A SEMINAR PAPER

ON

ORGANIC VEGETABLE AND ITS PRESENT SITUATION

Course Title: Seminar
Course Code: SST 598

SUMMER, 2018

SUBMITTED TO:

Course Instructors	Major Professor
1. Dr. A. K. M. Aminul Islam Professor , BSMRAU **2. Dr. Md. Mizanur Rahman** Professor , BSMRAU **3. Dr. Md. Rafiqul Islam** Professor, BSMRAU **4. Dr. Dinesh Chandra Shaha** Assistant Professor, BSMRAU	**Dr. M. Mofazzol Hossain** Professor Department of Horticulture BSMRAU, Gazipur

SUBMITTED BY:

SAJEDA KHANOM

MS Student

Reg. No.: 16-11-4169

Department of Seed Science and Technology

BANGABANDHU SHEIKH MUJIBUR RAHMAN AGRICULTURAL UNIVERSITY

SALNA, GAZIPUR 1706

ABSTRACT

The organic production system aims at supporting and sustaining healthy ecosystems,fermer, soil, food production, the community, and the economy. Reduction and elimination of the adverse effects of inorganic fertilizers and pesticides on human health and the environment is a strong indicator that organic agriculture is gaining worldwide attention. Organic fertilizers are environmentally friendly, since they are from organic sources. Furthermore organic farming focuses on the improvement of management practices such as nutrient application and pest control, and very seldom deals with variety improvement or breeding. Commercial varieties developed and performing well under conventional high-input methods were mostly not suitable under organic low-input conditions. So breeding under organic low-input conditions is a must to achieve high yield in organic farming systems. But it is found that when both organic and inorganic fertilizer used together then it shows better performance. Food security is also challenging considering the climate change, land degradation and natural disasters in the highly populated countries in Asia ,USA, Europe and so other country in the world. Organic agriculture is considered to be a suitable agricultural production area to ensure correlation between human welfare and sustainable development. Day by day the growth of organic farmland in the world is increasing which is very promising ,in 1999 organic farmland was .2% but in 2015 it was converted into 1.1%. In 2015, 87 countries in the world were related with organic farming and the number of producer was 2.3 millions.

CONTENTS

LIST OF THE TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Organic agriculture was introduced during the period 1924 – 1970 and gained acceptance and respectability during the period 1980–2002 when most of the National and International Standards were set and implemented (Bitar et.al.,2001). In the last 14 years, the total organic agricultural land in the world has increased by almost 300%. India has the largest number of organic producers (650,000), Australia has the largest area (17.2 million hectares), the USA has the largest market (24,347 million Euros), and Switzerland has the highest per capita consumption as reported by the International Federation of Organic Agriculture Movements (IFOAM , 2015). Organic farming is an agricultural production system of farming that maintains the long-term fertility of the soil. The US Department of Agriculture defined organic farming as a production system which avoids or largely excludes the use of synthetic fertilizers, pesticides, growth regulators and genetically-modified organisms (GMO). Organic farming has been described as the sum total of the use of locally adapted varieties, the reduction of nutrients losses, wide rotation, steering natural balances and mechanical and manual weed control without need for synthetic inputs (Byiringiro et.al., 2003). Organic farming management relies on developing biological diversity in the field to disrupt habitat for pest organisms and the purposeful maintenance and replenishment of soil fertility (Bitar et al., 2002).

Soil health is in jeopardy due to loss of organic matter content and continuous use of unbalanced chemical fertilizers for irrigated rice production. Declining productivity due to soil degradation is now a major constrain. Excessive use of inorganic fertilizer is one of the reason for detorioration of the soil condition (FAO,2004). So reducing this condition practicing organic farming is needed. Organic farming is growing worldwide and consumer demand for organically produced food is increasing (Griffith et.al, 2008 & Owusu et al., 2013). Organic fresh vegetables are the top selling category of organically grown food (Anonymous 2016). Vegetables that are labeled as organic are those that are grown and processed without synthetic chemicals such as pesticides and chemical fertilizers are known as organic vegetables. According to the MORI poll (2001), 43% of consumers of organic food give "better taste" as a major reason for purchasing organic fruits and vegetables (MORI Poll, 2001) .Performance of cultivars developed for conventional cropping systems differ in organic production system (Murphy et al., 2007) &(Ahmad et al., 2007). 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 (Hossain et al., 2005), organic vegetable production in sac (Hossain et.al, 2011), pheromone-trap for insect control, compost (kitchen waste, vermin-compost, pile compost, basket compost etc). According to the Food and Agriculture Organization (FAO), Bangladesh holds the third position in world for vegetable production (FAO, 2015). But organic farming in Bangladesh still occurs largely on an experimental basis. Considering the above facts the present study was undertaken to fulfill the following objectives.

