

concentrated in IMFs as a model for irrigated farming in the Terai plain.

- (2) Practical trial and demonstration of irrigated farming method be developed in IMFs for other areas.
- (3) Test boring, data collection and analysis of data be done to confirm technical feasibility for STWP area.
- (4) Training of maintenance and repair works be carried out for the Project mechanics as well as village level mechanics.
- (5) ~~The~~ Project should continue to carry out the activities in the Project hill areas. However, the services of Japanese Experts should be primarily concentrated in Terai area.

For the above mentioned works, it is recommended that both governments should take necessary measures to support the activities of the Project.

Annex I

ABBREVIATION

AA	:	Agriculture Assistant
ADB/N	:	Agricultural Development Bank, Nepal
ADO	:	Agricultural Development Office or Officer
AIC	:	Agricultural Inputs Corporation
DTW	:	Deep Tube Well
HMG/N	:	His Majesty's Govt. of Nepal
IAP	:	Intensive Irrigation Agriculture Programme
IMF	:	Irrigated Model Farm
JADP	:	Janakpur Agriculture Development Project
JICA	:	Japan International Cooperation Agency
JT	:	Junior Technician
JTA	:	Junior Technical Assistant
STWP	:	Shallow Tube-well Programme

Annex II

ITINERARY

Date	Activities
Sept. 11 (Sat)	Arrival at Kathmandu Meeting with the Ambassador of Japan and other staff
12 (Sun)	Courtesy call to the Ministry of Agri- culture Meeting with the authorities concerned of HMG/N. Meeting with Japanese Experts
13 (Mon)	
14 (Tue)	Leave for Janakpur Meeting with the staff of JADP
15 (Wed)	Field survey
16 (Thu)	" "
17 (Fri)	" "
18 (Sat)	Consolidation of data and information collected
19 (Sun)	Compilation of Reports
20 (Mon)	Leave for Kathmandu
21 (Tue)	Compilation of Reports
22 (Wed)	Joint Meeting
23 (Thu)	Reporting to the Embassy of Japan
24 (Fri)	Leave for Japan

Annex III

MEMBER LIST
OF
THE JAPANESE PROJECT EVALUATION TEAM
FOR THE JANAKPUR ZONE AGRICULTURE DEVELOPMENT PROJECT
IN NEPAL

ASSIGNMENT	NAME	PRESENT POSITION
1. Team Leader	Mr. Akira KAWAMATA	Head, Technical Cooperation Division, Agricultural Development Cooperation Department, JICA
2. Agricultural Extension	Mr. Masao ODASHIMA	Lecturer, Iwate Prefectural College of Agriculture
3. Water Management	Mr. Katsumi TAGUCHI	Chief, Foreign Affairs Section, Design Division, Construction Department, Agricultural Structure Improvement Bureau, MAFF
4. Cooperation Planning	Mr. Masao TAKAI	Chief, Technical Cooperation Section, International Cooperation Division, International Affairs Department, Economic Affairs Bureau, MAFF
5. Agricultural Development	Mr. Tateo KUSANO	President, System Science Consultants Inc.
6. Coordination	Mr. Kaoru IWASAKI	Officer, Technical Cooperation Division, Agricultural Development Cooperation Department, JICA

MAFF: MINISTRY OF AGRICULTURE, FORESTRY
AND FISHERIES

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Technical Cooperation Division,
Agricultural Development Cooperation
Department,
P.O. Box 216, Mitsui Bldg.,
2-1, Nishi-Shinjuku, Shinjuku-ku
Tokyo 160, Japan
Tel.: 03-346-5264



Annex IV

MEMBERS OF THE JANAKPUR ZONE AGRICULTURE DEVELOPMENT BOARD

- | | | |
|----|---|------------------|
| 1. | Mr. B.B. Khadka
Secretary, Ministry of Agriculture | Chairman |
| 2. | Dr. T.N. Pant
Joint Secretary, Ministry of Agriculture | Member |
| 3. | Mr. P.P. Gorkhali
Director General, Department of Agriculture | Member |
| 4. | Mr. S. Adhikary
Deputy Director General,
Dept. of Irri. & Hydro. | Member |
| 5. | Mr. S.N. Sarkar
Act. Director, Central Regional
Agri. Directorate | Member |
| 6. | Mr. K. Parajuli
Section-Officer, Finance Ministry
(Foreign Aid Div.) | Member |
| 7. | Mr. R.B. Thapa
Project Manager, JADP | Member Secretary |
| 8. | Mr. P.N. Rana
General Manager, Agriculture Input
Corporation, Kathmandu | Invitee |

