



## UPGRADATION OF THE VEGETABLE PRODUCTION SCENARIO OF BANGLADESH: SUGGESTED STRATEGY

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Bangladesh is primarily an agrarian economy. Agriculture is the single largest producing sector of economy since it comprises about 32% of the country's GDP and employing around 63% of the total labour force. In the rural areas agricultural land holdings are already small, estimated as 0.68 ha per household on the average (Bangladesh Bureau of Statistics, 2000). Bangladeshi diets lack essential amino acids, fats and minerals, and vitamins causing widespread malnutrition mainly due to meager of around 60 g daily per capita availability of vegetables against the required amount of 300 g as per the dieticians.

Government of Bangladesh Government has called for a departure from "rice-led" growth to a more diversified production base that includes several non-rice crops like, maize, legumes, livestock, and vegetables (Hoque 2000). Diversification into vegetable crops and increasing commercialization can support the development of the agricultural sector in several ways. Basically subsistence farming community grows vegetables in Bangladesh mainly around their homesteads where the land is generally more fertile than the land used for field crops. Although, in some areas of Bangladesh (namely Jessore, greater Dhaka region, and Rangpur and Dinajpur districts), this growth has been tremendous and has contributed to a change of existing farming practices, replacing traditional crops as jute, pulses and rice. More than 60 types of vegetables of indigenous and exotic origin are grown in Bangladesh. Based on the growing season, vegetables are categorized as summer/rainy season vegetables, winter season vegetables, and all-season vegetables. Summer/rainy season vegetables are cultivated during the monsoon season from May to October. On the other hand, winter vegetables are grown in short winter span from November to April. About two-thirds of the total vegetables, other than roots and tubers, are produced during this short winter season (Rahim et al, 2007). In fact, 60 to 70% vegetables are produced in winter season and most districts produce marketable surplus during that season (Weinberger and Genova, 2005). Naturally, summer/ rainy season is the scarce season for vegetables in Bangladesh.

Low productivity is the major bottle neck for increasing the total production of vegetables in Bangladesh. Vegetable production in Bangladesh has increased between 1980 and 2003, with an average annual growth rate of 2.8%. Most of this growth can be attributed to area expansion (2.6%) and only a small share to increase in productivity (0.2%). Current

productivity of 7.0 t/ha is marginally higher than 6.8 t/ha witnessed in 1980s (Bangladesh Bureau of Statistics, 2000). Many factors particularly lack of good seed, good varieties, inability and reluctance of the growers to use agrichemicals, and lack of incentives due to improper marketing facilities contributed to such very poor yield level of vegetables in Bangladesh. In the present situation, instead of targeting the expansion of area, the main strategy should to enhance the productivity of vegetable crops excluding potato from the present low of 7.00 tonnes per hectare to at least 10.00 tonnes per hectare by the next five year period. The bunch of action plan proposed include 1) stress on seed production of vegetable crops 2) declaration of special vegetable production zone, 3) germplasm evaluation and varietal development, 4) development and promotion of indigenous vegetables, 5) stress on coverage of larger areas with the hybrids, 6) off season vegetable cultivation, 7) post harvest management, 8) expansion of irrigation coverage, 9) increase in capital inflow in vegetable production system, 10) encouraging hi-tech vegetable production, 11) encouraging high value vegetable cultivation in poly house, 12) development of 'Bio resource centre' for conservation of genetic resources, 13) crop diversification, 14) development of 'Plant health clinic', 15) promotion of integrated plant nutrient management system, 16) Promotion of integrated pest management, 17) development of quality control laboratory, 18) development of pack house facility, 19) improvement /establishment of regular markets/strengthening fresh vegetable marketing, 20) mechanisation of vegetable farming, 21) vocational courses for entrepreneurs/Master farmers, 22) Awareness on the benefits of fruit and vegetables, 23) clear cut policy for GM vegetable and 24) Sustained research and developmental activities.

### **Vegetable production scenario in Bangladesh**

Bangladesh's accomplishments in transforming its agricultural sector into one of the most productive farm economies in all of South Asia is a major development success story. Bangladesh is primarily an agrarian economy. Agriculture is the single largest producing sector of economy since it comprises about 32% of the country's GDP and employing around 63% of the total labour force. In the rural areas agricultural land holdings are already small, estimated as 0.68 ha per household on the average (Bangladesh Bureau of Statistics, 2000). Bangladeshi diets lack essential amino acids, fats and minerals, and vitamins causing widespread mal nutrition mainly due to meager of

around 60 g daily per capita availability of vegetables against the required amount of 300 g as per the dieticians.