Objectives

01. To know the performance of organic vegetable against the conventional one.

02. To know the present situation of organic vegetable.

CHAPTER 2

MATERIALS AND METHODS

The seminer paper is exclusively a review paper. So, there is no specific method involved to collect data. The data and relevant information were collected from the following secondary sources:

1. Different Agricultural Installation such as:

a. National journals

b. Books

c.Publications and Reports

2. Different Agriculteral Libraries:

a. Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU)

b. Bangladesh Agricultural University (BAU)

Good suggestion, valuable information and kind consideration from my honorable major professor, course instructors and other resources personnel were taken to enrich the paper.

3. Internet Browsing:

After collecting necessary information, it has compiled and arranged chronologically for better understanding and clarification

CHAPTER 3

REVIEW OF FINDINGS

3.1 Organic fertilizer

Compost

Compost is an organic matter that has been decomposed in a process called composting. This process recycles various organic materials otherwise regarded as waste products and produces a soil conditionar. Worms is used to recycle food scraps and other organic materials into a valuable soil amendment called vermicompost.

Green manure

Green manure is created by leaving uprooted or sown crop parts to wither on field so that they serve as mulch and soil amendment. Typically they are ploughed under and incorporated into soil while green or shortly after flowering. A green manure crop will benefit by the soil providing cover to suppress the weeds, Loosen the soil ,Improve the fertility of soil, Locks up soil fertility, protect the soil structure.

3.2 Variety development

Recently, especially in the Asia and Pacific region, efforts have been initiated in breeding varieties for organic production systems. Organic varieties or seeds are required in organic production. Conventional F1 varieties are allowed in organic production provided that seeds are produced for at least one generation under an organic system (Ratanawaraha , 2007 & Lammerts van Bueren, 2002). However, previous variety trials show that conventional varieties do not always perform well under organic conditions. This may be because conventional varieties are intentionally developed under optimum conditions but are not adaptable to low input conditions and an organic environment. Basically, the concept of organic breeding is the same as conventional breeding, with Phenotype (P) = Genotype (G) + Environment (E) + Genotype × Environment (GE), where the performance of the variety (P) is dependent on the genetic trait (G), effect(s) of the environment (E), and the interaction between the variety and the environment (GE). However, varieties from conventional breeding may have traits that may be unsuitable for organic production systems, and some important traits for organic farming systems may not be found in the conventional varieties(Legzina, 2005). Breeding under organic conditions may result in improved levels of stress tolerance and disease resistance in the resulting varieties. Hence, the evaluation and improvement of varieties through breeding under organic conditions at minimum levels of input application are essential for the development of the organic sector and for the quality of organic products. IFOAM done a research and the research has the objectives of selecting, recommending or developing organic vegetable cultivars such as yard long bean (*Vignaunguiculata subsp. sesquipedalis*), squash *(Cucurbitamoschata*), lettuce *(Lactuca sativa*) and cucumber *(Cucumis sativus*) for organic production and consequently to increase vegetable production in organic systems (IFOAM, 2011).

Organic fertilizers (vermi compost and other compost materials) were applied at a minimal level of about 50%-75% of the nutrition required by the plant, specifically at 2–3 $t{\cdot}ha^{-1}$. Fermented plant juice and fermented fruit juice were also applied at specific stages of the plants. Minimal weeding and pest control measures were practiced. Plastic mulch was used to control weeds, while aromatic pest-repellent plants such as lemon grass and marigold were planted as a means of pest control. Besides, flowering plants such as

Mexican sunflower and Zinnia were planted to attract pollinators and other beneficial insects, while barrier plants were established around the experimental areas to prevent contamination from neighboring farms. These farm practices were employed for every season of evaluation of the selected lines. For every generation, individual plants were selected based on general vigor, fruit characteristics, resistance to pests and diseases, and tolerance to environmental stress. Selfing was performed for each individual plant selection, and the seeds obtained were used for the following generation. At the F6 generation, the selected lines were evaluated in an observational trial to determine the top lines to be included in the yield trials.

3.2.1 Yield performance

Yard long bean

In the development of varieties of yard long bean, average yields of 22.29 $t \cdot ha^{-1}$ (selection 0801-5-1-1-0), 22.13 $t \cdot ha^{-1}$ (selection 1096-1-1-0-0), 20.25 t/ha (selection 10116-1-1-0-0) and were achieved. These selections had average yield advantages of 31%, 30%, 25% respectively, over the check variety and was showed in (Table 1.)

Table 01: Yield and percent yield advantage above the check yield of potential varieties developed for organic low-input conditions in yard long bean

Crop/Entry	Yield (t/ha)	Yield Advantage (%)
0801-5-1-1-0	22.29	31
1096-1-1-0-0	22.13	30
10116-1-1-0-0	22.25	25
check	17.1	

(Source: Maria Emblem, 2016)

Cucumber

For cucumber variety selections, average yields observed were 11622 with 26.03t·ha^{-1}, 11621 with 18.87 t·ha^{-1} and 11624 with 17.97 t·ha^{-1}. Entry 11622 had an average yield advantage over the check variety of 43%, 11621 was 4% more in (Table 02.).