9. Mr. A.N. Rana-

Invitee

Chairman & General Manager,

Agriculture Development Bank/Nepal

Dispatched Japanese Experts from JICA

Term	Fields	Project Manager	Agricultural Extension Planning	Agronomy	Irrigation	Farm Machinery	Liaison Officer
Long-term Experts (over one year)		1-(35)	1-(26)	2-(36)	2-(59)	2-(33)	1-(35)
	Fields	Geology	Construction Management	Fruit Tree	Agricultural Economy	Farm Machinery	
Short-term Experts (within one year)		1-(1)	1-(4)	1-(3)	1-(1)	1-(1.5)	5-(9.5)

Total 14-(233.5)

Remarks: Fig: person (Fig)=M/M; Number of man per month

During the cooperated term since November 1979, the dispatched long term Japanese experts are 9 persons, or 224 M/M, and the dispatched short term Japanese experts are 5 persons, or 9.5 M/M, total 14 persons or 233.5 M/M

Annex VI

Provision of Machinery Implements & Materials from Japan (JICA)

(Fig. in '000 Yen)

Fiscal Year	Amount	Main Equipments
1979	65,836	land cruiser, fork lift, station wagon, tractor shovel, jeep, cable wire; printing machine, autobike
1980	51,633	motorcycle, lawn mower, drill spare tools, soil analyzer, drill spare tools
1981	42,467	pump sets, track, tractor, hand sprayers, workshop machineries spare parts
1982	(30,000)	Spare parts (Plan)
Total	189,936	

Annex VII

Counterparts Training in Japan for past 3 years (1979 - 82)

Name	Fiscal Duration Year (Month)	Training Subject	Post at the time participated
1. R.B. Shah	1979 10	(G) Vegetable Crop Production	Pomologist, Dept. of Agriculture, JADP
2. D.K. Thapa	1979 10	(G) Rice Cultivation	Farm Manager, JADP
3. U.B. Thapa	1980 8	(G) Control of Rice Disease & Insect Pests	Assistant, Plant Pathologist, Dept. of Agriculture
4. G.L. Shrestha	1980 10	(G) Irrigation & Drainage	Assistant Agricultural Engineer, Farm Irrigation Div., Dept. of Agriculture
5. M.L. Shrestha	1980 10	(G) Rice Cultivation	Assistant Agronomist, Farm Irrigation Div., Dept. of Agriculture
6. M.B. Thapa	1980 8	(G) Rice Cultivation	Assistant, Agriculture Information Officer, JADP
7. R.B. Thapa	1981 0.5	(I) Observation	Project Manager, Dept. of Agriculture, JADP
8. S.K. Subedi	1981 3	(G) Agricultural Statistics	Agricultural Planning Section, Dept. of Agriculture
9. C.B. Tamang	1981 2.5	(I) Audio-Visual Equipment	Junior Technician, JADP
10. D.N. Yadav	1981 3	(I) Agriculture Extension	Junior Technician, JADP
11. B.B.B. Singh	1982 3	(G) Agricultural Extension Service	Assistant, Agricultural Development Officer, JADP

Remarks: (G)...Group Training Course (I)...Individual Training Course

Annex VIII

ALLOCATION OF COUNTERPARTS & OTHER STAFF

Ranking	Gazetted Post			Non-Gazetted Post				Peon & Others	Total										
	I	II	III	Sub-total	I	II	III			IV	Sub-total								
No. of Staff	1	(2)	3	(2)	20	(6)	24	(1)	36	(10)	50	18	7	(11)	111	(2)	64	(17)	199

N.B.: () means vacant post.

