Tubers can reduce rice waste

There has been a growing concern in recent times about the deteriorating conditions of soil health and water resources due to improper use of chemicals for rice monoculture. There is a greater need to have an integrated approach in the management of plant nutrients and chemicals. Tuber crop production may reduce this environmental degradation.

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THE Gangetic delta is famous for rice consumption since the Neolithic age. The Bangladeshis eat rice every day and at every meal. Most of the people start the day with a breakfast of 'Panta' (boiled rice soaked overnight in water and slightly fermented). Moori (puffed rice), Cheera (flattened rice), 'khoi' (popped rice), 'Chal vaja' (fried rice), 'Shirni' (rice boiled with crude sugar and coconut milk) `pitha' (rice cake), 'khichuri' (rice boiled with pulses), payesh (rice boiled in milk plus sweet)' are very common in our everyday meals.

Bangladesh is an agriculture based country having more than 150 million people living on 147570 sq km area of land. The population will be double in the next 40 years. The rice consumption is about 160 kg/year/ person (BBS, 2011), which is equal to 76% of total calorie intake and 66% total protein requirement. Rice sector contributes one-half of the agricultural GDP and one-sixth of the national income in Bangladesh. The total area under rice in Bangladesh is about 10.83 million hectares with a production of 33.54 million metric tons (BBS, 2011). Bangladesh imported only 27,700 tonnes of rice since the beginning of fiscal 2012-13, down 94 percent from 5.15 lakh tonnes in the same period a year earlier, according to the food ministry.

Impact of rice monoculture on the environment

To grow more rice to feed more people, most of the cultivable lands were brought under rice production. Rice monoculture is the agricultural practice of producing rice over a field year after year. It causes quicker spread of diseases and pest outbreak because a single crop is more susceptible to a specific pathogen or pest. It has negative impacts on agro-biodiversity. Rice monoculture provides a narrower range of habitat than crop diversification. Agricultural system consists of two dimensions of biodiversity: (1) the diversity of crops and animals chosen by a farmer for production (planned biodiversity) and (2), the "associated" biodiversity including the micro-organisms, insects, birds, and other wildlife so that both depend upon and help maintain agro-ecosystems. Monoculture affects the associated biodiversity. Abundance of beneficial insects like honeybees, bats, and birds tend to be lower in monocultures than in fields containing diverse forage and nesting sites. Continuous application of urea and other pesticides for rice monoculture has negative impacts on water quality, wildlife populations, and human health. Without integrated soil nutrient management practices, soil fertility declines as the same crop absorbs nutrients from the same layer/ horizon of soils.

Alternatives to rice monoculture

Crop diversification gives a wider choice in the production of a variety of crops in a given area to expand production of various crops and also to reduce the risk. Crop diversification can be considered as a shift from traditionally grown less remunerative rice to more remunerative crops. Market and social attitudes are also related to induce crop shift. Higher profitability as well as the resilience/stability in production also induces crop diversification. Cultivations of large number of crops in rainfed lands can reduce the risk factor of crop failures due to drought.

A slump in the market value for rice greatly reduces the income of the producers. Unfavourable weather or pest outbreak destroys a large part of rice crop, leaving the farmer in ruins. Farmers having crop diversity can avoid these risks and provide their families a healthy diet. Addition of more crops to the existing cropping system is termed as horizontal diversification. The systems of multiple cropping can increase food production potentially. In vertical crop diversification, various other downstream activities are undertaken.

Malnutrition is still an issue of national urgency. The consumption of food items other than rice is much less than the minimum requirements. Further, the composition of the diet is not balanced as lion share of the calorie and protein intake comes from rice. Tuber crop is able to reduce malnutrition in Bangladesh.

In future a balanced use of land and water resources will be the central theme for sustainability of agricultural growth in Bangladesh. There has been a growing concern in recent times about the deteriorating conditions of soil health and water resources due to improper use of chemicals for rice monoculture. There is a greater need to have an integrated approach in the management of plant nutrients and chemicals. Tuber crop production may reduce this environmental degradation.

