A SEMINAR PAPER ON

Comparative Profitability Analysis of Spices Production in Bangladesh

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SUBMITTED TO:

Course Instructors	Major Professor
1. Dr. Md. Mizanur Rahman **Professor** **BSMRAU** **2. Dr. A. K. M. Aminul Islam** **Professor** **BSMRAU** **3. Dr. Md. Sanaullah Biswas** **Associate Professor** **BSMRAU** **4. Dr. Shilpi Islam** **Associate Professor** **BSMRAU**	**Dr. M Kamruzzaman** **Professor** **Department of Agricultural Economics** **BSMRAU**

SUBMITTED BY:

Jannat Ara Prity

MS Student

Reg. No.: 13-05-3083

Department of Agricultural Economics

BANGABANDHU SHEIKH MUJIBUR RAHMAN AGRICULTURAL UNIVERSITY

SALNA, GAZIPUR 1706

ABSTRACT

Bangladesh is predominantly an agricultural country where agriculture sector plays an important role in accelerating the economic growth. It is very important to have a profitable, sustainable and environment-friendly agricultural system to ensure long-term food security for people of our country. The present study attempts to determine the production, yield and profitability of four promising spices that's are onion, chili, ginger and turmeric. The highest production of onion and chili was in the year 2015-16 and the lowest production of onion was in the year 2011-12 whereas for chili it was lowest in the year 2012-13. The production of ginger was highest in the year 2014-15 and lowest in the year 2012-13 but in this study it was seen that turmeric production was the highest in the year 2011-12 and that was slightly fall till 2014-15. But it was little bit risen in the year 2015-16. The study revealed that spices production in Bangladesh is influenced by the average price in the market. When the market price falls then farmer do not want to produce that crop in the next year. From BCR analysis it is found that among all the spices of the study turmeric (5) was the most profitable, followed by BCR (3.12) for ginger, BCR (2.19) for chili and BCR (2.13) for onion.

Key Words: Profitability, Gross return, Net return, Cost, BCR.

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CHAPTER 1

INTRODUCTION

Agricultural sector has been given the highest priority in order to make Bangladesh self-sufficient in food. The Government determined to develop the overall agriculture sector with the concern of the goals set out in the Seventh Five Year Plan and National Agriculture Policy. Sustainable growth has maintained and GDP growth of more than 6 percent on an average during the last decade in the economy of Bangladesh. The GDP growth go beyond the 7 percent in FY 2015-16 and stood at 7.11 percent. According to the BBS, the GDP growth stood at 7.28 percent in FY 2016-17. Among the 3 wide sectors of economy the growth of agriculture sector increased to 2.97 percent of GDP, which was 2.79 percent in previous fiscal year. Growth of agriculture and forestry sector under broad agriculture sector rose to 1.96 percent of GDP (BER, 2017). Spices are very important as food and also as medicine. They bring out the unique natural taste of cuisines and could be used to change the look of food to make it more attractive in color. Almost all people are habituated to use spices in curries and other food. They bring different flavors and aroma. Not only medicine but also food, the importance of spices cannot be overemphasized. Almost all curries are popular and testy which are made from a combination of several spices. Presently 109 kinds of spices are cultivated in the world (ISO list of spices) but in Bangladesh we use only 27 and produce 17. Major spices are regularly used in daily diet at large amount such as chili, onion, garlic, turmeric and ginger. Turmeric is helpful in reducing blood sugar. Turmeric has long been used as a home remedy against common colds and influenza. Ginger, for example, is well known as a helpful digestive aid. Garlic is touted for preserving memory and keeping a heart healthy (Islam *et al.*, 2011).

Now-a-days many spice-processing industries such as Square, BD Foods, PRAN, Archu, Advanced Chemical Industries (ACI), Amrita, Dekko etc. have been established in Bangladesh. They are exporting spices as a finished product outside the country. Due to that, demands for spices as raw material of these industries are increasing with the extension of their production. That is why; the total demands for spices are increasing at incremental rate. Resulting that, a big gap was observed between production and demand now. To meet up this gap the country has to spend a huge amount of foreign currency in every year for importing spices from abroad. Realizing the importance of spices, Bangladesh government started spices research institute (Hasan & Mahmud, 2014).

BARI developed and released 18 (major-12, minor-6) disease resistance improved variety of spices. On the other hand, 81 technologies on production, soil and water management; disease and insect management and post-harvest management have been also been developed. BARI, BARC, DAE and NGO's have strengthened their works to extend these technologies. However, using these technologies, farmers are now immensely benefited in large scale. As a result, total production of spices has increased (Islam *et al.,* 2011).

Onion is one of the most important spices in Bangladesh both in acreage and production. It is to consume either as spice or as condiment. Onion is popular crop to the farmer for its higher demand and price, diversified use, favorable potentiality to grow the soils and agro-climatic condition in Bangladesh. Onion obtained from two sources was marketed in our country; one is indigenous production and the other was imported. Onion is semi-perishable in nature. Post-harvest technique reduces short term losses of onion. After harvesting of onion, farmers cut the onion tops within 1.0 to 1.5 cm neck length. Top cutting bulbs significantly improved the storage quality of onion (Adnan *et al.*, 2014).

Chili is a valuable spice and also one of the most important cash crops grown in Bangladesh. It is available and used in the form of green, dried and powdered. It has become an essential ingredient in Bangladeshi meals. It has diversified uses. The peoples of Bangladesh are usually used chilies in all curry preparation like meat, fish, vegetables, pulses etc. for its typical color, taste and flavor. In addition, chili are a good source of most vitamin-B and vitamin-B6 in particular. They are very high in potassium, magnesium and iron (BBS, 2014). Production estimates of crops, cost of production and market price of crops are directly interrelated and important factor that influence the farmers in their decision of land utilization. Statistical data on these issues are essential for government policy making in agriculture sector. The government fixes up procurement price at the harvesting time considering the investment of farmers for certain crops. If price is lower than the production cost, producers get looser and are discouraged to produce those crops. This type of loss and profit influences the farmers for cultivating the crop in the following years. Accurate information in this regard can facilitate policy makers, planners, researchers, and stakeholders in understanding factors those are needed to be taken into care (BBS, 2013). Most of the spices are high value crops. Net returns of major spices are almost 2 to 3 times higher than any other crops. It can play a vital role to increase the farmer's income,

generate employment, alleviate poverty, enhance food security, and empower women and to increase social development of Bangladesh. Bangladesh possesses a favorable agro-ecological condition for the production of spices crops. Though production of spices has been increasing in the recent year, Bangladesh import some spices from the abroad. Now government are taking initiative to increase the production of spices and reduce the import of spices. Based on above facts the objectives of this review paper are-

- To review the present status of selected spices in terms of area, yield and production,
- To highlight the annual price variation and financial profitability of selected spices &
- To identify the constraints of spices production.