BUDGET ALLOCATION

Unit: Rs. 1,000/-

	1. Approved Budget			2. Budget Expenditure			1/2 Ratio %		
	IMG	KRF	Total	IMG	KRF	Total	IMG	KRF	Total
79 - 80	1,476	8,515	9,991	1,436	1,854	3,289	97	22	33
80 - 81	1,779	8,054	9,831	1,853	2,867	4,720	104	36	48
81 - 82	2,200	12,586	14,786	2,102	4,960	7,062	96	39	48

II ネパール側延長要請書

MINISTRY OF FOREIGN AFFAIRS

His Majesty's Government of Nepal
Kathmandu



SEA/72-2/2456

The Ministry of Foreign Affairs, His Majesty's Government of Nepal presents its compliments to the Embassy of Japan in Kathmandu and has the honour to request the Government of Japan for the continuation of the present Agreement concerning technical co-operation for the Janakpur Zone Agricultural Development Project, for another three years from the date of expiry of the above agreement on November 6, 1982.

The Ministry of Foreign Affairs has further the honour to forward herewith a copy of the proposal prepared by the Ministry of Agriculture, His Majesty's Government of Nepal, and request the Embassy to be good enough to transmit the above request and the proposal to the competent authorities in Japan for the kind consideration of the Government of Japan.

The Ministry of Foreign Affairs, His Majesty's Government of Nepal avails itself of this opportunity to renew to the Embassy of Japan the assurances of its highest consideration.

March 30, 1982.

The Embassy of Japan,
Panipokhari,
Kathmandu.



His Majesty's Government's request to the
Government of Japan for the Extension of
Janakpur Zone Agricultural Development
Project

Ministry of Agriculture
HMG, Nepal.

March 1982.

Foreword

The Janakpur Zone Agricultural Development Project has been implemented for the past eleven years under the joint auspices of both His Majesty's Government of Nepal and the Government of Japan under the R/D of the First Phase (1971 - Nov. 1974), the Agreement of the Second Phase (Nov. 1974 - Nov. 1979) and the R/D of the Third Phase (Nov. 1979 - Nov. 1982).

During this period, various types of activities have been undertaken with the aim of increasing the income and uplifting the living standard of the farmers in the area, and actually they have attained a lot of achievements. Especially, during the period of the Second R/D in the Third Phase, the establishment of irrigated farming in Terai Plain, the introduction of the Shallow Tube-Well Programme under the Grant Aid by the Government of Japan for the purpose of increasing food production, the introduction of micro hydraulic generators for the purpose of agricultural development in the hilly area and the realization of the Grant Aid for the equipments for the construction of 39 km road connecting the Agricultural Development Project site to Sindhuli Sub-Centre which is the contact point between the Plain and the hilly areas have been done, and they have had great impact in the area.

In the field of the technical cooperation, the model farms in the five districts of the Plain under the Model Infrastructure Scheme of 1981 have greatly contributed to enhance the volition of the farmers toward agriculture, though it has not passed even one year since the completion of the construction. In the intensive irrigated farming area, the problem of inadequate water supply has been minimized with the use of pumps which were provided by the project.

It is the task of J.A.D.P. to utilize fully the physical facilities created so far, the Model Infrastructure Scheme and IAP scheme to the benefit of the farmers in the area as soon as possible. Thus, the need to extend the project for another three years.

The Japanese Experts and the staff of H.M.G. have made efforts in the training of able persons, development of appropriate technology, improvement in educational equipment, horticultural promotion programme, and so on.

The Ministry of Agriculture, HMG strongly hopes that these technical cooperation activities will definitely uplift the living standard of the farmers of the area and help solve the problem of food shortage in the Kingdom of Nepal.

Rationale for the Extension of the Project

This Project is a multi-purpose one as any other agricultural project. The eight years during the R/D of the First Phase and the Agreement of the Second Phase were the period of construction activities of the Project, and the Third Phase can be considered a period in which the technical cooperation was started on the farmers' level. Actually, the effective use of equipments procured under the Grant Aid and propagation of techniques which have been developed and established so far have been promoted during this period.

1. Activities of Training

1) Training of agricultural extension officers and technicians.

Training of personnel in order to make them able to grasp the various types of problems of the farmers and cope with them.

Methods:

Training under the curriculum jointly developed by the Department of Agriculture and J.A.D.P. All the trainees shall be accommodated in the facilities of J.A.D.P for intensive training.

