

PA-ABS-226
15/1/2010

Working Paper No. 5

**COSTS AND RETURNS FOR SOME FRUITS
AND SEMI-PERENNIAL CROPS IN
BANGLADESH**

Md. Karimullah Bhuiyan

June 1993

Funded by USAID under Contract NO. 388-0027-C-00-9026-00

BIDS-IFPRI AGRICULTURE DIVERSIFICATION PROJECT

BANGLADESH INSTITUTE OF DEVELOPMENT STUDIES (BIDS)
E-17, Agargaon, Sher-e-Bangla Nagar,
Dhaka-1207, GPO Box No. 3854, Bangladesh

**COSTS AND RETURNS FOR SOME FRUITS
AND SEMI-PERENNIAL CROPS IN
BANGLADESH**

Md. Karimullah Bhuiyan

June 1993

The author is a Research Associate of Bangladesh Institute of Development Studies. He is grateful to all the members of Core Research Team of IFPRI-BIDS Agriculture Diversification Project for their active cooperation and encouragement. The author wishes to express his deep sense of gratitude to Dr. Sajjad Zohir for his constant support and guidance throughout the study period.

(i)

Table of Contents

<u>Section</u>	<u>Page</u>
1. Introduction	1
2. Review of Trends in Fruits Cultivation in Bangladesh	2
3. Sources of Data	5
4. Methodology of Estimates on Costs and Returns	7
5. Estimates on Costs and Returns of Betelnut Cultivation	8
6. Estimates on Costs and Returns of Betel Leaf Cultivation	11
7. Estimates on Costs and Returns of Guava Cultivation	12
8. Estimates on Costs and Returns of Banana Cultivation	16
9. Estimates on Costs and Returns of Lemon Cultivation	19
10. Estimates on Cost and Returns of Papaya Cultivation	23
11. Estimates on Costs and Returns of Mango Cultivation	26
12. Estimates on Costs and Returns of Jackfruit Cultivation	29
13. Summary and Conclusion	33

Contd..

Table of Contents (Contd.)

Appendices

Table A-1: Production Trends of Some Fruits in Bangladesh	37
Appendix A-2 : Betelnut Cultivation - Costs & Revenue	40
Appendix A-3 : Betel Leaf Cultivation - Costs & Revenue	42
Appendix A-4 : Guava Cultivation - Costs & Revenue	44
Appendix A-5 : Banana Cultivation - Costs & Revenue	46
Appendix A-6 : Lemon Cultivation - Costs & Revenue	48
Appendix A-7 : Papaya Cultivation - Costs & Revenue	50
Appendix A-8 : Mango Cultivation - Costs & Revenue	52
Appendix A-9 : Jackfruit Cultivation - Costs & Revenue	54
Appendix A-10: Olive Cultivation - Costs & Revenue	56
Appendix A-11: Pineapple Cultivation - Costs & Revenue	59

1. Introduction

National land budget in the Fourth Five Year Plan envisages the target of 475 thousand acres from the bench mark (1989-90) level of 410 thousand acres for fruits cultivation and the output target is envisaged for 35.1% higher than the bench mark production level. In Bangladesh, agricultural exports of jute and jute products, shrimp, fish, tea, hides & skin etc. though constitute a significant source of foreign exchange earnings but these face slow growth prospects due to global competition and other emerging factors in the international arena. So, identification and promotion of non-traditional items which have high growth potentials in world market are necessary and in this context the importance of horticultural products for both domestic consumption and export possibility can hardly be overemphasized. Bangladesh as a labour surplus country can develop comparative advantage in horticultural products particularly for some fruits and other perennial crops. The cultivation and promotion of various fruits garden will augment significantly in the agricultural diversification process and employment expansion in the country. The supply abundance of fruits will influence entrepreneurs for establishment of fruit processing industries as the processed fruit products always have longer durability with high premium in world market than the fruits.

This report is a sub-component of IFPRI-BIDS Agriculture Diversification Project and it focuses mainly the costs and returns of some fruits and semi-perennial crops which are compiled from the field survey data. The report is

structured with twelve other sections and appendices after this introductory section. Section 2 deals with some macro estimates regarding acreage and production of some fruits in Bangladesh and their trend. Section 3 and 4 deal with the sources of data and methodology of estimates and in sections 5-12 we have compiled the costs and revenue estimates of some fruits and semi-perennial crops as revealed from the survey data. Finally, section 13 deals with summary and conclusion.

2. Review of Trends in Fruits Cultivation in Bangladesh

Table A-1 in the appendix shows the acreages, production and yield rate (metric ton per acre) for banana, mango, pineapple, jackfruit, papaya, guava, lime & lemon, litchi, betelnut, betel leaves, coconut, and other citrus fruits which include 'amloki', 'amra', 'olive', 'koromcha', 'kamranga' etc., during the period 1974-75 to 1989-90 in Bangladesh.

Banana : The acreage of banana has been registered with upward trend over the years with slight ups and downs. The overall increase in acreage over the period 1974-75 to 1989-90 is 6.3% but the highest increase was registered 16% in 1982-83 compared to 1974-75. Per acre yield rate of banana was slightly higher (4%) over the period 1974-75 to 1989-90 but the highest yield rate, 6.897 met. ton per acre, was found in 1984-85 which is 9.1% higher than the base year 1974-75.

Mango : The acreage of mango cultivation has increased 19% over the years from 1974-75 to 1989-90 but production of mango has declined 38.2% during the same period. This is due to continuous fall of yield rate over the years. During the later half of eighties the yield rates of mango have reduced to less than half of the yield rate of 1974-75. The cause of such drastic fall of mango yield rates need to be identified by the agronomist or experts in this line and proper remedial measures should be taken.

Pineapple : The acreage of pineapple cultivation is more or less static in Bangladesh over the years though after 1983-84 the acreage has been slightly reduced. But yield rate of pineapple has slightly increased in eighties compared to second half of seventies which eventually increases the production in eighties and the production increase is 26% higher in 1989-90 compared to 1974-75.

Jackfruit: The acreage of jackfruit has increased from 44735 acres in 1974-75 to 60768 acres in 1989-90 which means the acreage increase is 35.8% over the years. The yield rate is more or less static and as such total production of jackfruit has also increased by 31.1%.

Papaya: The acreage of production has increased from 6235 acres in 1974-74 to 9010 acre in 1987-88 and the increase is 44.5% during this period. Yield rate has also increased by 6.4% in 1987-88 compared to 1974-75. So, the overall

production has increased from 19, 290 metric ton to 29,655 metric ton during this period and the production is 45.2% higher in 1989-90 compared to 1974-75.

Guava: The acreage and production of guava have substantially increased over the years but the yield rate of guava is more or less static. The acreage has increased by 133.6% in 1987-88 compared to 1974-75. The production has increased by 109% in 1987-88 and 212% in 1989-90 while comparing the production of 1974-75.

Lime and Lemon: The acreage and production of lime and lemon have increased by 75% and 70% respectively in 1987-88 compared to 1974-75 but yield rate has declined by 3.1% during the same period.

Litchi: The acreage of litchi has steadily increased from 5695 acres in 1974-75 to 9589 acres in 1989-90 but the yield rate has gradually decreased from 2.009 metric ton per acre in 1974-75 to 1.040 metric ton per acre in 1983-84. After 1983-84 the yield rates improved very marginally but in 1989-90 still below 1974-75 level. Though yield rate declined but total production of litchi has increased 44% in 1989-90 as compared to production of 1974-75 due to acreage increase by 68% during the same period.

Betelnut : The total production of betelnut is almost static over the years with some ups and downs in some years due to increased or decreased yield rates. It appears that total acreage of betelnut cultivation has decreased by

6.8% during 1974-75 to 1989-90 but yield rate has increased 9.9% during the same period giving 2.6% production increase during the same period.

Betel leaves : The total production and acreage of betel leaves have increased steadily by 16.1% and 19.4% respectively during the period 1974-75 to 1987-88 but yield rate has declined by 2.8% during the same period.

Coconut : The acreage, production and yield rate have increased over time during the period 1974-75 to 1989-90 by 22.2%, 31.9% and 8.0% respectively.

Other citrus fruits : This category includes fruits like 'Amra', 'Amloki', Olive, 'Karomcha', 'Kamranga' etc. The acreage of other citrus fruits has increased by 8.3% during the period 1974-75 to 1987-88 but yield rate has declined 8.7% during the same period. Production of these category of fruits are more or less static with some fluctuations in some years due to variable yield rates caused by weather variability.

3. Sources of Data

Detailed survey was carried out in 75 villages of 42 upazilas in Bangladesh and different sets of questionnaires were administered in the IFPRI-BIDS Agriculture Diversification project for different components of the study. One questionnaire was designed to collect information regarding production, input cost, labour use, harvesting and marketing cost, sales price etc. for some

fruits and semi-perennial crops. Survey was carried out for fruits or semi-perennial crops in the selected villages¹ where these products are cultivated at a relatively large scale from commercial point of view and not merely for household consumption. The sample villages and upazilas were purposively selected for all components of the study such that they represent various agro-economic zones, soil type, land elevations and cropping pattern zones.

Costs and revenue data were collected for the products betelnut, betel leaf, guava, banana, lemon, pineapple, papaya, mango, jackfruit and olive. Each of the products has its variability in terms of location, level of production and other factor costs. So, the products are individually discussed in the subsequent sections while olive and pineapple due to very small sample size are relegated to the appendix A.10 & A.11.

¹ For details please see: (a) Zohir & Bhuiyan (1991)- 'Selection of Study Area for Collection of Production and Marketing Data' and (b) Zohir (1991) - 'Note on Zoning of Bangladesh'.

4. Methodology of Estimates on Costs and Returns

Since we are dealing here with semi-perennial and perennial crops, complications of standardizing flows of costs and returns are enormous. Generally, all these crops require investments during the first year, returns from which come only in some later years. These investments are identified here as fixed costs. Such costs include those required for land development, seedlings, plantation, fencing, etc. Each garden has its own cycle of production subject to the age and sufficient maintenance of garden. So in computing the fixed cost of the garden the number of harvesting years have been considered. The computation of fixed costs by type of average garden has been demonstrated in relevant appendix.

