DIVERSITY OF RICE VARIETIES IN SOME SELECTED HAOR AREAS OF SUNAMGANJ DISTRICT

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ABSTRACT

Muttaleb M. A., Jalil M. A., Paul A. K., Elias Habib S. M. and Hossain M. M. 2008. *Diversity of Rice Varieties in Some Selected Haor Areas of Sunamganj District*. **Int. J. Sustain. Crop Prod. 3(5):31-34**

A study was conducted to find out the rice varietal diversity in some selected Haor areas of Sunamganj district during January to march, 2008. Data were collected from 102 farmers of 6 villages of Sunamganj district. It was revealed that majority (65.69%) of the farmers cultivated 2 to 3 rice varieties, 26.47% farmers cultivated single variety and only 7.84% farmers cultivated 4 to 5 varieties. Among the varieties, BRRI dhan29 ranked first in respect of percent of cultivated farmers (92.20%) and areas (58.30%) followed by BR19. Overwhelming majority (69.30%) of the farmers had low to moderate rice varietal diversity while 26.47% had no rice varietal diversity and only 3.92 % farmers had high rice varietal diversity.

Keywords: Rice varietal diversity, farmer, Haor

INTRODUCTION

Agricultural sustainability for better quality food, protecting natural resource base and promoting social wellbeing of farming communities and societies is supported by agro biodiversity (Jacson and Pascual, 2007). Rice covered about 75% cultivated area in Bangladesh. Although widespread planting of modern rice varieties has kept the world's increasing population fed but these has also increased the dangers of genetic vulnerability to major disease or insect pest outbreaks (IRRI, 1998). Whether subsistence or commercial, irrigated or rainfed, all rice farmers need genetic diversity in their rice as the basis for a healthy crop as it lessen the likelihood of an epidemic in intensive agricultural system as well as prevent minor pests from evolving into major ones (IRRI, 1998). Diverse rice varieties provide a solid alternative to chemical pesticides for insect pests (IRRI, 1998). Agricultural production increasingly relies on temporal diversity, changing varieties more frequently to maintain resistance to pests and diseases (Rubenstein *et al*., 2005) in the light of the changing circumstances and environments (Heywood, 2007). Rice biodiversity provides the base of genetic improvement by pure line selection and hybridization and molecular techniques for desirable traits (Singh *et al.*, 2000). Number of traditional varieties has shrunk with a few productive and relatively uniform high yielding varieties dominating the rice landscape (Singh *et al.*, 2000). Loss of biodiversity and the associated decline in ecosystem services affect all aspects of human life (Hengsdijk, *et al.*, 2007). Hence, biodiversity maintenance in rice along with other crop is very much essential but in this regard there is a scarcity of farm level information in Bangladesh including remote Haor areas of Sunamganj district. Therefore, a study was designed to describe and to ascertain the rice varietal diversity in Haor areas of Suanamganj district of Bangladesh.

METHODOLOGY

Data were collected through multistage sampling procedure from six villages of Sunamganj district. Initially, two Upazilas were selected randomly from 12 upazialas. In the second stage, a union was selected randomly from each of Tahirpur and Sunamganj sadar upazila. In the third stage, three villages were selected from each selected union by using random number. The selected villages were pataboka, Manik khola and Vabanipur of Dakshin Sreepur union under Taherpur upazila and Bahadurpur, Neelpur and Haluargaon of Lakshmansree union under Sunamganj sadar upazila. Finally, 17 farmers were selected by using random number from each selected village. Thus a total of 102 farmers constituted the sample of this study. Data were collected through pre-tested structured interview schedule by face-to-face interview procedure during January to March, 2008. Variety is simply understood as a crop population recognised by farmers and encompasses landraces that have been grown and selected by farmers for many years, including modern varieties that meet the traits of being distinct, uniform and stable (Wood and Lenne, 1997; Bellon and Risopoulos, 2001; Benin *et al*, 2004). Rice varietal diversity refers to the existence of diversity of rice varieties in farmer's field (Singh *et. al.*, 2000: 24). Rice Varietal diversity was measured through rice varietal diversity index (VDI) (Kshirsagar *et al.*, 1997). The operational definition of rice varietal diversity index (VDI) for a particular farmer was one minus of the squared

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sum of the proportional area planted to each variety (Kshirsagar *et al.*, 1997) and rice varietal diversity index (VDI) for a particular farmer was measured by using the following formula:

$$\mathrm{VDI}_i = 1 - \sum_{j=1}^{n}\left(\frac{a_{ij}}{A_i}\right)^2$$

Where,

VDI_i = rice varietal diversity index

a_{ij} = area planted to the jth variety in the ith farmer and

A_i = total area planted under rice for the farmer

The index could range from 0 to 1, zero indicated no rice varietal diversity and 1 indicated very high rice varietal diversity for a farmer. Data were analyzed according to the objectives of this study with Excel and Statistical Package for Social Sciences (SPSS).

