# Does Diversification of Rice-based Systems Always Lead to Gender Equity?

**Article** · December 2014

CITATIONS
0

READS
31

**1 author:**

Kamala Gurung
International Centre for Integrated Mountain Development
**9** PUBLICATIONS **14** CITATIONS

SEE PROFILE

CAPSA
Centre for Alleviation of Poverty through Sustainable Agriculture

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

palawija
newsletter

Vol 31. No 3. Dec 2014

RESEARCH ARTICLE

# Does Diversification of Rice-based Systems Always Lead to Gender Equity?

## A case study from Bangladesh

**By Kamala Gurung and Humnath Bhandari**

Kamala Gurung
International Rice Research Institute (IRRI), Social Sciences Division, Dhaka, Bangladesh

Humnath Bhandari
International Rice Research Institute (IRRI), Social Sciences Division, Dhaka, Bangladesh

## Introduction

Rice cultivation and fisheries are the basis of the livelihoods of the majority of the over 150 million people in Bangladesh. Rice is the country's main agricultural crop, grown on 11.7 million hectares with almost all 15 million farm families in the country producing the cereal. Rice production and related activities generate one-sixth of the average rural household income, half of agricultural GDP and half of rural employment. Rice provides two-thirds of the per capita daily calorie intake and half of per capita daily protein intake in the country. The past three decades have seen a more than two-fold increase in paddy production, from 21 million tonnes in 1980 to 48 million tonnes in 2010, substantially improving food security and reducing poverty in Bangladesh. Food accounts for 54 per cent of the average household consumption expenditure in Bangladesh, of which rice constitutes 31 per cent. Rice thus has a key role in promoting food and livelihood security in Bangladesh. Rice farming in the country is labour-intensive, and participation by men and women varies according to geographical location and socioeconomic conditions. Rural women in Bangladesh are less involved in field activities in rice crop production and more in post-harvest activities organized within the homestead.

Rice-based farming systems in Bangladesh have been diversifying and changing with an expansion of monoculture commercial aquaculture farming (CAF) in rice fields over the past decades, in particular of fish, shrimp, and prawn. Traditional subsistence backyard fish farming ponds are also being converted into CAF. Such transformation can affect livelihood options, gender roles and responsibilities as well as access to productive resources such as credit. Accordingly, this paper examines the transformation in rice-based agricultural systems and the implications of CAF for gender roles and relations and household food security.

## Data and method

Khulna, Sathkhira and Mymensingh, districts that have undergone commercial aquaculture development over the past decades, were selected for the study in keeping with its objectives. Commercial aquaculture farming is dominant in 7 of the 10 villages selected from the three districts while rice farming is the main agricultural activity in three villages. Forty sample households were selected at random from each village with a total of 400 households included in the survey.

Data collection comprised qualitative and quantitative techniques. Qualitative data were collected using multiparticipatory research techniques such as self-evaluation of access to and control over resources,

timeline of land-use system, and the well-being ranking. Quantitative data were collected by pre-tested survey questionnaires. Farm households were classified into four socioeconomic groups based on the criteria for wealth ranking identified by the farmers. The analysis is disaggregated by socioeconomic groups and gender.

## Evidence

**Trends in agricultural land use**

Information on agriculture land-use trends was mainly gathered through focus group discussions with key informants. The 'agricultural land-use' calendar from 1970 to 2011 was used in the 10 research villages. Land use in the sample villages falls in the following main categories: (a) rice cultivation, both local and high-yielding variety (HYV); (b) commercial aquaculture; (c) seasonal fallow; and (d) cultivation of crops such as legumes, jute, vegetables, oilseeds and wheat.

Until the 1990s, local rice varieties occupied a relatively large proportion of farmland, but this declined drastically from 33 per cent of crop area in 1971-1980 to 17 per cent in 2006-2011. In contrast, area under HYV rice increased significantly from 1 per cent in 1980-1990 to 25 per cent in 2006-2011. Local rice varieties are mainly cultivated in the *aman* season and HYVs during the *boro* season. Because of short-duration HYVs being planted in the *boro* season, the seasonal fallow land area has decreased drastically from 50 to 20 per cent over the past three decades. These findings are consistent with farmers' views on changes in land-use patterns in research sites.