2) Extension Works

Technicians who will finish the training shall be distributed in the spot area for the contact with Japanese experts and counterparts. And on the other hand, they are supposed to prepare the meeting halls for the farmers as well as promote cash crops and horticulture.

3) Frameworks of Training

Both the Japanese experts and counterparts are supposed to carry out activities under the same consciousness and fully understand that these activities aim at fostering of able counterparts.

II. Activities for Increasing Food Production.

1. The Shallow Tube-well Programme

The shipment of 1,000 pump sets and rig machines which started at the end of 1979 is supposed to be completed by March, 1983. The pumpsets which were provided under the First and Second programme are being distributed to the farmers.

Eighty wells were excavated up to now and this enables farmers to irrigate 7 ha. with one pump. Outgrowing from the rainfed farming means the stable agriculture and production increase in food in the granary of Nepal.

From now on, the emphasis should be placed on the digging of wells and training of technicians so that beautiful and productive field of more than 7,000 ha. can be formed by distribution of pumps to the farmers - they are eagerly waiting for the completion of wells - , and this contributes to the production increase in food. The shipment and distribution of equipments to the farmers are expected to be completed all in these three years according to this plan, both ^{by} JADP facilities and by using private contractors.

2. IAP Works

In the early stage, the J.A.D.P. tried to carry out the activities on the basis of deep wells in the intensive irrigated area in Janakpur Zone, but it could not meet the expectation of the Nepal side due to the shortage in counterparts and low volition of personnel in spite of the investment of time and equipments. It is an urgent task to set eight pump sets provided at the end of March, 1982, to increase the water amount and construct the water canals which have not completed yet. The agricultural extension officers who finish the training at J.A.D.P. shall take the charge of them as the activity for production increase in food, and the Japanese experts shall supervise their activities.

3. IF Activities

The Model Infrastructure Scheme started in 1981 for the purpose of the promotion of the Shallow Tube-well Programme for five districts, and the first planting will be completed by

farmers themselves in 1982. Extension officers shall be distributed to earnest farmers for the guidance on irrigated farming, water management and introduction of cropping pattern.

4. Credit facilities.

Necessary funds for credit to the farmers to purchase inputs will be provided through ADE/M under the project.

5. Development of Appropriate Technology.

To aim at the stable farming and production increase by human efforts while giving priority to the traditional farming pattern.

6. Horticultural Promotion

To aim at the promotion of fruit trees as cash crops for special product of Sindhuli and Ramechhap districts. Necessity of establishing a small-scaled project for storing and food processing will be executed.

7. Introduction of Micro Hydraulic Generators

According to the E/N for Grant Aid which was concluded in November, 1982, twenty-two micro hydraulic generators shall be provided mainly in hilly area. They shall be utilized for both generation of electricity and irrigation for increased food production. The assistance of J.A.D.P. shall be definitely needed not only for the selection of the places to be installed and effective use in the hilly areas but also to take active responsibilities to make their programme successful.

8. Compilation of Textbooks for Training

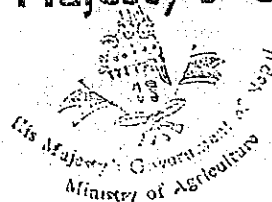
Since proper teaching materials were in shorage for training which aims at fostering of personnel and fruitful promotion of the Project so far, they have been compiled under the cooperation of J.O.C.V. this year. They shall be utilized effectively.

9. Aid for the Construction of Sindhuli Road

The Grant Aid for the Road was decided to be offered according to the E/A in 1982, and the Department of Road came to take the charge of the construction. But, J.A.D.P. shall be more benefited by this road, and the urgent construction is required for the further effective use of Sindhuli Sub-Centre.

III 果樹園芸プロジェクト要請書(非公式)

His Majesty's Government



Ministry of Agriculture
Singh Durbar
KATHMANDU, NEPAL.

Sept. 22, 1982.

Mr. Akira Kawamata
Team Leader
JADF Evaluation Team.