RESULTS AND DISCUSSION

Rice variety grown by the farmer ranged from 1 to 5 with the average being 2.18 and the standard deviation 0.99. Overwhelming majority (74.53%) of the farmers cultivated more than one variety. Almost two-thirds (65.69%) of the farmers cultivated 2 to 3 varieties while only 7.84 % farmers cultivated 4 to 5 varieties (Table 1). Singh *et al.*, (2000) reported that majority (70 %) of the farmers cultivated more than two to five rice varieties while 20% farmers cultivated six to eight rice varieties in eastern India. Farmers select new varieties depending upon land type, soil type and water availability. Farmers have been growing more than one variety due to diverse and unpredictable environment of ecosystems, diverse household needs, combat pests and diseases, suit different cropping systems and market demand (Singh *et. al.*, 2000). Some farmers opined that unavailability of desired variety's seed as constraint of varietal diversity.

Table 1 Distribution of number of rice varieties grown by the farmers

Number of rice varieties grown by farmer	Farmers		Mean	Standard deviation
	Number	Percent		
1	27	26.47		
2	43	42.16		
3	24	23.53	2.17	0.99
4	4	3.92		
5	4	3.92		

Overwhelming majority (92.20 percent) farmers have adopted BRRI dhan29 (Table 2) followed by BR19 (51.00 percent), local variety Gochi (23.50 percent), different hybrids (22.50 percent), BRRI dhan28 (15.70 percent), BR14 (7.80 percent), local vaiety Rata (3.90 percent) and Jagli (3.90 percent).

Table 2 Distribution of rice varieties of the farmers along with area (%) and rank order

Rice varieties grown by farmers	Farmers			Rice varietal coverage	
	Number	Percent	Rank order	Area (%)	Rank order
BRRI dhan29	94	92.20	I	58.30	I
BRRI dhan 28	16	15.70	V	4.59	V
BR19	52	51.00	II	20.19	II
BR14	8	7.80	VI	1.21	VII
Hybrid	23	22.50	IV	6.26	III
Gochi	24	23.50	III	6.21	IV
Rata	4	3.90	VII	0.81	VIII
Jagli	4	3.90	VII	2.43	VI

In respect of area coverage, BRRI dhan29 ranked first covering with 58.30 percent cultivated area followed by BR19 (20.19 %). The ranges of covered area by remaining five varieties were 0.81 - 6.26 % of the total

cultivated area. Huda (2004) reported that 43 % area covered by BRRI dhan29 in Sunamganj district and 39% area of Haor of Bangladesh which was lower than this finding. He also opined that farmers' preferred this variety due to its higher yield. Muttaleb (2006) reported that cent percent farmers preferred BRRI dhan29 due higher yield and non shattering attribute in some selected haor areas of Habiganj district even though this variety had experienced of crop damage by early flash flood in some years. Modern varieties occupied a vast majority area (90.55%) than local varieties (Table 2). Huda (2004) indicated that 60% cultivated area of Haor covered by modern varieties that was lower than this finding. Such increased coverage of modern rice varieties may be due the availability of seeds of modern varieties at farm level, expansion of farmers to farmers seed exchange programme, special emphasis of government on rice production and farmers increased awareness for their own food security. Joseph *et al*., 2006 reported that 52 percent areas occupied by a rice variety 'Uma' due to its high grain yield, high straw yield, tolerance to pests and diseases, good cooking quality, grain quality and high marketability in Chenkal village under Thiruvananthapuram district of Kerala state of southern India.

Rice **v**arietal diversity index of the farmers ranged from 0 to 0.74, the average being 0.36 and the standard deviation 0.25. Farmers were classified into four categories viz. no varietal diversity index, low varietal diversity index, medium varietal diversity index and high varietal diversity index (Table 3). Data presented in Table 3 indicate that the highest proportion (62.75 percent) of the farmers had medium rice varietal diversity while 26.47 percent had no rice varietal diversity. About 7 percent farmers had low diversity and only 3.92 percent had high rice varietal diversity.

Table 3 Distribution of farmers according to their rice varietal diversity index

Rice varietal diversity categories (scores)	Farmers		Range	Mean	Standard deviation
	Number	Percent			
No rice varietal diversity (0)	27	26.47			
Low rice varietal diversity (0.01-0.33)	7	6.86		0.36	0.25
Medium rice varietal diversity (0.34-0.66)	64	62.75	0-0.74		
High rice varietal diversity (>0.66)	4	3.92			
Total	102	100			

Thus, overwhelming majority (96.08 percent) of the farmers had no, low or medium rice varietal diversity index. Rice varietal diversity provides different growth duration with diverse characters that may reduce or escape the risk of rice crop damages due to early flash flood, hailstorm, severe wind, pests, diseases, drought and other natural hazards (Bellon *et. al.,* 1998). Varietal diversity also can lessen short term labour scarcities by providing the scope of labour requirement at different times (White *et. al.,* 2005). Diversification of farm enterprises is an important risk reduction and efficient resources use strategy in farm management (Anosike and Coughenour, 1990).