Government of Bangladesh Government has called for a departure from “rice-led” growth to a more diversified production base that includes several non-rice crops like, maize, legumes, livestock, and vegetables (Hoque 2000). Diversification into vegetable crops and increasing commercialization can support the development of the agricultural sector in several ways. Commercialization is characterized by households moving from subsistence systems into semi-commercial and commercial systems (with the main objective of achieving food self-sufficiency), thereby maximizing profits and generating surplus (Pingali and Rosegrant 1995). It implies increased market transactions since farmers participate in the process to capture gains from specialization (von Braun 1995). Similarly, increasing capital intensity in production and processing leads to growth in the agribusiness sector. As a result, the number of agro-processing, distribution and farm-input provision companies increases (Reardon and Barrett 2000).

Basically subsistence farming community grows vegetables in Bangladesh mainly around their homesteads where the land is generally more fertile than the land used for field crops. Although, in some areas of Bangladesh (namely Jessore, greater Dhaka region, and Rangpur and Dinajpur districts), this growth has been tremendous and has contributed to a change of existing farming practices, replacing traditional crops as jute, pulses and rice. More than 60 types of vegetables of indigenous and exotic origin are grown in Bangladesh. Based on the growing season, vegetables are categorized as summer/rainy season vegetables, winter season vegetables, and all-season vegetables. Of the summer vegetables, various cucurbits, vegetable cowpea, hyacinth bean, stem amaranth, several aroids and Indian spinach are predominant. Winter vegetables include tomato, cabbage, Chinese cabbage, cauliflower, eggplant, carrot, spinach, bottle gourd, bush bean and radish. Crops like okra, heat-tolerant tomato, eggplant, carrot, spinach, many leafy vegetables and small onion are grown all year round. Summer vegetables are cultivated during the monsoon season from May to October. On the other hand, winter vegetables are grown in short winter span from November to April. About two-thirds of the total vegetables, other than roots and tubers, are produced during this short winter season (Rahim et al, 2007). In fact, 60 to 70% vegetables are produced in winter season and most districts produce marketable surplus during that season (Weinberger and Genova, 2005). Naturally, summer/rainy season is the scarce season for vegetables in Bangladesh.

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attributed to area expansion (2.6%) and only a small share to yield increases (0.2%). Current productivity of 7.0 t/ha is marginally higher than 6.8 t/ha witnessed in 1980s (Bangladesh Bureau of Statistics, 2000). Many factors particularly lack of good seed, good varieties, inability and reluctance of the growers to use agrichemicals, and lack of incentives due to improper marketing facilities contributed to such very poor yield level of vegetables in Bangladesh. However, very low seed replacement rate seems to be the major reason for realization of low productivity of vegetable in Bangladesh. The gap between local production and demand for seed amounts to nearly 87 percent. Of the seeds used for vegetable cultivation, only 13% accounts for quality seed, 40% non tested and unlabeled seed and 47% farmers’ own seed (Seed Wing, Ministry of Agriculture, Bangladesh, 2006). Imported seeds thus play a major role in the seed sector of Bangladesh. Huge opportunity, therefore, exists for the expansion of local seed production and seed business.

Agricultural land holdings, farming system and agro-climatic condition and productivity scenario of vegetable crops in Bangladesh may have some relevance to that of West Bengal. So, the problems of vegetable farming encountered in west Bengal may be similar in nature and dimension as envisaged in Bangladesh.

#### **Major problem of vegetable farming in West Bengal, India**

1. Most of the vegetable growers in the state are basically small and marginal farmers (93% farmers of West Bengal are small and marginal) with limited capability of generating capital inflow for vegetable farming.
2. No activity of the farmers’ co-operatives in the marketing venture of vegetables and preponderance of intermediaries attenuate the incentive of vegetable growing with improved technology and input.
3. Poor post harvest handling and marketing facility for the perishable product like vegetables.
4. Meager coverage of different vegetable hybrids apart from tomato and cabbage.
5. Lack of availability of the seeds of improved varieties of the tropical and indigenous vegetable crops namely, all cucurbits, brinjal, chilli, cowpea, hyacinth bean, leaf amaranth, palak, onion, etc.
6. Vegetable cultivation in the vast red and laterite tract of western part of West Bengal is basically rainfed.
7. Lack of dissemination of improved production technologies to the vegetable growers.
8. Declining organic matter levels and mining of nutrients causing deficiencies of certain secondary and micro- nutrients particularly in the areas of high cropping intensity which necessitated bringing up the packages of integrated nutrient management in vegetable crops.