My dear Mr. Kawamata,

We are aware of the fact that your mission to this country is primarily meant for the purpose of evaluating the need for extension of the J.A.D.P. In the meantime, we would like to take this opportunity to request for your kind cooperation in forwarding the accompanying "Project Proposal for Horticultural Development in Nepal" to the concerned authorities in Japan for study and discussion, and eventually leading to a project formulation. We feel that horticultural crops have a great potential to help the poor and small farmers in Nepal to improve their economic standard. To this end, we have already started to launch a few of the horticultural production programmes in different pockets of the country. Any assistance from the Govt. of Japan to support the horticultural production programmes will go a long way in strengthening our efforts for horticultural development in Nepal.

With regards,

Yours sincerely,

(T.N. Pant)

Joint-Secretary (Planning)

Copy for information:

1. The Embassy of Japan to Nepal
Panipokhari, Kathmandu.
2. Japan International Cooperation Agency
Kathmandu Office,
Tahachal, Kathmandu.

A Proposal for
Horticultural Development
in Nepal



SEPT. 1982

A Proposal for Horticulture Development in Nepal.

The geographical area of the Kingdom of Nepal is 141,000 Square Kilometers. The snow-covered ranges of the Himalayas comprise a small portion of the kingdom along the northern border. This inhospitable regions as well as the middle hills are most typical areas of Nepal with a continual series of hills, covering more than three fourth of the country's land land surface. Some hills are incredibly steep. There are terraces upon terraces marching up the hillsides, and small villages and farming lands are formed on these hillsides and ridges. The southern part of the country which lies to the north of the Ganges plain is more or less a flat terai area. It is a subtropical zone and is situated at about 70 meters to 200 meters above the mean sea level. The population of Nepal is 15 million as per the 1981 census with a growth rate of 2.6 percent per annum. The rate of substantial economic growth is 4.1% during 1981-82 period. The national income per capita is US \$ 110 a year.

Nepal is a small, landlocked country shaped like a rectangle of approximately 800 Km long from east to west and 153 Km to 273 Km wide from South to North. The terrain changes from the glacier along the Tibetan border in the north to the flax jungles of the terai, barely 70 meters above mean sea-level. The country rises in several chains of hills running in an east-west direction finally terminating in the highest hills in the World - the Himalayas, including Mt. Everest 8848 meters. The country is, for the most part, covered with hills and mountains.

In fact, Nepal is known by its hills and more than two-third of the population live in the hills and these people have to sustain themselves in just less than one third of the total cultivated land of the country. Because of the difficult terrain on the hillsides, management of crop production is not so easy & so

the crop yield is also very low. In the past, considerable efforts have been made to raise crop production and productivity in Nepal, but a larger portion of the resources that have been utilised in Nepal for agricultural development have gone for building up the basic infrastructure and strengthening the food grain production activities in the terai regions of Nepal and the hill regions have a very negligible share of the resources so far invested for agricultural development in Nepal. Hitherto there has been a growing realisation that in order to have a balanced economic development of the country, the pace of development in the hill regions must be accelerated. Because of the low crop yield, the food grains produced in the hill regions are not enough to sustain the hill population, the crop production in the hills needs to be increased sufficiently by improving the crop management practices in order to meet the requirements of the hill population. This is an urgent and immediate need. Therefore, crop production programmes in the hill regions need to be considerably strengthened and the poor and helpless farmers in the hills need to be strongly supported in order to enable them to adopt better farming practices. In addition to crop production, the mid-hill regions of Nepal are very much suited to the growing of horticultural crops such as fruits, vegetables and spices. The horticultural crops give much greater economic returns from the land and will greatly help in increasing the purchasing power of the hill people. This will also help in improving the nutritional quality of their diet. Besides, the fruit trees planted over the hill sides will help conserve the soil and will also help in checking the deterioration of the hill environment.

Therefore horticultural development in the hill regions of Nepal has a great scope and can help the hill people to raise their cash income to a considerable extent. It is felt that top priority should be given to the production of horticultural crops all throughout the hill regions. The variation in altitude, topography and climate throughout the hill regions

provides an ideal condition for production of large number of horticultural crops.

In view of the above mentioned facts, a few of the horticultural programmes have been proposed for support with the assistance of the Government of Japan.

