

**An assessment on the performance of BRAC nursery  
seedlings with special emphasis on *Amrapali***

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An assessment on the performance of BRAC nursery seedlings with special emphasis on *Amrapali*

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**Executive summary**

The study examined the performance of the three kinds of seedlings of BRAC nurseries named Amrpali, lemon, and guava. Interview was taken from those buyers who bought those seedlings from BRAC. A total of 153 buyers among those 109 were of Amrpali and 22 lemon and 22 guava. Growers were selected from 29 BRAC area offices covering six divisions across the country. Since it is claimed that Amrapali gives better fruits if these seedlings are grown after two years of plantation of the seedlings. Therefore, seedlings grown in year 1999 were selected for the study conducted in February 2003.

More than 90% of the seedling plantation is of homestead type. Out of 807 Amrapali seedlings grown by the buyers in 1999 around 69% were found to survive during the study. The average survival rate of the three varieties is 72.8%. The main reason for death of the seedlings grown was carelessness of the buyers. Some kinds of carelessness included growing of the seedlings under shade and breaking of stem by children or animals. Majority of the respondents mentioned that they faced pest -attack during cultivation of the plants. Majority of the growers were found to be hopeful with their seedlings grown.

There is a serious lack of technical knowledge about cultivating the seedlings. Buyers claimed that technical support of BRAC staff is not sufficient. Therefore BRAC staff should help them giving more technical knowledge for cultivation of seedlings.

## INTRODUCTION

BRAC the largest national non-government development organization, primarily aims to work on poverty alleviation and empowerment of the poor, in Bangladesh's rural areas. Its social forestry programme is one of the employment and income generating activities.

The social forestry programme aims to maintain or improve ecological balance through afforestation, and will contribute towards increasing environmental awareness as well as the generation of income and employment. The social forestry programmes, launched in 1988, uses a variety of activities to increase awareness about the necessity of planting trees and to increase the number and variety of trees not only to meet the basic needs such as timber, fuel and fruit but also to restore the ecological balance. The programme components are horticulture nursery, grafting nursery and agro-forestry. One of the major objectives of the programme is to encourage people to plant trees throughout the country. At present there are 73,508 agro and social forestry farmers involved with BRAC (BRAC 2002).

The programme helps the group members increase their income by involving them in planting various trees, that can give short term, medium term and long term returns.

BRAC has started nursery programme to supply good quality seedlings locally. Nursery workers are given training by BRAC's Regional Sector Specialists (Social Forestry). Each nursery is on 7-10 decimals of land and produces 10,000 seedlings annually. The seedlings are of different species and are sold within the community. BRAC staff provides technical support and supervises tree plantation done by the group members on homestead and roadside land. BRAC provides credit, technical support and extension for its nursery workers. After 3 months,

nursery workers begin to sell their seedlings, paying back the loan that BRAC has given them.

Management of seedlings at the individual level of the seedlings is called horticultural nursery. This management is done up to handover of the seedlings to the buyers. Although BRAC started its nursery activities initially as grafting later on activities were expanded and now all nurseries are horticultural nursery where seedlings are produced by different means of propagation like seed to seedlings vegetative propagation i.e. grafting, etc.

### **BRAC's *Amrapali* programme**

*Amrapali*, a hybrid mango variety, has been produced by crossing between *Kiron* (female) and *Deshari* (male) varieties. This hybrid plant has been produced in India and BRAC started to introduce this variety from India to Bangladesh. Production of *Amrapali* seedlings is a new programme of BRAC which aims to increase the fruit production throughout the country. The programme also aims to increase the supply of this delicious fruits and contribute in the preservation of the nature throughout the country increasing the forest coverage as well.

Initially BRAC started to import *Amrapali* seedlings from India in late 1998. Since then *Amrapali* seedlings are imported from India and distributed to the Area to make this plant available i the cross the country. Recently BRAC has started to produce seedlings from mother plants in its own area offices.

Besides *Amrapali*, two other hybrid varieties named *Mallicka* and *Banison*, were also imported from India in 1998 nd in 2001 respectively. But due to their low quality compared to *Amrapali* later on these were not imported further.

At present, BRAC has been producing *Amrapali* hybrid seedlings from the scion of the mother plants grown by BRAC in its own garden.