The regular expenses to maintain a garden for harvest and marketing the fruits are included as variable costs. These includes maintenance costs, cost of irrigation, fertilizer and pesticide, transport, agricultural implements etc. Given an estimated time interval at which the fixed costs are incurred, the annualized costs are calculated. The latter is added to the variable costs; and an extra 10 percent of this aggregate cost is included to account for opportunities foregone. In our presentation, we distinguish between full cost and cash cost.

Sales price per unit of product or by products have been estimated since large proportion of product or by-products have been sold to the market and

the residuals are either consumed at the household or stolen/wasted by natural hazard. To compute the actual gross value of production we have added the quantities of sales and home consumption and multiplied it by the sales price. The potential value of production has been derived adding the perceived value of stolen or wastage products.

Due to variability in size of garden, labour use, input use and other factor costs for locational dispersion, the costs and revenue data are compiled on per acre per year basis for ready references and comparability among the different crops.

5. Estimates on Costs and Returns of Betelnut Cultivation

Betelnut is grown all over Bangladesh but among the 42 selected upazilas, dominance of betelnut cultivation is found in the upazilas Bagerhat sadar, Paikgacha (Khulna), Matlab (Chandpur), Gaibandha Sadar, Parsuram (Feni), Ramu (Cox's Bazar), Tungipara (Gopalganj), Panchagarh Sadar, Senbagh (Feni) and Begumganj (Noakhali) which constitute our sample space for collection of cost and revenue data regarding betelnut cultivation.

A betelnut plant begins to yield within 5-7 years after plantation of seedlings and continues to yield in almost every year for the next 15-20 years until the tree is uprooted or badly damaged by natural calamities. No irriga-

tion is required in the betelnut garden but low dose of fertilizer and manure are applied occasionally before and after flowering.

In some gardens presence of some fruit trees, bamboo bush or other trees for fire-wood are noticeable. In each year a few plants are happened to be badly damaged either by storm or by otherwise and in that case the damaged plants are replaced by planting new plants. It requires fertilization and manuring before plantation of seedlings. Watering is done by bucket to the newly planted seedlings in case of drought. Weeding, mulching and fencing are also being practiced by some farmers.

During the time of harvest when the betelnuts are matured and ripen incidences of theft are not ruled out and as such watching is necessary by the members of the household. A small proportion of total produce is consumed at the household and marketed in the local primary market before drying to meet the incidental expenses. The great bulk of produce after harvest is dried, processed and stored in the house for future marketing in the assembly market which captures reasonably better price. This is possible as the betelnut cultivators are by and large well to do people in the village. The costs and revenue estimates for one acre betelnut cultivation per year are shown in Table 1 and Appendix: A-2.

Table 1
Costs and Returns to Betelnut Cultivation, 1991

Cost Items	Full cost basis (Tk.)	Cash cost basis (Tk.)
Fixed cost of garden	2437.80	2437.80
<u>Garden maintenance:</u>		
- Seedlings	86.00	86.00
- Labour	2400.53	969.82
- Fertilizer	559.03	559.03
- Transport	123.35	123.35
- Agricultural implements	246.21	246.21
Harvesting and marketing	1957.36	1340.07
Sub-Total	7810.28	5762.28
Interest (10% of cash cost)	576.23	-
Total cost	8386.51	5762.28
 <u>Gross Revenue</u>		
Value of actual production (in Tk.)		
- Dry betelnut (547.88 kg.)	=	27,317.30
- Other revenue (fuel & seedlings)	=	1,282.67
Total	=	28,599.97
 Value of potential production (in Tk.)		
- Dry betelnut (589.35 kg.)	=	29,384.99
- Other revenue (fuel & seedlings)	=	1,282.67
Total	=	30,667.66
 <u>Net Return</u>		
- At full cost basis (in Tk.):		
(a) actual	=	20,213.46
(b) potential	=	22,281.15
- At cash cost basis (in Tk.):		
(a) actual	=	22,837.69
(b) potential	=	24,905.38

Source: IFPRI-BIDS Survey, 1991.

6. Estimates on Costs and Returns of Betel Leaf Cultivation

Betel leaf is a very useful commodity in the cultural tradition of Bangladesh particularly in the rural areas where guests are very often entertained by betel leaves. Moreover, this commodity has significant contribution in foreign exchange earning as every year Bangladesh exports huge volume of betel leaves. It grows in various parts of Bangladesh but among the 42 selected upazilas, dominance of betel leaf cultivation is found in the upazilas Sherpur (Bogra), Bagerhat Sadar, Phultola (Khulna), Kaliganj (Jhenaidah), Agailjhara (Barisal), Muradnagar (Comilla), Ramu (Cox's Bazar) and Rangunia, Patiya & Lohagara upazilas of Chittagong.

Most of the farmers cultivate local variety 'bangla paan' and there is no significant product variation. There are some small percentage of mixed varieties (e.g. locally these are called as 'misti paan', 'bhavna paan', 'jello paan', etc.) in a few garden but their proportion is much less compared to the 'bangla paan'.

The cultivation of betel leaf is highly labour intensive and the labour intensity is possibly highest among all other crops produced in the country. The practice of betel leaf cultivation is also highly capital intensive in terms of input (e.g. fertilizer, insecticide) use, irrigation and other materials cost.

After plantation of betel leaf seedlings, they begin to yield within 4-5 months if properly nursed them and continue to yield for the next 2-3 years. The matured leaves are generally plucked from the plant 2-3 times in a month. The plucked leaves are packed in bundles. In one bundle there are 80 pieces of leaves and one such bundle is called one 'pon'. The betel leaves (in pon) are basketed and sent to the local market. The 'paikers' from distant places come to the local market and the farmers sell their products to the paikers. Sometimes in peak season, paikers being united themselves exploit the betel leaf cultivators by lower price of betel leaf. So, large farmers very often send their products to the assembly market for reasonable price but this process include higher transportation cost, storage cost, toll or commission and higher labour cost. The costs and revenue estimates for one acre betel leaf cultivation per year are shown in Table 2 and Appendix: A-3.

7. Estimates on Costs and Returns of Guava Cultivation

Guava, a very common fruit, is a good source of vitamin C and it is delicious too and as such it is liked by all particularly the youngsters. Its cultivation is very simple and it requires less effort in terms of labour use, fertilizer use etc. than other fruits. A guava plant begins to yield within 2 years after plantation and some times it yields in two seasons in a year but the peak season is identified during the months of 'bangla' Ashar, Sravan & Kartik. The production and practice of guava cultivation has not increased

Table 2
Costs and Returns to Betel leaf Cultivation, 1991

Cost Items	Full cost basis (Tk.)	Cash cost basis (Tk.)
Land preparation and plantation	2636.00	2636.00
Garden maintenance		
- Materials	10,200.67	10,200.67
- Labour	20,320.00	9,160.00
- Fertilizer, insecticides & irrigation	10,405.51	10,405.51
- Transport for procurement	578.38	578.38
- Agricultural implements	329.15	329.15
Harvesting and marketing	14,492.88	9572.88
Sub-Total	58,962.59	42,882.59
Interest (10% of cash cost)	4,288.26	-
Total cost	63,250.85	42,882.59
Gross Revenue		
- Value of production (in Tk.)	=	116,138.40
Net Return (in Tk.)		
- At full cost basis	=	52,887.55
- At cash cost basis	=	73,255.81

Source: IFPRI-BIDS Survey, 1991.

much though it has potentials in terms of food value and marketability. The farmers can easily plant a few seedlings of guava in their homestead which will increase their household consumption level and will also bring extra-income. Though guava is grown all over Bangladesh but from commercial and scientific point of view, its cultivation is very much limited as among the 42 selected upazilas dominance of guava cultivation is found only in the four upazilas Bandarban Sadar, Patiya (Chittagong), Sreepur (Gazipur) and Ullapara (Sirajganj).

Fertilizer is used generally twice in a year before and after flowering. Generally it does not require irrigation but during drought manual irrigation is occasionally provided after weeding the garden. Mulching is also occasionally practiced to keep moisture in the soil. The trimming is generally done once in a year after the harvest but weeding is done atleast twice before and after flowering.

The farmers generally harvest the fruits gradually once or twice in a week during the harvesting months when the colour of the fruits indicate their maturity. Among the sample guava gardens dominance is noticed for the recently developed 'Kazi Piara' which constitutes 69% of trees in the garden followed by a high yielding variety (25% of trees) and the rest 6% trees are of local variety. The dominance of 'kazi piara' is due to larger size of the product and higher yield rate. The farmers immediately after plucking the fruits from the trees carry them in bamboo baskets to either local primary markets or to nearby assembly markets once or twice in a week. The 'paikers' or 'beparees' buy guavas in lots and send them for profit at various urban centres or markets. The costs and revenue estimates for guava cultivation in one acre land per year are shown in Table 3 and Appendix: A-4.

Table 3
Costs and Returns to Guava Cultivation, 1991

Cost Items	Full cost basis (Tk.)	Cash cost basis (Tk.)
Fixed cost of garden	706.74	706.74
Labour cost for garden maintenance	2338.80	1308.12
Fertilizer	1114.89	1114.89
Other cost	700.94	700.94
Marketing cost	1345.76	1159.40
Sub-Total	6207.13	4990.09
Interest (10% of cash cost)	499.00	-
Total cost	6706.13	4990.09
<u>Revenue (in Tk.)</u>		
- Value of production	=	27,033.30
<u>Net Return (in Tk.)</u>		
- At full cost basis	=	20,327.17
- At cash cost basis	=	22,043.21

Source: IFPRI-BIDS Survey, 1991.

8. Estimates on Costs and Returns of Banana Cultivation

Banana is a very common fruit in Bangladesh and everybody likes it. It grows round the year in almost all over Bangladesh except in areas of sandy and rocky soils. The climate and soil of Bangladesh is very suitable for banana cultivation but banana plant can not survive in stagnant water during flood. There are demand for banana in both domestic market as well as in international market. But banana production has not increased satisfactorily due to some socio-economic factors and risks involved for natural calamities like flood, storm etc.

