

Fruit Development in Nepal: Success Cases

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Abstract

Fruit development program in Nepal has been fetching state priority ever since the Fifth Plan. Since then many efforts have been made in fruit research and development. Among many efforts of the past, introduction and evaluation of exotic varieties, intensive fruit production programs in the late sixty, private fruit nursery development, national priority program for citrus development in 20 mid-hill districts, special junar production program of Sindhuli and Ramechhap, establishment of demo-farms in production areas, LARC/ PARC model of fruit development program, command area approach of government farms and the programs in farmers' initiation were reported as successful ones. The impact of these programs could be justified by an increase in fruit production in the areas they were implemented. If we analyze the reasons of the successes, many lessons can be learned from them.

Introduction

Nepal has a long history of growing fruits in kitchen gardens. Formal collection and evaluation of exotic germplasms of fruit crops started from 1952 at Singh Durbar (Kathmandu) and Kakani (Nuwakot). During the Fifties, many varieties of pear, plum, peach, persimmon, chestnut etc., were introduced by the government for evaluation. But systematic approaches of fruit research and development were started only after 1967 when a separate department of horticulture and 13 farms under it were established at different agro-ecological regions of the country. Since then many efforts have been made in the development of fruit industry. Fruit development programs started to receive support of the government in an impressive way since the Fifth plan (1975-1980), which gave priority on production oriented researches and establishment of commercial orchards mainly in the mid-hills. Before the period, 'the agriculture year' was observed in 1973 which gave emphasis on establishment of private fruit-nurseries throughout the country.

In the Sixth Plan (1980-85), efforts were made to develop orchards in areas where transport infrastructures were developed. Also the areas near urban centers got priority for the establishment of orchards. As in the Sixth Plan, the Seventh Plan (1985-1990) also continued the concentrated effort of fruit development around highway corridors, cities and densely populated areas. Emphasis was given on the production of mango, litchi, banana, pineapple, mandarin, orange and apple. The plan also aimed to substitute import and promote export of these fruits. Interest subsidy on the credit was provided to encourage farmers for the establishment of commercial orchards. During the period, a number of donor supported project were started for the development of fruit sub-sector. For example, an excellent training center was established at Kirtipur with JICA support. The Eight Plan (1992-97) focused on those fruit development programs which could provide both employment and income to farmers. The Ninth Plan (1997-02), the first phase of Agriculture Perspective Plan, laid priority on citrus development in the Middle-mountain and apple development in the Trans-himalayan Zone. Poverty reduction through fruit development program is the focus of the Tenth Plan (2002-07). Combined efforts in

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the past considerably increased the area, production and productivity of important fruit crops (Appendix 1).

Among the efforts in the past, some were much successful to impart positive impacts on fruit industry, which are discussed hereunder.

1. Introduction and evaluation of exotic varieties

After the establishment of 13 horticulture farms at different agro-ecological zones of the country, many exotic varieties of fruit crops were introduced and tested at these farms. In fact, almost all the so-called improved fruit-varieties that we have today were then introduced. The horticulture development program in collaboration with the Government of India introduced many varieties of citrus in Dhankuta and Pokhara; apple in Jumla, Mustang, Rasuwa Helumbu, Baitadi and Daman; peach and plum in Kirtipur, Mustang, Jumla, Helumbu, Daman and Baitadi and Mango in Janakpur, Trisuli and Dhunibesi during 1960-1973. Altogether 123 varieties of 104 fruit crops were introduced during the period; some of them are still giving good yields in the farms. Excepting citrus, the varieties were found promising under Nepalese conditions. The orchards of these fruit crops are still serving as the progeny orchards.