The crop having modified stem or root to store food materials is termed as tuber. They are rich in starch and can be used as staple or a supplementary food in Bangladesh. Tuber crops like potato, sweet potato, aroid (Kachu), yam (Meta alu/ Gachh alu) and cassava (Shimul alu) grow in Bangladesh. Tuber crops are cheaper sources of protein and calorie and they also have a positive impact on the nutrient balance of the soil. The farmers can easily cultivate these crops after harvesting the major ones. Due to 'Green Revolution' production of rice increased tremendously. But the production of tuber crops did not increase in the same trend (Figure 1). With this realization and to reduce the huge drain of foreign exchange in importing rice, tuber cultivation should be expanded throughout the country.

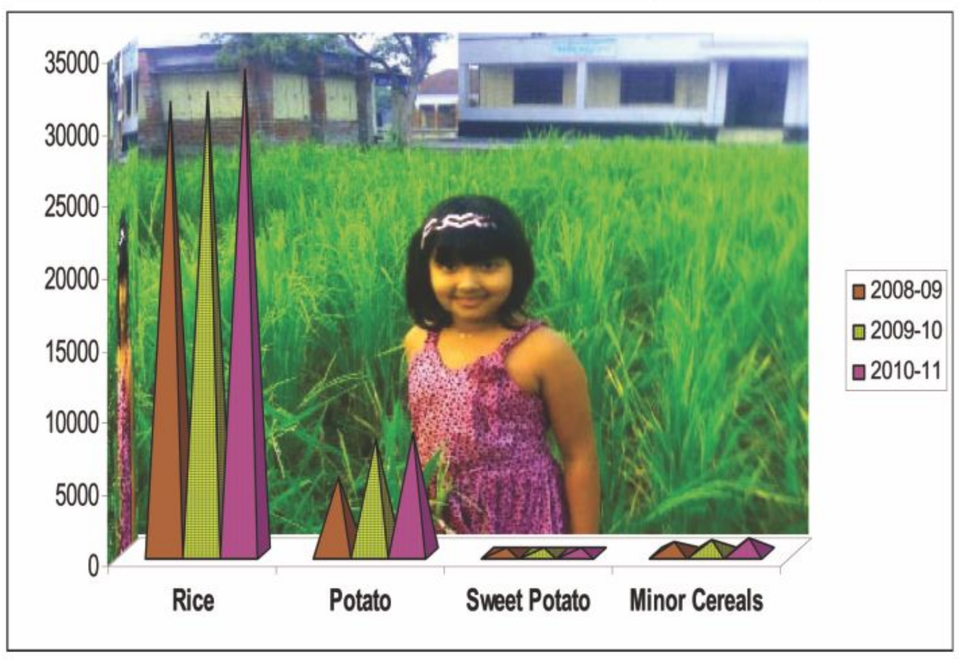

Figure 1: Trend of rice and tuber crop production in Bangladesh

Potato: It can be considered as a security crop in times of rice shortages, due to its high carbohydrate content contributing to improved food security. It is also used as a vegetable by most of the people. As a short duration crop, its increased use can reduce the pressure on rice. The average yield is triple of rice. Bangladesh can expand potato cropped area from the northwestern part to the middle part of the country. Potato - Boro (HYV) - T. Aman cropping pattern can ensure maximum return from a crop field.

Sweet potato: It is considered as an important supplementary food as well as a poor people's food. Young stems and leaves are used as vegetables as well as fodder. The average yield is about triple of rice. It grows on marginal lands, homestead areas, roadsides and elsewhere as a low input crop. Sweet potato-Aus- Fallow or Sweet Potato-Jute-Fallow cropping pattern can provide maximum return from a fallow land.

Aroids/ Taro (Kachu): Most of the aroids are used as food, others are used as ornamentals and a few have medicinal value. It can grow on any land including moist and shady places. The average yield is more than double of rice. Taro (Mukhi Kachu), Giant Taro (Man kachu), Elephant Foot Aroid (Ol kachu), and Eddoe (Pani Kachu) are commercially cultivated in our country. The Arrow-leaf Elephant Ear (Dudh Kachu) and Tania (Moulavi Kachu) are mainly cultivated as vegetable. The leaves of some wild aroids are also edible. The aroids are rich in starch and can be processed like potato. Aroid starch is used to prepare baby foods for its easily digestible characteristic. It is a good quality source of minerals and vitamins. For its cultivation, no intercultural operations and fertilizer or pesticide application are required. Its production should be encouraged to ensure maximum utilization of fallow or aquatic land.