Though banana cultivation is noticeable in every upazilas of the country but dominance is observed in the upazilas Muradnagar & Chowddagram (Comilla), Muladi (Barisal), Kaliganj (Jhenaidah), Bagerhat Sadar, Mirpur (Kushtia), Sreepur (Gazipur), Modhupur (Tangail), Jhalakati Sadar, Bandarban Sadar and Lohagara (Chittagong).

Banana cultivation is very much labour intensive and may also be regarded as capital intensive in terms of fertilizer and insecticide use and materials and irrigation cost. The process starts with land preparation. Selected plot of land is first of all ploughed well 3-5 times subject to the soil condition and necessary levelling and dressing are also made. Then holes are made at a distance of 6-8 feet and the size of each hole is 1.50 feet in depth, 1.50 feet in length and 1.50 feet in breadth. After sun drying for some days each

hole is filled up with the mixture of 7-8 kg. cowdung, 250-300 gms TSP and soil of the hole for planting the seedlings. The planting is generally done during the month of February and as such irrigation is required till the rainy season. Necessary hoeing and weeding are continued after each irrigation. Extra care is taken during rainy season so that excessive rain water drains out of the garden. Various fertilizers in various doses at various times are applied when the soil remains dry. Storm is a menacing factor in banana cultivation as such bamboo sticks are attached to each grown up plants so that they do not collapse due to storms. During the dry months of November-March irrigation is required in each month and in case of difficulty for irrigation mulching after hoeing is done so that sufficient moisture is contained in the soil of garden. Seedlings stem out regularly from each plant but for healthy growth and good harvest only one seedling is allowed to grow and the rest are pruned out regularly. Most of the seedlings planted during February yield before next winter and the banana garden is generally maintained for 2-3 years. But planting of seedlings for second and third year is not necessary as earlier said that seedlings stem out from the mother plants. After each harvest the best seedling is allowed to grow and the mother plant along with other seedlings are uprooted to ensure healthy space and growth of the remaining seedling in the following year.

It has been observed that irrigation was provided to all the sample gardens but in various degrees or frequencies. Mode of irrigation is different for different garden. In about 75% cases mode of irrigation is either L.L.P

or S.T.W while in the remaining 25% cases irrigation is made by traditional methods like doon, swing baskets and even by buckets.

There are some product differentials as observed in the sample gardens. But dominance has been observed for 'Sagar' (65%) in terms of number of plants followed by 'Sabri' (30%) and the rest ('Chapa' and 'Kaach Kola') comprise 5% of plants. The product differentials does not effect much for revenue earning per plant but 'Sagar' has been identified much quicker yielding crop then others.

It has been observed that farmers themselves consume 5-10% of their products in the household and from the rest they earn good revenue. The farmers harvest banana when it is matured but before changing the green colour. All harvest is not made at a time as it is subjected to maturity. The farmers take their products to the local primary market and in some cases to the assembly market subject to the nearness and availability of transport. The 'farias', 'beparees' or 'paikers' are the buyers in these markets who again resell the products to other distant urban markets. Sometimes 'farias' or 'paikers' also buy banana directly from the garden. The incidence of forward sale is 15% where farmers sell their garden products at pre-determined price before harvest. The costs and revenue estimates of one acre banana garden per year are shown in Table 4 and Appendix: A-5.

Table 4
Costs and Returns to Banana Cultivation, 1991

Cost Items	Full cost basis (Tk.)	Cash cost basis (Tk.)
Seedlings	2805.00	-
Labour and bullocks	10,740.00	6256.24
Fertilizer	4054.28	3817.60
Irrigation	457.60	457.60
Agricultural implements	276.64	276.64
Materials cost (bamboo)	3250.00	3250.00
Marketing cost (except labour)	618.08	618.08
Sub-Total	22,201.95	14,676.16
Interest (10% of cash cost)	1,467.62	-
Total cost	23,669.57	14,676.16
 Gross Revenue (in Tk.)		
- Value of actual banana production (6495 x 7.06)	=	45,854.70
- Value of seedlings produced	=	3,000.00
- Total value of production	=	48,854.70
 Net Return (in Tk.)		
- At full cost basis	=	25,185.13
- At cash cost basis	=	34,178.54

Source: IFPRI-BIDS Survey, 1991.

9. Estimates on Costs and Returns of Lemon Cultivation

Lemon is a very useful fruit in the socio-economic condition of Bangladesh. It grows all over the country except in rocky or excessive sandy soils but its importance is yet to be looked into from commercial point of view. It contains high proportion of Vitamin C, Vitamin A, Vitamin B-1 and other mineral resources and as such the drinks made of lemon juice are very useful

for good health. So, lemon is liked by all class of people but its large scale cultivation among the farmers as a cash crop is very limited. Most of the farm household have one or two plants in their homestead primarily for household consumption. Its cultivation is very simple as it does not require much labour or capital. But it yields round the year having peak during monsoons.

Though lemon grows in almost all the upazilas in the country but dominance has been observed in 6 upazilas e.g. Sreepur (Gazipur), Modhupur (Tangail), Patiya, Rangunia, and Lohagara (Chittagong) and Bandarban Sadar, among our 42 selected upazilas. It appears that dominance is dependent on type of soil and high land.

The average size of lemon garden is about 30 decimal. 'Elachi', 'Kagozi' and local variety are generally cultivated and among these the product 'Elachi' is dominant in terms of number of plants (67%) followed by local variety (18%) and 'Kagozi' (15%). The products vary in size and yield but in terms of revenue earning all the products have almost similar response.

A lemon garden if properly nursed then it begins to yield within 3-4 years and sometimes even earlier and continues to yield for the next 10-15 years but a plant yields most during its age 7-10 years. A matured plant in its youth can yield 200-300 pieces per year. The yield is again dependent on maintenance of garden. Before plantation land is carefully prepared free from weeds. Then holes of size 1.50 feet in length, 1.50 feet in breadth and 1.50

in depth are made. Appropriate proportion of cow-dung, MP, TSP, oilcake, ashes etc. are mixed with the soil of hole. These holes are generally made at a distance of 12-14 feet apart and 3-4 days before filling the hole with the mixture. One seedling is planted in each filled up hole. During post plantation period necessary irrigation is provided for survival of the plants till the rainy season. Again care is also taken so that weeds do not effect the growth of the plants or stagnant water does not damage the plants. Fertilization and manuring is generally done before and after rainy season in each year.

As lemon grows round the year, so its harvesting and marketing are also done during the whole year. The farmers harvest when the fruits mature and sell them to the local primary market. The 'paikers', 'beparees' or 'farias' buy the products in lots and send them to the various urban destination for resale. In some cases, local 'farias' buy lemon from the garden when scarcity prevails during dry season. During dry months the price goes up when production goes down. The cultivation of lemon is profitable but it is not that much attractive as other fruits. The costs and revenue estimates for lemon cultivation in one acre land per year are shown in Table 5 and Appendix: A-6.

Table 5
Costs and Returns to Lemon Cultivation, 1991:

Cost Items	Full cost basis (Tk.)	Cash cost basis (Tk.)
Land preparation and plantation	582.40	534.40
Garden maintenance	2295.41	1655.41
Harvesting and marketing	798.47	398.47
Sub-Total	3676.28	2588.28
Interest (10% of cash cost)	258.83	-
Total cost	3935.11	2588.28
 <u>Value of production (in Tk.)</u>		
- Actual	=	15609.60
- Potential	=	15973.20
 <u>Net return</u>		
At full cost basis (in Tk.):		
- Actual	=	11,674.49
- Potential	=	12,038.09
At cash cost basis (in Tk.):		
- Actual	=	13,021.32
- Potential	=	13,384.92

Source: IFPRI-BIDS Survey, 1991.

10. Estimates on Cost and Returns of Papaya Cultivation

Papaya is a tropical fruit and it grows all over the country round the year having its peak during August, September and October and lowest production during winter months. It contains high quality of riboflavin, vitamin B-1, vitamin C and various minerals which are very useful for human health and nutrition. So it is liked by all class of people and it is also used as a vegetable. Considering the food value and usefulness there is an adage "A papaya a day, keeps the doctor away". But the cultivation of papaya and its production in the country is far below potentials due to lack of awareness about its profitability. The risk involved in the maintenance of papaya garden due to storms in monsoons, inundation of flood water, lack of proper knowledge for nursing the garden etc. contribute for lower level of papaya cultivation.

Among the 42 selected upazilas dominance of papaya cultivation has been observed in the upazilas Sreepur (Gazipur), Muladi (Barisal), Tungipara (Gopalganj), Gaibandha Sadar, Nawabganj Sadar, Bandarban Sadar and Rangunia (Chittagong). Average size of the sample papaya garden is less than 30 decimal and the gardens are located in most cases at homestead land which are generally of high land category where flood water does not inundate. It has been observed that in the sample gardens 57% plants are of HYV type while 43% plants are of local variety.

Papaya cultivation is very much labour intensive and it involves the following stages. First of all seed bed is prepared for rearing seedlings. The

selected land for papaya plantation is cleaned, levelled and ploughed well 3-4 times. When the seedlings are of 1.5 - 2 months age or growth is 8-9 inches in height then the seedlings are planted in the garden. Holes of size 2 feet in length, 2 feet in breadth and 2 feet in depth are made in the garden at a distance of 7-8 feet apart before 3-4 days of plantation. Each hole is allowed to dry in the sun for 2-3 days and then the soil of the hole is mixed with cowdung, oil cake and TSP in appropriate proportion for filling each hole with the mixture. The seedlings reared in the seed bed may be either male or female origin and it has been observed that male origin flowers only and does not yield papaya. But the male plant contributes naturally for better yield by the female plant. So, it is the practice of keeping 8-10% of male plants in each garden. Before flowering it is difficult to identify which plant will yield and which will not. So the farmers plant 3 seedlings at a distance of 6 inches in each filled up hole. It is very likely that among the 3 seedlings planted in each pit there will be at least one female plant. The planting is generally made during March-April and irrigation is provided atleast twice in a month unless it rains till the plants flower. The plants are attached with bamboo sticks so that they do not collapse due to storms. Within 2-3 months after plantation the plants flower when the male plants are uprooted from the pit and 8-10% male plants are kept in the garden. Manuring and fertilization at appropriate doses are done after uprooting the male plants. Hoeing and weeding is also done at this stage for better growth and yield of the plants. Fertilization and manuring is done again when the plants are of 6-7 months age. Necessary irrigation, hoeing, weeding etc. are maintained round the year

and in case of heavy rain the rain water is drained out as the plants are susceptible and can not survive in stagnant water. Sometimes concentration of fruits in the yielding plants are so high that it requires to pluck some fruits so that the remaining fruits can grow better. Generally the fruits ripe within 6 months after flowering but most of the farmers harvest and sell papaya as vegetable while it is green. It has been observed that if the harvest is made earlier while it is green then the plants yield more in terms of number of fruits. Ripe papaya always catch higher per unit price than the green ones but risk of theft is there while it ripens in the garden. It has been observed that 70-75% of produce are sold and consumed while it is green and the residuals are ripened for better price.

