

Horticulture Resource Centre Development for Sustainable Development of Horticulture Sector

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Abstract

Horticultural Resource Centre has key role in inputs supply, technology generation and verification, demonstration and providing technical services to the growers of horticultural crops. As a result of government developmental activities since 1970 A.D. there were 45 Horticulture Resource Centers including horticulture research units and program which is now limited to 40 in number. Their importance and contribution in the past have been well recognized in the command areas of the farms. When the concept of 1:1 ratio of budget and revenue for performance based evaluation began, some farms were kept under low profile and were either privatized or handed over to other organizations. Double Track Management System was also introduced for income generation. After few years of operation, all the privatized farms were returned to the government and double track system was discontinued without formal evaluation of the modality of the operation. Some resource centers have also experienced the encroachment of the landholdings by the security forces of the government. In the present federal government system, the linkage with the parental institution and organized system of extension services has been disrupted, thus their role and importance has been more realized for the sustainable development of horticulture sector of the country. Collaboration and coordination with other public and private organization, efficient utilization of the resources, cutting down nonproductive expenses, eliminating program without significant outputs and avoidance of duplication of fund flow should be taken due consideration for the sustainable development of resource center itself and horticultural sector as a whole.

Keywords: Resource center, privatization, double track system, encroachment

Introduction

Horticultural Resource Centre has key role in inputs supply, technology generation, verification and demonstration and providing technical services to the growers of horticultural crops. As a result of government's

developmental activities since 1970 A.D, there were 45 Horticulture Resource centers (farm/station) including horticulture research units and program scattered at different agro-ecological belts of cool temperate, warm temperate, sub-tropical and tropical zones of

the country which is now limited to 40 in number due to the various reasons. Their importance of existence and contribution in the past has been well recognized. When the concept of 1:1 ratio of budget and revenue was introduced by the government in the operations of resource centers, performance based evaluation started by the auditor general and so as by the planners and policy makers. As a result, due to less revenue generation some farms/stations were kept under low profile by providing them limited budget and program activities e.g. horticulture farm Helambu and Darma, Humla etc. When government adopted policy of privatization in 1990 A.D. those low profile farms/stations were either privatized or handed over to other organizations. Five horticulture farms (Panchkhal, Darma, Sindhupalchock, Dhunibeshi, and Janakpur) were leased out and while four horticulture farms were handed over to other agencies (Rasuwa to Wildlife, Kakani to Tourism, Dhunibeshi to Mulberry, and Yagyapuri to Cancer Hospital) in 1993 A.D. (Acharya & Atreya, 2013). Double track management

system was also introduced to fully utilize the land and human resources of the government farms/stations for income generation with additional commercial program together with regular program. After few years of operation, all the privatized farms/stations were returned to the government and double track system was discontinued. Some resource centers have also experienced the encroachment of the land holdings by the security forces of the government. Despite all those ups and downs during the course of horticultural development, the importance and role of horticultural resource center cannot be underestimated at present three tier's government: federal, provincial and local government system where there is demand of new horticultural crop varieties and precision technology under competitive market oriented horticultural production. Various horticultural resource centers all over the country are presented in the following table 1. Their importance has also been more realized for the sustainable development of horticulture sector of the country.

S.N.	Name of Farm/ Station	Address	Under Federal/ Provincial Government	Mandate Main Crop	Agro-ecological Specialized Field
1.	Horticulture Center	Jaunbari, Illam	Provincial	Potato	Temperate Horticulture
2.	Agriculture Research Station	Jaunbari, Illam	Federal	Potato	Temperate Horticulture
3.	Large Cardamom Development Center	Fikkal, Illam	Federal	Large Cardamom	Warm Temperate
4.	National Citrus Research Program	Dhankuta	Federal	Citrus	Sub-tropical Horticulture
5	National Commercial Crop Research Program	Dhankuta	Federal	Large Cardamom, Tea	Warm Temperate
6.	Agriculture Research Station	Pakhribas, Dhankuta	Federal	Research	Warm Temperate