Before the 1990s, there was no commercial aquaculture, particularly shrimp/prawn farming, in the research study sites. Homestead fishpond culture was mostly for meeting household consumption needs or run as a small-scale enterprise. However, there has been a remarkable increase in CAF after the 1990s because of the high international demand for shrimp and fish. Of the total 400 sample households, 36 per cent own fishponds. The farmers' perception of the increasing trend of commercial aquaculture evidently correlates with the number of fishponds constructed by sample households from 1968 to 2011. A large number of fishponds were constructed after 2000. The average pond area ranges from 0.03 to 4.68 ha per household, according to the 2011 household survey. The rapid growth in the number of ponds in recent years reveals that small aquaculture farming is transforming into CAF, a monoculture system characterized by high capital, high input and high yield.

**Economics of rice farming and commercial aquaculture**

The main factors driving the shift from rice farming to monoculture CAF are: (a) higher profit, (b) shortage of farm labour for rice production, and (c) higher cost of labour and other inputs for rice production. More than two-thirds of households surveyed found rice production less profitable than CAF, which motivates farmers to engage in CAF despite the higher capital investment required.

The study analysed incomes from CAF and rice production and found the net return from CAF of about $2,245/ha/year to be 3.6 times higher than that from rice production in three seasons (per year). On the other hand, the total cost of three seasons of rice production at $2,284/ha/year is higher than the cost of aquaculture farming at $2,117/ha/year. The cost of labour for rice production is higher than that of other inputs. Among the three seasons, the cost of $1,062/ha/year and also the net return of $503/ha/year from *boro* rice production are higher than those for the other two seasons of rice production. The return on *aus* rice production is negative at $–33/ha/year. For CAF, the variable cost of $1,650/ha/year is much higher than the fixed cost of $467/ha/year, comprising mainly of the cost of fish feed and the labour cost for fish feeding and pond maintenance.

During the group discussion with male and female farmers, it was learned that CAF offers quick and direct cash benefits with less work than rice cultivation. However, women farmers said that CAF adoption had unintended effects on the allocation of food within the household. Thus, households that were self-sufficient in rice, become rice-deficient after shifting to CAF. This happened because the rice farm was converted to aquaculture use. This has made them more dependent on the market for their daily food consumption and more vulnerable to increasing rice prices.

**Unequal income distribution**

The disparity in incomes was studied to examine the hypothesis that CAF adoption increases income inequality. This involved a comparison of the incomes of households with and without commercial aquaculture. The Gini coefficient and Lorenz curve were used to measure income distribution and inequality. The analysis shows

## EDITORIAL

**Dear Palawija News readers**

Women play an important role in agricultural production in developing countries but twenty years after the world conference on women in 1995, the majority of rural women continue to live in poverty and social marginalization. A 2011 report of the Food and Agriculture Organization of the United Nations (FAO) highlighted constraints faced by women that reduce their productivity, as a reason for the underperformance of the agricultural sector in many countries. The World Bank has also underscored the need for increasing rural women's access to crucial services and opportunities that have traditionally been limited by persistent cultural, social and political barriers. However, in many parts of the world, women's role as the main farm producers, is largely unrecognized.

This issue of Palawija Newsletter addresses the role of women in the sector and the need to empower them to promote sustainable agriculture.

The research article by Kamala Gurung and Humnath Bhandari of IRRI, Bangladesh examines the transformation in rice-based agricultural systems in Bangladesh and the implications of commercial aquaculture farming (CAF) for gender roles and household food security. The short article by Cai Cai of the ESCAP Gender Equality and Women's Empowerment Section underlines the importance of forward-looking, gender-responsive government policies and programmes for the post-2015 era, to enable rural women to contribute fully to sustainable agriculture and rural development.

This issue also reviews the FAO report *Gender in Agriculture*: *Closing the knowledge gap* which summarizes women's contribution to agriculture and food security and the obstacles to their broader participation. Links to additional recommended readings and resources are provided to explore the subject in greater detail.