The papaya garden is generally maintained for at least 2 years by the farmers and in case of any damage to any plant then it is replaced by new ones. Manuring, fertilization, hoeing, weeding etc. are maintained periodically in every year for good harvest.

As papaya grows round the year, the farmers are found to sell in almost all weeks after first harvest in various quantities. Most of the farmers sell their products to local primary market or to an assembly market subject to the nearness and transport availability. The 'paikers' or 'beparees' are the buyers who resell the products at distant urban markets. Sometimes some buyers particularly 'farias' purchase the products directly from the garden but incidence of forward sale like banana is absent in case of papaya.

The sample gardens indicate that papaya cultivation is very much profitable compared to other crops as shown in Table 6 and Appendix A-7.

11. Estimates on Costs and Returns of Mango Cultivation

Mango is a popular fruit in Bangladesh. It grows almost all over the country but significant quality differential prevails from one region to other. The best quality of mangoes grow generally in the northern and western zones of the country particularly in the old districts of Rajshahi, Bogra, Dinajpur, Kushtia and Jessore. Chapai Nawabganj is very prominent for the best quality of mango production. There are more than hundred types of mango prevalent in the country but qualitative significance are for the types 'Lengra', 'Fazli', 'Himsagar', 'Gopalvogue', 'Khirsapati', 'Mohonvogue', 'Bombai', 'Misreevogue', 'Kohitoor', 'Brindaboni', 'Kishanvogue', 'Doodia', 'Baromashi', 'Kachamitha', etc. Each of these have also different others names in different parts of the country. Among the selected 42 upazilas, dominance of mango cultivation is observed in only 3 upazilas viz. Gaibandha Sadar, Chapai Nawabganj Sadar and Kaliganj (Jhenaidah). The average size of the sample garden is 0.77 acre. As observed, there are 13 varieties of mango in the sample gardens.

Table 6
Costs and Returns to Papaya Garden, 1991

Cost Items	Full cost basis (Tk.)	Cash cost basis (Tk.)
Land preparation and plantation (annualised cost)	2197.33	1525.33
Garden maintenance	13708.46	9382.46
Harvesting and marketing	3495.46	2445.46
Sub-Total	19401.25	13353.25
Interest (10% of cash cost)	1335.33	-
Total cost	20736.58	13353.25

Gross Revenue (in Tk.)

- Actual	=	42784.09
- Potential	=	44166.79

Net Return:

At full cost basis (in Tk.)

- Actual	=	22,047.51
- Potential	=	23,430.21

At cash cost basis (in Tk.)

- Actual	=	29,430.84
- Potential	=	30,813.54

Source: IFPRI-BIDS Survey, 1991.

The dominant category is 'lengra' (29% trees) followed by 'Bombaiya' (18% trees), 'Fazli' (17% trees), 'Himsagar' (10% trees), 'Khirsavogue' (8% trees), 'Gopalvogue' (7% trees) and others e.g. 'Gooti', 'Hasina', 'Lata', 'Mohonvogue', 'Misreevogue', 'Aswina', Kohitoor etc. All the sample gardens are of 15-20 years old and all the trees yielded last year in all the gardens. Incidence of damage to any tree or replacement of any tree by new plantation is absent as revealed in the sample survey. Yield per year per tree is found to vary within the range 30-60 kg. which is in the low side. This is possibly due to lower doses of fertilization and practice of ginger and turmeric cultivation in the garden. In spite of lower yield rate of mango garden, each of the garden is found to be profitable while comparing with other cropping pattern.

Mango as a perennial crop, its cultivation is very simple. After selecting a suitable piece of land, seedlings are planted in appropriate manner and if the plants are nursed well then they begin to yield within next 5-6 years and yield for the next 20-25 years. But for good harvest the trees should be periodically nursed in terms of dressing, trimming, irrigation, insecticide and fertilizer use etc. in each year. The crops like ginger, turmeric etc. may also be cultivated in the mango garden but for this necessary inputs e.g. manuring, fertilization should be used.

The incidence of forward sale is very much prevailing for mango garden. Sometimes mango gardens are found to be sold twice or thrice e.g. farmer sells the garden to the local 'farias' immediately after flowering who resell the

garden to the 'paikers' when mangoes are of one month's age and the 'paikers' again resell the garden to other groups of 'paikers' when mangoes are matured enough. So, harvesting & marketing of mangoes involve speculation and gambling to some extent as the harvest is variant with weather and climatic condition. By forward sale poor farmers are relieved from the variance of yield due to weather fluctuation, watching the garden and marketing cost but revenue is decreased. But well-to-do farmers sell the produce at its maturity either at the garden or to the primary or nearby secondary market.

The costs and revenue estimates per year for one acre mango garden are shown in Table 7 and Appendix: A-8.

12. Estimates on Costs and Returns of Jackfruit Cultivation

Jackfruit is a tropical fruit and it grows at every nook and corner of Bangladesh. Most of the households in the country particularly in the rural area have at least one or two jackfruit trees in their homestead. Among all the available fruits in Bangladesh its price is the lowest in terms of per unit quantity but its nutrient contents and food value are as good as other fruits. Its per capita consumption is always higher in rural area than the urban area and the poorer people are found to consume it more than the rich or well to-do people. So, jackfruit is very popular fruit to the poor.

Table 7
Costs and Returns to Mango Garden, 1991

Cost Items	Full cost basis (Tk.)	Cash cost basis (Tk.)
Land preparation and plantation	238.63	231.63
Garden maintenance	3344.14	1860.49
Harvesting and marketing	827.00	463.00
Sub-Total	4409.77	2555.12
Interest (10% of cash cost)	255.51	-
Total cost	4665.28	2555.12

Gross Revenue (in Tk.)

- Actual	=	24,239.38
- Potential	=	25,223.72

Net return

At full cost basis (in Tk.):

- Actual	=	19,574.10
- Potential	=	20,558.44

At cash cost basis (in Tk.):

- Actual	=	21,684.26
- Potential	=	22,668.60

Source: IFPRI-BIDS Survey, 1991.

The cultivation of jackfruit is very simple and it requires negligible labour and capital. But due to scarcity of land and other socio-economic constraints the commercial venture for jackfruit cultivation is rarely found.

The only difficulty for jackfruit cultivation is that it requires high land so that flood water does not inundate the garden as it can not survive in stagnant water. The dominance of jack-fruit production has been observed in the upazilas Rangunia (Chittagong), Modhupur (Tangail), Ishurdi (Pabna) and Badarganj (Rangpur) among the 42 selected upazilas in the sample. There are some product differentiation in terms of size, shape, weight and sweetness. Some trees yield large number of fruits but smaller in size and in contrary some trees yield small number of fruits but larger in size. Some trees yield 20-25 fruits and some yield more than 150 fruits.

Generally high land is selected for jackfruit plantation as it can not survive in stagnant or flood water. The land selected for jackfruit cultivation is first of all cleaned, ploughed, levelled and holes of size 3 feet in length, 3 feet in breadth and 3 feet depth are made at a distance of 35-40 feet apart. The holes are dried in the sun and the soil of the holes after sun drying are mixed with cow-dung, oilcake, TSP and MP in appropriate proportion. The holes are filled up with the mixture and seedlings are planted in each pit. The seedlings after plantation are fenced properly so that they are not damaged by goats or cattle. At the early stage of plantation necessary irrigation are also provided for steady growth of the plants. If properly nursed, the plants begin to yield within 5-6 years after plantation and continue to yield for the next 15-20 years until the plants are uprooted or otherwise damaged. Crops like brinjal, beans, ladies finger and other vegetables can be cultivated in the early age of the garden. In our sample gardens, crops like ginger, turmeric and beans are found to be produced with some additional input use and the return from these crops are reasonably good. For a good harvest fertilization and manuring are necessary before and after the monsoons and in case of drought sufficient irrigation is required. The harvest is generally made during 2-3 months from each tree as the fruits do not mature all at a time. The farmers take their products to the local primary or assembly markets either by cart, van, or boat and sell them to the 'paikers' who send the products for distant destination. Incidence of forward sale like

mango marketing is absent in case of jack-fruit marketing but some times local paikers buy jackfruit from the garden. It appears that though commercial plantation of jackfruit is rare in the country but it is profitable as revealed from the estimates of our survey. The costs and revenue estimates per year from one acre jackfruit garden are shown as follows:

Table 8
Costs and Returns to Jackfruit Garden, 1991

Cost items	Full cost (Tk.)	Cash cost (Tk.)
Land preparation and plantation	236.50	236.50
Garden maintenance	2118.53	1344.73
Harvesting and marketing	1124.51	771.55
Sub-total:	3479.54	2352.78
Interest (10% of cash cost)	235.28	-
Total cost	3714.82	2352.78

Gross Revenue (in Tk.)

- Actual	=	23,366.48
- Potential	=	24,573.44

Net Return

At full cost basis (in Tk.):

- Actual	=	19,651.66
- Potential	=	20,858.62

At cash cost basis (in Tk.):

- Actual	=	21,013.70
- Potential	=	22,220.66

Source: IFPRI-BIDS Survey, 1991.