S.N.	Name of Farm/ Station	Address	Under Federal/ Provincial Government	Mandate Main Crop	Agro- ecological Specialized Field
7.	Directorate of Agriculture Research (horticulture Unit)	Tarahara, Sunsari	Federal	Research	Tropical Horticulture
8.	Horticulture Center	Faplu, Solukhumbu	Provincial	Temperate Fruits	Temperate Horticulture
9.	Tropical Horticultural Nursery Development Center	Janakpur, Dhanusha	Provincial	Tropical Fruits	Tropical Horticulture
10.	Tropical Horticulture Center	Nawalpur, Sarlahi	Federal	Tropical Fruits	Tropical Horticulture
11.	Temperate Fruits Rootstock Development Center	Bonch, Dolakha	Provincial	Temperate Fruits	Temperate Horticulture
12.	Potato Development Center	Nigale, Sindhupalchowk	Federal	Potato	Warm Temperate
13.	Root and Tuber Crops Development Center	Sindhuli	Provincial	Root and Tuber Crops	Sub-tropical horticulture
14. ***	Horticulture Farm	Sarmathang, Helambu, Sindhupalchowk	-	-	Temperate Horticulture
15.	Spices Development Center	Panchkhal, Kavrepalanchowk	Provincial	Spices	Tropical Horticulture
16.	Flower Development Center	Godawari, Lalitpur	Provincial	Ornamental Plants	Warm Temperate Horticulture
17.	Vegetable Crop Development Center	Khumaltar, Lalitpur	Federal	Vegetables	Warm Temperate
18.	National Horticulture Research Centre	Khumaltar, Lalitpur	Federal	Fruits and Vegetables	Sub-tropical horticulture
19.	National Potato Research Program	Khumaltar, Lalitpur	Federal	Potato, Sweet potato	Sub-tropical horticulture
20.	Warm Temperate Horticulture Center	Kirtipur, Kathmandu	Federal	Warm Temperate Fruits	Warm Temperate
21.**	Horticulture Farm	Kakani, Nuwakot	-	-	Temperate Horticulture

S.N.	Name of Farm/ Station	Address	Under Federal/ Provincial Government	Mandate Main Crop	Agro- ecological Specialized Field
22.	Sub-tropical Horticulture Development Center	Trishuli, Nuwakot	Provincial	Development	Tropical Horticulture
23.***	Horticulture Farm	Dhunchu, Rasuwa	-	-	Temperate Horticulture
24.****	Horticulture Farm	Dhunibesi, Dhading	-	-	Sub-tropical Horticulture
25.	Temperate Horticulture Nursery Center	Daman, Makwanpur	Provincial	Development	Temperate Horticulture Nursery Center
26.	Directorate of Agriculture Research (Horticulture Unit)	Parwanipur, Bara	Federal	Research	Tropical Horticulture
27.*	Horticulture Farm	Yagyapuri, Chitwan			Tropical Horticulture
28.	Horticulture Research Station	Malepatan, Kaski	Federal	Research	Sub-tropical horticulture
29.	Directorate of Agriculture Research (Horticulture Unit)	Lumle, Kaski	Federal	Research	Warm Temperate Horticulture
30.	Citrus Development Center	Palpa	Federal	Development	Sub-tropical Horticulture
31.	Coffee Development Farm	Gulmi	Federal	Coffee	Sub-tropical Horticulture
32.	Coffee Research Program	Bhandaridanda, Gulmi	Federal	Coffee	Sub-tropical Horticulture
33.	Temperate Horticulture Development Center	Marpha, Mustang	Federal	Temperate Fruits and vegetable seeds	Temperate Horticulture
34	Spice Crops Research Program	Kapurkot, Salyan	Federal	Zinger and Turmeric	Sub-tropical Horticulture
35	Directorate of Agriculture Research (horticulture Unit)	Dashrathpur, Surkhet	Federal	Research	Sub-tropical Horticulture