Although Banison and Mallicka were introduced in small scale but finally Amrapalli was imported and other two varieties were discarded because of comparative good performance of Amrapalli. The advantages of Amrapali cultivation are as follows:

- 1) There is no alternate bearing
- 2) Bushy type growth helps to accommodate more number of plants in a small area
- 3) Adaptability rate is high
- 4) Yield and quality is high
- 5) Size is moderate to big
- 6) Percentage of sweetness is high

#### **Selling and distribution mechanism of the Amrapali seedlings**

Several approaches were applied to promote cultivate the BRAC nursery varieties specially the Amrapali. Firstly, a bill board/sign board was placed in front of the office. Another one was a discussion on the prospect of the variety among the VO members in the VO meetings. This was done when people came to the BRAC office for various purposes. The other one was motivating people who came to the BRAC office for various purposes. Miking was also done in some BRAC area offices. During the study period, it was noted in Domar office in Nilphamari district where after miking a huge demand for Amrapali was created.

#### **Research issue**

It was frequently heard to claim that quality of seedlings of BRAC nursery is not satisfactory. Some of the Amrapali growers claimed that it did not grow well and did not produce any fruits. Some also claimed that size of lemon and guava was not satisfactory. It is also claimed that BRAC's field staff influenced the VO members for purchasing seedlings without justifying their interest and capacity to

grow those plants. BRAC-RED therefore, thought that these questions should be answered through an assessment at the field level.

## **OBJECTIVES**

The broad objective of the study was to ascertain the performance of the three BRAC nursery seedlings named Amrapali, lemon, and guava grown by the buyers. The specific objectives were to know

- 1) The rate of adaptation of the seedlings
- 2) Growers' perception about the quality of the seedlings
- 3) Growers' level of technical knowledge on growing seedlings

## **DATA COLLECTION**

Three kinds of BRAC nursery seedlings named (1) Amrapali, (2) lemon, and (3) guava of the BRAC nurseries grown by the buyers in 1999 have been selected for the study. Since it is claimed that Amrapali normally takes at least two years after planting to produce flowering, therefore, seedlings those grown in 1999 were selected for the study. Then data were collected from growers from 29 area offices across the country..

A total of 153 buyers among those 109 Amrapali, 22 lemon and 22 guava growers were interviewed in the study. Data were collected in February 2003. Quality of the fruits of the three seedlings was measured compared with that of the respective local varieties.

## **RESULTS**

### **Socio-demographic profile of the sample population**

Socio-demographic profile of the sample population has been shown in Table 1. About 21.6% of the respondents had never been to school. About 48% people were engaged in occupation of lower category whereas around 52.1% were of

high occupation mainly service and business. From poverty self assessment in terms of food it appears that majority of them (35.9%) were surplus, 30.7% were breakeven, 22.9% were sometimes deficit and the rest 10.5% were always deficit.

**Table 1. Socio-demographic characteristics of the sample population**

<b>Socio-demographic factors</b>	<b>N</b>	<b>%</b>
<b><i>Educational background</i></b>		
Never schooled	33	21.6
Primary level	30	19.6
Secondary level	61	39.8
Tertiary and above	29	19.0
<b><i>Occupation</i></b>		
Low (agriculture and labor)	72	47.9
High (service, business etc)	81	52.1
<b><i>Poverty self assessment in terms of food</i></b>		
Always deficit	16	10.5
Sometimes deficit	35	22.9
Breakeven	47	30.7
Surplus	55	35.9

#### **Distribution of the seedling buyers**

Majority of the seedling buyers were found in the division of Rajshahi. Growers of Amrapali were lower in Dhaka division (Table 2).

**Table 2: Division wise distribution of the growers selected for interview**

	<b>Amrapali</b>	<b>Lemon</b>	<b>Guava</b>	<b>Total</b>
Dhaka	10	6	5	21
Chittagong	18	2	2	22
Rajshahi	43	9	10	62
Khulna	12	1	2	15
Barisal	14	4	3	21
Sylhet	12	0	0	12
<b>Total</b>	<b>109</b>	<b>22</b>	<b>22</b>	<b>153</b>

## Type and purpose of plantation

More than ninety percent of the plantation was of homestead type. Majority of the plantation were homestead plantation. Most of the growers cultivated the seedlings for the purpose of domestic consumption (Table 3).