Table 02: Yield and percent yield advantage above the check yield of potential varieties developed for organic low-input conditions in cucumber

Crop/Entry	Yield (t/ha)	Yield Advantage (%)
11622	26.03	43
11621	18.87	4
11624	17.97	-1.3
check	18.21	

(Source: Maria Emblem, 2016)

Lettuce

In(Table 03) There are two types of lettuce recommended loose-leaf and the Cosor Romaine type. Loose-leaf type Le1103 had the highest average yield of 10.96 t·ha^{-1} with average yield advantage over the check of 44%, and Le 0701 yielded 6.38 t·ha^{-1}. While Le 0701 had a lower average yield, it was highly acceptable. Le 0702, on the other hand, was the top yielder of the Cos type with a 7.74 t·ha^{-1} and a yield advantage of 0.9%.

Table 03: Yield and percent yield advantage above the check yield of potential varieties developed for organic low-input conditions in Lettuce

Crop/Entry	Yield (t/ha)	Yield Advantage (%)
Le 1103(Looseleaf)	10.96	44.0
Le 0701 (Looseleaf)	6.38	−16.
Check (Looseleaf)	7.61	
Le 0702 (Cos)	7.74	0.9
Le 1104 (Cos)	6.93	−9.7
Check (Cos)	7.67	

(Source: Maria Emblem, 2016)

3.3.1 Organic land use and crops

In 2016 (Table 04) the United Kingdom had a total area of 508 thousand hectares of land farmed organically, down from 521 thousand hectares in 2015. The area in-conversion expressed as a percentage of the total organic area rose for the second consecutive year.

Table 04: Organic land use 2013 to 2016 in United Kingdom

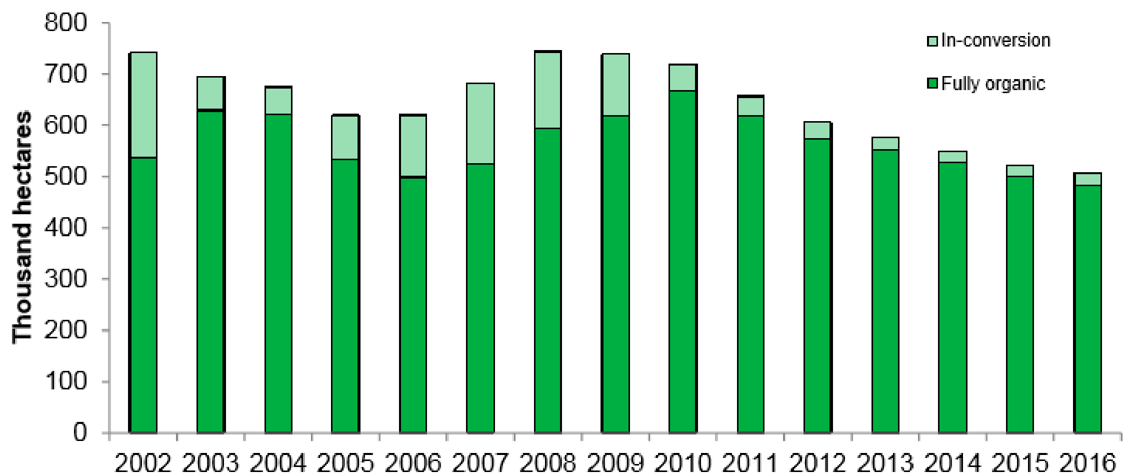
Thousand hectares

	2013	2014	2015	2016	% change 2016/2015
United Kingdom					
Cereals	43.7	42.2	39.6	38.4	-3.2
Other crops	7.6	7.3	6.9	7.3	4.7
Fruit & nuts	2.1	2.1	1.9	1.9	-0.4
Vegetables (inc potatoes)	11.3	9.4	10.4	10.2	-1.2
Herbaceous & ornamentals	6.8	8.5	6.2	5.8	-7.5
Temporary pasture	98.9	93.7	92.2	92.1	-0.2
Permanent pasture (inc rough grazing)	387.0	369.7	347.1	335.0	-3.5
Woodland	7.6	7.0	6.9	7.4	6.1
Non cropping	10.4	8.7	10.0	9.9	-0.7
Total	**575.3**	**548.6**	**521.4**	**507.9**	**-2.6**

(DEFR, 2017)

3.3.2 Land area farmed organically

In 2016, the United Kingdom had a total area of 508 thousand hectares of land farmed organically (i.e. the fully converted area and area under conversion), down from 521 thousand hectares in 2015. Since 2008 when the area of land farmed organically peaked, the organically farmed area has declined by 32%. The organically farmed area represents 2.9% of the total farmed area on agricultural holdings in the United Kingdom(Fig 01).