S.N.	Name of Farm/ Station	Address	Under Federal/ Provincial Government	Mandate Main Crop	Agro- ecological Specialized Field
36.	Horticulture Research Station	Rajikot, Jumla	Federal	Temperate Fruits and vegetables	Temperate Horticulture
37.	Temperate Vegetable Seed Production Center	Juphal, Dolpa	Provincial	Vegetable seed	Temperate Horticulture
38.	Potato Development Centre	Darma, Humla	Provincial	Potato	Temperate Horticulture
39.	Horticulture Research Station	Kimigaun, Dailekh	Federal	Citrus and Vegetable seed	Sub-tropical Horticulture
40.	Vegetable Seed Production Center	Rukum West	Federal	Development	Warm Temperate Horticulture
41.	Directorate of Agriculture Research (horticulture Unit)	Khajura, Banke	Federal	Research	Tropical Horticulture
42.	Dry Fruits Development Center	Satbanjh, Baitadi	Provincial	Temperate Fruits	Temperate Horticulture
43.	Vegetable Germplasm Maintenance and Seed Production Center	Dadeldhura	Provincial	Development	Warm Temperate Horticulture
44.	Directorate of Agriculture Research (horticulture Unit)	Bhagetada, Doti	Federal	Research	Sub-tropical Horticulture
45	Horticulture Resource Center	Dumribo, Malepatan Pokhara	Provincial	Development	Sub-tropical Horticulture

Source: AICTC, 2020; NCFD, 2020; NCPVSCD, 2020; Nepali et al., 2016

Note:

* Handed over to B.P. Koirala Memorial Cancer Hospital, Chitwan

** Handed over to Ministry of Tourism

*** Handed over to National Conservation to Rain-bow Trout Research Station (NARC)

**** Handed over to Silkworm Development Program after coming back from privatization

Situation Analysis of Resource centers under Government

Objectives and Programs of the Government Resource Centers:

There are clear cut objectives for the resource center of government working on research and development.

Objectives of	
Research Station	Developmental Center
<ul style="list-style-type: none"> • To conduct research on variety, husbandry management, post-harvest, disease/insect pests management, nursery management and genetic resource conservation and utilization • To maintain and multiply breeder and foundation seeds and produce quality saplings of horticultural crops under targets • To coordinate with various research and development line agencies for collaborative research and development programs • To establish linkage with national and international research organizations • To prioritize research areas in the country • To document and maintain information on targeted commodity research and development • To provide technical support and services to the stakeholders 	<ul style="list-style-type: none"> • Conservation, evaluation and utilization of germplasm • To produce foundation and improved seeds, saplings of horticultural crops under targets, sell and distribute to the farmers • To conduct adaptive research on horticultural crops • To provide technical guidance and services to farmers on production, post-harvest and nursery management technology of horticultural crops • To demonstrate improved technologies related to horticultural crops • To conduct training on production, post-harvest, nursery management technologies of horticultural crops • To provide technical support and services to the stakeholders • To coordinate with other line agencies to meet the need of famers/entrepreneurs and give suggestions/recommendations as when required

Based on the objectives mentioned above different farm/stations have undertaken different research and development program activities as per their mandate commodity crops suitable to their agro-ecological belts. At one level of research and development, they have maintained the in-country supply of breeder seed, foundation seed, improved seeds of horticultural crops and different type fruit saplings. Private sectors' resource centers have also been strengthened in the same direction in the supply of seeds and saplings of horticultural crops. Successful demonstration of

the horticultural crop production within the fence and extension program on horticulture crop production supported by technical backstopping initiated commercialization in horticulture in their command areas and it's up scaling in other feasible areas of the country.

Contribution of resource centers can be pointed out as apple production in Jumla and Mustang; vegetable seed production in Rukum West; Vegetable production in Panchkhal, Dhunibesi, Nawalpur, Junar production in Sindhuli and Ramechhap, Mandarin production in Dailekh and

Dhankutka, etc. (Kaini, 2012). The contribution of resource centers also include the development of private agencies and cooperatives and the expansion of business in vegetable seed and fresh vegetables (Pandey, 2001). However, at the present context of market oriented development, they lag behind in introduction of new horticultural crop varieties, hybrid vegetable seed production and precision horticultural technology etc. which made the country dependent on the imports of planting materials and technology itself. For short term period it fulfills the in-country demand of technology but in the long run, it is not a

sustainable approach.

Human Resources

Human resource is one of the main factors to drive the resource center towards fulfilling its set of objectives and sustainable management of the farm/stations and technical service delivery to the farmers.