Hill Agriculture Development Project (1977-80) was the other important project which introduced 118 new varieties of different fruit-crops. Besides these varieties, the project also introduced maling-morten series and *Malus prunifolia* apples at Kirtipur, which are still being used as source-materials for apple rootstocks. The Horticulture Development Project (1985-97) also played a major role for introducing fruit crop varieties in Nepal. This project introduced 10 varieties of pear, six varieties of grapes, eight varieties of persimmon, three varieties of chestnut, one variety of Kiwi fruit, two varieties of loquat, two varieties of plum and nine varieties of citrus. The project also selected some local types of Junar, mandarin and limes. Lumle Agriculture Research Centre (LARC) and Pakhribas Agricultural Research Centre (PARC) also introduced many varieties of different fruit crops. Among them Anna and Vered of Apple; Taxes, Spring Time, Orion, and Alton of Peach; Methley and Black Champa of Plum and Kumini and Tsukaba of chestnut are the main ones. The centers also screened local germplasms of citrus and banana. There are many other formal and informal sources of exotic fruit varieties. As compared with the size of the country, Nepal is very rich in fruit biodiversity. In fact, 186 varieties of 42 different fruit crops are reported to be in cultivation (Kaini, 1995). The introduction of exotic fruit varieties has enriched fruit biodiversity and increased fruit production of the country. The program of fruit variety introduction is, therefore, a successful case, which should be continued in future.

2. Intensive fruit production program of the late sixties

The first intensive fruit production program was started from the fiscal year 1968/69. This program was implemented in 16 districts of the country. In eleven districts – Bara, Parsa, Rautahat, Chitawan, Jhapa, Bardiya, Kailali, Kavre, Dhading, Makwanpur and Nuwakot, fruit crops like mango, litchi, pineapple, guava and lemon were planted. Kathmandu, Lalitpur, Bhaktapur, Rasuwa and Sindhupalchok districts were selected for apple, pear, peach, plum, persimmon and apricot. Altogether, one hundred thousands fruit saplings were distributed in the districts under this program. Then a similar type of program was launched in Jumla and Mustang districts for apple. The apple trees planted at that time are still giving good harvests to the farmers. This program could also be listed as a success case, and the reasons for the success were as listed below.

1. A block of 40 *ropani** was a unit for providing support to plant fruit trees.
2. Intensive technical services were provided to the farmers free of cost.
3. Eighty percent subsidy was provided on the cost of fruit saplings.
4. Similarly, 50 percent subsidy on the cost of sprayer, fertilizer, insecticides and fungicides were also given to the farmers.
5. After plantation, regular monitoring of fields was done to provide necessary technical advises to the farmers.

3. Private fruit nursery development program

The establishment of private level fruit nurseries started from 1973 associated with many other special programs to observe 'Agriculture Year'. Since then private sector is being encouraged to develop fruit nurseries. As a result, there are 375 such nurseries in the country (Appendix 2), which have been contributing to the supply of 83 percent fruit saplings required by the state. Therefore, private nursery program was also a success in supplementing fruit development program in the country. Some of the reasons behind the success are as follows.

1. Nurseries are located close to the fruit growing areas.
2. Intensive training is provided to the nurserymen.
3. There is increasing demand of fruit saplings.
4. Execution of support programs for nursery establishment and strengthening such as subsidies, technical advices and nursery competition.

4. National priority program for citrus development in 20 districts.

This program was started in the fiscal year 1983/84 with an objective of boosting up citrus production in 20 mid-hill districts namely Dhankuta, Terathum, Sankhuwasabha, Bhojpur, Okhaldhunga, Ramechhap, Sindhuli, Dhading, Gorkha, Lamjung, Tanahun, Kaski, Syangja, Palpa, Gulmi, Arghakhanchi, Salyan, Khotang, Dailekh and Illam. Though it was a nationally prioritized program, there was no external source of funding. The program was launched with strong commitments of the government. Hence, it became successful, and the impact of which is now seen in those districts where citrus production has increased in a considerable volume. Many commercial orchards of mandarin-orange were established after implementation of this program. The followings were the reasons of the success.

1. A strong organizational setup with a National Citrus Development Program in Dhankuta and three citrus research and development centers in Dhankuta, Pokhara and Dailekh.
2. A strong commitment and support programs of the government.
3. Qualified, experienced and dedicated staffs.
4. Regular and close monitoring of program implementation.
5. Monthly review of progress at departmental level.
6. Expanding markets for citrus fruits.
7. Suitable land and climatic conditions.
8. Farmers' interest in citrus cultivation.
9. Strong research extension linkage.