**Table 3: Type and purpose of plantation of the seedlings**

Type of plantation	Amrapali (%)	Lemon (%)	Guava (%)	Total
Homestead plantation	100 (91.7)	20 (90.9)	20 (90.9)	140
Garden plantation	9 (8.3)	2 (9.1)	2 (9.1)	13
Total	109 (100)	22 (100)	22 (100)	153
Purpose of cultivation				
Domestic	96 (88.1)	13 (59.1)	15 (68.2)	124
Commercial	3 (2.8)	0 (0)	0 (0)	3
Both	10 (9.2)	9 (40.9)	7 (31.8)	26
Total	109 (100)	22 (100)	22 (100)	153

## Adaptation of the seedlings

Adaptation rate of the seedlings of the three kinds of seedlings has been noted (Table 4). A total of 807 Amrapali seedlings was grown by 109 growers in 1999. Of these saplings 557 (69.4%) were found to survive during the period of survey in 2003. These seedlings were found at the stage of either flowering, fruiting and harvesting. Guava showed survival rate of 67.8%. The rate of survival is high in case of lemon (85.7%). The average survival rate of these three varieties is 72.8%.

When the growers were asked to say what were the main reasons for the death of the seedlings after plantation it was found that majority of that was due to carelessness of the growers. These carelessness included; growing under shade, breaking of stem by children or animals, not planting properly, over dose of fertilizer, extremely dry soil, cutting for construction purposes, attack of spiders, cultivating in off seasons, etc. Of the 93 respondents, 49 mentioned carelessness as the main reasons for death of their plants. The second cause of



the death of the saplings was unknown. The symptoms of the unknown reasons included: gradual drying of the sapling, sudden death, leaf-fall, etc. Grazing by cattle was another cause of the death of the plants. Besides flood, water logging and pest attack also caused death of the plants.

**Table 4: Survival rate of the seedlings grown by the buyers**

	Amrapali	Lemon	Guava	Total
Saplings grown	803	328	289	1420
Saplings survived	557	281	196	1034
Survival rate (%)	69.4	85.7	67.8	72.8

#### Main reasons for death of saplings

Main reasons of death of the saplings have been shown in Table 5.

**Table 5: Main reasons for death of saplings**

	Amrapali	Lemon	Guava	Total
Carelessness	32 (53.3)	10 (58.8)	7 (43.8)	49
Unknown disease	14 (23.3)	2 (11.8)	2 (12.5)	18
Grazing	8 (13.3)	1 (5.9)	1 (6.3)	10
Pest	1 (1.7)	3 (17.6)	4 (25)	8
Flood/water logging	5 (8.3)	1 (5.9)	2 (12.5)	8
Total	60 (100)	17 (100)	16 (100)	93

N.B. Multiple responses were considered

When the growers were asked mention what types of problems they faced during cultivation of their plants various types of causes was noted. Majority of the respondents said that they faced pest attack during cultivating the plants. The other responses were unknown diseases, grazing, water logging, stem rot, leaf fall, yellowing of leaf, fruit fall and attack of black ant. Besides, some respondents could not mention the problems specifically. Problems seen only in Amrapali were leaf fall, yellowing of leaf, and fruit fall. Guava variety faced a problem of attack by black-ant. There should be an investigation to ascertain what are these unknown diseases that are found mostly in case of Amrapali. These might be totally new with this variety in that area.

### Difficulties in cultivating the seedlings

The growers were also asked to mention what type of problems they faced during plantation of the seedlings then a variety of problems were noted (Table 6).

**Table 6: Problems faced during cultivation of the variety**

Problems	Amrapali	Lemon	Guava	Total
Pest	33 (48.5)	13 (62.9)	11 (61.1)	57
Unknown disease	15 (22.1)	3 (14.3)	1 (5.6)	19
Grazing	9 (13.2)	2 (9.5)	2 (11.1)	13
Water logging	6 (8.8)	3 (14.3)	3 (16.7)	12
Stem rot	2 (2.9)	0	0	2
Leaf fall	1 (1.5)	0	0	1
Yellow leaf	1 (1.5)	0	0	1
Fruit fall	1 (1.5)	0	0	1
Black ant	0	0	1 (5.6)	1
Total	68 (100)	21	18	107

N.B. Multiple responses were considered

When the growers were asked to respond regarding the price of the seedlings then it was found that out of 102 Amrapali growers 68 mentioned that the price was high and about half of them said that this was reasonable. Only one said that the price is low. Only 10 people mentioned that the price of the lemon seedlings is high and almost same number said that the price is reasonable and only 2 said that it was low. Majority of the guava growers said that the price of the guava sapling is reasonable whether as about half of them said that the price is high.