13. Summary and Conclusion

While looking at the estimates of costs and returns, it appears that cultivation of fruits or semi-perennial crops are profitable and their yield rates are also found higher than the national estimates (Table A.1). There are significant variation, as observed, in labour use, fertilizer use or other input-use and also in profitability among these crops under study.

The labour (man-days) used per acre per year is the highest for betel leaf (738) cultivation and marketing followed by papaya (261.5), banana (231), pineapple (119) betelnut (108.3) guava (75.9) & lemon (52). The corresponding labour used for mango, jackfruit and olive are 85.4, 66 and 75 man-days but these include labour days for cultivating and marketing of crops like ginger, turmeric & beans. So the semi-perennials crops betel leaf, papaya & banana are very much labour intensive. Cost of irrigation (per acre per year) is highest for papaya (Tk. 991) followed by banana (Tk. 458), betel leaf (Tk. 428), guava (Tk. 137), mango (Tk. 71), lemon (Tk. 58) & jackfruit (Tk. 15). There are no irrigation cost for betelnut, olive and pineapple. Cost of insecticide (per acre per year) is also highest for papaya (Tk. 375) followed by mango (Tk. 367), betel leaf (Tk. 360) and guava (Tk. 120). The insecticide cost is either negligible or zero for other crops. The cost of fertilizer/manuring is prevalent for all the crops but it is highest for betel leaf (Tk. 9618) followed by banana (Tk. 3737), papaya (Tk. 2923), pineapple (Tk. 2206), olive (Tk. 1360), guava (Tk. 1115), lemon (Tk. 939) and negligible for betelnut, mango and jackfruit.

The total cost of production and marketing is highest for betel leaf (Tk. 63251) followed by banana (Tk. 23670), papaya (Tk. 20737), pineapple (Tk. 9493), betelnut (Tk. 8387), guava (Tk. 6706), olive (Tk. 5897), mango (4666), lemon (Tk. 3935) and jackfruit (Tk. 3715). Net actual return (after deducting all costs including imputed family labour, inputs from own farm and accrued interest) per acre per year comes highest from betel leaf (Tk. 52888) followed by pineapple (tk. 28622), banana (Tk. 25185), olive (Tk. 22882), papaya (Tk. 22048), guava (Tk. 20327), betelnut (Tk. 20213), jackfruit (Tk. 19652), mango (Tk. 19574) and lemon (Tk. 11674).

The population of Bangladesh has increased nearly 40% during the period 1974-75 to 1989-90 but fruit production has not increased in parallel to population growth except for papaya, guava, lemon and litchi. The production of some fruits have declined over time e.g. production of mango has decreased by 38% during the period 1974-75 to 1989-90. The production of betel leaf has increased nearly 16.1% during the period 1974-75 to 1987-88 but its export has increased many fold during this period. Evidences are there (Bangladesh Export Statistics, EPBB) that Bangladesh earned foreign currency of worth Tk. 6.8 lacs in 1975-76 by exporting betel leaf and this earning increased to Tk. 1285.6 lacs in 1985-86 and to Tk. 1041.9 lacs in 1986-87. But in 1988-89 this earning came down to Tk. 375.1 lacs possibly due to flood damage of betel leaf garden. Betel leaf has high comparative advantage in production and it has high demand in the countries Pakistan, U.K., Saudi Arabia, Kuwait, UAE, Qatar,

Bahrain, USA, Egypt and other countries. So, betel leaf cultivation should be intensified and proper measures e.g. institutional credit facilities etc. should be taken.

During 1976-77 to 1987-88, betelnut was both exported from Bangladesh and imported into Bangladesh but the volume of export is negligible (36.65 met. tons) in comparison to import (59083.4 met. tons). As it is shown, betelnut cultivation is profitable, but its production has increased only 2.6% during the period 1974-75 to 1989-90. So appropriate measures should also be taken for betelnut production.

Pineapples, mango & banana are important in the context of export and import. Foreign Trade Statistics of Bangladesh (various issues) indicate that these three types of fruits have been exported from Bangladesh and also imported into Bangladesh in various years and volume of import is larger than the volume of export. As cultivation of all fruits appear to be profitable so appropriate measures should be taken for steady growth of production of all types of fruits.

Inspite of higher profitability for fruits and semi-perennial crops the practice of large scale commercial cultivation among the farmers is very limited due to some socio-economic constraints which are as follows:

- a) lack of awareness about the technology and profitability;
- b) lack of market and infrastructure;
- c) lack of credit facilities, capital etc.;
- d) high risk involved as the products are perishable in nature;
- e) weather fluctuation, natural calamities like flood, drought, storm etc.;
- f) lack of resources and suitable land;
- g) lack of appropriate policy option at various levels for production and marketing.

If we want to augment the agriculture diversification process then it is imperatively necessary to intensify our efforts at all levels to increase production of fruits and also to increase the marketing facility of farmers. Apart from domestic supply for consumption and export, the increased production will increase the employment opportunity in rural/cottage industry as shipment of products require baskets, bags, container etc. and transportation will prosper while the increased products will be marketed at distant places. Also, fruit processing enterprises will emerge as processed fruit has high demand in any market whether national or international and processed fruits always have higher longevity than the unprocessed ones. Finally the intensification of fruits and semi-perennial crops gardening will not only increase the level of income among the farmers but will also raise, by and large, the nutritional status of people, It will also give impetus as an environment-factor to control the degradation of nature. So, the economic return of perennial or semi-perennial crops are of much higher order than that of our survey estimates.

Appendices

Table A.1

Production Trend of Some Fruits in Bangladesh

(area in acres and production in metric tons)

Year	Banana			Mango			Pineapple			Jack-fruit		
	Area	Production	Yield (m.t./acre)	Area	Production	Yield (m.t./acre)	Area	Production	Yield (m.t./acre)	Area	Production	Yield (m.t./acre)
1974-75	91005	575357	6.322	101125	283849	2.807	31785	124304	3.911	44735	193531	4.326
1975-76	91950	578557	6.292	105810	271561	2.567	35475	138546	3.905	45715	196355	4.295
1976-77	93245	588868	6.315	106360	268449	2.524	36285	143881	3.965	46660	205972	4.414
1977-78	93880	589958	6.284	106975	245300	2.377	36062	143673	3.984	47230	206415	4.370
1978-79	94420	596639	6.319	106780	214188	2.006	36155	139684	3.863	47110	193547	4.108
1979-80	96480	615630	6.381	106945	207030	1.936	36520	142188	3.893	48700	198465	4.075
1980-81	99400	652370	6.563	107940	202982	1.881	35665	153428	4.302	49920	204119	4.089
1981-82	104755	684366	6.533	112245	183883	1.638	36190	155887	4.307	51485	207595	4.032
1982-83	105610	699109	6.620	113310	196206	1.732	36470	156322	4.286	52515	208736	3.975
1983-84	103555	675020	6.518	110820	158688	1.432	34015	136669	4.018	53155	211046	3.970
1984-85	100020	689805	6.897	111845	162660	1.454	32880	131660	4.004	55140	221360	4.015
1985-86	100275	691405	6.895	113870	159015	1.396	32145	127790	3.975	57355	229060	3.994
1986-87	101255	759110	7.497	114870	155390	1.353	32355	132990	4.110	58400	234580	4.017
1987-88	101450	683970	6.742	119665	160180	1.339	33790	145455	4.305	61295	254235	4.148
1988-89	94677	608921	6.432	120437	159141	1.321	32508	136857	4.210	60658	251326	4.143
1989-90	96736	637087	6.586	120395	175402	1.456	33508	156735	4.678	60768	253780	4.176

Source: (a) Year Book of Agricultural Statistics of Bangladesh (various volumes), B.B.S.
 (b) 1991 - Statistical Year Book of Bangladesh, B.B.S.

Contd..

Table A.1 (contd.)

Year	Papaya			Guava			Lime and Lemon			Litchi		
	Area	Production	Yield (m.t./acre)	Area	Production	Yield (m.t./acre)	Area	Production	Yield (m.t./acre)	Area	Production	Yield (m.t./acre)
1974-75	6235	19290	3.094	4510	7691	1.705	3740	3588	0.960	5695	11440	2.009
1975-76	6305	19066	3.024	4665	7812	1.675	3925	3883	0.989	6185	11613	1.878
1976-77	6280	19255	3.066	5020	8123	1.618	3620	3449	0.953	6595	12051	1.827
1977-78	6475	20205	3.120	5310	8523	1.605	3585	3324	0.927	6660	11888	1.785
1978-79	6675	20472	3.067	5455	8517	1.561	3750	3529	0.941	6980	10921	1.565
1979-80	6895	20311	2.946	5660	8847	1.563	3900	3449	0.884	7260	11276	1.553
1980-81	6940	20719	2.985	5895	9430	1.600	4020	3711	0.923	7435	11233	1.511
1981-82	7645	24893	3.256	6450	10294	1.596	4245	4122	0.971	7940	11871	1.495
1982-83	7715	26168	3.392	7140	11659	1.602	4670	4875	1.044	8170	12174	1.490
1983-84	7920	27518	3.475	7720	12259	1.588	4860	5294	1.089	8345	8679	1.040
1984-85	8260	27285	3.303	8565	13445	1.570	5430	6310	1.162	8680	10080	1.161
1985-86	8405	28205	3.356	9100	14080	1.547	5685	6565	1.155	8815	9410	1.067
1986-87	8620	28700	3.329	9570	14465	1.511	6030	7195	1.193	9145	9625	1.052
1987-88	9010	29655	3.291	10535	16105	1.529	6555	6105	0.931	9455	10120	1.070
1988-89	n.a.	30000	n.a.	n.a.	25000	n.a.	n.a.	n.a.	n.a.	9518	10308	1.083
1989-90	n.a.	28000	n.a.	n.a.	24000	n.a.	n.a.	n.a.	n.a.	9589	16486	1.719

Contd..

Table A.1 (contd.)

