



# Impacts of DFID-funded participatory crop research in South Asia

Tens of thousands of the poorest farmers in marginal areas of South Asia are benefiting from the products of a new, low-input Green Revolution. DFID-funded participatory crop research has brought new, high yielding varieties to regions that have been untouched, for the past thirty years or more, by the products of modern plant breeding. Not only do the new varieties yield up to 50% more than the local cultivars, but they do so without any additional inputs.

DFID-funded participatory crop research has given farmers in marginal areas a greater choice of varieties that perform well under local, low-input conditions. The research has been an outstanding success and for a wide range of important crops including rice, maize, chickpea and horsegram. We describe here the outputs of the rice improvement research.

## The Problem

Farmers in marginal areas of South Asia have benefited little, if at all, from better varieties that could produce higher and more stable yields. The varieties they grow are very old and low-yielding often because they are susceptible to pests and diseases. Unfortunately, solutions are not readily available as most of the modern



**Farmers assessing rice varieties in a client-oriented breeding programme in India.**

varieties that have been released are not suitable to low-input, rainfed conditions of have inferior quality grain that makes farmers reject them. DFID-funded participatory crop research has changed this.

## The Solution..

For the first time the true needs of the farmers have been fully accounted for by the research system. This was done by working closely with the client farmers in the testing and breeding of new varieties. The research was brought to the farm by the pioneering techniques of participatory varietal selection (PVS) and client-oriented breeding. These have provided farmers with access to new rice varieties that perform well on marginal lands without the need for expensive additional inputs.

## ..in India

The release in 2001 of two new rice varieties, Ashoka 200F and Ashoka 228, from a client-oriented breeding programme marked the first-ever release of fine-grained rice varieties for rainfed upland conditions. Apart from much better grain quality, the new rice varieties when compared to the best local alternatives are:

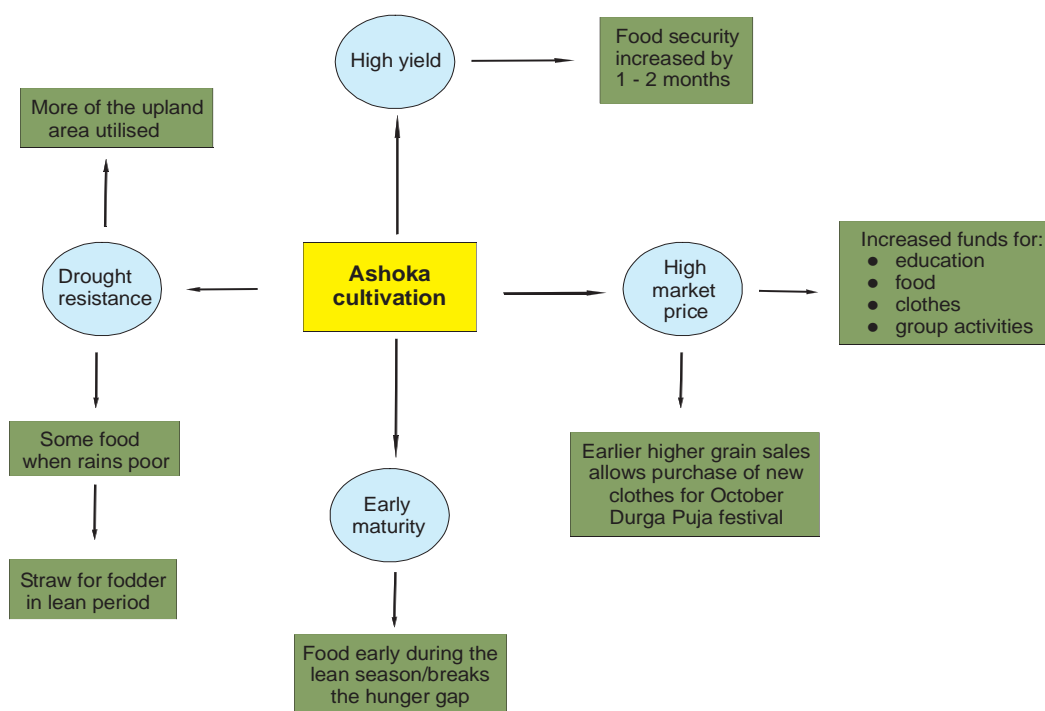
- **High-yielding** - 30% more grain.
- **Early-maturing** - mature earlier than the earliest material that was previously available. Not only does this reduce the risk of crop losses due to end-of-season drought but it reduces the hunger gap so there is less need to borrow money for food, and gives farmers grain to sell when prices are highest.

- **Drought-tolerant** - the vast majority of farmers that grow them say the new varieties are more drought tolerant than any alternative. They produced grain in the severe drought of 2002 in eastern India, when all other varieties failed. Departments of agriculture, on seeing this performance, are promoting them even in Indian States where they are not officially recommended.
- **Extremely popular** - the acceptability of these varieties is remarkable. Once farmers have tried them, all (over 99%) continue to grow them on increasing proportions of their land.

Growing the new rice varieties substantially improves farmers' livelihoods (Fig. 1). The most important effect has been the increase in food security by about 25%. This shifts many households from grain-deficiency to self-sufficiency.



**Ashoka 200F and Ashoka 228 identified from client-oriented breeding and released as Birsa Vikas Dhan 109 and 110 by the Birsa Agricultural University in May 2001.**



**Fig. 1. The effects of cultivating Ashoka rice varieties on farmers' livelihoods. The diagram is a summary of farmer group discussions from 14 villages in three districts of eastern India, October 2004.**

## ..in Nepal

DFID-funded research has created new rice varieties that are adapted to the low-fertility, rainfed conditions of the *Terai*. The new varieties yield up to 50% more grain, have improved drought tolerance, lower production costs and are earlier to mature. The *Terai* accounts for nearly 75% of the rice area of Nepal, yet until this research delivered new varieties most farmers were growing decades-old varieties.

The impacts are considerable. Tens of thousands of farming households have adopted project varieties and they report substantial benefits to their livelihoods.



**A farmer with a breeding population of rice in which she will select early season rice, Chitwan, Nepal.**

## ..in Bangladesh

The products of client-oriented breeding of rice in Nepal have been enthusiastically adopted by farmers in Bangladesh because they yield much more grain (about 1 t ha<sup>-1</sup> more) but without any of the disadvantages that are often encountered with modern varieties. The yield gains of over 35% are a considerable achievement as no additional inputs are required.



**A Bangladeshi farmer threshes his Judi 582 rice crop**

One of the most promising varieties, Judi 582, not only produces higher yields of better quality grain but matures over 3 weeks earlier than the most popular local variety, Swarna. Farmers greatly like early maturity because it allows the follow-on crops to be sown earlier, thereby giving

higher yields and thus maximising the productivity of the cropping system as a whole.

Judi 582 is just one of several examples. So far, nine varieties from the client-oriented breeding in Nepal have been tested in Bangladesh and all nine have performed better than the best locally available or recommended varieties.

## A little money goes a long way!

In Bangladesh, significant impacts on rice productivity at the national level are expected if current trends in adoption continue. The value is expected to amount to hundreds of millions of pounds.

Financial analyses have been done for eastern India and Nepal. We have used very conservative estimates based on substantial amounts of field survey data. In Nepal the net present values are high (£10 million by 2010) and the internal rates of return are also high (83%). In eastern India, using the most conservative estimates the cumulative benefits by 2010 are predicted to exceed the total expenditure of £19.5 million on the Plant Sciences Programme between 1995 and 2005.

## Acknowledgements

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