CHAPTER 2

MATERIALS AND METHODS

This seminar paper is exclusively a review paper. All data and information has been collected from the secondary sources. During preparation of this paper, I went through various articles published in different journals, books, proceedings, reports, publications and annual report etc. Different published reports of different journals mainly supported in providing data for this paper. Findings related to my topic have been reviewed with the help of the library facilities of Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU) and Bangladesh Agricultural University (BAU). Information also collected from Department of Agricultural Economics, BSMRAU. I have also searched related internet websites to collect information. I got valuable suggestion and information from my major professor and course instructors. After collecting all the available information, I myself compiled and prepared this seminar paper.

CHAPTER 3

REVIEW OF FINDINGS

Onion

Onion is one of the important spices in Bangladesh. It ranks first in production among the spice crops and is used as salad while its stalk becomes green. Onion is cooked in many ways in preparing curries and other delicious foods which are important ingredient in the list of spices. Moreover, has been used as a common ingredient in various dishes since past in different cultures in the South East Asia. There are different varieties of onion like red, yellow, white, and green. Each has its own unique flavor for its own far its strong and mildly sweet essence (BBS, 2014). From early July to August 18, 2013, the market prices of onion rose dramatically in Bangladesh. Although prices showed a downward trend at the end of August and early September, they have begun to rise again. Onion is popular in Bangladeshi cooking, so demand for it is high and growing steadily alongside increasing incomes of population. In fact, demand is expected to increase by 51 percent this decade from 1.23 million metric tons in 2010 to 1.86 million metric tons in 2020 under the business-as-usual scenario. Under an optimistic income growth scenario, it's expected to increase by 69 percent to 2.08 million metric tons (Ahmed & Ahmad, 2013).

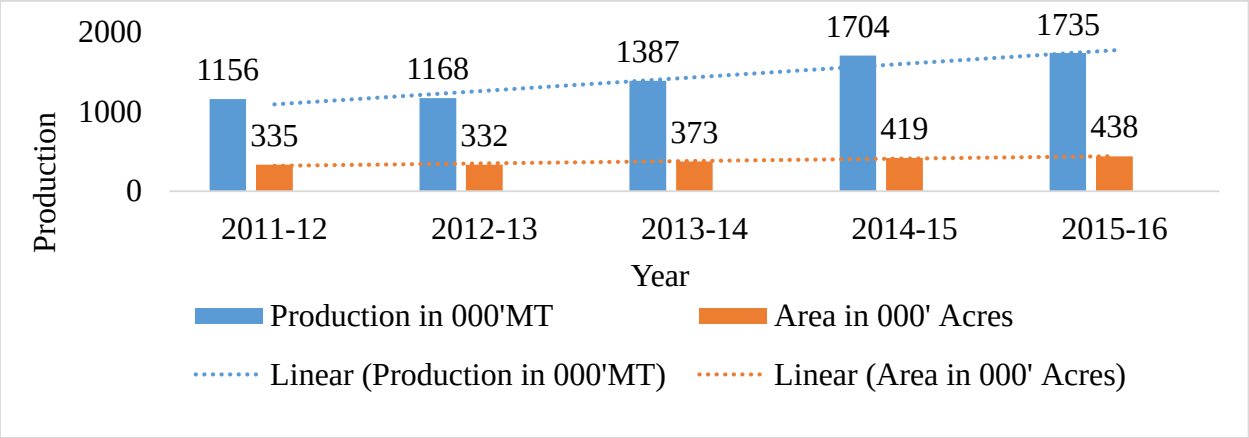

Fig. 3.1. Production and area of production of onion crop (BBS, 2014 & BBS, 2016).

Fig. 3.1 shows that the production of onion is increasing every year. In the year 2011-12 the production of onion was 1156000 MT and cultivated area for onion was 335000 acre and in the

year 2015-16 the production was increased in 1735000 MT and cultivated area for onion was 438000 acre. As a whole the production shows increasing trend line than cultivated area.

Table 3.1. Yield of Onion 2013-14 to 2015-16

Division	2013-14	2014-15	2015-16
	Yield(kg)/acre	Yield(kg)/acre	Yield(kg)/acre
Barisal	1503	1491	1541
Chittagong	2093	2179	2166
Dhaka	3487	4011	3822
Khulna	4036	4626	4709
Rajshahi	4126	4159	4000
Rangpur	2454	3160	3198
Sylhet	1627	2463	2145
Average	3719	4067	3958

Source: Calculated from BBS (2017)

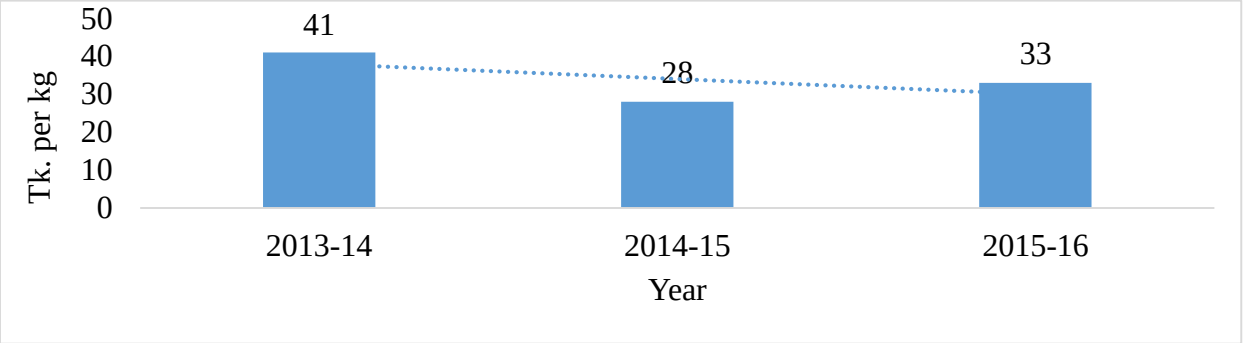

Fig. 3.2. Annual price variation for onion (DAM, 2017).

From the Fig. 3.2 the highest price of onion was 41 Tk. per kg in the year 2013-14 and lowest price was 28 Tk. per kg in the year 2014-15. From the figure it can be concluded that the price of onion shows decreasing trend line.