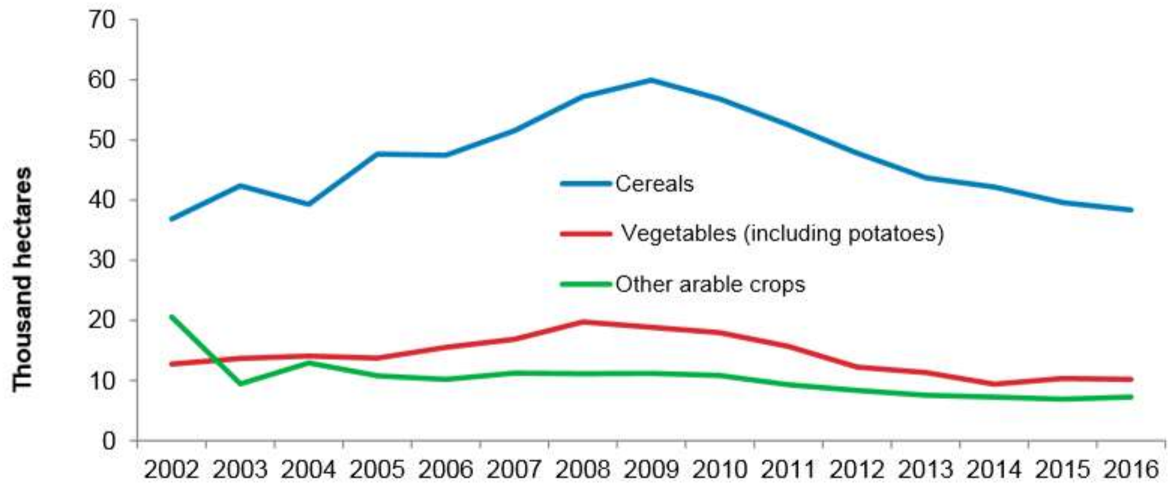


(DEFR, 2017)

Figure 01: Land area farmed organically, United Kingdom

3.3.3 Organic crops

The three main crop types grown organically are cereals, vegetables including potatoes, and other arable crops. All have shown a decline since the late 2000s, mirroring the fall in the land area farmed organically since 2008 (Fig 02).

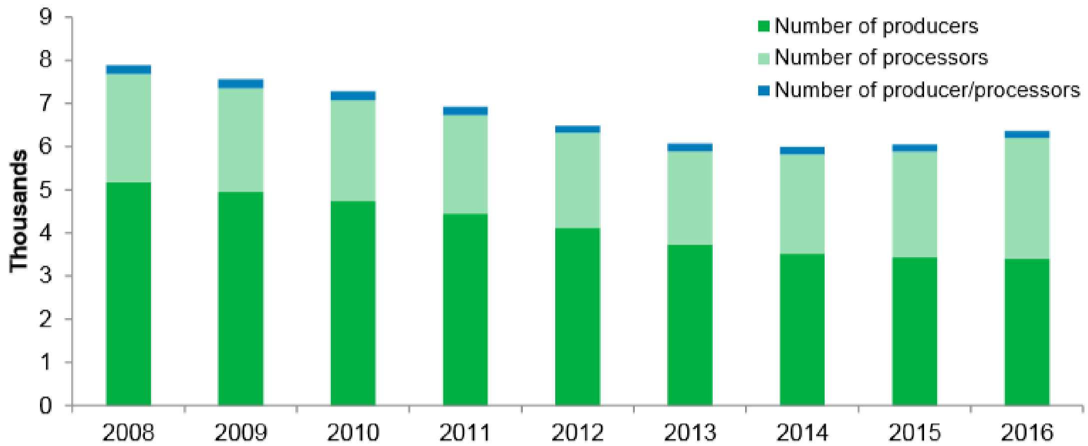


(DEFR, 2017)

Figure 02: Organic crops: United Kingdom

3.3.4 Number of organic producers and processors

In 2016, there were 6,363 producers and processors registered with the organic certification bodies in the United Kingdom, an increase from 6,056 in 2015. The number of producers has declined by 35% since 2007, mirroring the decline in the land area farmed organically. The number of processors has increased for the third year running and now stands at almost 2,800 (Fig 03).



(DEFR, 2017)

Figure 03: Organic producers and processors,United Kingdom

3.4 Yield performance of different vegetable

Tomato

Vermicompost (T1) 12 ton, Compost (T2) 10 ton, Integrated plant nutrient system (IPNS)/Mixed

fertilizers (T3) (organic 2/3 + inorganic 1/3); 8 ton vermicompost + N = 40 kg, P = 14 kg, K = 24 kg, S = 5 kg, Zn = 0.7 kg, B = 700 g Inorganic fertilizers (T4) N = 120 kg, P = 40 kg, K = 70 kg, S = 15 kg, Zn = 2 kg, B = 1 kg Control (T5) No fertilizers and manures was used in Two varieties of tomato ca Roma VF (V1) and BARI tomato 15 (V2) . The application of T3 (mixed fertilizers, organic 2/3 + inorganic 1/3) produced the highest number of flower clusters (31.2), fruit clusters (24.9), fruit yield (15.3 t/ha) and plant height (71.6 cm). T5 (control or no fertilizer) had the lowest number of flower clusters per plant (27.22), number of fruit clusters per plant (20.1 cm), yield (9.4 t/ha) and plant height (62.1 t/ha) (Table 05) .(Patil et al. 2004 and Reddy et al. 2002).