### Growers' opinion regarding the price of seedlings

Table 7 shows the opinion of the people about the price of the seedlings sold by BRAC.

**Table 7: Growers' opinion regarding the price of seedlings**

	Amrapali (%)	Lemon (%)	Guava (%)	Total
High	68 (66.7)	10 (47.6)	7 (33.3)	85
Reasonable	33 (32.4)	9 (42.9)	14 (66.7)	56
Low	1 (1.0)	2 (9.5)	0	3
Total	102 (100)	21 (100)	21 (100)	144

### **Growers satisfaction about the seedlings**

When the growers were asked to reply whether they were satisfied with the present condition of their seedlings then the same number of Amrapali growers were hopeful about their seedlings (Table 8).

**Table 8: Growers' opinion about the present situation of their plantation**

	Amrapali	Lemon	Guava	Total
Satisfied	22	6	8	36
Frustrated	22	3	5	30
Hopeful	53	11	6	70
Total	97	20	19	136

### **Buyers' willingness to buy seedlings from BRAC nurseries**

It is seldom claimed that seedlings are sold to the VO members after releasing of loan. But it was observed that motivation of people rather than enforcement. POs motivate them and then they bought those. Since there is no money in the hand of the people they will not buy any items for plantation. After growing these plants and harvesting them they became happy and then praised BRAC people for helping them take decision of purchasing the seedlings. Most of the growers (84.2%) bought seedlings from BRAC offices willingly. the rest of the people bought seedlings being influenced by the BRAC field staff (Table 9).

**Table 9: Buyers' willingness to buy the seedlings before plantation**

	Amrapali	Lemon	Guava	Total
Bought willingly	92 (85.2)	18 (81.8)	18 (81.8)	128
Bought not willingly	16 (14.8)	4 (18.2)	4 (18.2)	24
Total	108	22 (100)	22 (100)	152

Growers' opinion on encouraging others to buy the seedlings from BRAC offices was also noted (Table 10). Majority of them mentioned that they will encourage others to buy seedlings from BRAC nurseries.

**Table 10: Growers' opinion on encouraging others to buy seedlings from BRAC**

	Amrapali (%)	Lemon (%)	Guava (%)	Total
Will encourage	89 (81.7)	21 (95.5)	21 (95.5)	131
Will not encourage	20 (18.3)	1 (4.5)	1 (4.5)	22
Total	109 (100)	22 (100)	22 (100)	153

**Growers' opinion about the quality of the fruits**

Growers' satisfaction with the size and taste of the fruits of the varieties has been observed. In case of Amrapali most of the people (90.4%) opined that they think the taste of the fruits is better compared to the locally available mango varieties (Table 11). Whereas regarding the size of the fruits majority have expressed that the size of the fruits is moderate.

In case of lemon majority have told that both taste and size of the fruits are better compared to the local varieties. In case of guava majority of the people have said that taste of the fruits is better than that of the local varieties whereas majority of them said that size is moderate.

**Table 11: Growers' satisfaction about the quality of the seedlings**

	Amrapali (%)	Lemon (%)	Guava (%)	Total
<b>Test of the fruits</b>				
Better	47 (90.4)	10 (83.3)	9 (60)	66
Moderate	4 (7.7)	2 (16.7)	5 (33.3)	11
Not good	1 (1.9)	0(0)	1 (6.7)	2
Total	52 (100)	12 (100)	15 (100)	79
<b>Size of the fruits</b>				
Better	18 (34.0)	9 (75)	7 (46.7)	34
Moderate	35 (66.0)	2 (16.7)	8 (53.3)	45
Not good	0 (0)	1 (8.3)	0 (0)	1
Total	53 (100)	12 (100)	15 (100)	80

**Growers' opinion regarding present condition of the seedlings**

Buyers of the seedling were asked to mention regarding the quality of flowering, fruiting, and harvesting of the seedlings they grew and it was found that these were better compared to that of the local varieties (Table 12).

