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Contribution of farmer-to-farmer video to food security: evidence from Bangladesh

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Introduction

According to the Food and Agriculture Organization about 1020 million people suffer from hunger and poverty in the world (FAO, 2009a). Between 2005 and 2007, the number increased by 75 million of which 41 million were from Asia and the Pacific (FAO, 2008). Poverty and hunger has been further exacerbated by the recent food, energy and financial crises. Apart from climatic and political factors, rapid urbanization and population growth coupled with changes in food habits has increased the pressure on cereal producers, especially in Asia. Between 1990 and 2007, the average annual population growth rate was 1.4% while the average annual growth in cereal and oilseeds production was only 1.3% (Dobbs, 2008). The world has observed the lowest cereal stock in three decades, and many developing countries, such as ten Asian rice growing countries including Bangladesh, have faced localized food crises. Market reliance and food imports are no key solutions towards food security, as made clear by the recent food crisis. This calls for an integration of an ecological and sustainable approach towards localized food production (Dobbs, 2008).

Food security is intrinsically related to seed security. Access to quality seed is one of the key factors influencing the production of cereals like rice. High costs of production inputs, such as fertilizer and seeds, led to a lack of access to quality seed by farmers in developing countries and stagnating production (FAO, 2009b). Research and extension services in many developing agrarian countries failed to ensure access to quality seeds of crops (World Bank, 2007). For instance, in Bangladesh about 70% of the totally required rice seeds come from farmer retained seeds (Bashar *et al.*, 2008). This indicates that the quality of farmer retained rice seeds is an important factor to strengthen local rice seed systems (Almekinders & Louwaars, 2002) and increase production.

Improving the quality of farmer retained seeds is challenging. Farmers in Bangladesh grow rice under volatile climatic (rainfall, flood, drought) and socio-cultural conditions. Agronomic practices, rice seed harvesting, drying and storage are major areas where Bangladeshi rice farmers face problems to maintain quality farm seeds. Especially women need additional skills, knowledge and innovative capacities to produce and market quality rice seeds (Van Mele *et al.*, 2005a). So how can we enhance the capacity of farmers to produce quality farm seeds? Face-to-face extension is costly and advisory services are facing numerous challenges to support their clients with quality information and innovations. In what follows, we take a closer look at how to use media, such as video, to reach more people with quality information that triggers innovations and contributed to poverty reduction.

Video-mediated farmers' capacity building is a new approach being tested in Bangladesh since 2003. CABI collaborated with the Rural Development Academy (RDA) and a non–government-organization

(NGO),Tenghamar Mahila Sabuj Sanhga (TMSS), with the support of the Poverty Elimination Through Rice Research Assistance (PETRRA) project. Local improved rice seed technologies and knowledge had been internalized through participatory learning and action research, and subsequently captured in video. Rice seed videos were developed on rice seedling production, rice seed harvest, post-harvest processing and storage with selected experienced farmers who explained and showed rice seed innovations before the camera. The intricacies of the video development are described by Van Mele *et al.* (2005b). Inspired by this experience CABI collaborated with RDA, TMSS and another NGO, the Agricultural Advisory Society (AAS), from 2005 to 2007. Unlike conventional training sessions, they used open-air video shows followed by interactive discussions in 43 villages of 12 north-west and north-eastern districts of Bangladesh. Seven villages served as control villages where no video-mediated learning interventions took place.

Video-mediated learning triggered experimentation and adaptation of the local innovations among resource-poor women (Van Mele, 2006; Van Mele *et al.*, 2007). Apparently, video was an effective tool in getting new ideas into the heads of rural women, who then tried and experimented with them. However, whether or not these ideas will lead to sustained change also depends on the ease of use and profitability of the technologies. Except for some conservative estimates, the studies did not investigate to what extent the seed videos contributed to changes in rice production and rice self-sufficiency of the rural households, which we present in this article.