Table 3.2. Cost of Onion Production per acre

Description of Items	Cost of Producing Onion
Land preparation	4912
Seed and seedbed related	5103
Seedling/onion	4484
Plantation	6186
Weeding	6186
Irrigation	3645
Fertilizer	6699
Pesticide/ Insecticide/ Harmon	2818
Harvesting	10651
Transport	1893
Others	373
Total	53399

Source: BBS (2014)

Table 3.3. Profitability of Onion for the year 2014-15

Item	Gross Return per acre (Tk.)	Production(Kg.)	Price per Kg. (Tk.)	Cost per Acre	Net Return per acre(Tk.)	Net Return per Kg.(Tk.)
Onion	113876	4067	28	53399	60477	14.87

Source: Calculated from BBS (2017)

Table 3.4. Benefit-Cost Analysis of Onion for the Farmers for the year 2014-15

Name of the spices	Gross Return per acre(Tk.)	Gross cost per acre (Tk.)	Benefit cost ratio
Onion	113876	53399	2.13

Source: Calculated from BBS (2017)

In the table 3.3 total production is multiplied by the price of that product to get gross return. The production cost is deducted from the gross return to get net return. Net return for onion is 14.87

Tk. per kg and the benefit cost ratio is 2.13. That means farmer get 2.13 Tk. for every one taka investment.

Chili

Chili grows in the tropical and sub-tropical region. It grows well in warm and humid climate. Deep, loamy, fertile soils rich in organic matter are suitable for the satisfactory growth. Also need well drained soils with adequate soil moisture for the growth of the crop. Chili grows well in the dry and the intermediate part of the country. Chili plants should be in a location that receives a good amount of light. Chilies should not be in a position where the nightly temperature falls below 12°C. Growth will be inhibited if temperatures fall below 15°C. Chili peppers are harvested when the peppers are either green or red. Red peppers are hotter than green peppers. If anyone wants to harvest green chili peppers, allow them to grow as large as possible. Harvesting of chilies should be done when they start to turn red. Clip the peppers from the plant by cutting the stems where they connect to the main branch (BBS, 2014).

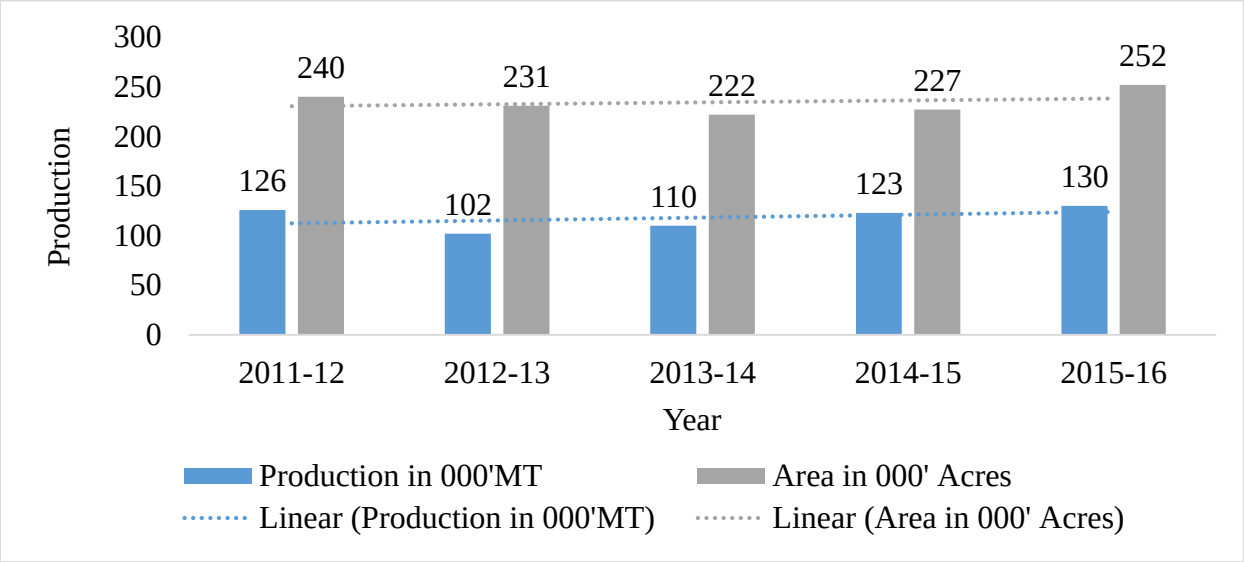

Fig. 3.3. Production and area of production of chili crop (BBS, 2014 & BBS, 2016).

Fig. 3.3 shows that the production of chili was 126000 MT in the year of 2011-12 and the cultivated area was 240000 acre. The production of chili was 130000 MT in the year of 2015-16 and the cultivated area was 252000 acre. The figure shows slightly increasing trend in production than the area of production.

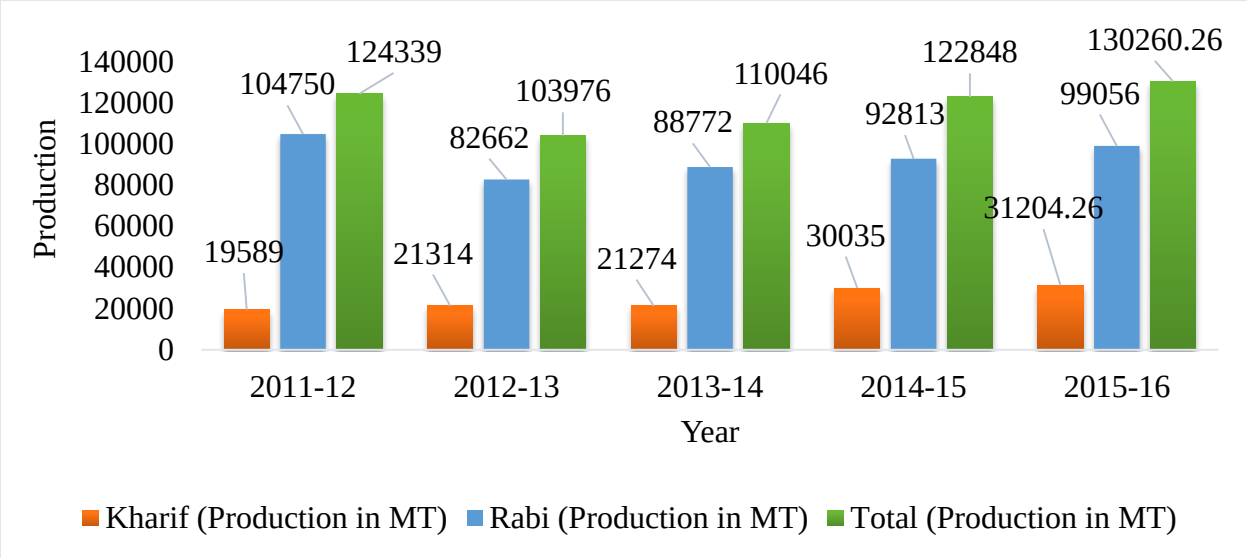

Fig. 3.4. Seasonal chili production (BBS, 2014 & BBS, 2016).