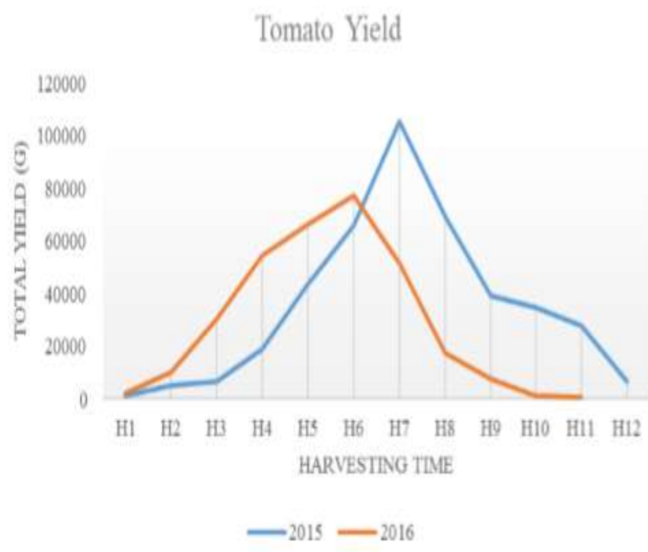
Table 05:Effect of various fertilizer treatments on tomato growth, fruit characteristics

And yield

Treatment	No of Fruits per Plant	No of Flower Clusters per Plant	No of Fruit Clusters per Plant	Fruit Length (cm)	Fruit Diameter (cm)	Yield (t/ha)
T_1	47.23	30.22	18.50	5.44	4.62	10.20
T_2	58.28	27.22	24.11	5.21	4.61	10.30
T_3	61.06	31.28	24.95	5.45	4.84	15.39
T_4	64.12	27.89	22.39	5.32	4.62	12.09
T_5	48.61	27.61	20.17	5.20	4.64	9.46

(Source: M. Ashraful et al., 2017)

Inconsistent water supply and temperature fluctuations increase the incidence of fruit cracking . Use of cultivars resistant to fruit cracking and cultivars exhibiting hairiness inhibits sucking pests could minimize the loss of tomato yield (Shrestha SL et.al.2014). Yields over harvests differed in 2015 and 2016 (Figure 04) (Source : Varinder Sidhu et.al. 2017)



(Source : *Varinder Sidhu* et al., 2017)

Figur 04: yield of organic tomato cultivars in 2015 and 2016

Cucumber (*Cucumis sativus L.)*

T_0[contro], T_1[FYM (75%)+NPK(25%)], T_2 [FYM(50%)+NPK(50%)],T_3[Vermi Compost(75%)+NPK(25%)],T_4[Vermi Compost(50%)+NPK(50%)],T_5[Poultry manure (75%)+NPK(25%)],T_6[Poulty manure (50%)+ NPK (50%)],T_7[FYM (50%)+Poultry manure (25%)+Vermi compost(25%)], T_8 [FTM(25%)+Poulty manure (25%)+NPK(25%)+Vermi compost(25%)]. Among all treatment T_8 show best performance in all successive growth stages (Table 06).

Table 06: Effects of Different Organic and Inorganic Fertilizers on Growth and Flowering of Cucumber (Cucumis sativus L.)

Treatments No.	Treatments Combination	Plant height (cm)	No. of Branches	Number of Leaf	Days to First Flowering	Days to 50% Flowering	Days to First Harvest
T_0	Control (Recommended dose of NPK 150:120:120)	314.87	2.80	104.73	34.00	47.59	62.67
T_1	FYM (75%) + NPK (25%)	332.80	3.00	108.60	33.63	47.10	61.67
T_2	FYM (50%) + NPK (50%)	337.07	3.23	108.07	33.00	47.33	62.00
T_3	Vermi Compost (75%) + NPK (25%)	343.67	2.83	110.07	33.33	47.00	61.33
T_4	Vermi Compost (50%) + NPK (50%)	344.47	3.38	114.93	32.33	45.00	60.00
T_5	Poultry manure (75%) + NPK (25%)	330.07	3.43	115.13	33.33	45.53	57.66
T_6	Poultry manure (50%) + NPK (50%)	345.20	3.48	115.80	31.43	44.76	58.00
T_7	FYM (50%) + Poultry manure (25%) + Vermi Compost (25%)	353.13	3.20	114.80	31.33	44.43	57.00
T_8	FYM (25%) + Poultry manure (25%) + Vermi Compost (25%) + NPK (25%)	370.00	3.51	119.84	31.24	43.33	56.00

The effect of different combination of Organic and Inorganic Fertilizers and their significant result on yield and related traits are showed in (Table 07).