In order to carry out the horticultural development programs, a " Horticulture Development Project" should be formed at the national level. It should be the executive agency for implementing the programmes for horticultural development and it will provide all the support services to all the programmes undertaken by the project in order to achieve the following objectives:-

Main Objectives:

- i) Establish and implement the horticultural production programmes in suitable pockets of Nepal especially in the mid-hills.
- ii) Strengthen and enlarge the nursery plant production in order to meet the growing needs of horticultural development.
- iii) Strengthen the training facilities for the horticultural extension workers, technical officials and the cooperating farmers.
- iv) Establish and strengthen the marketing facilities at urban centres.
- v) Improve the horticultural development infrastructure in production areas in order to facilitate the implementation of the horticultural production programmes more effectively.
- vi) Establish processing facilities at suitable locations.

There are vast scopes for developing horticultural crops in the hill regions.

It is felt that the production of different horticultural crops needs to be accelerated in suitable pockets of the hill regions on commercial scales.

The following programmes have been suggested for consideration:-

i. Junar Production Programme in Sindhuli and Ramechhap districts.

Junar is the local name for sweet orange (*Citrus sinensis*, Osbeck). Sindhuli has been the traditional home for Junar production and in the past, Junar cultivation has been extended to Sindhuli and Ramechhap districts in a limited scale. Junar is a high quality orange and is in great demand in the country and has a great potential for export as well. Hence it is felt that production of Junar fruits in these two districts needs to be intensified on commercial scale.

HMG has also given special priority to expand the commercial production of junar in these two districts and accordingly by the end of 1982/83, plantation of 540 hectares of new junar orchards is expected to be completed, and it is recommended that its cultivation should further be expanded to an additional area of about 3000 hectares in a period of five years, as indicated in the following table.

		Junar Plantation					(Area in hectares).
Districts	1983/84	1984/84	1985/86	1986/87	1987/88	Total	
Sindhuli	600	300	300	300	300	1800	
Ramechhap	600	200	200	200	200	1400	
Total	1200	500	500	500	500	3900	

ii). Mandarin (Suntala) production programmes: Suntala (*Citrus reticulata*, Blanco) is a traditional citrus fruit which is in cultivation in an extensive scale throughout the midhill regions in Nepal. It has a very great commercial importance and there is an increasing demand for the fruit. Dolakha, Kavre Planchok and Sindhupalchok districts of the central regions of Nepal have a very great potential for expansion of mandarin production. These districts are contiguous to Kathmandu valley and have a network of well-developed transport system which will facilitate in the transport and marketing of the fruits produced in these area. It is suggested that in each district 1000 hectares of mandarin orchards should be established in a period of five years support should be

provided to strengthen the extension services in the areas so that the mandarin growers would get a strong technical and material support from the programme for production of high quality mandarin fruits.

- iii) Grape production programme:- Although grape growing is new to Nepal, certain drier regions in the Western Nepal have indicated a great promise for commercial production of grapes. HMG has given high priority developing the potentials of grape production in favourable locations of western Nepal and a programme for plantation of vineyards in Banke and Bardia in the western terai and Manang in the western high hills has already been launched for the last two years. It is felt that this programme should further be continued in order to enable the production of grapes to come up to a commercial scale.

Therefore the following programmes have been suggested:-

- (a) Table grape production in the Banke and Bardia districts of Western Nepal Terai. The plantation of vineyards should be expanded to 250 hectares in both districts in a period of five years.
- (b) Wine and Raisin grape production in the Manang district of the Western hills. The plantation of vineyards in this district should be expanded to an area of 120 hectares in a period of five years.