This issue also highlights a success story on how home gardens have contributed to household nutrition security and the changing of women's roles in household food management in India.

We hope readers benefit from the information in the Newsletter and welcome your feedback and contributions to future issues.

that the Gini coefficient for households that are not practising aquaculture is smaller (0.35) than for households engaged in aquaculture (0.48) (see Table 1). Likewise, the Lorenz curve area for households not engaged in aquaculture is smaller than for households practising in aquaculture (see Figure 1). Both measures indicate that income inequality is lower among households without CAF than among those with CAF. On the other hand, low-medium income and poor households also leased out their farmland. The discussions revealed that such households were compelled to lease/mortgage their lands which were surrounded by large neighbouring shrimp/fish farms. Moreover, crop cultivation on such lands is not suitable due to waterlogging and high salinity problems caused by the surrounding aquaculture farms. Often, such farmers face pressure from influential persons to lease out their land and their lack of access to credit/loan services means they also cannot start aquaculture farming themselves.

This implies that CAF increases income inequality. The findings clearly indicate that it is mainly the rich and upper-medium income households which are engaged in CAF, which thus increases their income, further widening inequality. On the other hand, poor and lower-middle income households were less involved in CAF. Such households said that CAF requires a large amount of capital and credit and they neither have the assets nor access to credit. This has resulted in income inequality.

It was found that credit is one of the main factors determining CAF adoption. Credit sources include commercial banks, non-governmental organizations (NGOs), money lenders and other informal sources such as relatives and friends. Of the households surveyed across different socioeconomic groups, 99 were able to access credit from different sources.

**Figure 1. Lorenz curves for income distribution and inequality for CAF and non-CAF sample households (2011-2012)**

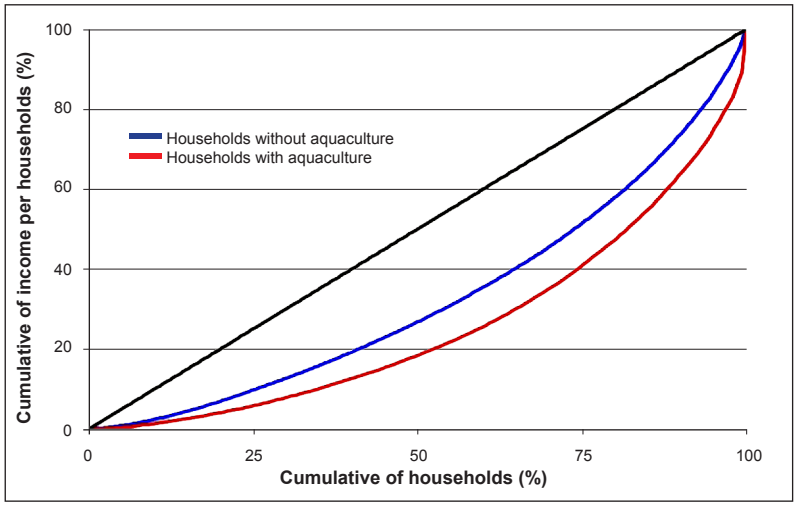


**Table 1: Gini coefficient for CAF and non-CAF sample households**

| Households | Gini coefficient (index) |
|---|---|
| With aquaculture | 0.48 |
| Without aquaculture | 0.35 |

Source: Household survey 2011-12

NGOs were the main source of credit, according to women in all the households surveyed. The findings also show that households availed of credit from NGOs more than once. The amount of credit varies significantly according to the socioeconomic status of the household. The average amount borrowed is significantly lower for poor households ($207) than for rich ones ($595). The data also show that poor and lower-middle income households, and women, were not able to access credit from banks. Only the rich and upper-medium income households have obtained bank loans. The amount borrowed from banks is much higher and the interest rate is much lower at about 11.5 per cent than for other sources. These findings are consistent with statements by poor farmers that the amount of credit they can access is not enough for aquaculture investment. Therefore, the upper-medium income and rich farming households, comprising a smaller proportion of farming communities, benefit more from CAF.