Methods

From December 2008 to February 2009, 140 female farmers were randomly selected from 28 villages where RDA and TMSS operated. Similarly, 40 female farmers were selected from four control villages in the same region. We used structured interviews containing questions on: (i) personal information; (ii) household characteristics; and (iii) rice and seed production statistics. For the latter, we relied on the recall method, since we did not have baseline data. Although this method has certain shortcomings, some authors (e.g. Kaaria *et al.*, 2008) suggest that it is a useful method to obtain insights and valid data. Indicators and local units were formulated in a way that respondents could easily compare their present (2008) and previous (2005) status. Since rice is central to the livelihoods of rural Bangladeshis, we used the rice self-sufficiency index (RSSI) to get insights in the food security status of the households. RSSI was calculated using the following formula modified from Page *et al.*(2009).

$$\text{Rice Self-Sufficiency Index} = \frac{\text{Actual yield (kg/ha)} \times \text{Landholding (ha)}}{\text{Annual paddy requirement (kg)}} \times 100$$

The annual paddy requirement (unprocessed) for each household was calculated taking into account the number of dependent adults, adolescents and children under 10 years and FAO's recommendation of energy intake (annual intake is 365 kg of unprocessed paddy rice for adult, 274 kg for adolescent child over 10 years and 183 kg for a child under 10 years). The farmer's own yield data in terms of kg of paddy/ha (derived after converting the local unit maund/bigha) was used to calculate the RSSI for each household. In cases where the farming families are sharecropping, the amount of grain that is due to the landlord was subtracted from the actual yield. Data were analyzed using descriptive statistics. Paired t-test was computed to assess the change of rice production and self-sufficiency index.

Results

The average age of the women in the video villages was 34.1 ± 8.1 years and that of the control villages was 34.7 ± 7.9 years. About 45% of the women in the video villages were illiterate and 40% had less than five years of schooling. In the control villages 55% of the women were illiterate. Most of the households in both villages were male headed. The principal activity was rice farming with households practicing double rice cropping. The rice cultivation seasons are called *Aman* (June/July-October/November) and *Boro*

(December/January-April/May). Farmer retained seed is one of the major sources of rice seed in all villages. Households of video and control villages had on average about 0.5 ha of cultivable land.

Table 1: Households rice production statistics in study sites, Bangladesh, 2005-2008.

Production characteristics	Video villages		t-value	Control villages		t-value
	Before	After		Before	After	
Average seed rate (kg/ha)	58.1±9.7	30.7±7.5	47.2***	55.7±9.5	54.8±9.8	2.7
Average yield (kg/ha) in Aman	3770.9±346.4	4323.1±361.7	-24.2***	3701.2±267.7	3709.5±255.3	-0.83
Average yield (kg/ha) in Boro	5414.8±506.4	6206±601.7	-32.9***	5632±497.9	5645.9±491	-1.6

***p<0.001

Results (Table 1) show that after the video mediated learning farmers reduced almost by half their seed rate. In *Aman* season, the average yield increased significantly by 14% from 3.7 t/ha to 4.3 t/ha, whereas the average yield increased by 15% from 5.4t/ha to 6.2 t/ha in *Boro* season. No significant changes were observed in the control villages.

Table 2: Rice self sufficiency index (RSSI) of households in the study sites, Bangladesh, 2005-2008.

Rice Self Sufficiency Index	Video villages		t-value	Control villages		t-value
	Before	After		Before	After	
Average (%)	185.8±72	213±82.4	-23***	138.5±55.5	138.9±55.8	-1.4

***p<0.001

Group discussions and in-depth interviews revealed that women could produce quality seeds by applying what they learnt from the videos. The seeds they produced were bright, had less deformity, and resulted in higher demand and price in the local market compared to before watching the videos. In addition to detrimental environmental factors (less sunshine, more temperature and humidity), poor quality of rice seeds contributed to comparatively low yields in *Aman* season. By applying the simple technologies presented in the videos farmers could produce and store quality seeds, which in turn contributed to yield increases in both seasons. About 69% of the households started using their own farm seeds compared to 42% before the video intervention. Table 2 indicates that the RSSI value increased significantly by 27% for the households that were exposed to videos. In control villages there was no significant change in the RSSI.