From the Fig. 3.4 it is clear that the production of Rabi chili is greater than the production of Kharif chili. It shows that the large portion of the total chili production comes from the Rabi seasons. The contribution of Kharif chili is too small in total chili production.

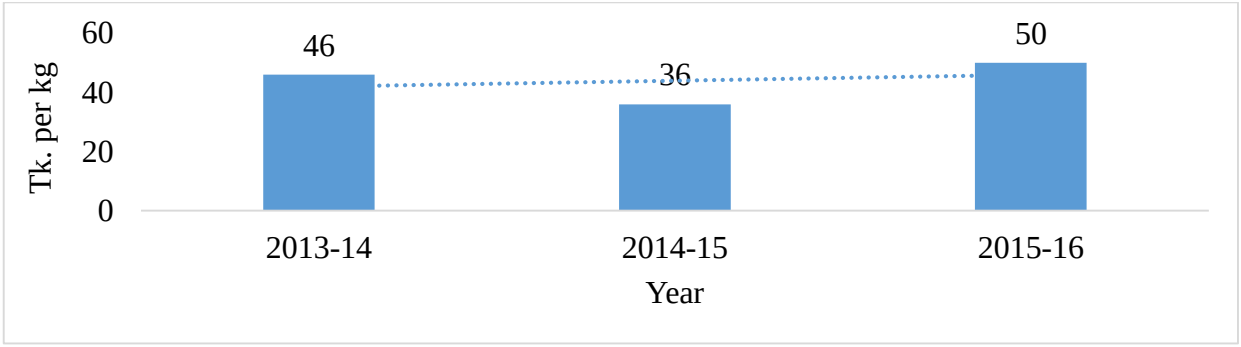

Fig. 3.5. Annual price variation for chili (DAM, 2017).

The Fig. 3.5 shows that the annual price variation for chili was highest in the year of 2015-16 amounted Tk. 50 per kg and the lowest was Tk. 36 per kg in the year 2014-15 and the price of chili shows an increasing trend.

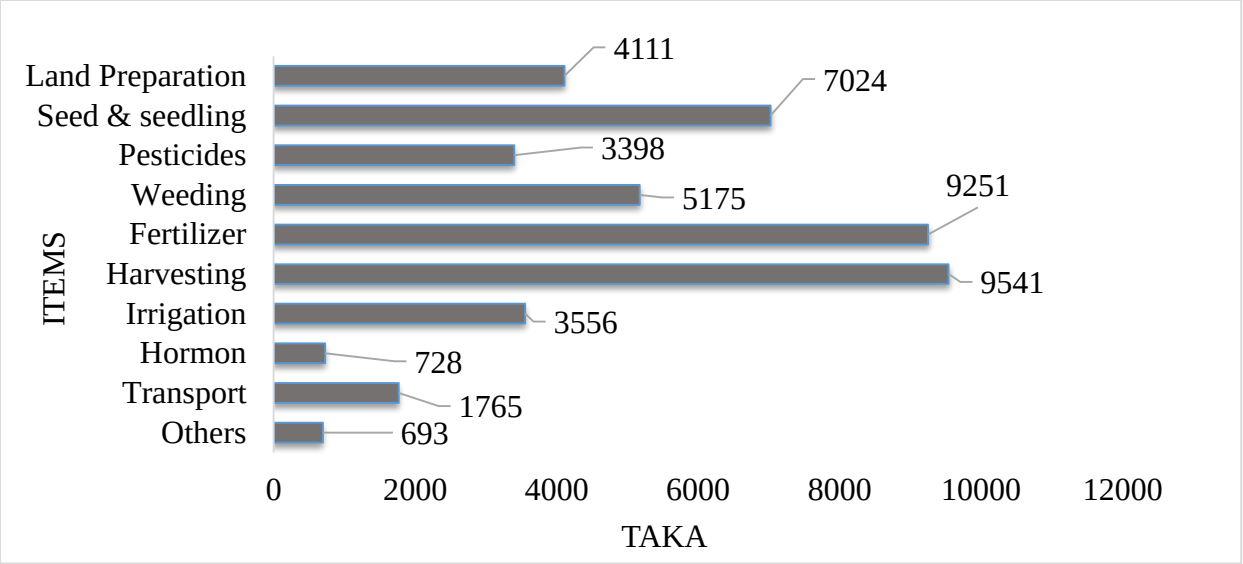

Fig. 3.6. Per acre production cost for chili production by type of input (BBS, 2014).

The Fig. 3.6 shows that most of the cost of production is invested in harvesting chili is 9541 Tk. per acre. Because in the peak season the price of labor and the availability of labor is too low. For this reason the farmer needs to pay high amount for labor and cost increase. Followed that, the lion share of total cost of production is spent in fertilizer application that is 9251 Tk. per acre and after that seedling and plantation that needs 7024 Tk. per acre. The total cost of chili production is 45242 Tk. per acre.

Per acre benefit cost ratio of chili crop by division is presented in the Fig. 3.7. It is observed that the highest BCR in Sylhet division was 2.41. Its means if farmer produce chili in Sylhet division then they are more benefited than they produce in other division. So the Sylhet division is more suitable for chili production. Followed by the Chittagong division and the lowest benefit cost ratio was 2.10 in Khulna division.

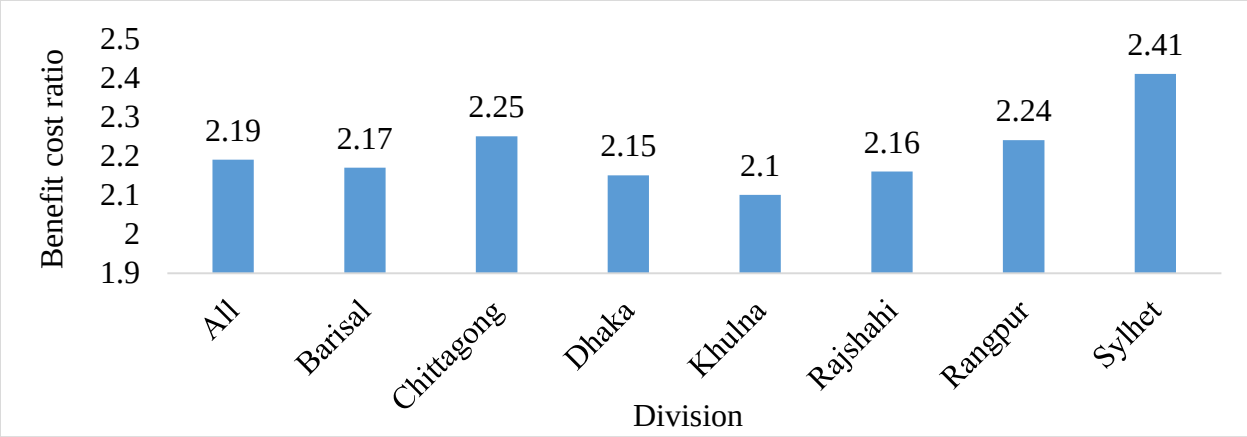

Fig. 3.7. BCR of chili for different division (BBS, 2014).

