

# The Challenge of Farm Forestry in India

Pulpwood farm forestry can be a lucrative business for farmers living near paper mills in India, where the paper industry's demand for pulpwood far outstrips supply and the government has blocked paper companies from running pulpwood plantations. IFC has partnered with the Ballarpur Industries Limited paper mill in Orissa, one of India's poorest states, to encourage pulpwood forestry among farmers. Four different informational awareness campaigns were tested via randomized experiment. Results clearly reveal the challenges these farmers face, the difficulty of convincing farmers to change their practices, and what not to say in an agribusiness information campaign.

Pulpwood farming can be a lucrative business for farmers living near paper mills in India, where IFC has partnered with the Ballarpur Industries Limited (BILT) paper mill in Orissa to encourage more rice farmers to engage in forestry programs. Participating communities are clearly benefiting from the income received from selling trees grown on previously non-cultivated degraded land after the 3-year growing period. One basic issue with such programs, though, is that despite their returns, participation rates have historically been quite low (less than 10%). Part of the reason may be that people often resist undertaking long-term beneficial activities that have immediate costs. Tree planting fits this class of problems. The benefits of the trees, while quite large in net-present-value terms, are still experienced in the distant future, while costs are experienced today. Self-control problems might make such activities especially difficult.

As part of the evaluation, we found that rice farmers had very little knowledge of the potential profitability of tree plantations. These farmers knew nothing about average market prices nor did they have any clear sense of potential profits per acre. Perhaps most surprisingly, this was even true among farmers who already had tree plantations. These farmers seemed to have planted trees more as an experimental residual investment—simply to try it out—rather than from enthusiasm about high returns.

Initial projections indicated that farmers would enjoy significant benefits from farm forestry. A farmer planting root-trained seedlings following the suggested growing protocols was expected to produce 20 tons of pulpwood per acre after five years which could be sold for a minimum of Rs. 1000 per ton, totaling Rs. 25,000. Deducting the cost, including interest (which is around Rs. 9,000 per acre), the farmer would be left with a net profit of Rs. 16,000. IFC conservatively estimated profits of Rs. 15,000 (between \$350-\$400 USD) per acre.

In an effort to increase knowledge about the potential benefits from tree planting and to boost participation, IFC designed four different communication scripts, each of which was intended to highlight a particular benefit of pulpwood farming, and tested the impact of these interventions using experimental methods. One script focused on the benefits of rice vs. pulpwood farming, one presented the case-study of a pulpwood farmer, one focused on convincing farmers to equate pulpwood plantations with savings, and one was a general script combining all of these elements (see Box 1). These four scripts were tested on 1,110 villagers in 100 different randomly-selected villages—20 villages to each script, plus 20 "control" villages receiving no script at all. The goal of the study was to test the effectiveness of various communication scripts and to improve our understanding of the obstacles to farm forestry faced by Indian farmers.

## Scripts

### Campaign #1: The General Information Script

Relates a story about how a farmer could not pay the expenses of his daughter's marriage and had to sell his lowlands. Works through the mathematics behind the cost/benefit of tree-farming.

### Campaign #2: Long-Term Savings Script

Discusses the importance of saving for a home, marriage, and/or another plot of land. Explains the self-control problem making it difficult for people to save, and emphasizes that farm-forestry locks up capital for many years, helping to address this problem.

### Campaign #3: Rice Script

Reviews the problems with rice farming (eg., erratic rainfall, monsoons, etc.) Compares rice farming to tree farming, working through the cost/benefit analysis.

### Campaign #4: Case Study Script

Tells the success story of a forest farmer, detailing revenues and profits. Considers other potential uses for land suitable for forestry, and shows these uses to be less profitable.

## Pulpwood Farming: More than Meets the Eye

IFC found that many factors conspire to make it difficult for farmers to manage pulpwood forests following BILT's recommended growing protocols. The number one problem farmers encountered was lack of credit; farmers reported they would plant trees if there was sufficient financing available. Some local rural banks that had, in the past, provided farmers with credit to plant trees were now willing to grant new loans only if BILT provided buyback guarantees on the pulpwood and these guarantees did not materialize. One of the largest banks in India offered financing to farmers on the condition that they produce a land certificate in their own name, which turned out to be a major obstacle because most of the land is registered under the name of a deceased father or grandfather who had owned it when the last land survey was conducted in 1956. Changing the name on a land certificate is a costly, non-transparent, bureaucratic process. Farmers that did qualify for these loans were not able to reap the full benefit: loan distribution was delayed, which delayed the purchase of fertilizers and pesticides beyond the time considered optimal for their application.