Year	Betelnut			Betel leaves			Coconut			Other citrus fruits		
	Area	Production	Yield (m.t./acre)	Area	Production	Yield (m.t./acre)	Area	Production	Yield (m.t./acre)	Area	Production	Yield (m.t./acre)
1974-75	92260	22424	0.243	27535	55869	2.029	65585	61856	0.943	5400	8057	1.492
1975-76	91550	23765	0.260	27865	55892	2.006	64475	61902	0.960	5735	8580	1.496
1976-77	92385	25665	0.278	26750	51981	1.943	65565	65306	0.996	5765	8693	1.508
1977-78	91720	25828	0.282	27835	57863	2.078	66390	68496	1.032	5910	8478	1.435
1978-79	90590	25458	0.292	27941	55064	1.971	67595	66871	0.989	6010	8605	1.432
1979-80	89519	23767	0.265	28615	54949	1.920	70165	71939	1.025	6035	8566	1.419
1980-81	90025	25045	0.278	29940	60317	2.015	72070	76716	1.064	6032	8564	1.420
1981-82	87395	24090	0.276	31380	61064	1.946	74015	77341	1.045	6165	8684	1.409
1982-83	87830	23573	0.268	32140	71321	2.219	74810	79255	1.059	6341	9349	1.474
1983-84	86935	24199	0.278	31525	61211	1.942	76255	83050	1.089	6460	9459	1.464
1984-85	85395	22700	0.266	30885	61895	2.004	75990	83017	1.092	6555	9210	1.405
1985-86	83880	23055	0.275	30445	60790	1.997	77410	83330	1.076	6150	8440	1.372
1986-87	84590	21765	0.257	30570	61500	2.042	77990	82615	1.059	5880	7945	1.351
1987-88	85615	22425	0.262	32880	64870	1.973	79900	86060	1.077	5850	7955	1.360
1988-89	86000	22000	0.256	n.a.	n.a.	n.a.	80178	83674	1.044	n.a.	n.a.	n.a.
1989-90	86000	23000	0.267	n.a.	n.a.	n.a.	80135	81604	1.018	n.a.	n.a.	n.a.

Source: (a) Year Book of Agricultural Statistics of Bangladesh (various volumes), B.B.S.
 (b) 1991 - Statistical Year Book of Bangladesh, B.B.S.

Appendix: A-2

Betelnut Cultivation: Costs & Revenue

- i) Size of garden = 1.00 acre
 ii) Value of one acre land = Tk. 140,667.00
 iii) Trees :
 - Number of trees in the garden = 3031
 - Number of trees yielded last year = 2487

- iv) Plantation :
 - Land preparation and plantation cost in the initial year which includes labour cost = Tk. 18378.00
 - Seedlings cost = Tk. 6000.00

Sub-Total = Tk. 24378.00

- v) Fixed cost of garden (assuming 10% cost of plantation) = Tk. 2437.80

vi) Garden maintenance cost:

- a) Yearly average seedlings plantation
 - Number of seedlings planted in each year on an average = 43
 - Cost of seedlings = Tk. 86.00

- b) Labour
 - Hired labour (man-days) = 26.85
 - Family labour (man-days) = 39.61
 - Wage rate = Tk. 36.12
 - Hired labour cost = Tk. 969.82
 - Family labour cost = Tk. 1430.71
 - Total labour cost = Tk. 2400.53

c) Fertilizer

Fertilizer used	Quantity (Kg.)	Price (Tk.) per kg.	Total cost (Tk.)
Urea	10	5.50	55.00
TSP	15	5.86	87.90
MP	12.52	4.25	53.21
Cow-dung	2191	0.12	262.92
Others	1000	0.10	100.00
Sub-total			559.03

Contd..

Appendix: A-2 (contd.)

d) Transport cost for procurement of fertilizer = Tk.123.35

e) Annualised cost of agricultural implements = Tk. 246.21

vii) Production:

- Actual production of betelnut (dry)	= 547.88 kg.
- Home consumption	= 32.87 kg.
- Sales	= 515.01 kg.
- Theft or wastage	= 41.47 kg.
- Potential production	= 589.35 kg.
- Sales price (dry betel nut)	= Tk. 49.86 per kg.
- Value of actual production	= Tk. 27,317.30
- Value of potential production	= Tk. 29,384.93

viii) Other revenue earned from the garden:

- Value of fuel (fire-wood)	= Tk. 453.00
- Income from other trees	= Tk. 329.67
- Seedlings	= Tk. 500.00

Sub-total = Tk.1282.67

ix) Harvesting and marketing cost:

	<u>Cost (Tk.)</u>
- Materials	= 193.63
- Hired labour (24.79 man-days)	= 895.41
- Family labour (17.09 man-days)	= 617.29
- Transport cost	= 83.88
- Toll/commission	= 17.09
- Storage cost	= 109.89
- Other cost	= 40.17

Sub-Total = 1957.36

Appendix: A-3

Betel Leaf Cultivation: Costs & Revenue

i) Size of garden	= 1.00 acre	
ii) Value of one acre land	= Tk. 130,500.00	
iii) <u>Land preparation and plantation :</u>		
a. Bullock pair-days (number)	= 30	
b. Rent of bullock pair-day	= Tk. 50.00	
c. Rent of bullocks (30x50)	= Tk. 1500.00	
d. Hired labour days	= 20	
e. Wage rate	= Tk. 40.00	
f. Cost of labour (20x40)	= Tk. 800.00	
g. Cost of seedlings	= Tk. 5608.00	
h. Annualised cost of land preparation and plantation, (c+f+g)/3	= Tk. 2636.00	
iv) <u>Garden maintenance cost:</u>		
a. Bamboo & jute sticks, bamboo mat and others for fencing, roofing etc. (annualised cost)	= Tk. 10,200.67	
b. Hired labour cost (229 man-days)	= Tk. 9,160.00	
c. Imputed family labour cost (279 man-days)	= Tk. 11,160.00	
d. <u>Fertilizer, insecticide and irrigation cost:</u>		
Items	Quantity in kg.	Value (Tk.)
Cowdung	1917	535.14
Oilcake	965	7546.30
Urea	95	532.00
TSP	79	454.25
MP	110	550.00
Insecticides	-	359.90
Irrigation	-	427.92
Sub-total		= Tk. 10,405.51
e) Transport cost for procurement of fertilizer and insecticides		= Tk. 578.38
f) Annualised cost of agricultural implements		= Tk. 329.15

Contd..

Appendix: A-3 (Contd.)

v) Harvesting and marketing cost:

a. Baskets and other materials	= Tk. 1617.12
b. Hired labour (101 man-days)	= Tk. 4040.00
c. Imputed family labour (123 man-days)	= Tk. 4920.00
d. Transport cost for marketing	= Tk. 2315.76
e. Storage cost	= Tk. 125.00
f. Toll/Commission	= Tk. 1475.00

Sub-total = Tk. 14,492.88

vi) Production and disposal:

a. Frequency of yearly harvest	= 21
b. Average quantity harvested in each time	= 637.14 pon
c. Yearly total harvest	= 13,380 pon
d. Home consumption	= 115 pon
e. Sales	= 13,265 pon
f. Sales price	= Tk. 8.68 per pon
g. Value of production (cxf)	= Tk. 1,16,138.40

Appendix: A-4

Guava Cultivation: Costs & Revenue

- i) Size of garden = 1.00 acre
- ii) Value of one acre land = Tk. 1,21,250.00
- iii) Number of trees in the garden = 444

iv) Land preparation and plantation:

(a) Fertilization before planting:

Items	Quantity in kg.	Value (Tk.)
Cowdung	4440	532.80
Oilcake	208	936.00
MP	111	532.80
TSP	222	1221.00
Sub-total		Tk. 3222.60

(b) Cost of seedlings and its procurement = Tk. 2273.28

(c) Labour cost for land preparation and plantation (34.5 man-days) = Tk. 1571.48

(d) Total cost of land preparation and plantation (a+b+c) = Tk. 7067.36

(e) Annualised fixed cost of garden (assuming the garden will be of 15-20 years life and the trees yield within 1-2 years after plantation i.e. 10% of (d) above) = Tk. 706.74

(v) Garden maintenance:

(a) Labour cost:

- Hired labour required = 32.5 man-days
- Family labour required = 25.6 man-days
- Wage rate per man-day = Tk. 40.25
- Hired labour cost (32.5 x 40.25) = Tk. 1308.12
- Imputed family labour cost = Tk. 1030.40
- Total labour cost = Tk. 2338.80

Contd..

Appendix: A-4 (Contd.)

(b) Fertilizer use:

Item	Quantity (Kg.)	Price (Tk.) per kg.	Value (Tk.)
Urea	72.37	5.14	371.98
TSP	67.59	6.19	418.38
MP	37.96	4.85	184.11
Cow-dung	1003	0.14	140.42
Sub-total			= 1114.89

(c) Other cost:

- Irrigation cost	= Tk. 137.00
- Insecticides cost	= Tk. 120.37
- Agricultural implements	= Tk. 386.57
- Transport cost for fertilizer procurement	= Tk. 57.00
Sub-total	= Tk. 700.00

vi) Production:

- Household consumption	= 125 kg.
- Sales	= 5392 kg.
- Total production	= 5517 kg.
- Sales Price (Tk./Kg.)	= Tk. 4.90
- Value of production	= Tk. 27033.30

vii) Marketing cost:

- Hired labour (9.72 man-days)	= Tk. 391.23
- Imputed family labour (4.63 man-days)	= Tk. 186.36
- Materials cost	= Tk. 328.33
- Transport cost	= Tk. 125.00
- Toll/commission	= Tk. 314.84
Sub-Total	= Tk. 1345.76

Appendix: A-5

Banana Cultivation: Costs & Revenue

i) Size of garden	= 1.00 acre	
ii) Value of one acre land	= Tk. 1,50,962.00	
iii) Number of plants in the garden	= 892	
iv) Number of plants yield	= 734	
v) <u>Total production:</u>		
(a) Banana (58451 pieces)	= 6495 kg.	
(b) Seedlings (number)	= 1000	
vi) Household consumption (4503 pieces)	= 500 kg.	
vii) Wastage/stolen	= 128 kg.	
viii) Sales	= 5995 kg.	
ix) Sales price (Tk./kg.)	= Tk. 7.06	
x) Value of sales	= Tk. 42,324.70	
xi) Value of production	= Tk. 45,854.70	
xii) <u>Labour used per acre:</u>		
(a) <u>Land preparation and planting:</u>		
- Bullock pair-days	= 12.0*	
- Hired labour (man-days)	= 45.2	
- Family labour (man-days)	= 15.3*	
- Rent of bullock pair-day	= 50.00	
- Wage rate per man-day	= Tk. 45.50	
(b) <u>Garden maintenance (weeding, fertilizing, irrigation, attaching sticks and harvesting):</u>		
- Hired labour (man-days)	= 81.3	
- Family labour (man-days)	= 48.2*	
- Wage rate per man-day	= Tk. 42.80	
(c) <u>Marketing:</u>		
- Hired labour (man-days)	= 16.0	
- Family labour (man-days)	= 25.0*	
- Wage rate per man-day		= Tk. 45.00
(d) Total labour (man-days)		= 231.00

Contd..