Ginger

Ginger (*Zingiber officinale*) is one of the common and popular spices, which has widely use in Bangladesh. The price fluctuation of ginger is relatively high than other spices (BBS 2015). However, there is no effective organization in the production and marketing of ginger in Bangladesh. Price of ginger can be controlled by maintaining its supply. On the other hand, fluctuations of ginger prices results the fluctuation of ginger production on the farm level. So, farmers have to aware of market prices to make their production plan accordingly. Prices in the market are formed based on supply and demand principles rather than production costs (Hasan *et al.*, 2017).

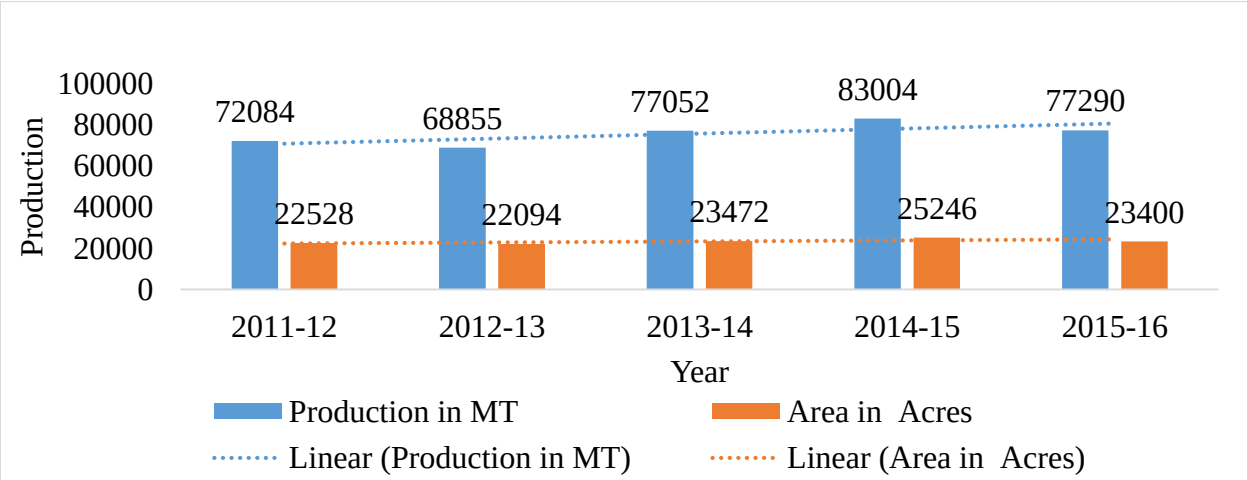

Fig. 3.8. Production and area of production of ginger crop (BBS, 2014 & BBS, 2016).

Above Fig. 3.8 shows that the production of ginger was 72084 MT in the year 2011-12 and the cultivated area was 22528 acre and the production of ginger was 77290 MT in the year 2015-16 and the cultivated area was 23400 acre. The above figure indicates increasing trend line for ginger production.

Table 3.5. Yield of Ginger 2013-14 to 2015-16

Division	2013-14	2014-15	2015-16
	Yield(kg)/acre	Yield(kg)/acre	Yield(kg)/acre
Barisal	–	–	–
Chittagong	3682	3560	3479
Dhaka	2690	2795	2926
Khulna	2935	3127	2976
Rajshahi	1960	2031	2699
Rangpur	3295	3438	3425
Sylhet	2182	2288	3256
Average	3283	3288	3303

Source: Calculated from BBS (2017)

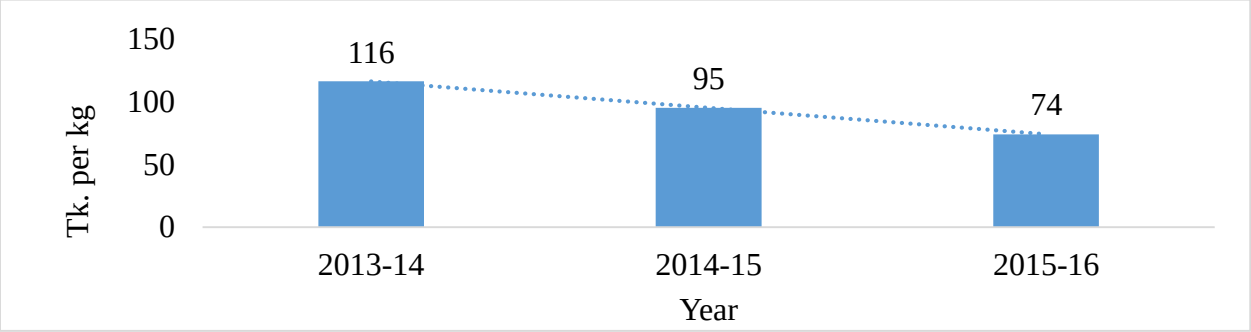

Fig. 3.9. Annual Price Variation for Ginger (DAM, 2017).

The Fig. 3.9 shows that the highest price of ginger was 116 Tk. per kg in the year of 2013-14 and the lowest price was 74 Tk. per kg in the year of 2015-16. The price of ginger shows decreasing trend line.

Cost of ginger production

The Fig. 3.10 shows that the seed and seedbed preparation for ginger need 49% of total production cost. Followed by the weeding need 9% of total production cost (Fig. 3.10).