**Labour participation by gender in rice farming and commercial aquaculture**

The labour requirement for *boro* rice cultivation is higher than that for CAF. This is consistent with the study's finding that the shortage of labour is a major reason for shifting from rice farming to CAF. Hired labour accounts for 62 per cent of the workforce in rice production. Crop establishment, particularly transplanting involves 51 work days per hectare while harvesting and threshing takes 55 work days per hectare. These are the most labour-intensive rice cultivation activities. In aquaculture farming, males in the household do more of the work than hired labour. Out of a total of 153 labour days/ha/year needed for aquaculture farming, only 34 per cent are provided by hired male labour, the rest being provided by family labour. This indicates that the shift from rice to CAF reduces overall farm employment opportunities and, more importantly, off-farm employment opportunities for the poor.

The contribution of labour by women in rice production is quite low compared to men. Women are mainly responsible for post-harvest activities such as drying, storage and seed selection. However, women's labour contribution in CAF is even lower compared to rice production. Although women are engaged in almost all activities and largely in fish feeding, their labour contribution is quite low at 4.2 work days/ha/year. This indicates that the shift from rice to CAF reduces employment opportunities for women. During the group discussions, women farmers said that while their workload had been reduced by CAF, they were also not able to use the time saved for other productive activities.

**Gender-differentiated market access for rice and commercial aquaculture products**

Women from households that had converted to CAF from rice farming and also leased out their

land, found their access to nutritional resources such as rice for home consumption, had reduced after the shift. In the past, households stocked rice for a whole year and women decided on its use for family consumption. But now, the women have to depend more on the market and on husbands for the family food needs because the household income is controlled by men. Women are not aware of the exact income from fish/shrimp farming as it is the men who sell in the market. They also said that, while before the shift to CAF they could obtain fish/shrimp any time for household consumption, they now have to wait for the harvesting period or ask husbands to procure fish/shrimp for the family meals. The women said they had more access to and control over agricultural food products when they were cultivating crops. Traders would come to the village to purchase the grain, so the women knew how much they were earning from selling rice. They could also decide how much rice to sell.

## Conclusion

The study shows that the switch to CAF from rice farming changed local livelihood sources as well as gender roles and relations. At the household level, CAF is mainly adopted by higher-income households because of the high capital requirements. However, CAF has affected the food self-sufficiency of households, making them dependent on markets.

At the community level, the shift to CAF has reduced off-farm employment opportunities for the lower-income groups and has made them dependent on non-farm activities. While the shift to CAF from rice farming has decreased work pressure on women, they find it less easy to source household food needs and have lesser say in the use of agricultural products. They now depend more on the market and on husbands for obtaining food for household consumption.

The findings have the following policy implications:

First, food security is the primary objective of rural households and hence, rice farming is unavoidable. Therefore, in view of the shortage of labour, there is a need for women-friendly, mechanized transplanting and harvesting techniques, in order to sustain rice cultivation. These methods could be used by women's groups formed as service providers to generate income.

Second, diversifying rice-based farming systems with vegetables, legumes and lentils could be an effective profit-enhancing strategy for developing sustainable rice-based enterprises that would benefit women and poor farmers.

Third, as poor and lower-medium income households, and rural women, have not been able to take advantage of CAF due to limited access to credit, it is important to ensure equitable and easy access to agricultural credit with low rates of interest and without collateral. Targeted aquaculture training will also enable women and poor farmers to take up aquaculture farming.

## Acknowledgments

The authors acknowledge the financial support of the two IRRI projects “Cereal Systems Initiatives for South Asia (CSISA)-Bangladesh”, funded by USAID and “Village Dynamics in South Asia (VDSA)”, funded by the Bill & Melinda Gates Foundation. The household data used were collected by the Dhaka-based NGO, Socioconsult. We would also like to thank Mr. John Marandy, Mr. Alamgir Chowdhary, Mr. Mukles and enumerators and staff from the NGO for their excellent survey work.

*(References will be made available upon request)*