

## **Organic farming in populated area: Bangladesh – an example of case study**

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### **ABSTRACT**

Agriculture plays a very important role in populated countries like Bangladesh. Bangladesh ranks eighth in World population rank and fifth in Asia. The conventional agriculture of Bangladesh after green revolution heavily depended on chemical fertilizers and pesticides causing several problems to human health and the environment. As a result, food safety has now become a big issue. Moreover, the cost of agriculture has increased manifold with declining yield levels and growing dependence on market for purchase of chemical fertilizers and pesticides. Hence the most urgent step is application of bio-products in order to ensure better and safe environment without any reduction in yield of crops.

Food security is also challenging considering the climate change, land degradation and natural disasters in the highly populated countries in Asia like Bangladesh. Small farmers in Bangladesh are struggling to compete with today's liberalized and globalised market and do not get fair price of their product. Organic agriculture is considered to be a suitable agricultural production area to ensure harmonization between human welfare and sustainable development. It may be noted that organic issues are yet to be highlighted as an important agenda in the research institutions and by the policy makers. Organic products have good potential for export, the local market can also be important since many consumers are interested with food quality and food safety and eager to purchase with premium price with proper certification and labeling. To develop the organic agricultural sector in Bangladesh, government should develop appropriate policies, product standardization and support programs.

This paper will discuss the importance of organic agriculture in populated countries with few examples, overall opportunities and limitations of Bangladesh.

### **World populated countries and food security:**

At present China is the most populated country followed by India. Among the top ten populated countries in the world, six belongs to Asia i.e. China (rank 1), India (rank 2), Indonesia (rank 4), Pakistan (rank 6), Bangladesh (rank 8) and Japan is in rank 10 position. In the populated countries basic agricultural challenges are identified as food security, productivity, climate change & vulnerability and primary source of livelihood. It was observed that Asian populated countries Global Food Security Index (GFSI) is comparatively lower than that of USA (GFSI 89.5, rank 1) and European countries. In Table 1, it can be seen that China's (GFSI 62.5) position is in 38 and India (GFSI 45.0) in 65 positions. The other top populated Asian countries' are Indonesia GFSI, 46.8, 64 position, Pakistan GFSI 38.5, 75 position and Bangladesh GFSI 34.6, 81 position. Among the Asian countries first and second position are Japan (GFSI 80.7, 16 positions) and South Korea (GFSI 77.8, 21 positions). In Asian countries only seven percent of the world's organic agricultural land is used. In the largest domestic markets for organic foods, only one Asian country Japan occupied 8<sup>th</sup> position.

Table: Top ten populated countries and corresponding Global Food Security Index

Rank	Country	Global Food Security Index score/100	GFSI position in World
1	China	62.5	38
2	India	45.0	66
3	United States	89.5	1
4	Indonesia	46.8	64
5	Brazil	67.6	31
6	Pakistan	38.5	75
7	Nigeria	34.8	80
8	Bangladesh	34.6	81
9	Russia	68.3	29
10	Japan	80.7	16

Source: Economic Intelligence Unit, The Economist, 2012

The largest number of organic producers lists only India is held the position number one in the top ten countries. 89% of Asian countries organic agricultural land is below 1% (organic.net. 2012). Considering the above facts, the organic production of Asia is not successful like USA and European states.

Agriculture in Asia is characterized by small holders of farmland having average size of less than 2 hectares (80% of total farms). The agricultural production of these small farms is presently meeting the food need of one-third of total world population. Asian smallholders are facing several challenges arising from a range of economic, demographic, structural, technological and institutional factors including industrialization and urbanization. Shrinking size of farms, rural-urban migration, environmental degradation, evolution and adoption of genetically modified crops, climate change and its impact may emerge as a future threat for Asian countries.

Bangladesh food security related to population:

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (World Food Summit – 1996). Food security is given the topmost priority in Bangladesh. Side by side with domestic food production, greater importance is given to ensure access to adequate and safe food for all people to maintain an active and healthy life.

Agriculture sector contributes about 21% of total GDP in Bangladesh, out of which crop sector shares 73%, fisheries 10%, livestock 10% and forestry 7%. Bangladesh has made a steady progress in the expansion of food production. Because of the increasing population pressure there has been an extensive use of land to meet the growing demand for food. In Bangladesh area of cultivable lands were 8.85, 8.18, 7.746, 8.44 and 9.098 m ha in 1990, 1995, 2000, 2006 and

2010 respectively. Food production during 1990, 2006 and 2010 were 14.55, 24.569 and 26.59 mMT against the requirements of 16.28, 23.029 and 24.52 mMT respectively (<sup>1</sup>) As per Global Food Security Index, Bangladesh position is lowest in the South Asian countries. 26% people are facing malnutrition and per day 290 cal is taken (where in rich country 1200 cal/per person/ per day).

Decreasing arable land in Bangladesh, together with increasing population and changing climatic conditions, make this challenge more acute. Most of the agriculture production is carried out on small pieces of lands. Bangladesh's population is increasing at a rate of two million every year. Beside that, in order to feed the ever increasing population, the government of Bangladesh emphasized cereal crops production with the introduction of high-yielding varieties of rice and wheat since independence.