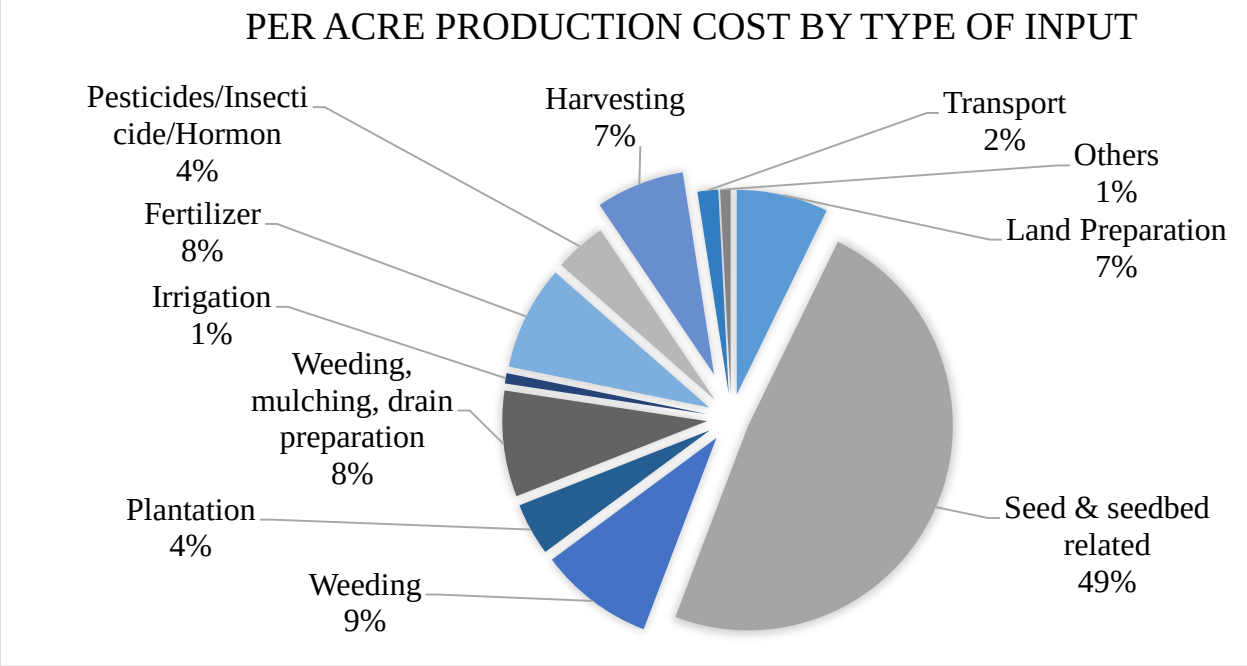

Fig. 3.10. Per acre production cost by type of input (BBS, 2015).

The cost of land preparation was Tk. 6218, seed and seedbed related was Tk. 41762, weeding was Tk. 7805, plantation was Tk. 3576, weeding, mulching and drain preparation was Tk. 7201, irrigation was Tk. 700, fertilizer was Tk. 7095, pesticide was Tk. 3519, harvesting was Tk. 6016, transportation was Tk. 1403, others was Tk. 706 and total cost was Tk. 78195 for ginger production.

Table 3.6. Profitability of Ginger for the year 2015-16

Item	Gross Return per acre (Tk.)	Production(Kg.)	Price per Kg. (Tk.)	Cost per Acre	Net Return per acre(Tk.)	Net Return per Kg.(Tk.)
Ginger	244422	3303	74	78195	46817	14.17

Source: Calculated from BBS (2017)

Table 3.7. Benefit-Cost Analysis of Ginger for the Farmers for the year 2015-16

Name of the spices	Gross Return per acre(Tk.)	Gross cost per acre (Tk.)	Benefit cost ratio
Ginger	244422	78195	3.12

Source: Calculated from BBS (2017)

From the table 3.6 and 3.7 it is seen that the total production is multiplied by the price of that product to get gross return. The production cost is deducted from the gross return to get net return. Net return for ginger is 14.17 Tk. per kg and the benefit cost ratio is 3.12. That means farmer get 3.12 taka for every one taka investment.

Turmeric

Turmeric is a spice made from the roots of the Curcuma longa plant referred as “Queen of Spices”. It is a similar of the ginger plant and produces a stalk over 5 feet tall with yellow flowers. The turmeric needs to boil the roots and bulbs, drying them to obtain the characteristic yellow color and grinding them into powder. The people of Bangladesh usually use turmeric in all curry preparation like meat, fish, vegetables, pulses etc. for its typical color and flavor. Besides, it is used in medicine and cosmetics and as dye in textile industries. It contents about 69.43% carbohydrate, 6.30% protein, 5.10% oil and 3.50% mineral and other important element in dry turmeric. It is intensively grown in the highland with sandy loam soil. Turmeric is cultivated commercially as an annual crop. For cultivating turmeric small rhizomes or pieces of rhizome is planted on flat soil. The growing plants require heavy manure to get the best possible yield of turmeric. When the lower leaves turn yellow then it’s ready for harvesting. It needs 7 to 10 months. Harvesting is done by digging the rhizomes up. Leafy tops are then cut off and the

roots and adhering earth is removed. Rhizomes are then washed. Some of these are retained and replanting them as a future crop. The remainders are processed into turmeric. For developing the yellow color and aroma, cleaned rhizomes are boiled in water for one hour under slightly alkaline conditions and then boiled rhizomes are dried in the sun for 6 to 8 days. Dried rhizomes are polished to smooth their exterior and also to improve the color. They are then sold in this form or grind into powder. Turmeric, specially Timla and local variety Sinduri, have huge demand in the market (BBS, 2013).