Table 07: Effects of Different Organic and Inorganic Fertilizers on Fruit Quality of Cucumber *(Cucumis sativus L.)*

Treatments No.	Treatments Combination	TSS (°Brix)	Vitamin C	Acidity
T_0	Control (Recommended dose of NPK 150:120:120)	3.25	5.16	1.45
T_1	FYM (75%) + NPK (25%)	3.31	5.67	1.39
T_2	FYM (50%) + NPK (50%)	3.48	6.21	0.33
T_3	Vermi Compost (75%) + NPK (25%)	3.60	6.93	1.17
T_4	Vermi Compost (50%) + NPK (50%)	3.81	7.66	0.98
T_5	Poultry manure (75%) + NPK (25%)	3.40	6.50	1.26
T_6	Poultry manure (50%) + NPK (50%)	3.53	7.01	1.03
T_7	FYM (50%) + Poultry manure (25%) + Vermi Compost (25%)	3.90	7.85	0.93
T_8	FYM (25%) + Poultry manure (25%) + Vermi Compost (25%) + NPK (25%)	4.10	8.39	0.90

The highest yield per plant was corresponding to more number of fruits per plant and average fruit weight with application of adequate amount of organic manure in combination with NPK. These results have been reported by Bindiya et al. (2006) and Ghasem et al. (2014) in cucumber.

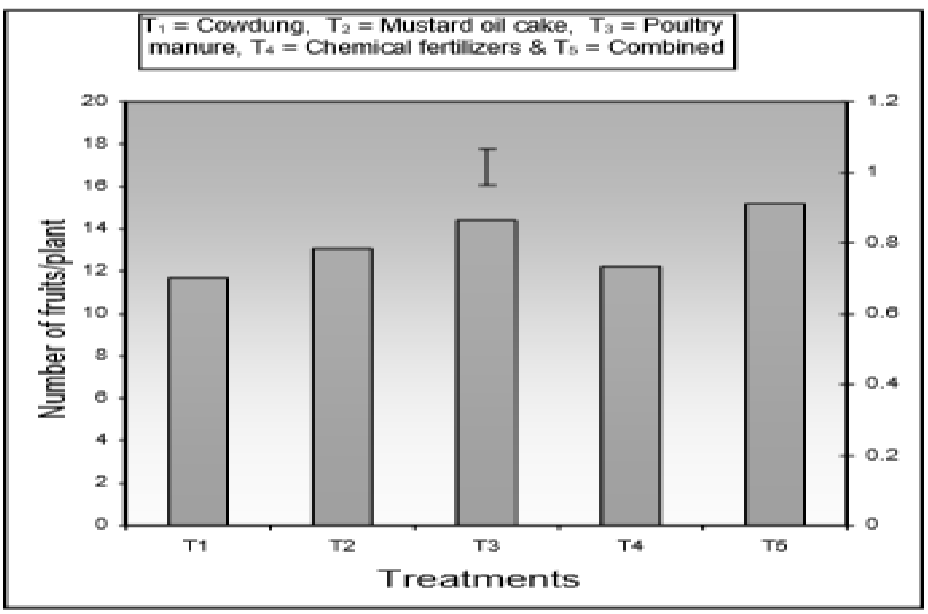
Bringal

The treatments, were T1 (Cowdung @ 22857 kg ha^{-1}) , T2 (mustard oil cake @1600 kg ha-1), T3 (poultry manure @ 5000 kg ha^{-1}), T4 (chemical fertilizers @ 174 kg urea ha^{-1} , 125 kg TSP ha^{-1} and 50 kg MoP ha^{-1}) and T5 (20% cowdung + 20% mustard oilcake + 20% poultry manure + 40% N+ P +K fertilizers). It was observed that the application of organic and inorganic fertilizers solely or combinedly had a great influence on the vegetative growth of the crop. The highest number of branches $plant^{-1}$ (20.1) was recorded from the treatment T5 containing 60% manures and 40% fertilizers (Table 08). Whereas, the lowest branching and leaves were found with T1 (cowdung). The maximum number of flowers (94.2) $plant^{-1}$ was produced by T5 treatment (Table 08). The maximum number of fruits (15.2) $plant^{-1}$ was also noted with T5 (combined treatment) (Fig. 05). The maximum length of fruits (14.1 cm) and the maximum fruit diameter (4.3 cm) was recorded with the combined treatment T5 (Table 08). In all cases the lowest value was obtained from the treatment T1 (cowdung only). The maximum fruit weight (1.97 kg) was also obtained from T5 treatment (Fig. 06). The result revealed that the maximum fruit yield (45.5 t/ha) was recorded from plant grown with the T5 (combined) treatment and the lowest was obtained from T1 (cowdung). (Devi et al., 2002).

