International Journal of Environmental Research and Development.
ISSN 2249-3131 Volume 4, Number 4 (2014), pp. 291-296

http://www.ripublication.com

Conservation and Utilization of Indigenous Rice Varieties for a Sustainable Livelihood Security

Sharmila Dutta Deka[1], Bhaswati Sarmah[1] and Sangeeta Sharma[2]

National Seed Project, Department of Plant Breeding and Genetics, Assam Agricultural University, Jorhat-785013, Assam, India

Abstract

Biodiversity conservation is a new approach to addressing sustainability in a rapidly changing world. Biodiversity is intrinsically essential for our existence and is fundamentally valuable in its own right. North-east India, including Assam, is endowed with exceptionally rich biodiversity. Assam is traditionally a rice growing area. Rice plays a pivotal role in the socio-cultural life of the people of the state. Besides, the region is inhabited by a large number of ethnic groups whose preference also varies from one another. All these factors are responsible for evolution of a large number of rice varieties in the region. The important indigenous varieties of Assam are unique to the state and not found in any other part of the world. In the present investigation, a cluster of fourteen villages under Jorhat and Golaghat subdivisions was chosen to study and uncover the indigenous diversity of rice from these interior areas of the state. The status and prospects of these varieties were also analyzed through different participatory tools like crop and varietal diversity matrix tool, simple ranking, matrix ranking, etc (Walter and Marja 2007). During the investigation, several indigenous rice varieties were identified in both the areas like, Joha (scented rice), Bora (glutinous rice), Chokowa (soft rice), Bao (red rice) and various Sali rice varieties. It was found that there is an ample scope towards sustainable livelihood improvement as well as security for the people of these areas since the identified specialty rice varieties have significant marketable prospects which could be utilized to exploit the market potential through proper channeling and market linking and generate an additional income source in the climate change scenario.

Key words: Conservation, indigenous rice, sustainability.

1. Introduction

During the long cultural development phase, plant biodiversity has been the single greatest natural resource mankind has ever garnered. Biodiversity is intrinsically essential for our existence and is fundamentally valuable in its own right. North-east India, including Assam, is endowed with exceptionally rich biodiversity. Although research and development has advanced throughout the years, there are enormous reservoirs of plant diversity in the north eastern region which may prove to be important for food security, nutrition and livelihood alleviation throughout the region. Variations in ecological conditions, ethnic diversity, diverse cultural practices and different quality preferences are accountable for the appearance and evolution of a large no of plant diversity in the region. Assam is traditionally a rice growing area. Rice plays a pivotal role in the socio-cultural life of the people of the state. Being the single major source of agricultural GDP, rice plays a significant role in the state economy. Further, its importance in the consumption basket (the average monthly consumption per capita is about 13kg) also speaks volumes on the rice orientation of the state (Islam, 2012). At present, rice occupies about two-third of the total cropped area in the state. Being the single major source of agricultural GDP, rice plays a significant role in the state economy. The crop has enormous diversity in the region, which has resulted due to highly variable rice growing ecosystems. The variations in soil and climatic conditions of Assam in particular have lead to a spontaneous occurrence of several indigenous rice varieties and all these factors are responsible for evolution of a large number of varieties in the region. Most of these have been in use from time immemorial with traditional method of preparation. Unknowingly people have selected many useful cultivars, which have commercial value in the present day world in which people prefer to have a variety of tastes. Besides, the region is inhabited by a large number of ethnic groups whose preference also varies from one another. Conservation of the traditional varieties in farmer's field is also important to maintain genetic variability in the variety.

2. Materials and Methods

An investigation was conducted to study and uncover the diversity of indigenous rice varieties available in a cluster of fourteen villages in Pirakota and Kosupathar under Jorhat and Golaghat subdivisions respectively, of the state of Assam. . Another objective was to analyze and determine the status and commercial prospects of these varieties. A participatory mode of approach using crop and varietal diversity matrix tool, simple ranking and matrix ranking (Walter and Marja2007) were followed to study and identify indigenous rice varieties grown in the target areas.