Table 3: Status of household categories in video villages, 2005-2008.

Categories*	Before Video (%)	After video (%)	Change of household categories (%)**
Marginal (RSSI<=100)	12.9	7.9	(-) 5
Subsistence (RSSI >100-200)	53.6	34.3	(-) 19.3
Rice Surplus (RSSI >200)	33.6	57.9	(+) 24.3

* Based on household categorization principle as suggested by Page *et al.*(2009) for north-western Bangladesh
** (-) indicates decrease and (+) indicates increase

Results indicate that marginal households decreased by 5% (Table 3), whereas rice subsistence households decreased by 19% after video exposure. Rice surplus households increased by 24% after the video intervention. So albeit rice self sufficiency of rural households significantly increased, subsistence households performed better in achieving rice self sufficiency than those falling into the marginal

households category. This is due to differences in rural institutions (land size, land tenure status, labour etc), which will be discussed in an upcoming publication.

The households produced (based on double cropping) on an average 2754±1053 kg paddy in 2005 and 3157±1208 kg in 2008. The average annual rice production significantly increased by 402 kg in video villages. At an arbitrary price of 6 US$ for 38 kg (1 maund) paddy the increased production contributed to an annual increase of income of 63 US$ per household.

Two-third of the respondents perceived that local rice seed innovations contributed to obtain additional income. They mentioned that selling additional paddy, rice seed and seedlings are major ways that contributed to getting additional income directly (Table 4). Some others saw input cost reduction and home consumption of additional paddy as an indirect contribution to household income.

Table 4: Perception of women about contribution of rice seed innovations to get additional income.

Perception about additional income	% respondents
Selling additional paddy	7.9
Selling additional rice seeds and seedlings	20.7
Selling both seeds and paddy	10.7
Sufficient paddy for the family saved cost to buy rice from the market	15
Production cost reduced due to use of own seeds	13.6
No income	32.1

Conclusion and outlook

The results of this study suggest that farmer-to-farmer videos increased women farmers' knowledge and practice on local rice seed techniques, which in turn increased their productivity and rice self-sufficiency significantly. After having watched the videos women could produce quality seed, which decreased the seed rate and increased total rice production. The results of this study are comparable to earlier experiences on rice seed health innovations which showed that retaining own seeds using locally grounded simple innovations farmers could obtain yield increase from 5 to 15%. Besides yield increase seeds could be sold at double the price of paddy (Orr *et al.*, 2004).

Video has been used for several decades, but mostly for disseminating expert information. Accessibility, financial sustainability and appropriateness of video as a tool to train rural people has always been questioned, even when the Food and Agriculture Organizations (FAO) undertook the first steps in the mid 1970s in Peru and Mexico to use video as a tool to recover, preserve, and reproduce farmers' knowledge. Several approaches, such as Farmers Field School (FFS), Integrated Pest Management (IPM) School, Participatory Technology Development (PTD), Participatory Learning and Action Research (PLAR), Local Agricultural Research Committees (CIALs), have been applied over the years, but without giving consideration to video as a potential farmer empowerment and poverty reduction tool. Video is a flexible learning tool that can be integrated with existing extension approaches. Our study shows that when farmers, who were previously involved in such participatory approaches, are involved in shaping the videos, the subsequent impact has been substantial. It is not the mere use of vide *per se*, but impacts depend on how women and poor people viz a viz other stakeholders are involved in the process of video development and subsequent use in other communities. Detailed descriptions of the process and impact on women farmers' innovation capacity has been described in separate studies (Van Mele, 2006; Van Mele *et al.*, 2007).

Sharing of knowledge and skills is more effective when farmers watch their peers explaining the '*why*' and '*how'* of a locally grounded technology. The results presented in this article shows that video has huge and untapped potential for building farmers' capacities at local and regional levels and as such can contribute to rural poverty reduction.

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