In the last two decades, frequent floods, droughts and cyclones have caused extensive economic damage and have impaired livelihoods in Bangladesh. Adapting to and mitigating the effects of climate change is a key to sustainable development and food security issue in Bangladesh. Overall, agricultural GDP in Bangladesh is projected to be 3.1 per cent less each year as a result of climate change. Bangladesh is a disaster-prone country, and, is often at the mercy of natural calamities.

#### Chemical compounds and effects:

Soil health is in jeopardy due to loss of organic matter content and continuous use of unbalanced chemical fertilizers for irrigated rice production. Chemical fertilizer was introduced at farm level in 1959. Then, in 1965, the Government launched a 'Grow More Food' campaign and provided fertilizers and low lift pump (LLP) at a highly subsidized rate with pesticide at free of cost to popularize these inputs among the farmers and meet the country's food shortage. Thus, fertilizer consumption began to increase rapidly with the introduction of HYV rice (i.e. IR5 & IR8) and LLP use.

Concern over sustainability of agriculture and food security in Bangladesh is mounting due to the deteriorating land quality, declining yield, and increasing population. To increase crop yield from the scarce arable land, farmers are intensifying land use, increasing the use of inorganic fertilizers, pesticides, irrigation equipments, and other technologies. The recently cumulative effects of many soil-related constraints such as depleted soil organic matter, imbalanced use of fertilizers, nutrient mining, degradation of soil physical and chemical properties, scant use of bio and organic fertilizers and poor management practices have slowed the growth in yield of major crops. Pesticide use grew rapidly in the early 1970s, following the introduction of modern rice varieties. Sales of pesticides became double in the second half of the 1980s (<sup>2</sup>). More than 47% of farmers in Bangladesh used more pesticides than needed to protect their crops observed in *boro* rice (January-June), potato, bean, eggplant, cabbage, sugarcane and mango growers. During green revolution, for example, 1 kg of added nitrogen fertilizer would produce 20 kg of grain, but now it only produces 8 to 10 kg (<sup>3</sup>). Declining productivity due to soil degradation is now a major constrain. It is said that a good soil should have an organic matter content of more than 3.5%, but in Bangladesh most soils have less than 1.7%, and some soils have even less than 1% organic matter (<sup>4</sup>). Until 1980, the farmers of Bangladesh used to supply three nutrients (N, P and K) to the soil and, thereafter, application of S and Zn particularly for rice cultivation was found necessary. Depletion of soil organic matter, unbalanced use of fertilizers, minimum use of

manure, increasing cropping intensity, use of modern varieties, nutrient leaching and light textured soils have favoured the emergence of micronutrient deficiency in soils of Bangladesh.

#### Organic agriculture technologies and production:

Organic agriculture as a holistic production management system, avoids usage of synthetic inputs and genetically modified organisms, minimizes pollution of air, soil and water, and optimizes the health and productivity of interdependent communities of plants, fisheries, animals and people. In recent years some organic agricultural technologies have proven to be effective technologies and accepted by the farmers such as integrated rice–duck farming practices <sup>(5)</sup>, organic vegetable production in sac <sup>(6)</sup>, pheromone-trap for insect control, compost (kitchen waste, vermin-compost, pile compost, basket compost etc.) and so on. Up till now, however, Bangladesh agriculture has not been able to benefit from the growing global organic market, and they have even failed to create a good domestic market of organic foods <sup>(7)</sup>.

#### Opportunities of organic farming in Bangladesh:

Rice is grown in 82% of total cultivated area in Bangladesh. In the year 2011, the country produced a record 34.25 million tonnes of rice; 3.16 per cent more yield than previous year, following favourable weather and continued government farm subsidies. Following higher production, prices also started to decline in the country causing worries for the growers. The operational food storages having some 1.6 million tonnes capacity are now almost filled in and there is no further space to store newly procured food-grains. In this situation the government is now contemplating for exports of rice after ensuring emergency stocks, to meet accidental need in case of natural disasters and volatile market situation <sup>(8)</sup>. Thailand and Philippines are two Asian countries produced the most organic rice for the export purpose, Bangladesh may also earn the foreign currency by producing and exporting organic rice as organic rice has high demand in domestic and export markets. The other potential organic products are identified in Bangladesh are cereals (wheat, maize or corn), pulses (gram, black gram & lentil), fruits: banana, mango, orange and pineapple, oil seeds & oils (soybean, sunflower, mustard, groundnut, castor, vegetables, herbs and spices (chilli, turmeric, tamarind, ginger etc.) and others: suger, tea. jute, cotton etc.

It is observed that fine rice is a profitable farming venture for farmers and a good source of livelihood. So, besides modern varieties, Bangladesh can produce the traditional fine and aromatic rice. Bangladesh is also a suitable land and climate for year round produces.

As before 1960s the country never practiced high chemical compounds and high inputs but now facing decline of soil health and other problems, so it will be much easier to convince the farmers to adopt organic farming. Organic agriculture is not just a solution for rich countries, but can also be beneficial for developing countries, where it can contribute to purposeful and sustainable socio-economic and ecological development. Organic farming is labor intensive, but Bangladesh has the comparative advantage due to the availability of sufficient labour with reasonable wages.