Participation is about empowerment (Chambers, 2006). It includes people's involvement in decision making process, in implementing programmes, their sharing of benefits of development programmes and their involvement in efforts to evaluate such programmes (Cohen and Uphoff, 1977). There are several participatory tools with the help of which the important genetic resources can be found out as well as their usefulness can also be determined. The Crop and varietal diversity matrix tool helps to identify unique, common and rare varieties of crop species cultivated in an

area. It further shows the diversity available in a community or farm household. It is a helpful tool to assess the origin and specific use of varieties and seeds. Simple ranking is another participatory tool that allows identification of criteria used by farmers to distinguish varieties followed by the detection of characteristics that distinguish them. Then in order to compare and characterize a range of varieties, for example, to compare local varieties with tested varieties, matrix ranking tool was employed.

3. Discussion

During the investigation, the areas of Pirakota and Kosupathar were found to be rich source of rice biodiversity as an ample number of indigenous varieties were found in the areas. The selection of the two districts in a way is an ideal location for collection, conservation and evaluation of rice diversity. It was observed that on an average, 10-15 different traditional rice varieties are grown in a village and one farmer grows 6-7 varieties in his lands. Broadly, the indigenous varieties identified could be encompassed in four categories of specialty rice (**Table 1.**) through the use of crop and varietal diversity matrix tool. These important varieties of rice, which are traditionally produced in Assam are unique to the State and not found in any other part of India or in any part of the world. It was also found that there is an ample scope towards sustainable livelihood improvement as well as security for the people of these areas since the identified specialty rice varieties have significant marketable prospects which could be utilized to exploit the market potential through proper channeling and market linking and generate an additional income source in the climate change scenario. The various indigenous specialty rice identified and their scope towards livelihood sustainability are discussed as follows-

Joha (aromatic rice)*: Joha* rice in the state are short to medium slender/bold grained unlike Basmati rice which are long slender grains. This indigenous cultivars cook non-sticky and tasty. The elongation ratio of joha rice is 1.4 times. However, aroma of this class of rice is as high as Basmati. The price of this class of rice is high as compared to any other rice in the domestic market. Joha rice is used in the preparation of Kheer (payas), polao and other vegetarian and non-vegetarian items. These aromatic varieties have a great demand and a big market in many South East Asian countries.

Bora (waxy rice): The waxy rice or glutinous rice known as *bora* in vernacular is grown by the farmers of the state to meet up their domestic consumptions. This class of rice is required to prepare a number of food items during any festival, religious occasions and ceremonies. Many communities in the region also prepare high class rice beer out of *bora* rice. Glutinous rice also has an enormous diversity in the region. The grains of the glutinous rice are opaque and cooked sticky due to its chemical constituent known as amylopectin, a component of the starch. They also cook easy and preparations can be preserved for long time. Traditionally many items are prepared. Mention may be made about *pithas* (biscuit like confectionaries) *chira* (flaked rice), *hurum* (expanded waxy rice), *Sunga chaol* (roasted rice inside bamboo

internode), *Sandohguri* (fried rice powder) and rice beers. Glutinous rice seems to have attracted many companies outside the state for preparation of instant and packet food, battery component etc. There is also possibility for preparation of glue, beverages etc. The food items prepared from this class of rice has a great demand not only in the local and domestic market but it has export potential too.

Chokowa (soft rice): This is another class of rice used for instant preparations. Similar class of rice is also not known in other parts of the world. Its preparations are very popular in community feasts and festivals in Assam. *Komol chaol* (soft rice) are prepared from this class of rice by boiling paddy followed by one drying and then dehusking them is very common and popular in rural Assam. This preparation can be preserved for quite long time and can be consumed instantly by soaking the rice either in cold or hot water for a brief period of time and then consumed with sugar or molasses, milk or curd and even with salts and oils and pickles. These preparations seem to be useful for sailors, travelers, mountaineers, defense personal etc. However, not much has been done so far either in research or popularizing them elsewhere in the country. Rice powders and flake rice prepared from *chokowa* rice are very tasty and preferred by the local people of the area. Thus this class of rice is metaphorically termed as "magical rice" as it becomes ready to use just by soaking and it has a great demand in the domestic as well as foreign market.

Bao (Red rice): While most varieties exhibit a white pericarp, local farmers traditionally grow rice varieties with a red pericarp, which are preferred over white rice because of their supposed higher nutritional value and market potential. Now-a-days people prefer to have a healthier diet and so the demand of red rice, which contains higher amounts if iron, fiber, zinc, vitamins and other micro nutrients, is increasing day by day. This class of rice has already found a momentous place in the American market.