The year wise programme for expansion of vineyards is shown in the following table:-

Grape Production Programmes (Area in hectares)

Kinds of Grapes	Locations	1983/84	1984/85	1985/86	1986/87	1987/88	Tot
Table Grapes	(i) Banke	25	25	25	25	25	125
	(ii) Bardia	25	25	25	25	25	125
	Total	50	50	50	50	50	250
Wine and	Manang	10	20	30	30	30	120
		60	70	80	80	80	370

- iv.) Chestnut Production Programme:- This programme should be implemented in the hill sides around Kathmandu valley, Kakani and Daman. A preliminary trial with the chestnut varieties imported from Japan has shown a great promise for production of high quality large-size chestnuts. With this programme an area of 200 hectares should be planted with the improved varieties of chestnuts in these areas in a period of five years.
- v.) Kathmandu Valley fruit Production Programme:- The demand for different kinds of seasonal fruits in the Kathmandu markets are increasing very rapidly and much of the demand for fruits is met with imports from India. The Kathmandu valley and the adjoining areas have a congenial climatic condition for the production of pear, persimmon and stone fruits such as peaches, plums and apricots. So an intensive programme have been launched to increase the production of these fruits in these areas and it is suggested that an additional resources should be mobilized to cover over 500 hectares under these fruit crops in a period of five years.
- vi.) Horticultural farm at Sarlahi: This farm is located in Sarlahi district within the project area of JADP and is being supported by JADP for improving the strengthening the facilities for the production of tropical horticultural crops. Support for improving the working facilities and strengthening the production programmes of the farm has been felt very necessary. Hence this programme for the improvement of the

Horticultural farm at Nawalpur has been proposed.

This farm will be the main centre for the development of tropical horticultural crops and materials and technologies development at this farm will also be utilised to support the horticultural programmes in the lower valleys in the hill regions. It is proposed that in addition to general improvement of the working facilities in this farm effort should be made to strengthen the nursery production programme. A training centre should also be established to give practical training on Tropical horticulture to the cooperating farmers and extension workers.

Establishment of a processing factory in this farm is thought highly desirable as this factory can be instrumental in providing a strong support to the horticultural production programmes.

vii.) Horticulture Training Centre at Kirtipur:-

Horticultural operations are different from other general farming practices and the Nepalese farmers have little experience in handling most of the horticultural crops. Horticultural crops require special skill and the growers should have an intimate knowledge of the physiology of horticultural crops. Therefore, in order to carry out the horticultural production programmes successfully, it is highly necessary to conduct intensive training programmes to impart necessary skill and knowledge to the growers of the horticultural crops and the extension workers who are engaged in rendering technical services to the horticultural farmers. At present, the horticultural training component is very weak and

is very inadequately supported. Hence it is felt that a horticultural training centre should be established in the Horticultural Research Station at Kirtipur. It should have adequate accommodation for training facilities and should be well equipped with necessary teaching materials and equipments and should have a dormitory to accommodate about 50 persons at a time. The facilities for library and research laboratories should also be improved and strengthened in the Horticultural Research Station, Kirtipur so that technology development activities could effectively be carried out in order to support the horticultural production programmes.

viii.) Horticultural Services Centres:-

In order to improve the institutional support to the horticultural production programmes, establishing and strengthening of the Horticultural Services Centres at production areas should be taken up with priority. Depending on the size of areas in each production pocket, one or more horticultural services centres should be established. One centre can provide effective services to the participating farmers of about 500 hectares of orchards or vegetable fields. In each centre, one experienced Junior technician should be placed to supervise the programmes and provide the effective services to the participating growers. The centre will provide all technical and extension services to the participating

growers, help the growers to receive necessary inputs and credits in time and assist in the marketing of the produce as the orchards will come to fruiting. There should be a building in each centre for providing the accommodation to the J.T., a meeting room and a store room to store the agricultural inputs and equipments. This centre will be the main venue to provide two-way services to the farmers. One is the production services as mentioned above and the other will be such services to the farmers as to help them in disposing the harvests at a minimum time and insure a fair return to them. This centre will therefore be closely linked with the marketing centres which will be established in the area to provide strong support to the farmers for their marketing problems.