Appendix: A-5 (Contd.)

viii)	Agricultural implements cost	= Tk. 276.64
xiv)	Irrigation cost	= Tk. 457.60
xv)	<u>Seedlings:</u>	
	- Number of seedlings planted	= 935
	- Cost of seedlings (935x3)	= Tk. 2805.00*
xvi)	Material cost (bamboo sticks and fencing)	= Tk. 3250.00

xvii) Fertilizer use:

Fertilizer	Quantity (Kg.)	Price (Tk.) per kg.	Value (Tk.)
Urea	239.2	5.13	1227.10
TSP	249.1	5.28	1315.26
MP	156.7	4.18	655.01
Cowdung	1820.6	0.13	236.68*
Oilcake & Others	62.4	4.85	302.64
Insecticides	-	-	174.56
Transport cost	-	-	143.04
Sub-total			4054.04

xviii) Marketing cost:

Item	Cost (Tk.)
Materials	33.60
Hired labour (16 man-days)	720.00
Family labour (25 man-days)	1125.00
Transport cost	339.20
Toll/commission	245.28
Sub-Total	= 2463.08

Note: * indicates input from own firm.

Appendix: A-6

Lemon Cultivation: Costs & Revenue

i) Size of garden	= 1.00 acre
ii) Value of one acre land	= Tk. 71,567.00
iii) <u>Land preparation and plantation:</u>	
a. <u>Labour cost:</u>	
- Hired labour (30 man-days)	= Tk. 1200.00
- Family labour (6 man-days)	= Tk. 240.00
b. Seedlings cost (280 plants)	= Tk. 560.00
c. Transport cost for procurement of seedlings	= Tk. 82.00
d. Manuring, fertilization and irrigation cost	= Tk. 830.00
<hr/>	
Sub-Total	= Tk. 2912.00
<hr/>	
e. Annualised cost of land preparation and plantation [20% of (iii)]	= Tk. 582.40
<hr/>	
iv) <u>Garden maintenance cost:</u>	
a. Hired labour cost (14 man-days) for dressing, trimming of trees, weeding and fertilizing	= Tk. 560.00
b. Imputed family labour for dressing, trimming of trees, weeding and fertilizing (16 man-days)	= Tk. 640.00
c. Irrigation cost	= Tk. 57.55
d. Insecticide cost	= Tk. 24.46
e. <u>Fertilizer cost:</u>	
- Urea (70 kg.)	= Tk. 359.71
- TSP (35 kg.)	= Tk. 343.60
- MP (37 kg.)	= Tk. 190.13
- Cowdung (130 kg.)	= Tk. 25.00
f. Agricultural implements	= Tk. 74.82
g. Transport cost for procurement of fertilizer	= Tk. 20.14
h. Yearly garden maintenance cost	= Tk. 2295.41
<hr/>	

Contd.

Appendix: A-6 (Contd.)

v) Harvesting and marketing cost:

a. Baskets and other materials	= Tk. 41.20
b. Hired labour (6 man-days)	= Tk. 240.00
c. Imputed family labour (10 man-days)	= Tk. 400.00
d. Transport cost for marketing	= Tk. 16.55
e. Toll/commission	= Tk. 100.72
<hr/>	
Sub-total	= Tk. 798.47

vi) Production and disposal:

a. Number of trees in the garden	= 270
b. Number of trees yielded last year	= 259
c. Household consumption = 486 pieces	= 43.13 kg.
d. Sales = 21194 pieces	= 1880.87 kg.
e. Wastage/stolen = 505 pieces	= 44.82 kg.
f. Sales price	= Tk. 0.72 per piece
g. Value of sales	= Tk. 15,259.68
h. Actual production (c+d)=21680 pieces	= 1924 kg.
i. Potential production (e+h) = 22185 pieces	= 1969 kg.

Appendix: A-7

Papaya Cultivation: Costs & Revenue

i) Size of garden	= 1.00 acre
ii) Value of one acre land	= Tk. 91,875.00
iii) Number of trees in the garden	= 725
iv) Number of trees yield	= 652
v) <u>Land preparation and plantation:</u>	
a. Bullock pair-days (number)	= 12
b. Rent of bullock pair-day	= Tk. 50.00
c. Rent of bullocks	= Tk. 600.00
d. <u>Labour use:</u>	
- Hired labour (man: days)	= 47
- Family labour (man-days)	= 32
- Wage rate per man-day	= Tk. 42.00
- Cost of labour (79x42)	= Tk. 3318.00
e. <u>Seedlings cost:</u>	
- Cost of seed and seed-bed preparation	= Tk. 476.65
- Number of seedlings planted	= 2176
- Number of seedlings remained in the garden after flowering	= 725
f. Total cost of land preparation and plantation (c+d+e)	= Tk. 4394.65
g. Annualised fixed cost of garden (assuming the garden will be maintained for atleast 2 years i.e. 50% of f. above)	= Tk. 2197.33
<hr/>	
vi) <u>Garden maintenance cost:</u>	
a. Hired labour cost (69 man-days)	= Tk. 2898.00
b. Imputed family labour (103 man-days)	= Tk. 4326.00
c. Agricultural implements	= Tk. 461.26
d. Material cost (bamboo sticks)	= Tk. 675.00
e. Insecticide cost	= Tk. 375.00
f. Irrigation cost	= Tk. 990.99
<hr/>	

Contd..

Appendix: A-7 (Contd.)

g. Fertilizer cost:

- Urea (112.61 kg.)	= Tk. 585.57
- TSP (168.91 kg.)	= Tk. 979.68
- MP (87.84 kg.)	= Tk. 404.06
- Cowdung (7334 kg.)	= Tk. 953.47
- Oil cake and others (216 kg.)	= Tk.1059.43

h. Yearly garden maintenance cost (a+b+... +g)	= Tk.13708.46
---	---------------

vii) Harvesting and marketing cost:

a. Baskets and other materials	= Tk. 157.66
b. Hired labour (25 man-days)	= Tk.1050.00
c. Imputed family labour (25 man-days)	= Tk.1050.00
d. Transport cost	= Tk. 750.00
e. Toll/commission	= Tk. 486.90
f. Total cost of marketing	= Tk.3495.46

viii) Production and disposal:

a. Household consumption	= 113 kg.
b. Sales	= 10098 kg.
c. Wastage/stolen	= 330 kg.
d. Sales price(Tk./kg.)	= Tk. 4.19
e. Value of sales(b x d)	= Tk. 42310.62
f. Actual production (a+b)	= 10211 kg.
g. Potential production (c+f)	= 10541 kg.

Appendix: A-8

Mango Cultivation: Costs & Revenue

i) Size of garden	= 1.00 acre
ii) Value of one acre land	= Tk. 90,000.00
iii) <u>Land preparation and plantation:</u>	
a. <u>Labour cost:</u>	
- Hired labour (27 man-days)	= Tk. 945.00
- Family labour (2 man-days)	= Tk. 70.00
b. Seedlings cost (50 plants)	= Tk. 575.00
c. Transport cost for procurement of seedlings from nursery	= Tk. 90.00
d. Manuring and watering of plants	= Tk. 266.34
e. Fencing the plants	= Tk. 440.00
f. Sub-total (a+b+..... +e)	= Tk. 2386.34
g. Annualised cost of land preparation and plantation (10% of f.)	= Tk. 236.63
<hr/>	
iv) <u>Garden maintenance cost:</u>	
a. Hired labour (21.15 man-days) for dressing, trimming of trees and for cultivation of ginger and turmeric	= Tk. 740.26
b. Imputed family labour cost for dressing, trimming of trees and for cultivation of ginger and turmeric (42.39 man-days)	= Tk. 1483.65
c. Irrigation cost	= Tk. 71.20
d. Insecticide cost	= Tk. 367.31
g. <u>Fertilizer cost:</u>	
- Urea (16.82 kg)	= Tk. 84.47
- TSP (33.0 kg)	= Tk. 214.24
- MP (8.41 kg)	= Tk. 37.86
- Cow-dung (350 kg)	= Tk. 50.00
f. Cost of seed for ginger and turmeric	= Tk. 245.00
g. Agricultural implements	= Tk. 50.16
Yearly garden maintenance cost (a+b+c+...+g)	= Tk. 3344.14
<hr/>	

Contd..