The indigenous varieties available in both the areas were compared among themselves and between two check varieties widely grown in the area, Ranjit and Mahsuri (**Table. 2**) using the Matrix ranking tool. It was found that the indigenous varieties were relatively superior than the check varieties with respect to demand, resistance to pest and diseases and eating quality although were a little pitiable from yield point of view. The eating quality was fount to be the best for *Joha* or scented varieties. Due to their wider adaptability, under different stress situations, non-dependant on too much of chemical fertilizers and good cooking and eating quality, these traditional varieties are still liked by the farmers. This happens more so in less accessible areas like these target areas.

Markets are constantly changing and new opportunities are emerging for tapping some of these dwindling pockets of agro-biodiversity to generate income for local people. Apart from adopting various conservation measures and techniques, mass awareness programme should also be taken up in safe guiding existing biological reserves for future improvement of agriculture. The Union Agriculture Ministry

ranked Assam 1st in position in rice production in 2010-11. The state produced around 51 lakh metric ton rice in 2010-11 which is 15.4% higher than the previous year. The special variety of rice grown in the state like – *Joha, Bora, Kumal, Bao* has good prospect for export and growing these varieties for seed production may attract good response from the trading/exporters communities if proper channelling and market linking can be accomplished.

Table 2. The indigenous varietiesidentified in the target areas

S.no	Red Rice Varieties	Waxy Rice Varieties	Scented Rice Varieties	Soft Rice Varieties
1	Maguri Bao	Ronga Bora	Kola Joha	Soru Chokowa
2	Dori Bao	Bokul Bora	Kon Joha	Bor Chokowa
3	Soimari	Jenguni Bora	Boga Joha	Chokowa
4	Adolia Bao	Aki Bora		
5	Amona Bao	Mou Bora		
6	Negeri Bao	Moina Bora		
7		Goria Bora		

Table 2. Matrix ranking of some of the popular indigenous varieties

Traits / Varieties	Yield	Demand	Pest and disease resistance	Taste/ Eating Quality
Maguri Bao	4	5	5	4
Dori Bao	4	3	5	3
Soimari	4	5	5	3
Adolia Bau	4	5	3	4
Amona Bao	3	2	4	3
Negheri Bao	4	5	5	4
Ronga Bora	4	5	5	4
Bokul Bora	4	5	5	4
Jengoni Bora	3	5	4	4
Aki Bora	3	5	5	3
Mou Bora	4	4	5	3
Moina Bora	4	5	4	4
Kola Joha	3	5	5	5
Kon Joha	3	5	5	5

Boga Joha	4	4	5	5
Soru Chokowa	3	5	5	4
Bor Chokowa	4	4	5	4
Ranjit	5	4	3	3
Mahsuri	5	4	2	3

1= LOW / BAD , 5= HIGH / GOOD

4. Conclusion

The investigation revealed that there is a huge market for these indigenous rice varieties. This will ignite interest among the growers of such rich species to increase its production and save these varieties from being abandoned. In a belated move, Government of India has finally proposed to apply registration of aromatic rice (Joha) and soft rice (Chokowa or Komal saul) of Assam as a Geographical Indication (GI). There is a need to further investigate in this area and update information on assessment of diversity distribution. Biodiversity conservation should aim at methods that can generate viable and desirable livelihood or development return over a long term while at the same time conserve biodiversity. Thus, in order to ensure sustainability conservation strategy of biodiversity there is a need to recognize and understand the indigenous system and technology so as to build a strategic frame work needed to conserve biodiversity. In addition, participatory farmers' friendly method of technology development must be put in place so as to carry the farmers along and also boost up their livelihood.

References

[1] J M Cohen and N Uphoff (1977), Rural development Participation: concepts and measures for project design, implementation and evaluation, Ithaca, New York, Cornell University, Rural Development Committee

[2] I Khairul (2012), Position of Rice Production in Assam, IJCAES special issue on basic, applied & social sciences,vol II.

[3] R Chambers (2006), Notes for participants in PRA-PLA familiarisation workshops, Brighton, IDS.

[4] S B Walter and H T Marja (2007), Participatory tools working with crops, varieties and seeds, pp. 11.