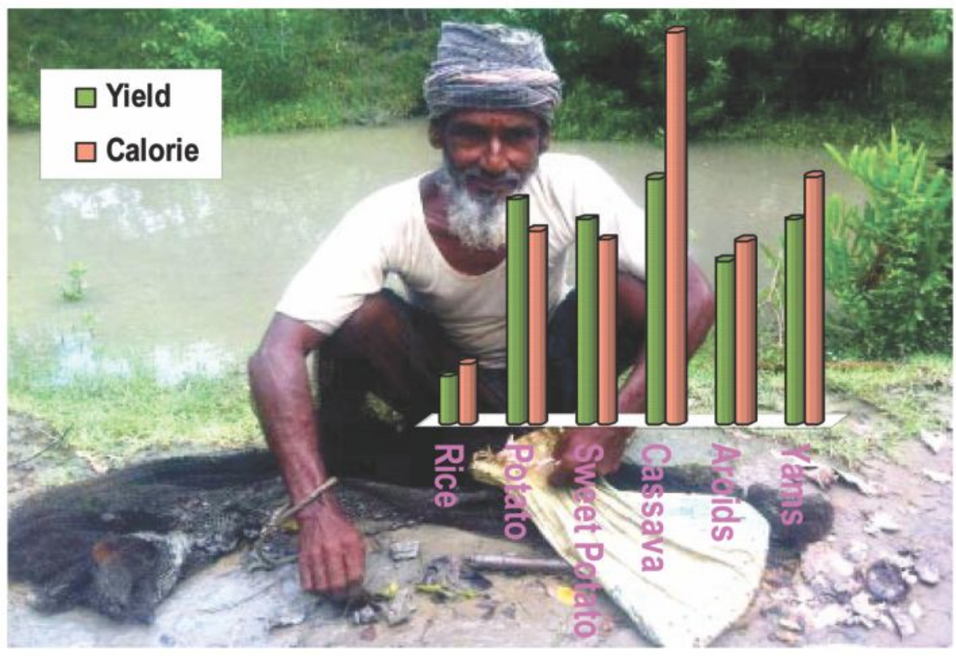

Figure 2: Comparative yield and calorie production from the same unit of land

Yams (Gachh alu/Meta alu): Yams are a primary agricultural and culturally important commodity in West Africa. They produce edible tubers, bulbils, or rhizomes. Yams naturally grow in the Sal/ Hill forests areas of Bangladesh but they are available all over the country. Purple yam (Goichcha alu), Air Yam (Gachh alu), Bitter Yam (Bish alu), Five-leaf Yam (Jhum alu), Cinnamon Yam (Pesta alu), Fancy Yam (Machh alu), Three-leaved Yam (Shuori alu), White Yam (Sada alu), Chinese Yam (Chupri alu), Yellow Guinea Yam (Boroi alu) and Ten-months Yam (Mom alu) are found in different parts of the country. It is cultivated mainly as a homestead plant and consumed as a vegetable. Like aroids no intercultural operations and fertilizer or pesticide applications are required for its production. The average yield is triple of rice.

Cassava (Shimul alu): It is a perennial shrub with enlarged tuberous root resembling sweet potatoes and is eaten in the same way. In Chittagong Hill Tracts and Garo Hill regions of greater Mymensingh district the adhivasi (tribal) people consume it as a supplementary staple. The average yield is quintuple of rice. Like aroids and yams no intercultural operations and fertilizer or pesticide applications are required for its production. Cassava is the highest calorie productive crop from the same unit of land (Figure 2)

Tips for managing rice waste

Through controlling a small portion of rice during cultivation, buying, cooking and eating we can reduce rice waste, save money and protect the environment.

Write a smart shopping list: Write a smart shopping list consisting of 50% rice and 50% tubers for just you need.