* 1 ropani= 500 sq.m.

5. Special junar production program

This program was started in the fiscal year 1980/81 in Ramechhap and Sindhuli districts with the establishment of private nurseries. Junar belongs to sweet-orange group, and is commonly known as orange in English. The area, production and productivity of Junar in Nepal are 5255 ha, 35474 Mt and 12 Mt/ha respectively (NCDP, 2005). Ramechhap and Sindhuli produce more than 75% of the production as the districts have many commercial orchards of Junar at bearing stage. This is the outcome of the efforts made to implement the special program which was supported by the Horticulture Development Project funded by JICA. The reasons for the success of the program were-

1. Very strong commitment of the government to implement the program
2. Adequate budget allocation
3. Selection of suitable pockets
4. Planting materials locally produced
5. Coordination office established at Sindhuli Horticulture Farm with provision of necessary staffs, authority and other resources
6. Program launched as a campaign
7. Proximity of production areas to the market
8. Expanding market of Junar and
9. Regular monitoring and progress review.

6. Demo-farms in production areas

The Horticulture Development Project established Junar demo-farms at production areas of Sindhuli and Ramechhap districts to demonstrate improved technologies of Junar production. These demo-farms were managed by leader farmers, and were found very supportive to promote Junar production program in those two districts. The reasons for this could be as listed below.

1. Demo-farms were established and managed under local conditions.
2. All farmers of the area could see management practices and their effect on orchard.
3. Demo-farms were used as venues for practical trainings.

Recently, the author had an opportunity to make a comparative study on mango production, post harvest management and marketing in Nepal and Bangladesh. One of the recommendations of the study is to establish demonstration orchard in production area and the recommendation is made based on the experience of Bangladesh.

7. The LARC/PARC's model of fruit development program

The Lumle Agriculture Research Center and Pakhribas Agriculture Research Center, established in the late sixties as training centers and later as research and development centers, have played vital roles in development of fruit sub-sector in the eastern and the western hills of Nepal. The centers carried out research, extension and training programs in an intensive way. Introduction of exotic varieties, development of orchard management (including plant-protection) and post-harvest technologies and scaling up of recommended technologies to command areas are some of the success cases. The followings are the reasons of the successes.

1. Integrated approach of fruit research, extension and training.
2. Adequate resources including qualified staffs and better incentives to them.
3. Consolidated command areas.
4. Selected fruit crops.
5. Support program to the farmers.
6. Practical trainings to the farmers.
7. Regular and close monitoring of program implementation.
8. Full authority given to the centre for execution of the program.

8. Command area approach of government farms

Each of the horticulture farms in the country launched some intensive programs of technology transfer in their command area during the eighties and the nineties. As per the program, farm-technicians visited command areas to provide technical services to the farmers. Available technologies and production inputs were provided to the farmers in an integrated way. District Agriculture Development Offices were also involved in farmers' selection. This approach was much effective to establish commercial orchards in vicinity of the farms. As a result, many commercial orchards were established in the command areas of horticulture farms. Followings are the noteworthy points in this approach.

1. Quick transfer of technology.
2. Better services to the farmers.
3. Regular follow up programs.
4. Farm-technicians well aware of farmers' issues and problems.

9. Programs in farmers' initiation

There are many examples of fruit development program initiated by leader farmers and rapidly scaled-up by the surrounding farmers, such as the banana pockets of Kabaswati (Nawalparasi) and Tikapur (Kailali). In Kabaswati, an area of more than 300 hectares has been brought under banana cultivation within 5 years' period. This is one of the most success cases of fruit development in the recent years. The reasons of the success are as listed below.

1. Program initiated by self-motivated farmers.
2. Production pocket connected to road head.
3. Locally produced planting materials.
4. Selection of suitable variety to the local conditions.
5. Group approach in production and marketing.
6. Educated farmers.
7. Backstopp support of DADO, NARC and IAAS.