#### Limitations:

Many farmers are convinced about the importance of organic agriculture and have accepted to adopt this approach on their homestead area. But they are not always able to use it on major

farming land, which provides most of their livelihood security. Key barriers to the wider adoption of organic farming are:

1. The availability of organic fertilizer in villages has not been kept up with increases in farm area and farming intensity. Homestead land gets priority for organic manure and little remains for big farms.
2. Though the quality of organically grown crops and vegetables is much better, organic farming produces fewer crops per unit of land compared to modern farming.
3. Media campaigns and untrained neighbors put pressure on trained farmers to use chemical fertilizers and pesticides for high yields, undermining the adoption of this programme.
4. High yielding seeds, chemical fertilizers and pesticides are more easily available and farmers can use credit to purchase these.
5. Landless and smallholder farmers depend on sharecropping, which forces them to maximize the short-term benefits from crop farming. Chemical fertilizers and pesticides are therefore more attractive, offering more immediate returns than organic farming.
6. Farmers are confused by the contradictory messages and conflicting approaches to promote ecological agriculture by different NGOs (<sup>9</sup>).

To ensure the quality and price of organic products and organize the organic growers, three organic farmers organization was formed in 2011 on a pilot basis in Sunamganj Sadar, Biswavarapur upzilla, Sunamganj and Nasirnagar upazilla in Bramon Baria districts. These societies are getting cooperation from local administration and public representatives. The local bazaar (market) committees are given separate places for the organic farmers to sell the products. But, there are few problems observed. The middlemen are purchasing the products in a bulk volume and do not pay any premium to organic producers and mixing all the organic and non-organic products and selling to more big markets. As a result, only few local consumers are getting the organic products. Considering these limitations, now it has been planning to improve the marketing system for organic growers and trying to make linkage to super markets and other big market outlets. A separate and unique marketing strategy is urgently needed to be developed for the organic growers.

In north-eastern Bangladesh, we are mostly working with small-scale farm households and the newly formed organic farmers organizations with local small farmers. As we have no government approved certification bodies, the organic farmers organizations are ensuring their products quality locally. In addition, Organic Bangladesh Limited (OBL), a private company has recently started standardization of the organic products. Unfortunately the responses from different stakeholders including government policy level are not encouraging this. In general, to grow organic products as per International standard, the field usually to be kept fellow for 3 years and a certain area free from insecticide application, which is too difficult for the growers until the market can be ensured.

#### Recommendations:

In our previous studies (<sup>7</sup>) it was observed that although the level of awareness about organic farming was low, it was revealed that both farmers and consumers were aware of the toxic effect of chemical fertilizers and pesticides. It can make some recommendations for enhancing the adoption of organic farming in Bangladesh.

1. establish commercial units to produce organic fertilizers and identify sources of compost
2. organic farmers group formation
3. develop marketing for organic products to get premium prices
4. on-farm trials, field days, and farmers' participatory training can play a vital role in enhancing a build-up in farmers' capacities.
5. develop and include the "National Organic Policy" in agricultural planning.
6. emphasis on organic farming research and establishment of "Bangladesh Organic Farming Research Institute".
7. an organic certification authority needs to be established on the basis of international standard and introduce Participatory Guarantee Systems (PGS) in farm levels.
8. media (both electronic-television and radio and print-newspapers) can play important roles in increasing awareness of producers and consumers.
9. improve the understanding of ecologically friendly agriculture among the government planners
10. development of organic farming marketing system

#### Conclusion:

Ensuring food security for the huge population for sustained organic agricultural production within the existing scenario of declining soil fertility, decreasing yields, increased and imbalanced use of inorganic fertilizers and pesticides has become a serious challenge for Bangladesh. The need for policymakers to design effective, targeted outreach programs that will address pesticide risk, safe handling, and protection.

Despite impressive gains in increasing domestic food grain production, problem of food and nutrition security remains. Investment in sustainable organic practices in agriculture production and small scale farmers in a new green revolution that gives high priority to small-scale food production based on ecologically viable systems are very important. The government should immediately put emphasis on organic agriculture considering the effects of light, soil nutrients and different dimensions of soil utilization to ensure the country's food security. Mere production cannot solve the problems; rather would create multidimensional irregularities and thus making people more dependent upon so-called high input-based technology.

Considering the scarcity of land and the continued growth of population, there is no alternative but to continue intensifying agricultural production in Bangladesh. Research is urgently needed to determine the magnitude and exact nature of problems including threats to the health of farmers and their families, of pollution of water-bodies, and of pesticide residues on food and to develop appropriate solutions. To ensure food security and food safety, Bangladesh has to pay keen attention to technology generation, uphold soil health, irrigation and water management activities, post-harvest techniques and marketing system.

Organic farming has the potential to expand in Bangladesh by identifying the suitable niches in different locations. Research and development activities need to be strengthened along with promotion of domestic and export marketing of high value organic agro-commodities. Government should take effective initiative through institutional approach to introduce organic farming in Bangladesh.

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