Table 08: Effect of organic and chemical fertilizer on growth, yield and yield contributing characters of brinjal

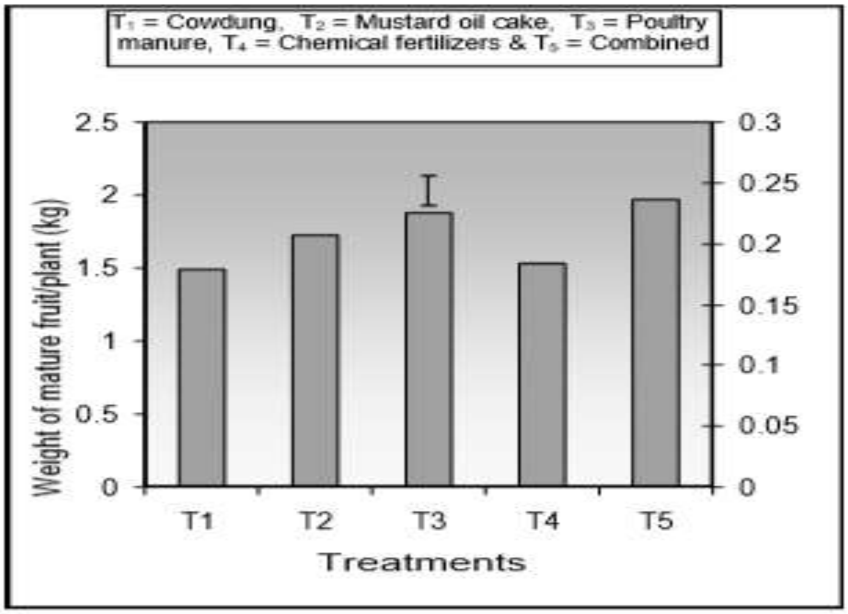
Treatment	No. of branches plant-1	Length of fruit (cm)	Diameter of fruit (cm)	Fruit yield (t/ha)
T1	15.20	10.01	2.52	36.65
T2	17.30	12.05	2.96	40.00
T3	18.50	13.42	3.09	42.00
T4	16.67	11.03	2.77	39.50
T5	20.10	14.11	4.30	45.50

(Source: M.S.Ullah,BAU,2008)



(Source: M.S.Ullah, BAU, 2008)

Figure 05: Effect of different treatments on number of fruits/plant



(Source: M.S.Ullah,BAU, 2008)

Figure 06 : Effect of different treatments on weight of mature fruit/plant

The results were such that although the application of only organic manures maintained the good health of soil, they were slow to release adequate nutrients timely. From the other side, only inorganic fertilizers application could affect the soil health, which in turn may affect flowering and fruiting. So the combined application of manures and fertilizers may supply the nutrients timely and also maintain the suitable condition for flowering, fruiting and their growth. Jablonska (1990) and Hosmani (1993).

The chemical properties of soil were influenced by different sources of soil nutrients (organic and chemical). Soil pH varied significantly with the treatments and it decreased with organic manures application and combined application but increased with only chemical fertilizer application (Table 09) Yada et al (2002).

Table 09: Effect of organic and inorganic farming of brinjal on soil Soil pH & organic matter

Treatments	Soil pH	Organic matter (%)
T1	6.01	2.05
T2	6.27	2.67
T3	6.13	3.06
T4	6.38	1.82
T5	6.19	3.57

(Source: M.S.Ullah, BAU,2008)

Soil organic matter was decreased by chemical fertilizer application but was increased with all types of organic manure application and that was recorded the highest with combined application (Table) Wells et al (2000)

3.5.Opportunities of organic farming in Bangladesh

Organic agriculture is not just a solution for rich countries, but can also be beneficial for developing countries like Bangladesh 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. Bangladesh earns the foreign currency by producing and exporting organic rice as organic rice has high demand in domestic and export markets(Hossain, 2007). 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.

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 (Hossain, 2012).

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, Biswavarpur 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 nonorganic products and selling to more big markets. As a result, only few local consumers are getting the organic products.

CHAPTER 4

CONCLUSIONS

Commercial varieties from conventional production systems do not always perform best under organic systems. Hence, breeding under organic low-input conditions is a must to achieve high yield in organic farming systems. Organically produce crops sometime give good performance than conventional one and sometime low performance also found. But it will be very effective if organic and inorganic fertilizers are used together in the field.

A separate and unique marketing strategy is urgently needed to be developed for the organic growers both home and abroad. It should immediately give emphasis on organic agriculture considering the effects of light, soil nutrients and different dimensions of soil utilization to ensure the world food security. 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 8th position. 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.

REFERANCES

Ahmad F, Khan O, Sarwar S, Hussain A, Ahmad S (2007) Performance evaluation of tomato at high altitude. *Sarhad J Agric* 23: 581-585.

Asgedom S, Struik PC, Heuvelink E, Araia W (2011) Opportunities and constraints of tomato production in Eritrea. African J Agr Res 6: 956-967.

Bangladesh: land-related constraints. (2004). Food and Agricultural Organization.

Bindiya, Y., Reddy, I. P., Srihari, D., Narayanamma, M., & Reddy, R. S. (2006). Effect of integrated nutrient management on growth and yield of cucumber (Cucumis sativus L.). *The journal of Research ANGRAU, 34*(4), 8-1.

Brady, K. (2011). *Yield and quality performance of eleven open pollinated and three hybrid tomato cultivars grown under organic management in Lajas Puertorico* (Doctoral dissertation, M. Sc. Thesis, Horticulture university of puertorico mayaguez campus).

