

Implementing Watershed Development and Integrated Farming Techniques to Enhance Dryland Agricultural Productivity

Three Case-Studies from Mandihal Village, Dharwad, Karnataka

In September 2009, Best Practices Foundation (BPF) in Dharwad began to work with 58 farmers from Mandihal village as part of a Desphande Foundation-funded project to promote watershed-based farming practices and sustainable natural resource management. Each small farmer possessed some farmland which was situated in a hilly area, had little access to water, and usually lay fallow.

During this project, BPF introduced watershed development techniques and integrated farming system concepts to the 58 farmers. These dryland farmers were encouraged to build mud embankments or contour bunds to reduce soil erosion and slow the flow of rainwater. Trenches were dug around the plots to collect rainwater and increase groundwater levels beneath the plots. These methods help to conserve and harvest rainwater, which usually flows down the hilly slopes, where the farmers' plots lie, to the bottom of the valley. Farmers were also taught to combine crop, livestock and forestry enterprises to increase production and profit. Each farmer received mango tree saplings to plant 25-30 ft. apart. BPF also recommended the incorporation of short-duration crops such as lemon, curry leaves and drumstick, and forest trees in the space between the saplings and along the bunds respectively.

More than one year has passed since the farmers undertook these activities. These are the stories of three of the farmers.

1. Mahadevappa Hadgad

Mahadevappa Hadgad has always been a farmer. At the age of 65, he lives in a modest house with his wife, his three sons and their families. His third son is still a bachelor, but his only daughter is already married. He has three bullocks and two cows. He owns two acres of land, one of which is used for rice paddy. The other acre plot, which is the subject of this project, usually lies fallow.

“This land was not really used because the soil quality is bad,” Mahadevappa recounts. “Some seven or eight years ago, we tried to grow cotton here. Some varieties only need a little bit of water. We were able to grow 1.5 quintals but it just wasn't worth it. Growing cotton requires a lot of physical labour from weeding to picking. Also, the crop attracted so many pests.” For all their efforts, Mahadevappa's family was only able to make a Rs. 3,000-4,000 profit from cotton per year.

Afterwards, Mahadevappa began growing horse gram on the one acre plot. “We tried to plant millet before as well but it wouldn't grow well and it would only be ready for harvest during the rainy season. Horse gram would grow easily but the crop isn't always

good.” Each year, Mahadevappa harvests about two bags of horse gram, with each bag selling for less than Rs. 2,000.

To make ends meet, Mahadeveppa’s eldest son works on another farmer’s land and receives a share of the crops. His second son operates a tractor on other farms and his youngest travels to Dharwad to engage in construction work. “We don’t make a profit right now,” Mahadeveppa tells us. “Everything we produce is for consumption. This year, we only got one bag of horse gram and we kept it to feed our family.”

In 2009, BPF approached Mahadevappa and asked him to join this project. Offering financial and technical support, Mahadevappa immediately agreed to collaborate with BPF. “Finally, this land would be put to use!” he exclaimed. “When BPF came and offered to provide saplings and help along the way, I couldn’t say no!” In the last year, Mahadevappa and his three sons prepared the land in line with the watershed programme. They planted 42 mango trees across the acre with horse gram crops in between; along the bunds, they grew trees and short-term crops like lemon and curry leaves.



Now, Mahadeveppa has 41 small mango trees on his one acre plot. One mango tree was lost because of rats. Only 10 per cent of the short-term crops survived. “We have no access to water here,” he explains. “And the saplings we received were very small. They were not strong enough. But the mangoes and forestry are growing well.”

When prompted about his future plans, Mahadeveppa smiles sheepishly and admits, “I have many plans but I will wait for everything to materialise first.” For the next three to five years, he and his sons plan to take care of the mango trees by regularly flushing out the rat population and also growing horse gram. In three to five years, when the mango trees are fully grown, he expects to harvest two tonnes of fruit. “The variety we received was *apus* mangoes. *Apus* is the king of mangoes! Each tonne sells today for 18,000-20,000 rupees.” In the next five years, Mahadeveppa and his sons will try again with the forestry trees. If successful, soil erosion will be reduced, and the trees will be used as both timber and fodder.

With three sons, Mahadeveppa’s dream is to buy another acre of land so that he can leave one acre to each of them. “We live on what we grow and we are doing okay. My grandchildren are already going to school but I would like to leave them with more. I don’t want their life to be so tough.”

2. **Fakirappa Yallappa Yadravi**

Fakirappa Yallappa Yadravi’s family owns five acres of land in Dharwad district just a few minutes from Mandihal village. Three generations of Yadravavis live from this land:

Fakirappa's brother and his family, and Fakirappa's nephew and his family. Fakirappa's family is fortunate to have so many acres, and also, to own four bullocks, one cow and one buffalo. From the five acres of land, one acre is used to grow rice paddy.

The four remaining acres, however, are situated together along the higher-end of a slope. The soil is dry, and allows little to grow. "Some 10 to 15 years ago, we used to grow cotton successfully on some of this land," Fakirappa recalls. "But the top soil has eroded and the fertility was gone." All four acres lay fallow.

