

## **Field bund & border as alternative land use for forage production: A case of marginal farmer in Bundelkhand region of India**

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### **Introduction**

In India, if marginal farmers are approached for production of forage grasses in their agricultural lands, the response of the farmers would be straight forward 'NO' to the forage crops on agricultural lands. The reason is that food grains (cereals & pulses), vegetables, oilseeds, fruits, *etc.* are grown on agricultural land and get the first preference for family members, while the forage grasses are least preferred, as crops residues are being fed to livestock. More than 60% of the farm produce come from the small farms only. The productivity of the marginal and small farmers is the solution for growing population food needs. Most of the marginal and small farmers cultivate the farm land with the support of their family members and local labour which the quality of the work is higher. They grow multiple crops and sow as soon as they harvest.

The last four decades has witnessed a sharp decline in the average size of operational land holdings in India. The average size of operational land holdings has reduced by half from 2.28 ha in 1970-71 to 1.6 ha in 2010-11. Land holdings in the marginal category (less than 1 ha) constitute 67% of the operational holdings in India (2010-11). Marginal and small holdings together, constitute 85% in terms of number of operational holdings and 44% of the operated area in the country. Thus, over the period, the marginal category has emerged as a distinct and dominant class by itself with its average size dwindling to a mere 0.38 ha. (NABARD, 2014).

This is the case study of an illiterate & marginal farmer, Shri Vijay Singh Kushwaha (37) S/o shri Dhan Singh resides in Kushwaha Dera at village Parasai (under Babina development block) in Jhansi district of Uttar Pradesh, Bundelkhand region of central India. He used to cultivate only monsoon crops, was the target of an extension programme initiated by ICAR-Central Agroforestry Research Institute, Jhansi in 2011 under the project "Enhancing groundwater recharge and water use efficiency in Semi-Arid Tropics region through watershed interventions, Parasai-Sindh watershed, Jhansi". The watershed is being developed in consortia mode with ICAR-Central Agroforestry Research Institute, Jhansi, and International Crop Research Institute for Semi-Arid Tropics (ICRISAT), Hyderabad. The watershed comprises three villages namely Parasai, Chhatpur and Bachhauni and located between 25° 23' 56" to 25° 27' 9.34" N latitude and 78° 19' 45.71" to 78° 22' 42.57" E longitude. The watershed is about 35 km in the West of the district headquarter. Bundelkhand is prone to severe drought leading to huge migration towards cities in search of livelihoods and the scarcity of green fodder posed as one of the major hindrances for dairy and livestock production activity in the region.

### **Materials and Methods**

Water scarcity was the biggest problem in the identified villages. ICAR-CAFRI, Jhansi initiated the Parasail-Sindh watershed to enhance water availability, water use efficiency and agricultural productivity through agroforestry and improved management of land and water resources. The total area of watershed is 1246 ha. The majority of farm families in the watershed (61%) are marginal & small farmers. Till now, about 1,10,000 m<sup>3</sup> surface water storage has been created through 12 rainwater harvesting structures in series including 2 ponds.

One of the important areas of research in extension is the manner in which farmers participate in management of natural resources. Farmers' choice of land for grasses is an important component in the process of fodder production. Therefore, every extension research activity should begin with a study of socio cultural environment (Dwivedi, 2002). The research team has followed the recommendation of the NCF *i.e.* "Before advising farmers, listen to them" (Swaminathan, 2005). Various extension tools *i.e.* Individual contact, farmer's fair, focused group discussion (FGD), kisan gosthi, exhibitions, exposure visits, evening chaupal and RAGHU (Reshaping Agroforestry for Global Human Upliftment) approach for agroforestry dissemination (Dwivedi, 2015) were used to create the awareness and motivate the farmers.

After got motivated, shri Vijay had decided to plant high yielding Napier Bajra Hybrid (NBH) in his field bund & one-side border. Planting of rooted slips was demonstrated to him in his field bund & border by the scientists and also closely supervised planting activity as it is the most important step for maintaining persistence and good yield in perennial crops. As per the farmer's choice, he planted NBH on bund & one-side border of 0.4 acre (1 *bigha*) land. He was guided about dose and timely fertilizer application and inter-cultivation aspects. Technical know-how on cutting management to ensure green fodder throughout the year was given. First cut was taken after 60 days of sowing and subsequent cuttings were at 40 days interval.

### **Results and Discussion**

After adoption of Napier Bajra Hybrid grass on field bund and one-side border of the land including agri-horticulture system of agroforestry in the agricultural land, Shri Vijay started getting food, round the year green fodder and vegetables from the same piece of land. He harvested 9 cuttings and got 20 q green fodder.

Before adoption, he has 1 buffalo, 1 cow, 1 cow calf. But after adoption of technology and round the year availability of green fodder the result was increase in herd size (purchased 3 buffaloes, 2 bollocks, 2 cows, 2 cow calf and 1 buffalo calf). Before watershed programme his well was supplying water for 1 hr only during summer. Now due to rainwater harvesting structures in the watershed his well is providing water for 3 hrs in continuation during summer, which has resulted in vegetable production in field. Now he is milking 35 lit milk daily and sale it @ Rs. 40/lit and earn Rs. 1400/- daily. In addition to sale of milk he used to give 5 lit milk daily free of cost to his two brothers. Due to assured water availability from his well, he started growing vegetables ( Brinjal, Tomato, Chilly, Coriander and Spinach) in his 0.4 acre land. He planted Guava along with crops. His annual earnings from vegetables about Rs.35,000. His daily income from sale of milk and vegetables is about Rs. 1700. He used to give his father sum of Rs.1000. per month in addition to wheat, vegetables and milk, because father resides with his brothers. Now he has started construction of pucca (concrete) house. Full time employment was provided to Vijay and his family. During the whole year, Vijay, his wife and three sons remained busy from morning till late in the night. Most of the works were performed by Vijay and his family. The vegetables were sold in village and local market. Vijay proudly says that he is now getting 35 liters of milk a day, his expenditure on feed concentrate has gone down considerably after he started feeding green fodder. He claims that 20-30% of extra milk yield is solely due to use of green fodder. Due to round the year availability of green fodder he is planning to further increase his herd size.

The efforts of Vijay and ICAR-CAFRI together in reshaping the agroforestry and transforming the traditional system into integrated farming system (IFS) helped a lot in the enhanced livelihood options to the marginal farmer.

### **Conclusion**

The scarcity of green fodder posed as one of the major hindrances for dairy production activity in Bundelkhand region (Dwivedi and Ramana, 2002). Growing fodder on field bunds & borders could resolve the issues of fodder scarcity in Bundelkhand region of central India. This type of extension efforts are needed to make agroforestry system as an eco-friendly alternative for sustainable rural livelihood (food security) and for sustainable land management to uplift the marginal & small farmers and rural poor, so that they can join the main stream of the society. Shri Vijay got name and fame in the surrounding villages as number of visitors including Scientific Advisor of Union Agriculture Minister, GOI, Chief Advisor of Union Water Resources Minister, GOI, Chairman-Central Water Commission, GOI, ICRAF, Kenya-Regional Director (Asia), DM & CDO Jhansi visited his field during June, 2015. Any forage production technology must not be imposed upon the marginal & small farmers and it should be disseminated to them as per their choice of site for growing of forage grasses.

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