Appendix: A-8 (Contd.)

v) Harvesting and marketing cost:

a. Baskets and other materials	= Tk. 30.50
b. Hired labour (9.5 man-day)	= Tk. 332.50
c. Imputed family labour (10.4 man-day)	= Tk. 364.00
d. Transport cost for marketing	= Tk. 65.00
e. Toll/commission	= Tk. 35.00

Sub-Total	= Tk. 827.00
-----------	--------------

vi) Production and disposal:

a. Number of mango trees	= 44
b. Number of trees yielded last year	= 44
c. Mangoes consumed in household last year	= 73 kg.
d. Mangoes stolen/wastage	= 89 kg.
e. Mangoes sold	= 1950 kg.
f. Sales price	= Tk. 11.06 per kg.
g. Value of sales	= Tk. 21,567.00
h. Actual production (c+e)	= 2023 kg.
i. Potential production (d+h)	= 2112 kg.
j. <u>Income from others:</u>	
- Ginger (95 kg)	= Tk. 760.00
- Turmeric (40 kg. dry)	= Tk. 810.00
- Fuel (dry leaves) and fire-wood	= Tk. 295.00

k. Income earned from the garden:

- Actual (hxf+j)	= Tk. 24,239.38
- Potential (ixf+j)	= Tk. 25,223.72

Appendix: A-9

Jackfruit Cultivation: Costs & Revenue

i)	Size of garden	= 1.00 acre
ii)	Value of one acre land	=Tk.80,000.00
iii)	<u>Land preparation and plantation:</u>	
	a. Labour cost (25 man-days)	= Tk. 875.00
	b. Seedlings cost (60 plants)	= Tk. 600.00
	c. Transport and labour cost for procurement of seedlings	= Tk. 190.00
	d. Manuring and watering of plants	= Tk. 250.00
	e. Fencing the plants	= Tk. 450.00
	f. <u>Sub-total</u>	<u>= Tk. 2365.00</u>
	g. Annualised cost of plantation (10% of f.)	= Tk. 236.50
iv)	<u>Garden maintenance cost:</u>	
	a. Hired labour (24.55 man-days) for dressing, trimming of trees and for cultivation of ginger and turmeric and beans	= Tk. 896.08
	b. Imputed family labour cost for dressing, trimming of trees and for cultivation of ginger, turmeric and beans (21.20 man-days)	= Tk. 773.80
	c. Irrigation cost (irrigation made manually by earthen pots during droughts)	= Tk. 15.15
	d. Agricultural implements	= Tk. 54.25
	e. Cow-dung used (515 kg)	= Tk. 124.25
	f. Cost of seed for ginger, turmeric and beans	= Tk. 255.00
	<u>Sub-total</u>	<u>=Tk. 2118.53</u>

Contd...

Appendix: A-9 (Contd.)

v) Harvesting and marketing cost:

a. Baskets and other materials	= Tk. 62.50
b. Hired labour (8.55 man-days)	= Tk. 312.08
c. Imputed family labour (9.67 man-days)	= Tk. 352.96
d. Transport cost for marketing	= Tk. 318.18
e. Toll/commission	= Tk. 78.79
<hr/>	
Sub-Total	= Tk.1124.51

vi) Production and disposal:

a. Number of trees	= 48
b. Number of trees yielded last year	= 43
c. Number of fruits consumed in the house last year	= 255
d. Number of fruits stolen/wastage	= 107
e. Number of fruits sold	= 1611
f. Value of sales	= Tk.18172.00
g. Actual production of fruits (c+e)(nos.)	= 1866
h. Potential production of fruits (g+d)(Nos.)	= 1973
i. Sales price per jackfruit	= Tk. 11.28
j. <u>Income from others:</u>	
- Ginger (72 kg)	= Tk. 540.00
- Turmeric (28 kg.dry)	= Tk. 532.00
- Beans (150 kg. green and 5 kg. dry)	= Tk. 850.00
- Fuel (dry leaves) and fire wood	= Tk. 396.00
k. <u>Income earned from the garden:</u>	
- Actual (gxi+j)	=Tk.23,366.48
- Potential (hxi+j)	=Tk.24,573.44

Appendix : A-10

Olive Cultivation: Costs & Revenue

i)	Size of garden	= 1.00 acre
ii)	Value of one acre land	= Tk. 90,000.00
iii)	<u>Land preparation and plantation:</u>	
	a. Labour cost	
	- Hired labour (10 man-days)	= Tk. 400.00
	- Family labour (8 man-days)	= Tk. 320.00
	b. Seedlings cost (60 plants)	= Tk. 300.00
	c. Transport cost for procurement of seedlings from nursery	= Tk. 50.00
	d. Manuring before plantation	
	- Cow-dung (1000 kg)	= Tk. 150.00
	- Oil cake (100 kg)	= Tk. 500.00
	- MP (25 kg)	= Tk. 120.00
	- TSP (50 kg)	= Tk. 275.00
	e. Fencing the plants	= Tk. 350.00
	f. Sub-total	= Tk. 2465.00
	g. Annualised cost of land preparation and plantation (10% of f)	= Tk. 246.50
iv)	<u>Garden maintenance cost:</u>	
	a. Hired labour cost (20 man-days) for dressing, trimming of tress and for cultivation of ginger and turmeric	= Tk. 800.00
	b. Imputed family labour cost for cultivation of ginger and turmeric and also for fertilization of garden (36 man-days)	= Tk. 1440.00
	c. <u>Fertilizer cost:</u>	
	- Cow-dung (3500 kg)	= Tk. 400.00
	- TSP (100 kg)	= Tk. 550.00
	- MP (35 kg)	= Tk. 160.00
	- Oilcake (50 kg)	= Tk. 250.00
	d. Cost of seed for ginger and turmeric	= Tk. 250.00
	e. Agricultural implements	= Tk. 115.50
	Sub-total	= Tk. 3965.50

Contd..

Appendix: A-10 (Contd.)

v) Harvesting and marketing cost:

a.	Baskets and other materials	= Tk.	62.50
b.	Hired labour (12 man-days)	= Tk.	480.00
c.	Family labour (15 man-days)	= Tk.	600.00
d.	Transport cost for marketing	= Tk.	120.00
e.	Toll/commission	= Tk.	75.00

	Sub-total	= Tk.	1337.50
--	-----------	-------	---------

vi) Production and disposal:

a.	Number of olive trees	=	49
b.	Number of trees yielded last year	=	49
c.	Olive consumed in the household last year	=	15 kg.
d.	Olive sold	=	5550 kg.
e.	Sales price	= Tk.	4.80 per kg.
f.	Value of sales	= Tk.	26,640.00
g.	Value of production, (c+d)xe	= Tk.	26,712.00
h.	Other income from the garden		
	- Ginger production (110 kg)	= Tk.	935.00
	- Turmeric production (42 kg. dry)	= Tk.	882.00
	- Fuel (dry leaves and fire-wood)	= Tk.	250.00
k.	Total income earned from the garden, (g+h)	= Tk.	28,779.00

Contd..

Appendix: A-10 (Contd.)

A: Costs of one acre olive garden:

Cost items	Full cost (Tk.)	Cash cost (Tk.)
Land preparation and plantation	246.50	214.50
Garden maintenance	3965.50	2525.50
Harvesting and marketing	1337.50	737.50
Sub-total:	5549.50	3477.50
Interest (10% of cash cost)	347.50	-
Total cost	5897.00	3477.50

B: Value of production:

- Olive (5565 kg)	= Tk.26,712.00
- Ginger (110 kg)	= Tk. 935.00
- Turmeric (42 kg. dry)	= Tk. 882.00
- Fuel	= Tk. 250.00
Total value of production	= Tk.28,779.00

C: Net return from one acre olive garden:

At full cost basis	= Tk. 22,882.00
At cash cost basis	= Tk. 25,301.50

Appendix : A-11

Pineapple Cultivation: Costs and Revenue

i) Size of garden	= 1.00 acre
ii) Value of one acre land	= Tk. 90,000.00
iii) <u>Land preparation and plantation:</u>	
a. <u>Labour cost:</u>	
- Hired labour (25 man-days)	= Tk. 875.00
- Family labour (9 man-days)	= Tk. 315.00
b. Rent of bullocks (10 bullock pair days)	= Tk. 500.00
c. Seedlings cost	= Tk. 1050.00
d. Transport cost for procurement of seedlings	= Tk. 125.00
e. Fertilizer (cow-dung) used before plantation	= Tk. 600.00
<hr style="border-top: 1px dashed black;"/>	
f. Sub-total	= Tk. 3465.00
<hr style="border-top: 1px dashed black;"/>	
g. Annualised cost of land preparation and plantation (20% of f.)	= Tk. 693.00
iv) <u>Garden maintenance cost:</u>	
a. Hired labour cost (40 man-days) for weeding, hoeing and fertilizing	= Tk. 1400.00
b. Family labour (50 man-days) for weeding, hoeing and fertilizing	= Tk. 1750.00
c. Insecticide cost	= Tk. 87.00
d. <u>Fertilizer cost:</u>	
- Urea (184 kg.)	= Tk. 920.00
- TSP (125 kg.)	= Tk. 687.50
- MP (114 kg.)	= Tk. 513.00
- Cow-dung (600 kg.)	= Tk. 85.00
e. Transport cost for procurement of fertilizer	= Tk. 28.40
f. Agricultural implements	= Tk. 220.00
Yearly garden maintenance cost (a+b+c+...+f)	= Tk. 5690.90
<hr style="border-top: 1px dashed black;"/>	

Contd..

Appendix: A-11 (Contd.)

v) <u>Harvesting and marketing cost:</u>		
a. Hired labour (10 man-days)	= Tk.	350.00
b. Family labour (12 man-days)	= Tk.	420.00
c. Transport cost	= Tk.	931.00
d. Toll/commission	= Tk.	748.00
Sub-total	= Tk.	2449.00

vi) <u>Production and disposal:</u>		
a. Number of plants in the garden	=	10625
b. Number of plants yielded last year	=	8350
c. Home consumption = 136 pieces	=	136 kg.
d. Sales = 8114 pieces	=	8114 kg.
e. Wastage/stolen = 100 pieces	=	100 kg.
f. Sales price	= Tk.	4.62 per piece
g. Value of sale	=	Tk. 37,486.68
h. Actual harvest, (c+d) = 8250 pieces	=	8250 kg.
i. Potential harvest, (e+h)	=	8350 kg.

A: Costs of one acre pine-apple garden:

Cost items	Full cost (Tk.)	Cash cost (Tk.)
Land preparation and plantation	693.00	630.00
Garden maintenance	5690.90	3940.90
Harvesting and marketing	2449.00	2029.00
Sub-total	8832.90	6599.90
Interest (10% of cash cost)	659.99	-
Total	9492.89	6599.90

B: Value of production:

- Actual	= Tk.	38115.00
- Potential	= Tk.	38577.00

C: Net return from one acre pine-apple garden:

At full cost basis:

- Actual	= Tk.	28,622.11
- Potential	= Tk.	29,084.11

At cash cost basis:

- Actual	= Tk.	31,515.10
- Potential	= Tk.	31,977.10