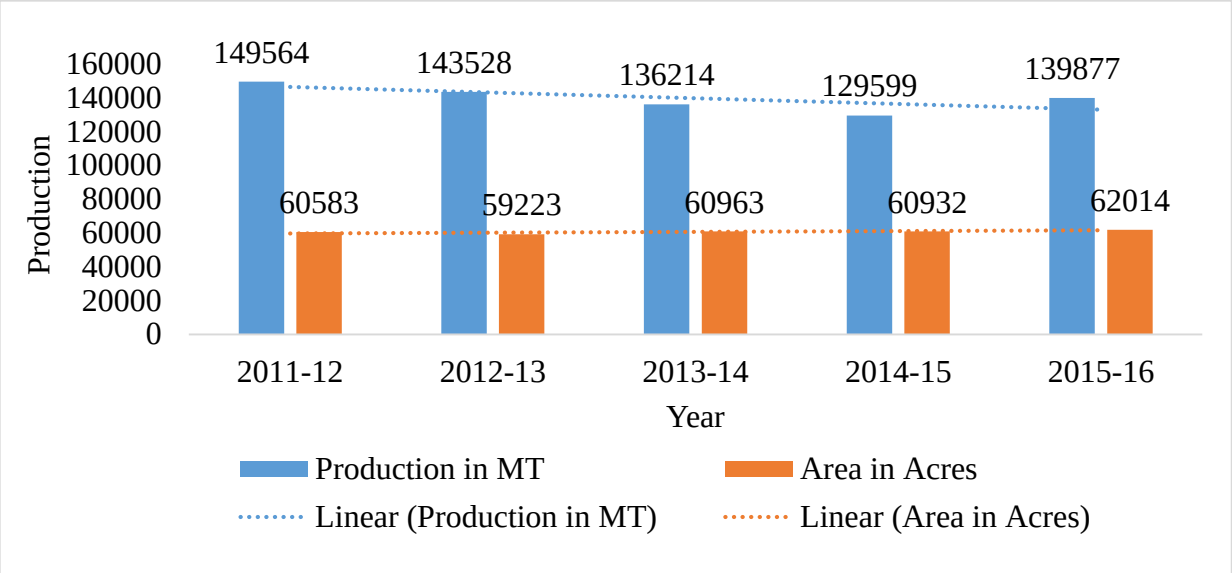

Fig. 3.11. Production and area of production of turmeric crop (BBS, 2014 & BBS, 2016).

Fig. 3.11 shows that the production of turmeric was 149564 MT in the year 2011-12 and the cultivated area was 60583 acre and the production of turmeric was 139877 MT in the year 2015-16 and the cultivated area was 62014 acre. From the figure it is seen that the trend of production is slightly decreasing.

Table 3.8. Yield of Turmeric 2013-14 to 2015-16

Division	2013-14	2014-15	2015-16
	Yield(kg)/acre	Yield(kg)/acre	Yield(kg)/acre
Barisal	675	1266	1389
Chittagong	1497	1453	1451
Dhaka	1426	1797	2054
Khulna	3702	3879	4072
Rajshahi	2705	2735	2849
Rangpur	2302	719	757
Sylhet	3738	3391	3521
Average	2234	2127	2255

Source: Calculated from BBS (2017)

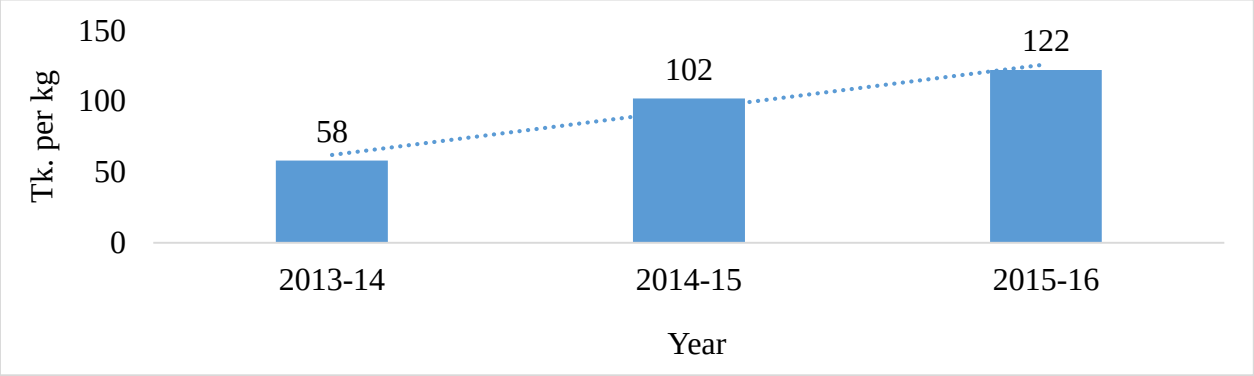

Fig. 3.12. Annual Price Variation for Turmeric (DAM, 2017).

The Fig. 3.12 shows that the highest price of turmeric was 122 Tk. per kg in the year of 2015-16 and the lowest price was 58 Tk. per kg in the year of 2013-14.

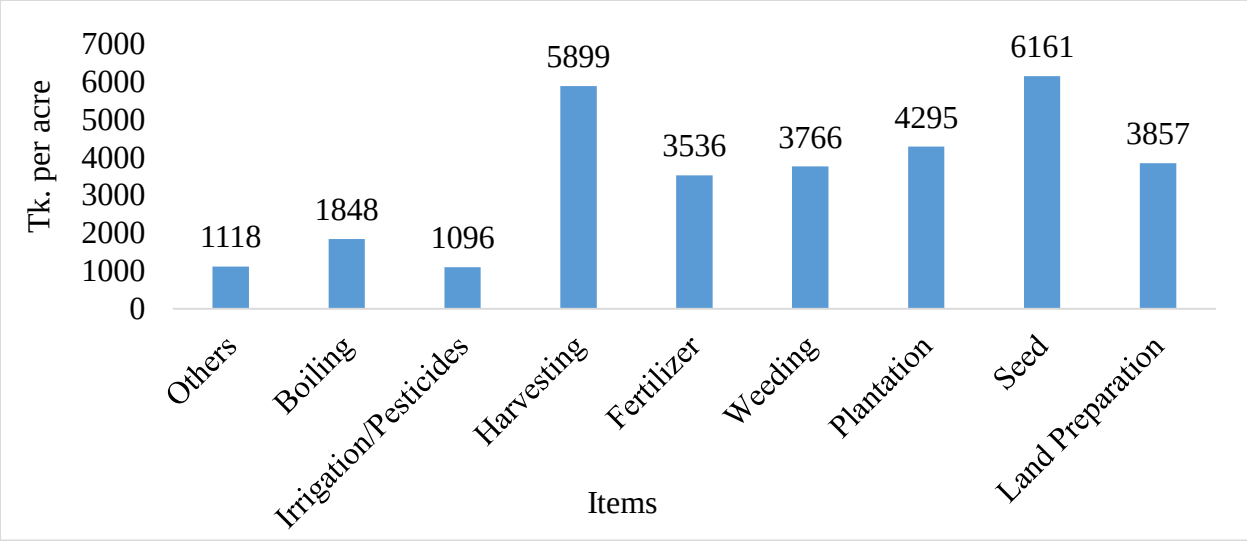

Fig. 3.13. Per acre production cost by type of input (BBS, 2013).

The Fig. 3.13 shows that the cost of production is the highest for seed that is 6161 Tk. per acre. Followed by harvesting that is 5899 Tk. per acre and then plantation is 4295 Tk. per acres. The total cost of turmeric production is 31575 Tk. per acre.