CONCLUSIONS AND RECOMMENDATIONS

Due to the great concern of declining of rice biodiversity and overwhelming majority farmers of the study area possessed moderate, low or no rice varietal diversity, it is essential to conserve varietal diversity through arrangements of adequate programme by the concern authorities for creating favorable attitude of farmers towards maintaining varietal diversity in rice and other crops. In this case, mass media campaign by popular TV channels, radio, cinema halls and news papers can play vital role. During, launching programmes for the promotion of diversity of rice as well as other crops emphasis are needed on in situ conservation. Timely availability of adequate amount of quality seeds of farmers' desire rice varieties and other crops at farm level may enhance rice varietal diversity. Policy makers need to consider the matter and introduce programmes involving seed producers and suppliers for timely disposal of different variety's seed to the farmers. It is also essential to aware the farmers about the benefits of high rice varietal diversity by the different government, non-government and private extension agencies.

REFERENCES

Anosike, N. and C. M. Coughenour. 1990. The Socioeconomic Basis of Farm Enterprises Diversification Decisions. *Rural Sociology*, 55(1):1-24

Bellon, M. R., D. S. Brar, B. R. Lu and J. L. Pham. 1998. Rice Genetic Diversity Resource In: Dowling, N. G., S. M. Greenfield and K.S. Fisher (Eds), *Sustainability of Rice in the Global System*. Los Banos (Philippines): IRRI.

Bellon, M. R. and J. Risopoulos. 2001. Small-scale Farmers Expand the Benefits of Maize Germplasm: A Case Study from Chiapas, Mexico. *World Dev.*, 29: 799–812

Benin, S., M. Smale, J. Pender, B. Gebremedhin and S. Ehui. 2004. The Economic Determinants of Cereal Crop Diversity on Farms in the Ethiopian Highlands. *Agricultural Economics*, 31: 197–208

Hengsdijk, H., W. Guanghuo, M. M. Van den Berg, W. Jiangdi, J. Wolf, L. Changhe, R. P. Roetter and H. Van Keulen. 2007. Poverty and Biodiversity Trade-off in Rural Development: A Case Study for Pujiang County, China. *Agricultural Systems*, 94: 851-861

Heywood, V., A. Casas, B. Ford-Lloyd, S. Kell and N. Maxted. 2007. Conservation and Sustainable Use of Crop Wild Relatives. *Agriculture, Ecosystems and Environment*, 121: 245–255

Huda, Q. M. 2004. Experience with Modern and Hybrid Rice Varieties in Haor Ecosystem. Proceeding of the Workshop on Modern Rice Cultivation in Bangladesh. Pp: 303-320

IRRI. 1998. Delivering Diversity to the Field. In: Biodiversity Maintaining the Balance. IRRI, Los Banos, Philippines

Jacson, L. E. and U. Pascual. 2007. Biodiversity in Agricultural Landscapes: Investing without Losing Interest. *Agricultural Systems,* 85: 183-201

Joseph, P. G., K. P. Kumar, M. Ananthraman and S. Ramanathan. 2006. TAR-IVLP: an Effective Institutional Mechanism for Assessing the Appropriateness of Rice Varieties. *International Rice Research Notes*, 31.1: 37-38

Kshirsagar, K. G., S. Pandey and M. R. Bellon. 1997. Farmers Perception, Varietal Characteristics and Technology Adoption: The Case of A Rainfed Village in Eastern India. Discussion Paper5/97(Draft). Social Science Division, IRRI.

Muttaleb, M. A. 2006. Farmers' Preference Matching and Adoption of Modern Rice Cultivation Practices in Northeast Haor Area of Bangladesh. Ph. D Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Rubenstein, K. D., J. P. Heisey, R. Shoemaker, J. Sullivan and G. Frisvold. 2005. Crop Genetic Resources: An Economic Appraisal. *Economic Information Bulletin* Number 2. USDA, Washington DC. In: Heywood, V, A. Casas, B. Ford-Lloyd, S. Kell and N. Maxted (2007) Conservation and Sustainable Use of Crop Wild Relatives. *Agriculture, Ecosystems and Environment*, 121: 245–255

Singh, R. K., N. K. Sarma, S. R. Das, J. K. Roy, R. K. Sahu, K. Prasad and S. Mallik.2000. Rice Biodiversity and Genetic Wealth. In: Singh, V. P. and R. K. Singh (Eds), *Rainfed Rice: A Sourcebook of Best Practices and Strategies in Eastern India*. Los Banos (Philippines): IRRI. 24-30

White, D. S., A. Labarta and E. J. Leguia. 2005. Technology Adoption by Resource- Poor Farmers: Considering the Implications of Peak-season Labour Costs. *Agricultural Systems,* 85: 183-201

Wood, D. and J. Lenne. 1997. The Conservation of Agro biodiversity on farm: Questioning the Emerging Paradigm. *Biodiversity Conserv.* 6:109–129