling, balanced dose of fertilizer, need-based application of pesticides and mechanical weed control.

Thus, it can be inferred from the successful journey of Smt. Gitanjali Naik that if a willing farmer or farmwoman is properly motivated and groomed with proper scientific knowledge in farming and adoption of crop diversifications with little input and technical support, he/she can bring significant changes, not only in his/her own livelihoods, but also can act as change agent in the vicinity to bring significant changes in society, particularly among the fellow farming communities.

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Action Photographs:

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<tr><td>Adopted farmer Smt. Gitanjali Naik receiving the “IARI Innovative Farmer Award 2025”</td><td>Smt. Gitanjali Naik receiving ‘Best Farmwoman Award’ during the 35th Institute Foundation Day</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Brinjal cultivation with poly mulching by Smt. Gitanjali Naik</td><td>Bitter gourd cultivation using trellis by Smt. Gitanjali Naik</td></tr>
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<tr><td colspan="2">Project scientists and staffs monitoring the Brinjal and Cauliflower demonstration fields and interacting with Smt. Naik</td></tr>
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<tr><td colspan="2">Daily harvest of vegetables ready for marketing</td></tr>
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<tr><td>Harvesting of Okra by Smt. Naik in her fields</td><td>Project scientists and ATARI, Kolkata team monitoring team in the Tissue culture Banana field of Smt. Naik</td></tr>
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<tr><td>Smt. Gitanjali seen busy in hulling of rice grains with her Mini Rice Huller</td><td>Kadaknath and Aseel backyard poultry farming by Smt. Naik</td></tr>
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