Table 3.9. Profitability of Turmeric for the year 2013-14

Item	Gross Return per acre (Tk.)	Production(Kg)	Price per Kg (Tk.)	Cost per Acre	Net Return per acre(Tk.)	Net Return per Kg (Tk.)
Turmeric	158614	2234	71	31575	127039	56.87

Source: Calculated from BBS (2017)

Table 3.10. Benefit-Cost Analysis of Turmeric for the Farmers for the year 2013-14

Name of the spices	Gross Return per acre(Tk.)	Gross cost per acre (Tk.)	Benefit cost ratio
Turmeric	158614	31575	5

Source: Calculated from BBS (2017)

From the table 3.9 and 3.10 it is seen that the total production is multiplied by the price of that crop to get gross return. When the production cost is deducted from the gross return then net

return is obtained. Net return for turmeric is 56.87 Tk. per kg and the benefit cost ratio is 5. That means farmer get 5 taka for every one taka investment.

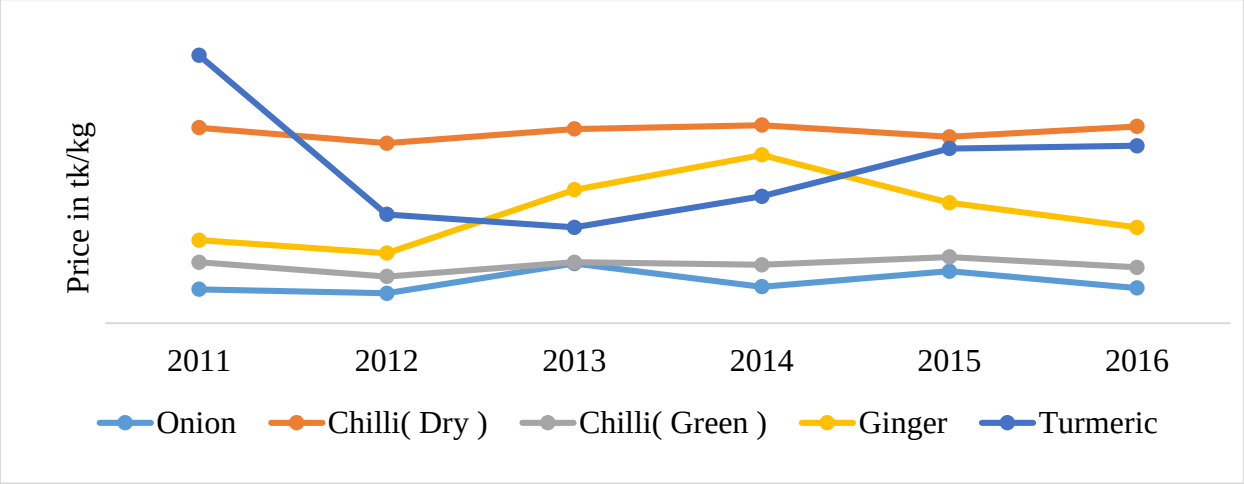

Fig. 3.14. Average wholesale price (BBS, 2012 & BBS, 2016).

Fig. 3.14 shows the price fluctuation of spices. The main reason for the price fluctuation of spices is the availability of that product. From the above figure it is clear that from the last couple of year the price fluctuation for ginger crop and turmeric crop was very high. On the other hand the price fluctuation for onion and chili was less than ginger and turmeric.

Constraints

Loss of arable Land

In Bangladesh, about 80,000 ha of arable land are going out of production every year. The loss is alarming and needs to be addressed immediately. The land use policy of the government should be updated and implemented immediately to stop further loss of arable land (Mondal, 2010).

Unfair price of agricultural produces

Most of the productive farmers of Bangladesh belong to small and marginal categories. These farmers do not have either Farmer's Association or Farmer's Co-operative to bargain for fair prices of their produces. They are forced to sell their produces at low prices to middleman. Since the farmers are often unable to meet procurement requirements (14% moisture content, absence of foreign materials in seeds, etc.) of the government, they cannot sell their produces at the price fixed by the government. (Mondal, 2010).

Lack of quality seeds

Of the total seed requirement, only about 6% quality seeds were supplied in 2003-2004, though seed as an input could increase production of crop by 10-15% (M. Mondal, 2005). Contribution of private sector and NGOs for quality seed production is still insignificant. Because the lacking of seed preservation and processing facilities. They have to depend on BADC for seed processing. It may be noted that farmer's low quality seeds still meet about 95% seed requirement that is considered to be one of the major constraints to crop productivity (Mondal, 2010).

Imbalanced use of fertilizers

Farmers normally use urea in recommended doses. Because of high prices, they apply P and K fertilizers at the rates that are far below the recommended amount. Chemical fertilizers are not usually integrated with organic manures. It is thus evident that farmers virtually do not use balanced fertilizers that are necessary for high productivity. A task force of the Ministry of Agriculture recently stated that the productivity of crops for the last few decades or so has either stagnated or declined even though fertilizer use in the country has almost increased three folds (Mondal, 2010).

Rate of taking new technology adoption

One of the causes of relatively poor performance of agriculture is the relatively poor rate of adoption of new technologies. Public services like research, education and extension are important to bring improvement in the adoption of new technology, obviously supported by the private sector input supply (seed, fertilizer, credit, etc.). The challenge is to develop effective linkages between these public services and farmers. Who plays a major role in testing and adapting technologies based on their local knowledge (Islam *et al*., 2012) .

Inadequate credit support to farmers

About 90% farmers of Bangladesh are small and marginal (below 2.5 acres land). They are very often constrained by finance and thus cannot afford high cost for management. They have very limited access to institutional credit because of collateral requirement. At present, only 27% of farmers receive institutional credit. The credit amount again is quite inadequate and not advanced in time. They are also not eligible for microcredit of NGOs that deal mainly with landless farmers. The situation compels these farmers to apply inputs, especially expensive P and K fertilizers far below the recommended doses that finally result in low yield. (Mondal, 2010).

Low education and experience of farmers

Most of the farmers are illiterate and they have not any knowledge and experience about how to reach in maximum frontier (Islam *et al*., 2012).

CHAPTER 4

CONCLUSION

- The production of spices is increasing every year. The production of onion is 1735000MT, the production of chili is 130000MT, the production of ginger is 77290MT and the production of turmeric is 139877MT in the year 2015-16.
- From BCR analysis it is found that among all the spices of the study turmeric (5) was the most profitable. Followed by BCR (3.12) for ginger, BCR (2.19) for chili and BCR (2.13) for onion.
- There are many constraints in spices production in Bangladesh. The main constraints are the loss of arable land, unfair price for agricultural products, low rate of technology adoption, low educational level of farmers etc. In every year a large amount of spices is imported from abroad due to the shortage of production. Bangladesh has a great prospect in spices production. So government should take some effective initiative to increase production in spices sector and raise consciousness among the farmer for enhancing spices production.

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