Yet it would be misleading to walk away with the impression that access to credit would solve all problems. One can interpret the statement "If I had credit, I'd plant trees" in two ways. First, it could mean that in the presence of some extra credit, tree planting would be their first choice. Second, it could mean that in the presence of credit specifically for tree planting, they would do it but if the credit were

unrestricted, they would use it for other purposes. Put another way, when farmers demand credit, are they expressing enthusiasm about the investment but frustration about lack of credit? Or are they simply pointing out that with free credit they would take a chance on something they are not interested in pursuing?

Two pre-program field visits led IFC's project team to believe that the second interpretation was the correct one. There were two telling facts. First, we asked farmers what they did when there was a big expansion in rice yield a few years ago, when they were flush with new cash. Farmers responded that they used the extra cash to expand rice production. Moreover, when asked what they would do if they were simply given unrestricted cash or credit, they responded that they would use it to plant more rice (or make other non-tree investments) This suggests that trees are not very high on their perceived value of investment hierarchy.

This may be due to the fact that forestry requires these poor farmers to wait 4-5 years before harvesting their crop and obtaining a profitable return on investment, and the farmers may know that the temptation to harvest early (at a loss) would be too great to make the endeavor worthwhile. IFC also learned that farmers who successfully grow and harvest their crop can sell pulpwood directly to the paper mill for \$32/ton whereas selling pulpwood through a contractor or middleman fetches around \$25/ton... and some middlemen cheat. Middlemen (who typically come from nearby cities) buy pulpwood by estimating weight without the use of scales, and their estimates are often biased downwards. Moreover, after agreeing on a purchase price, dishonest middlemen often pay only a portion of the full price, take the pulpwood, and tell the farmers that the remaining balance will be paid once the pulpwood is sold to the contractor—but never return with the balance. Even government officials may exploit the farmers: before selling their pulpwood, farmers need a "No-objections Certificate" (NOC) from the Forestry Department certifying that the wood was not harvested from Forest Department land. Farmers report that forest officials often require bribes for NOC clearance.

## Survey Results

Despite all these obstacles, we found the overwhelming majority of farmers surveyed reported interest in farm forestry (see table 1). Prior to our delivery of a communication script, more than 95% of villagers were interested in learning more about pulpwood plantations, and delivering the information awareness campaigns did not induce any significant changes up or down. Prior to the campaigns, farmers said "earning money" was the underlying reason they were interested in farm forestry.

**Table 1: Pre-treatment Interest in Growing Trees**

	Total	Fraction	Total	Fraction	Total	Fraction	Total	Fraction	Total	Fraction
<b>Interested in plantations before treatment</b>										
Yes	231	100%	201	97%	215	98%	224	100%	217	96%
No	0	0%	6	3%	5	2%	1	0%	10	4%
	<b>231</b>	<b>100%</b>	<b>207</b>	<b>100%</b>	<b>220</b>	<b>100%</b>	<b>225</b>	<b>100%</b>	<b>227</b>	<b>100%</b>
<b>If yes, why?</b>										
Earn money	147	64%	129	64%	168	78%	156	70%	125	58%
Use unused upland	35	15%	35	17%	17	8%	36	16%	43	20%
Repay loan	12	5%	7	3%	5	2%	12	5%	10	5%
Other	37	16%	30	15%	25	12%	20	9%	39	18%
	<b>231</b>	<b>100%</b>	<b>201</b>	<b>100%</b>	<b>215</b>	<b>100%</b>	<b>224</b>	<b>100%</b>	<b>217</b>	<b>100%</b>

The post-communication results are reported in Table 2. After the campaign, other reasons (eg., to make use of fallow land, to pay for marriages, etc.) became more important than earning money. The savings script in particular seemed to encourage farmers to consider the long-term benefits of farm forestry. Because we asked about farmers' interest in forestry via a Yes/No question, we were unable to gauge the extent to which farmers' intensity of interest varied across scripts. In future surveys, we will learn from this experience and ask survey recipients them to rank their level of interest on a five-point scale.