Conclusion

Fruits are important sources of nutrition and income in the country. While grown successfully along the contours of mountain slope, fruit-trees not only provide income to the mountain farmers but also check soil erosion. Realizing these facts, several efforts were made in the past to develop fruit in the hills and the mountains. As discussed earlier, one of the success efforts is the introduction of improved fruit varieties. The development of fruit varieties is a slow and costly process, but the demand of varieties is changing with time. Nepal cannot meet the demand of modern varieties with her internal source and effort. Hence, continuous effort is to be made to introduce desirable varieties as in the past. These days, it is said that plant genetic resources are the common heritage of mankind, and they should be made available to all those who need them. However, such efforts should not minimize the importance of indigenous varieties. Nepal is rich in local fruit germplasms. Fruit crops like mandarin-orange, sweet-orange, pear, lime and lemon have very popular local varieties. Introduction and evaluation of exotic varieties and collection, evaluation and selection of local landraces should get priority for variety development of fruit crops. All varieties should be documented in monographs giving major emphasis on desirable traits.

Role of private sectors in the production of fruit saplings is very encouraging in Nepal. However, Nepal does not have certification laws for the planting materials, and hence, quality issue is emerging as a challenge these days. Therefore, formulation and implementation of fruit nursery act should get high priority.

We have to learn lessons from the success-cases of the past and, on such basis, design future program. If we analyze the reasons behind the successes, many lessons can be learned from them. A strong commitment of the government, adequate resource allocation, demand and market led programs, supports to the farmers, accessible production areas, use of appropriate varieties and production technologies, educated farmers, regular and close program-monitoring are some essentials of fruit development program to make it a success. Post-harvest management including handling, packaging, transportation, storage and marketing did not receive much attention in the past. Researches on post-harvest management and processing need to be pursued more actively for value addition and diversification of the products.

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Appendix 1: Area, Production and Productivity of Important Fruit Crops (2004/05)

Kind of Fruits	Area (ha)	Production (Mt.)	Productivity (Mt./ha)
Mango	22960	132496	9.37
Mandarin Orange	15987	97480	11.31
Banana	5055	51581	14.22
Guava	4355	36446	11.51
Junar	5255	35474	11.97
Apple	7799	34983	9.57
Pear	3576	33362	11.89
Papaya	2711	29445	14.01
Lime	3895	19132	8.01
Jack Fruit	2201	17865	11.61
Litchi	3850	16734	7.74
Peach	2448	13653	6.90
Pineapple	936	9980	14.24
Plum	1625	9425	7.03
Lemon	600	3822	7.84
Areca nut	2487	3816	1.91
Apricot	154	567	6.75
Persimon	143	443	6.72
Pomegranate	143	441	4.59
Coconut	347	352	2.03
Almond	16	11	1.00
Others	25910	156956	10.75
Total	89312.25	552879	9.99

Source: FDD

Appendix 2: Private Fruit Nurseries in Nepal (2004/05)

Dev. Regions	Citrus	Winter Fruits	Summer Fruits	Mix Fruits	Total
Eastern Development Region	46	2	31	1	80
Central Development Region	30	5	43	12	90
Western Development Region	38	-	3	7	48
Mid-western Development	33	59	7	15	114
Far-western Development	21	1	3	10	43
Total	176	67	87	45	375

Source: FDD

[Queries from the participants of the seminar:

Breaking silence and with a humorous sense, Mr. I.R. Pandey queried on 'why committed staffs and other resources as required had not been available for horticulture development in the country despite being of high ranking horticulturists including the presenter and writer of this paper in the policy level. Mr. B.R. Sherchand raised the issue that the horticulture farms/centers in the country are not only lacking necessary supports from the center, but also they are suffering from undue administrative interventions like that of Kirtipur. In response to the queries, the presenter added that the districts on an average had more than 25% of the total budget allocation on horticultural sector. On such ground, he denied that the center had not supported horticulture sector. However, he accepted that horticultural farms and centers were deteriorating due to poor budget allocation by the state. On the concluding remarks, the chairperson of the session linked fruit germplasm introduction achievements in the country to the past period of Ten Years' Plan for Agriculture Development, when a Plant Introduction Unit was operative in the Ministry of Agriculture (MOA) and research-extension linkage was strong due to well operating commodity programs.]