Stick to the list: Don't be tempted by offers and don't buy when you are hungry, otherwise you will come back with more rice than you need.

Buy less quantity of rice than you need exactly: After buying more amounts of seasonal fruits and leafy vegetables, buy less amount of rice than you need exactly.

Cook /eat 50% rice + 50% tubers: Cook and eat 50% rice and 50% tubers (potato or sweet potato or yams or aroids or cassava) to satisfy your stomach. At first you need to change your food habit slowly.

Don't throw cooked rice-water (Fan/ Mar) away: Don't drain out cooked rice-water as it is highly rich in amylose. Amylose is water soluble and easily digestible polysaccharides having an unbranched, linear, or spiral structure.

Rotate: Try to be habituated with new food items everyday putting the older back.

Eat less rice to flatten your belly: Eat clean but also observe your starches and sugars. Eat vegetables and cut rice portion by half. This will start your system on the road to weight loss. Bulkiness makes you aged and slimness makes you smart.

Serve small amounts: Serve small quantity of rice with the understanding that everybody is not same hungry. This is especially applicable for the children, who rarely estimate how much they can eat at once. Any leftovers can be stored in the freezer for using another day or can be soaked overnight in water for taking as a breakfast in the next morning.

Use plant leaves on stored rice: Sustainable agriculture means a productive agriculture that uses and conserves natural resources. We need to be proactive against the use of toxic chemicals. Foliages of some plant species having insecticidal properties can be used for storing rice without being toxic to pets and humans. Dried leaves of Neem, Malabar Nut (Basak), Knotweed (Bish kanthali), Chaste Tree (Nishinda), Jimson Weed (Datura), Pennywort (Thankuni Pata), Bush Morning Glory (Dhol Kolmi), Onion, Garlic and Turmeric have repellent and lethal effects against the pests of rice. Five centimeter thick layer of dried leaves on the uppermost surface of the pots can protect the stored rice from the attack of any pest.

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Informed decision can reduce our foodprint

CONTINUED FROM PAGE 17

a European funded project "ice2sea" has developed a computer model of glaciers and ice sheets. This model suggests that melting ice would contribute to sea level rise by 4 cm and 37 cm by 2100. However, adding this to other causes of sea level rise such as expansion of ocean as temperature rises we get a figure between 16 and 69 cm by 2100. Here I would like to point out that the model does not predict on the basis of all possible scenarios rather it takes mid range possibility. What is important is that the warming will not be uniform across the globe. Therefore in addition to global projection, regional projection is required, but regional projection is highly unreliable. Looking at the big picture in front of us, we can say that the earth is gradually warming and sea level will eventually rise. Through this process of expansion, some region will feel a cooling effect. This expansion might have a causal effect on food shortage as land mass relates to food production. In order to mitigate this situation, we need to identify our "avoidable food waste and food loss" parameter and act accordingly.

Government needs to show its commitment to positive environmental action not just with words but with concrete action. As an example, in case of Mongolia, projects have been set up to enhance young people's understanding of environmental protection and a national tree planting day set up to combat desertification. In case of Bangladesh, even if we can't reduce waste immediately, we may be able to convert waste into resources through energy harnessing anaerobic digestion or incineration technology. However, reduction of waste at the source is of paramount importance. This is possible through our informed decision about food choice. We shall have to act locally, but think globally. This will surely reduce some of our transportation and storage problem. We always should remind ourselves that "Waste not, want not".

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Waste not, want not

CONTINUED FROM PAGE 17

food waste is the food that is thrown away after it has been purchased by the customer. Such waste includes customer plate wastes from restaurants, or any food purchased from a retail store but then not properly eaten.

If current trend in our consumption pattern continues in such wasteful manner mentioned above, Bangladesh will need to produce about twice as much food by 2050 in a changing climate with higher prices for energy, water and fertilizers. By swapping our wasteful habits for a more sustainable approach to buying, preparing and managing our food, we can all play a part in bringing about significant environmental and greenhouse benefits. We can all reduce the environmental impact by changing our actions towards food production and food waste when we grow and buy local produces and support sustainable farming.

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