**Table 12: Growers' opinion regarding physiology of the seedlings**

	Amrapali (%)	Lemon (%)	Guava (%)	Total
<b>Quality of flowering</b>				
Better	44 (60.3)	11 (84.6)	11 (68.8)	66
Moderate	24 (32.9)	2 (15.4)	4 (25)	30
Not good	5 (6.8)	0 (0)	1 (6.2)	6
Total	73 (100)	13 (100)	16 (100)	102
<b>Quality of fruiting</b>				
Better	28 (41.8)	10 (76.9)	7 (43.8)	45
Moderate	24 (35.8)	2 (15.4)	8 (50)	34
Not good	15 (22.4)	1 (7.7)	1 (6.3)	17
Total	67 (100)	13 (100)	16 (100)	96
<b>Quality of harvesting</b>				
Better	23 (44.2)	11 (84.6)	8 (53.3)	42
Moderate	17 (32.7)	1 (7.7)	5 (6.7)	23
Not good	12 (23.1)	1 (7.7)	2 (13.3)	15
Total	52 (100)	13 (100)	15 (100)	80

### **Growers' technical knowledge on cultivation of the seedlings**

Time of fertilization in Amrapali is a crucial factor. Fertilization not in appropriate time hampers its flowering. Therefore, cultivators of this variety should know the time of fertilization. Pruning helps lemon plants produce more branching which is necessary for its fruiting. But majority of the cultivators taken in the present study do not have the idea of pruning (Table 13). Except the growers of guava both the Amrapali and lemon growers do not know how to control pest attack. Most of the growers do not receive training on cultivation of these seedlings. Majority of the growers said that BRAC staff did not give them the full support while growing the seedlings. They also felt need of BRAC staff in growing these varieties.

Findings reveal that growers were not aware of the adequate technical knowledge on cultivation of the seedlings.

**Table 13: Technical knowledge of the growers on cultivation of the seedlings.**

	Amrapali (%)	Lemon (%)	Guava (%)	Total
<b>1. Do you know what is the appropriate time for fertilization</b>				
Yes	39 (35.8)	8 (36.4)	11 (50)	58
No	70 (64.2)	14 (63.6)	11 (50)	95
Total	109 (100)	22 (100)	22 (100)	153
<b>2. Do you know what is pruning?</b>				
Yes	-	9 (40.9)	-	9
No	-	13 (59.1)	-	13
Total	-	22	-	22
<b>3. Do you know how to control pest attack?</b>				
Yes	47 (43.1)	10 (45.5)	13 (59.1)	70
No	62 (56.9)	12 (54.5)	9 (40.9)	83
Total	109 (100)	22 (100)	22 (100)	153
<b>4. Have you received any training on cultivation of this plant?</b>				
Yes	18 (16.7)	3 (13.6)	5 (22.7)	26
No	90 (83.3)	19 (86.4)	17 (77.3)	126
Total	108 (100)	22 (100)	22 (100)	152
<b>5. Has any BRAC staff helped you in cultivating this plant?</b>				
Yes	27 (24.8)	9 (40.9)	8 (36.4)	44
No	82 (75.2)	13 (59.1)	14 (63.4)	109
Total	109 (100)	22 (100)	22 (100)	153
<b>6. Do you think BRAC staff should visit you during cultivation of the seedlings?</b>				
Yes	99 (93.4)	21 (95.5)	22 (100)	142
No	7 (6.6)	1 (4.5)	-	8
Total	106 (100)	22 (100)	22 (100)	150

'-' indicates not applicable

## CONCLUSION

The present study reveals that the the three selected seedlings named Amrapali lemon and guava are better in terms of quality of size and shape compared to those of the local varieties. More than 90% of the seedling plantation is of homestead type. Out of 807 Amrapali seedlings grown by the buyers in 1999 around 69% were found to survive during the study. The average survival rate of the three varieties is 72.8%. The main reason for death of the seedlings grown was carelessness of the buyers. Some kinds of carelessness included growing of

the seedlings under shade and breaking of stem by children or animals. Majority of the respondents mentioned that they faced pest -attack during cultivation of the plants. Majority of the growers were found to be hopeful with their seedlings grown.

There is a serious lack of technical knowledge about cultivating the seedlings. Buyers claimed that technical support of BRAC staff is not sufficient. Therefore BRAC staff should help them giving more technical knowledge for cultivation of seedlings.

### **References**

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