Approximately three years ago, Fakirappa and his nephew, Shankar, set to work to enhance the productivity of these four acres. As a first step, Fakirappa and Shankar dug a bore well, which radically changed the landscape of their plots. Then, the pair planted soya bean and cotton, invested in a water storage tank to harvest rainwater and water their crops with the help of a cart. All of a sudden, Fakirappa was making a profit of some Rs. 3,000-4,000 from these four acres.

In 2009, Shankar was recruited by BPF in Dharwad to lead efforts to convert a group of small farmers in Mandihal village into an environmentally-conscious, integrated farming community. Trained about contour bunding and trenching techniques, conservation tillage and mulching, and the benefits of combining forestry, animal husbandry and crop enterprises, Shankar urged Fakirappa to join the project. Fakirappa readily offered half an acre for the project activities, planted 23 *apus* mango trees and dug trenches and built bunds along the periphery. Between the crops, Fakirappa sowed the hardy horse gram crops while along the bunds he planted short-duration crops like lemon, papaya, curry leaves and drum sticks as well as local varieties of mangoes.



Since the seedlings were implanted almost two years ago, all 23 of Fakirappa's mango trees have survived. Convinced of the success of these methods only a year after the project began, Fakirappa and Shankar transformed the remaining 3.5 acres to mirror the half-acre that was targeted under this project. Now all four acres have contour bunds, trenches,

forestry and fodder plants along the sides. Fakirappa can hardly contain his joy. "Before, I didn't know if what Shankar was saying about bunds, trenches and forestry would help," he says. "After a year, I was convinced! I never knew this land could turn into something profitable!"

Equipped with knowledge of sustainable farming techniques and a vested interest in seeing his family's farm grow, Shankar has many ideas on how to make this four-acre dryland farm more productive. "We will devote two acres, including the half-acre covered by this project, to growing *apus* mango trees. I just finished a course in grafting

so we will alter the local variety mango trees to bear *apus* mangoes, which sell for a much higher profit.”



However, their plans do not stop with mangoes! “The two remaining acres, we will devote to sericulture,” Fakirappa tells us. “We will build a separate shed for the silkworms and cultivate raw silk. The silkworms require 24-hour a day attention but that will be no problem for us. I live in the farmhouse and never leave the farm!”

Currently, a section of the two acres is used for an outdoor nursery. “All the short-term crops are failing because the saplings we receive are of poor quality,” Shankar says. “We are going to convert this empty lot behind the farm house into a nursery, take orders from local farmers on what saplings they will need and grow and sell them. There is a very low start-up cost for us.

We will make a nice profit and help our community.”

In addition, Fakirappa and Shankar are constructing a vermin-compost behind the farmhouse to increase the quality their soil and grow healthier crops. “I think our neighbours will follow our example,” Shankar tells us, “after they see how successful we are with our farm and crops.” With this unstoppable duo, we cannot doubt their success.



of

3. Kubendra Ramappa Badiger

“I have three acres total,” Kubendra Ramappa Badiger begins. “Half is used for paddy, and the other half is the dryland you are looking at.” Kubendra is a small-time farmer living in Mandihal village with his wife and three children.

“Before, I used to grow some *jawar* and maize on this dryland,” Kubendra continues. “But the crops never grew very well. We were very dependent on the rainy season especially since we had no water facility.” Kubendra’s 1.5 acre plot used to yield some 20 bags of *jawar* and maize. Some of the bounty was kept for household consumption; the remainder would sell on the market for approximately Rs. 800 per bag.

When BPF approached Kubendra about joining this project, he was initially sceptical. “When Shankar [the BPF project manager] came and told us about planting mangoes, I

told him to give us water first! I didn't believe him that he had another solution for our dryness problem!"

Regardless, Kubendra offered one acre for the project. Per Shankar's instructions, he dug trenches and built bunds along the periphery, and planted 40 mango trees spaced evenly across the field and forest trees along the bunds. In addition, to the water tank that he got from the project, he purchased six large pipes to deliver water from a neighbour's bore well to his land, and regularly place mulch underneath the mango trees to retain more water and stop soil erosion.

The results speak for themselves: all 40 *apus* mango trees are flourishing and approximately 80 per cent of the forestry have survived. "I followed Shankar's instructions perfectly," Kubendra tell us gleefully. "I've also made my own adjustments. I let water collect in the trenches and have planted some of the forestry lower along the bunds. I think this is why my trees are growing so well." After seeing the results, Kubendra set to work to immediately mirror his remaining half-acre after the plot covered by this project.

Seeing Kubendra's excellent results, the neighbours have followed suit: each surrounding plot contains mango trees with bunds, trenches and forestry along its borders. "Before, I



used to have to visit my plot often to make sure that cattle wouldn't roam through and eat or stomp on my crops. Now that all the neighbours have changed their plots to look like mine, we have jointly decided to keep the cows out!"

When prompted about his future plans, Kubendra tells us that he wants to build a vermi-compost and plant other fruit crops between the growing mango trees. "I think this type of soil is good for fruit

trees. I want to grow some chikoo. It is a safer choice than mango because sometimes, mango trees flower but don't produce a high yield." Kubendra tells us that he also wants to build a small farm house on his 1.5 acre plot to better watch over his crops. "Before, I never used to like to come to my farm," Kubendra says. "Now my crops are growing so well! I'm so happy and I never want to leave!"