9. Some of the disease and pest problems like, leaf curl virus in tomato, fruit and shoot borer in brinjal, bacterial wilt in solanaceous vegetable crops, mite and anthracnose in chilli, downey mildew in bitter gourd and cucumber, rot in pointed gourd, root knot nematodes in different vegetable crops, etc. still assume serious proportion. Appropriate plant protection measures and surveillance of diseases in different vegetable growing zones.
10. Lack of region specific research back up for organic farming package, lack of availability of organic inputs and at the same time lack of assured market are the main hindrance of implementing this farming system in concerted manner.

#### **Strategy**

In this situation with sprawling urbanization, it will be rather difficult to increase the area under vegetable crops. In the present situation, instead of targeting the expansion of area, the main strategy should to enhance the productivity of vegetable crops excluding potato from the present low of 7.00 tonnes per hectare to at least 10.00 tonnes per hectare by the next five year period.

#### **Action plan proposed**

**Stress on seed production of vegetable crops:** The gap between local production and demand for seed amounts to nearly 87 percent. Imported seeds thus play a major role in the seed sector of Bangladesh. Huge opportunity also exists for the expansion of local seed production. Cluster of seed villages for the production of open pollinated and hybrid seeds may be organized through cooperatives, public and private sector agencies with adequate training facilities.

**Declaration of special vegetable production zone:** Development of logistic support and infrastructure viz., roads, packaging station, multipurpose cold storage, truck terminal, transportation facility, processing set up and market intelligence in the special vegetable production zones at Jessore, greater Dhaka region, and Rangpur and Dinajpur districts and other prominent vegetable production areas so that vegetables produced in the winter months can be judiciously marketed at different parts of the country and the marketable surplus be stored for some what extended utilization.

Adequate provision for different inputs viz., seeds, fertilizers, micro-nutrient chemicals, bio-control agents, botanicals, bio-fertilizers, pheromone trap and recommended insecticides, antibiotics and fungicides for different vegetables. Structuring of Agri-business consortium in the special vegetable production zone and tying up of the exporters, vegetable traders and processing industries with the vegetable growers.

**Germplasm evaluation and varietal development:** Adequate research interventions are warranted for germplasm evaluation and varietal development for many vegetables, including tomato, brinjal, chili, okra, onion, garlic, radish, red amaranth, Indian spinach, cabbage, Chinese cabbage, cauliflower, yardlong bean, peas and different cucurbits.

#### **Development and promotion of indigenous vegetables:**

Different indigenous vegetables such as yams, spine gourd, sponge gourd, bitter gourd, pumpkin, pointed gourd, ash gourd, ribbed gourd, string beans, sword bean, stem amaranth, Indian spinach, plantain, aroids, moringa and brinjal are the rich sources of minerals, vitamins and essential amino acids which also offer scope for year-round production in the homesteads and hilly region of Bangladesh. Launching of specific research and developmental programme at the Govt. level for their genetic development coupled with assured supply of seeds and planting materials to the farmers.

#### **Stress on coverage of larger areas with the hybrids:**

Though the past decade has been marked by a transition from open pollinated varieties to hybrids deriving maximum utilization from the existing land mass still concerted efforts need to be made to cover about 35-40% area under hybrids of different important vegetable crops viz, tomato, cabbage, okra, chilli, sweet pepper, cauliflower, bottle gourd, bitter gourd, cucumber, ridge gourd, pumpkin, watermelon, muskmelon, summer squash, etc.

**Off season vegetable cultivation:** About two-thirds of the total vegetables, other than roots and tubers, are produced during the short winter season. So, only 30 percent of total vegetables are generally produced in summer/rainy season posing serious scarcity of vegetables. Consorted research and developmental initiatives need to be undertaken to augment vegetable production during the hot and wet months between March to October through development of wet heat tolerant varieties particularly of tomato, cauliflower, cabbage, etc. and adoption of low cost polyhouse technology for rain shelter.

**Post harvest management:** Governmental policy interventions are needed for adequate post harvest management of the produce through the development of production centres based on cluster village concept and establishment of processing units which may include input subsidies for establishment of cool chain, processing into value-added products, pricing policies, import/export tariffs and facilities for marketing.

**Expansion of irrigation coverage:** Irrigation coverage need to be expanded through water shed development, renovation of different water bodies in the rural areas and judicious use of water by encouraging the use of drips and sprinkler system of irrigation.