Depending on the size of the resource center and program activities and infrastructural facilities developed, the size of the human resource varies. Table 2 has shown the human resources of two development farms and two research stations

Table 2: Human Resource of four Resource Centers

Farm/Stations	Level	Approved	Fulfilled	Vacant
1. Dry Fruits Development Centre, Satbanjh, Baitadi	Officer	2	2	0
	Technician	4	3	1
	General	10	7	3
	Total	16	12	4
2. Tropical Horticulture development Centre, Nawalpur, Sarlahi	Officer	7	7	0
	Technician	8	6	2
	General	11	7	4
	Total	26	20	6
3. National Citrus Research Program, Paripatle, Dhankuta	Scientist	8	2	6
	Technical officer	6	0	6
	Technician	20	5	15
	General	3	3	0
	Total	37	10	27
4. Horticulture Research Station, Rajikot, Jumla	Scientist	3	1	2
	Technical officer	3	0	3
	Technician	6	5	1
	General	7	6	1
	Total	19	12	7

Looking into the size of the human resource in research stations it ranged from 19 to 37 and in development farms it ranged from 16 to 26. Large number of human resource (73%) is vacant in case of NCRP, Dhankuta. There is severe crunch of scientist and technical staff in NARC. In such situation, good performance of the research station is hard to expect and achieve.

Annual Budgets and Revenue:

The table 3 shows the annual budget and revenue of the four resource centers. More than 2.5 crores rupees total budget was allocated in each resource center whereas the revenue collection falls far behind the total budget expenses/operational budget expenses. The revenue ranged from 23 Lakh to 66 Lakh rupees. The majority of the budget was spent on salaries, administrations and maintenance of the farm.

Table 3: Annual Regular Budget and Revenue of Four Resource Centers

Farm/Stations	Dry Fruits Development Center (2076/77)	Tropical Horticulture Center, Nawalpur, Sarlahi (2076/77)	Horticulture Research Station, Rajikot, Jumla (2075/76)	National Citrus Research Program, Paripatle, Dhankuta (2076/77)
Total Regular Annual Budget (NRs.)	3,95,32,500.00	3,09,44,000.00	2,52,00,000.00	3,30,76,000.00
➤ Operational/ Production Inputs and Services (NRs.)	2,56,82,500.00	2,98,74,000.00	1,90,00,000.00	2,55,71,000.00
Capital Budget (NRs.)	1,38,50,000.00	10,70,000.00	62,00,000.00	75,05,000.00
Total Expenses (NRs.)	3,00,55,682.99	2,78,20,240.00	2,13,13,984.00	3,13,69,550.51
➤ Operational / Production Inputs and Services (NRs.)	2,16,82,386.99	2,77,14,790	1,75,55,433.00	2,46,29,638.65
➤ Capital Budget (NRs.)	83,73,296.00	1,05,450.00	37,58,551.00	67,39,911.86
Total Revenue (NRs.)	23,13,271.00	65,97,450.00	14,81,347.62	36,62,980.00
➤ Revenue with respect to total budget expense (%)	7.7	23.7	6.9	11.7
Revenue with respect to Operational budget expense (%)	10.7	23.8	8.4	14.9

Source: DFDC, 2021; HRS, 2020; NCRP, 2020; and THDC, 2021

The expectation of revenue from Horticulture Center could be justifiable but expecting the same from Research Station could be a flaw. Apart from revenue, the performance could be evaluated based on quantity and quality of research carried out, output in terms of recommendation, journal papers, number of farmers or front liners (extension worker based in palika) trained etc.

Physical Facilities:

The physical facility varies from farm to farm. Some farm stations have adequate office buildings, staff quarters and store rooms, and laboratory facilities while some farms/stations lack basic facilities needed for their proper management and conduction of viable research and demonstration activities. Some temperate farm stations have even no motorable access too.

Experience of Double Track Farm Management System:

Management of the farms/stations was always a concern of Government. Double Track System was introduced in 2003 A.D. for the management of the government farms/stations. Horticulture Centre, Nawalpur, Sarlahi was the first farm to test this system. In this system of farm operation together with regular program, an additional income generating program with profitable business plan was planned, approved and implemented. The utilization of income generated by the additional program was divided as follows:

- 15% to be deposited in the government treasury
- 25% set aside as program expenses fund
- 30% to be used in repair and maintenance and stock replenishment in the farm
- 30% to be paid as incentive to the staff involved. (Kaini, 2012)

Now this system has been discontinued without doing any formal evaluation of the system.