**Table 2. Post-Treatment Interest in Growing Trees**

Communication scripts	GENERAL		SAVINGS		RICE		CASE STUDY		CONTROL	
	Total	Fraction	Total	Fraction	Total	Fraction	Total	Fraction	Total	Fraction
<b>Interested in plantations after treatment</b>										
Yes	208	90%	177	86%	210	95%	196	87%		
No	23	10%	30	14%	10	5%	29	13%		
	<b>231</b>	<b>100%</b>	<b>207</b>	<b>100%</b>	<b>220</b>	<b>100%</b>	<b>225</b>	<b>100%</b>		
<b>If yes, why?</b>										
Earn money	70	34%	48	27%	54	26%	81	41%	125	58%
Use unused land	18	9%	7	4%	23	11%	18	9%	43	20%
Benefit in multiple ways	16	8%	16	9%	11	5%	43	22%	0	0%
Create assets, pay for marriage	35	17%	40	23%	23	11%	23	12%	0	0%
Repay loan	17	8%	8	5%	19	9%	5	3%	10	5%
Other	52	25%	58	33%	80	38%	26	13%	39	18%
	<b>208</b>	<b>100%</b>	<b>177</b>	<b>100%</b>	<b>210</b>	<b>100%</b>	<b>196</b>	<b>100%</b>	<b>217</b>	<b>100%</b>

While it was impossible to identify an effect of any of the four scripts on farmers' interest in farm forestry, we were able to identify a significant effect of one script (the "rice" script) on actual plantation uptake (Table 3). In villages where the other three scripts were delivered and in the control-group village as well, take-up of farm forestry was about 5%; in the villages that received the rice script, take up was less than 1%. The "rice" script compared pulpwood farming with rice farming, making the argument that pulpwood was a more lucrative and secure source of income. From this experiment we learned that it is counterproductive to disparage rice farming—this lesson is probably due to the fact that farmers have great faith in rice farming because it has been their primary means of livelihood for several generations.

**Table 3. The Effects of Different Communication Scripts on Forest Farm Take-Up**

Started a plantation	General Script	Savings Script	Rice Script	Case Study Script	Control (No Script)
Yes	10	13	1	13	10
No	221	194	219	212	217
Fraction who start	0.04	0.06	0.005	0.06	0.04

We also found that some farmers simply plant the seedlings and return five years later, failing to take the time and effort to maintain plantations according to BILT's recommendations. To encourage a more active forest stewardship that would in turn promote higher yields, BILT now teaches farmers to inter-crop wheat, peas, potatoes, and other vegetables between rows of trees in the hope that this will lead to more time tending saplings instead of planting the seeds only to return 5 years later for the harvest. There is also the hope that intercropping will give farmers more incentive to use fertilizers past the first year, which has been cited as a problem by extension workers, and that it will provide a source of short-term income. BILT discourages inter-cropping of fast-growing plants (e.g., maize, sorghum, sunflower, etc.) which compete for nutrients with young eucalyptus plants.

## Wider Lessons

The BILT forestry experience demonstrates yet again the challenges of working in agribusiness. Farmers in Orissa, like poor farmers everywhere, tend to have difficulty accessing the financing they need to buy the supplies necessary to adhere to recommended growing protocols. Many farmers rely upon middlemen who cheat them. To gain legal title to their land, farmers bear the costs of significant formal and informal payments to government bureaucrats. All these problems notwithstanding, farmers in Orissa are keen to learn more about

forestry even if many do not invest the time required to properly maintain their plantations.

For projects such as this to have a chance of success, it is necessary to provide farmers with more than just information campaigns and technical assistance on growing practices. These farmers face so many obstacles that they need a more comprehensive package of support, including access-to-finance. Large firms like BILT are in a prime position to leverage their local economic and political clout to help facilitate relationships with lenders, dealings with government agencies, and ensure fair market pricing. For example, firms such as BILT could decide to buy directly from all the farmers (cutting out middlemen) or help villages obtain accurate scales and up-to-date information. Lastly, the role of timing should not be overlooked. It takes time to enter into purchasing agreements, and loan approvals can take weeks if not months to process. Given the importance of these activities and the time they require, it would be have been better if the scripts been delivered during the month of April, two to three months prior to the planting season. Of course, to solve these problems it is first necessary to recognize that they exist *at the stage of program-design*. Proper scoping and effective follow-through is key in any project, but certainly essential in the agribusiness context which is always subject to the vicissitudes of local, context-specific natural, political, and human factors.