Byiringiro, F. (2003). The potential role of organic agriculture in the alleviation of land degradation in The ESCWA Region. Proceedings of The Arabic Conference on Organic Agriculture for a Better Environment and Stronger Economy, Tunis, September 27-28, 2003, Pp 116-126

Department for Environment Food & Rural Affairs (2017). Organic Farming Statistics 2016 (www.gov.uk/government/statistics/organic-farming-statistics-2016)

Devi, H.J., Maity, T.K., Thapa, U. and Paria, N.C. (2002). Effect of integrated nitrogen management on yield and Economics of Brinjal. J. Interacademicia. 6: 450-453.

EL Bitar, L. (2001). Scientific Mediterranean Organic Agriculture Network. (MOAN). International Symposium on Organic Agriculture, Agadir-Maroc 7-10 October 2001.

EL Bitar, L. (2002). History, definition and general principles of organic agriculture. A paper presented in The Short Course on Organic Vegetable production in The Mediterranean Basin 19-31 March 2002,Cairo, Egypt.

Ghasem, S., Morteza, A. S., & Maryam, T. (2014). Effect of organic fertilizers on cucumber (Cucumis sativus) yield. *International Journal of Agriculture and Crop Sciences*, *7*(11), 808.

Griffith, R., & Nesheim, L. (2008). Household willingness to pay for organic products.

Hosmani, M.M. (1993). Chili Crop (Capsicum annuum L.). 2nd Edition. Mrs. S.M. Hosmani, Dharwad, kalkatta.

Hossain, S. T. (2012). Organic farming in populated area: Bangladesh–an example of case study. *Organic farming in populated area: Bangladesh–an example of case study*, 105-113.

Hossain, S. T., & Akter, S. (2011). Organic sack garden ensuring nutrition and improve the food security on small scale households. In *Proceedings of 17th IFOAM Organic World Congress 2011*.

Hossain, S. T., Sugimoto, H., Ahmed, G. J. U., & Islam, M. (2005). Effect of integrated rice-duck farming on rice yield, farm productivity, and rice-provisioning ability of farmers. *Asian Journal of Agriculture and Development*, *2*(1), 79-86.

Hossain, S. T., Sugimoto, H., Ueno, H., & Huque, S. M. R. (2007). Adoption of organic rice for sustainable development in Bangladesh. *Journal of Organic Systems*, *2*(2), 27-37.

IFOAM. Consolidated Annual Report of IFOAM—Organics International; IFOAM-Organics International Head Office: Bonn, Germany, 2015

Jablonska, C.R. (1990). Straw as an organic fertilizer in cultivation of vegetables. Part II. Effect of fertilization with straw on the growth of vegetable plants. Hort. Abstr., 63: 244.

Legzdina, L., & Skrabule, I. (2005). Plant breeding for organic farming: current status and problems in Europe.

Maghirang, R. G., Rodulfo, G. S., Enicola, E. E., & Candelaria, R. (2011, September). Organic Breeding and seed production in selected vegetables. In *Proceedings of the Organic Seed Preconference of the 17th IFOAM Organic World Congress, Namyangju, Korea* (pp. 26-27).

MORI Poll (2001) Organics and the political agenda. Commissioned by the Soil Association, UK.

Murphy, K. M., Campbell, K. G., Lyon, S. R., & Jones, S. S. (2007). Evidence of varietal adaptation to organic farming systems. *Field Crops Research*, *102*(3), 172-177.

Nandwani, D., Dennery, S., Forbes, V., & Geiger, T. (2014). Evaluation Of Four Tomato Varieties For Commercial Organic Production In The US Virgin Islands. In *50th Annual Meeting, July 7-11, 2014, St. Thomas, US Virgin Islands* (No. 253334). Caribbean Food Crops Society.

Owusua, V., & Anifori, M. O. (2013). Consumer willingness to pay a premium for organic fruit and vegetable in Ghana. *International Food and Agribusiness Management Review*, *16*(1). Anonymous (2016) Organic market overview. USDA Economic Research Services, Washington, DC, USA

Peet M, Willitis H (1995) Role of excess water in tomato fruit cracking. Hortscience 30: 65-68

Shrestha SL, Sah RL (2014) Evaluation of Tomato cultivars for central Tarai of Nepal. Nepal J Sci Technol 15: 11-16.

Van Bueren, E. L. (2002). *Organic plant breeding and propagation: concepts and strategies*. sn].

Wells, A.T., Chan, K.Y. and Cornish, P.S. (2000). Comparison of conventional and alternative vegetable farming system on the properties of a yellow earth in New South Wales. Agric. Eco. Environ., 80 (1/2): 962-966.

Yadav, A.C., Sharma, S.K. and Batra, B.R. (2002). Effect of sodic water, FYM and Gypsum on the soil, growth and yield of brinjal. Ann. Agric. Biol. Res., 7(1): 73-77.