Experience of Privatization of Farm/station:

During nineties Horticulture Farm, Humla; Horticulture Farm, Dhunibesi; Horticulture Farm, Janakpur; and Duwachaur Nursery (a part of Helambu Farm) were privatized with certain criteria to ensure the continuation of horticultural activities in the farms (Nepali et.al. 2016). Within few years of operation all privatized farms/stations were returned to the government. Not a single farm was successfully run by the private sector, rather because of their poor management, the orchard remained in bad condition. During same period Horticulture Farm, Rasuwa and Helambu (Orchard Site) were handed over to Ministry of Forest and Soil Conservation and Horticulture Farm, Kakani to the Ministry of Tourism respectively. Horticulture Farm, Yagyapuri was also handed over to B. P. Koirala Memorial Cancer Hospital, Chitwan in 1993 A.D.

Major Issues Related to Resource Centers

Capital Budget:

Capital budget is still low in some farm stations to meet the basic infrastructures needed for the operation of farm/station at its full potential.

Human Resource:

Not timely fulfilment of manpower, frequent transfer, weak team spirit among the staff members, improper allocation and poor utilization of existing human resources.

Infrastructural facilities:

Physical facilities like buildings, farm machineries, Irrigation, fencing, tools equipment in most of the farms are in worse condition, needs repair and maintenance

Production Cost and Revenue Collection:

There is a big gap between production cost and revenue raised in almost all farms/stations. It is one of the criteria set by Auditor General

to evaluate the performance of farm/station operating under sustainable way or not.

Germplasm:

Maintenance cost of germplasm is high

Encroachment of Landholdings:

Encroachment of farmland holdings has been done by security forces in Warm Temperate Horticulture Center, Kirtipur; Horticulture Research Station, Malepatan, Pokhara; Root and Tuber Crop Development Center, Sindhuli and Temperate Horticulture Development Center, Marpha, Mustang which has not only reduced the landholding of the centers but also discouraged the horticultural development enthusiasm of the resource center affected.

Way Forward/ Recommendations

To make Horticulture Resource Centres more effective towards becoming the real back stopper for the frontline extension (Palika and Gyan Kendra), following recommendations are made:

- Best use of resources available including human resource should be taken seriously for the sustainability of the resource center. Every effort should be made to maintain 1:1 ratio of budget expense (at least direct production cost) to revenue by farm management team members led by farm/station manager.
- Maintain the timely full occupation of the approved post of the human resource of the farm/station. Farm Manager/Station chief and Scientist should stay at least for five years period and frequent transfer of the staff should be stopped. Farm manager/station chief should be given training on farm management and team building of the farm staff. Capacity building of farm staff should be done periodically to refresh them.
- Sufficient capital budget should be allocated to the farm/station to meet the basic physical infrastructures.

- Direct production cost oriented activities should have approved business plan for those program activities and budget. Seed production and saplings production should be supported by the balance sheet of demand and supply.
- Germplasm should be maintained at minimum cost.
- Research activities should be problem focused/oriented and output oriented and periodic evaluation of the adoption rate of the technology should be carried out.
- Collaborative program of research and development. For research it should be well coordinated with NARC leadership while involving research activities with horticultural education institute, private sector and with NARC itself. For development activities on collaboration, that should be well coordinated with Technical division/center leadership while involving development activities with private individuals, companies, commodity associations and farmers' cooperatives.
- Mechanization of farm operations should be encouraged.
- Provision of paid training program and paid technical service should be there for those interested resource rich farmers/entrepreneurs. For this, approval in principle should be availed from the higher authorities.
- Provision of sharing idle/underused resources on rental basis for income generation of the resource center.
- Unproductive operational cost should be cut down and personal use of official resources should be charged to individual officials.
- Organize farm/station day to have communication with people outside the organization for information sharing and collection of suggestion to manage farm/station effectively and making farm/station self-sustainable

- The performance evaluation of the farm/ station should not be based only on revenue generation. Together with revenue generation, the performance evaluation should also be based on the benefits (recommendations of technologies, technical service and training provided, and technical publications) received by the farmers and frontline extension workers to justify the sustainability of the farms/stations.

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