Marketing facilities for horticultural crops:-

Establishment of marketing facilities is a prerequisite for pushing ahead the horticultural development programmes. Horticultural crops, are, in general, very delicate and easily and quickly perishable. Once the crops are harvested, they need to be immediately disposed off. They can not be held in common stores for long period. Hence a well organised marketing infrastructure need to be developed and the facilities right from the collection of the horticultural produce from the growers fields through cleaning, grading, packing upto transporting to consumers markets should be established. To safeguard the producers' interest, facilities such as cold storage, processing factories should also be established at key points to relieve the markets from over supply during the peak seasons. A horticultural marketing intelligence system should also be developed and effectively enforced to facilitate the marketing of the horticultural produce at reasonable and competitive prices. It is proposed that the project should assist in establishing such marketing facilities in Nepal and at the moment it is felt necessary that market yards of moderate sizes should be constructed and the marketing of horticultural crops should be operated at six urban centres such as Kathmandu, Birgunj, Pokhara,

Janakpur, Biratnagar and Nepalgunj. The market yards should enclose well-accomodated operational sheds for daily transactions of the horticultural produce arrived from the production areas, store rooms, handling space, cold storage, offices and sufficient space for the movement of the transport vehicles. Based on local situations and experiences accumulated in other neighbouring countries, an effective system should be developed and enforced to run these market yards as smoothly as practically feasible. The main collection centre should be established in Sindhulimadi where junar fruits collected from different horticultural services centres of both Sindhuli and Ramechhap districts will be handled, that is, on arrival of the Junar fruits at the main collection centre, they will be cleaned, sorted, graded according to the sizes, packed in suitable packages or containers and then properly labelled according to the quality and grades of the fruits in the packages. At the collection centre, the sound, unblemished and quality fruits of proper sizes will be sorted and handled in series as described above before they will be transported to different market places, stockists or dealers. The culled fruits should be auctioned to the processing factories which will utilise them to manufacture suitable products.¹

At some later date when the junar plantations at both the districts will come to large scale production, it will be needed to have a juice concentrate plant established at Sindhulimadi. The installation of such processing plant should be taken up sometime on the fourth year of the project period.²

A similar collection centre should be established either in Banepa or in Panchkhal of the Kavre palanchok district to facilitate the handling and marketing of the mandarin oranges from Kavre, Sindhupalchok and Dolakha districts. The main collection centre should also be

highly necessary for Nepalgunj to help in handling and marketing of the grapes, in particular, produced in Banke and Bardia districts and other horticultural crops in general.

One fruit processing factory and a sizable cold storage should be established in the Horticultural Farm at Nawalpur, Sarlahi district to supplement the marketing of the horticultural crops and it is necessary to provide a safeguard to the producers against the risks of losses through spoilage and market gluts.

Other facilities:-

In order to implement the programmes of the proposed HD Project most effectively, the following facilities should also be supported so that the participating farmers get a strong support for their production activities.

1. In order to meet the requirements of the fruit plants for all the proposed horticultural programmes, the nursery production activities with each programme should greatly be strengthened. The Govt. nurseries and the farmers involved in the production of nursery plants should strongly be supported to enable them to produce good quality plants in numbers as required for the programmes.
2. In the hills of Sindhuli and Ramechhap at most places the road virtually does not exist and the people have to walk through the narrow field terraces and channel bunds. So in order to improve the mobility of the men and materials in the programme areas, the people should be encouraged to make service roads (atleast horse tracks) to connect the production areas and they should be assisted with necessary tools and equipments and some construction materials such as iron rods and cement.

3. Transport vehicles such as Jeeps, pickups, trucks, motor cycles, bicycles and horses (for the hills) will be needed for implementation of the proposed programmes.
4. In order to support the farmers in the hills in developing small irrigation systems from streams, and rivers for irrigating the orchards material help in terms of pipes, irrigation pumps, small dam making materials such as cement and iron rods should be made available to the farmers on easy terms.
5. Necessary equipments such as plant protection equipments, chemicals, Meteorological instruments, Radio Wireless sets for the programmes will be required.

Conclusion:-

In view of the need to strengthen the horticultural production programmes in Nepal and to build up a sound infrastructure which may enable the horticulture development activities to run smoothly and effectively so that horticulture could play a major role in contributing to the hill economy of Nepal, a few of the important horticultural production programmes have been conceived and tentatively proposed to be implemented by the Horticulture Development Project with the technical and financial assistance of the Govt. of Japan. It is just an indicative plan and further study is needed to examine the relevance of these programmes for horticultural development in Nepal and to work out the cost estimates to implement these programmes in full scales. It is recommended that a team of experts may be invited from the Govt. of Japan to study the relevance of these programmes for horticultural development in Nepal and help in formulation of detailed programmes and cost estimates.

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