**Increase in capital inflow in vegetable production system:** Specific market driven and export oriented quality vegetable production can be tagged with short or medium term bank loans for ensuring capital in flow in total agriculture in the country.

**Encouraging hi-tech vegetable production:** i) development of Hi-tech nursery for production of healthy seedling, ii) protected vegetable cultivation around peri-urban areas, iii) efficient use of water and nutrient through drip/sprinkler irrigation and fertigation, iv) raised bed cultivation and use of organic/degradable biomass for mulching, v) promotion of precision farming for maximizing input

use efficiency to get higher and quality return and vi) promotion of off-season production of vegetables.

**Encouraging high value vegetable cultivation in poly house:** Precision farming of high value vegetable crops viz. coloured capsicum, celery, lettuce, leek, etc. in poly house under controlled environment conditions need to be encouraged through subsidy and bank credit oriented facilities.

**Development of Bio resource centre for conservation of genetic resources:** Setting up of bio resource centres for conservation of available diversity in vegetable crops under the supervision of Agricultural University.

**Crop diversification:** Crop diversification among the vegetables, the underutilized and exotic vegetables rich in nutrient for both domestic as well as export markets should be promoted through adoption of different developmental schemes. Some of the vegetable crops which need to be promoted particularly in the urban sector are sweet corn, baby corn, moringa, leek, bunching onion, welsh onion, broccoli, brussels sprouts, Chinese cabbage, pointed gourd, spine gourd, ivy gourd, faba bean, runner bean, lima bean, winged bean, sword bean, velvet bean, early rabi onion, etc.

**Development of Plant health clinic:** Plant health clinic is district or specific production zone level laboratory based and service oriented project for the growers and other stake holders to elevate their skill and operative standards to produce high quality and safe product through Good Agricultural Practice.

**Promotion of integrated plant nutrient management system (IPNS):** The IPNS system is more result oriented in protected vegetable cultivation where crop rotation and soil replacement is a highly difficult task. It will be more effective and sustainable if both IPNS and IPM systems are adopted together.

**Promotion of integrated pest management (IPM):** It is the eco-friendly system approach in both strategies and technologies to reduce the dependence of chemicals for controlling the pest and diseases. Nevertheless, multiple support and co-operation from public and private organizations is needed to harness full potential of available technologies and strategies. Use of resistant/tolerant varieties

**Development of quality control laboratory:** Development of quality control laboratory for testing the pesticide residue and other nutritional qualities under the supervision of Agricultural Universities is necessary in the interest of enhancing the export of vegetables and processed products in the state.

**Development of pack house facility:** At least one pack house facility equipped with washing, grading, pre-cooling and sorting facilities should be there in the specified production zones with some additional facilities. These pack house may serve as training centres for farmers and input distribution points.

**Improvement/Establishment of regular markets/strengthening fresh vegetable marketing:** More regular markets for vegetables need to be established at suburban areas, town, and metropolises and the existing markets need to be modernized to

encourage not only efficient marketing but also assure good quality and hygienic produce to the consumer. The condition of the weekly or bi-weekly big markets in the rural areas, local markets in the suburban areas need to be improved through providing adequate space, cleanliness inside the market and efficient transport facilities.

**Mechanisation of vegetable farming:** Adequate and cost effective machinery and tools should be made available to the farmers with proper demonstration facilities.

**Vocational courses for entrepreneurs/Master farmers:** Development of knowledge base to the progressive vegetable growers through vocational courses particularly on “Good Agricultural Practices” for the production of the safe produce, appropriate pre and post harvest technologies to extend the availability of the produce, codexes for pesticide residue level, integrated plant nutrient management system and integrated pest management system.

**Awareness on the benefits of fruit and vegetables:** Educational activities for pre-school children including puzzles, posters and songs and framing of television and radio programmes on the benefits of fruit and vegetables, their proper washing, storage, healthy preparation, and cooking methods.

**Clear cut policy for GM vegetable:** A clear-cut policy need to be framed taking views of the biotechnologists, geneticist and plant breeders, crop management specialists, representatives of industry and also the stakeholders so that it is ensured through strict vigilance that the GM vegetable will not destroy the environment, will not cause the development of resistance in the target insect pest to the transgenic product and moreover, be safe.

**Sustained research and developmental activities:** Policy decision needs to be taken to bring fund in the agricultural universities and research institutes from both govt. Agencies and private sectors for carrying out mission oriented research and developmental activities on priority aspects of vegetable crops.

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