

## 参 考 資 料

- No. 1 Summary Report on the Economic Survey for the Horticultural Development Project in Nepal
- No. 2 A Proposal for Horticultural Development in Nepal
- No. 3 ネパール園芸開発プロジェクトのマスタープラン  
(近藤長期調査員の報告に基づき修正されたもの)
- No. 4 ネパールの地域区分と地域開発計画の区域区分



June 6, 1985.

To:  
Mr. P. N. Rana  
Act. Secretary  
Ministry of Agriculture  
HMG/Nepal.

Dear Sir,

A new agricultural technical cooperation programme for the horticulture development in Nepal is now under progress between the authorities concerned of Nepal and Japan. And Horticulture Development Center, which will be planned to construct in Kirtipur under the Japanese Grant aid programme, will be used as a core facility for this project. This Technical Cooperation Project will be in start after The Record of Discussion is finalized between both sides.

Proceeding to the realization of The Project, Japan International Cooperation Agency (JICA) dispatched myself, Chiyoshi Owaki (Staff Researcher-Agro Economist, Rural Development Planning Commission) from 30th April, 1985 to 10th June, 1985 to make economic survey of fruit production in Nepal.

During my stay in Nepal, I could visit various concerned Organizations, regions, markets (wholesalers & retailers), fruit processing factories, and could meet farmers also with the ample chance of exchanging views with them. I had a good time to hear about the economic condition of fruit production in the kingdom of Nepal. The detailed schedule is attached herewith.

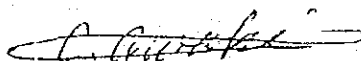
I am pleased to report you about successful completion of my survey. I would like to take an opportunity to express my heartfelt thanks to all the concerned persons, organizations and farmers who really cooperated to me to smoothen survey, especially, I express my deep gratefulness to smart counterpart, Mr. K. B. Shrestha for his valuable help and dedication.

After my return to Japan, I'll make report to JICA about my survey results, referring of survey report of other technical experts. I feel and await my survey and study may contribute to the smooth realization and progress of Horticulture Development Project. To understand the present situation of the fruit production, its distribution & processing prior to the development of the project, is essential for the evaluation of the project later on.

The outcome of my study I did in limited time is submitted herewith in a short report form.

With regards,

Yours Sincerely,



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Chiyoshi Owaki  
Expert on Economic Survey for  
The Horticulture Development  
Project-Nepal

C.C.

Embassy of Japan  
Kathmandu.  
JICA in Nepal.

SUMMARY REPORT  
ON  
THE ECONOMIC SURVEY  
FOR THE HORTICULTURAL DEVELOPMENT PROJECT IN NEPAL

by  
Chiyoshi Owaki  
Expert Agro-economist  
dispatched by JICA

(April 30 to June 10, 1985)

## 1. Importance of Horticulture Development

The 1980/81 statistics reveals that the total land under cultivation for fruit production is not more than 43,200 ha, just less than 0.8% of total arable land, and total fruit production (1980/81) is equivalent to Rs. 1167.68 million contributing 10% to total agricultural output. Most of the fruits are tropical fruits like mango, banana etc.

The importance of horticulture development in Nepal has increased tremendously in the recent years, due to following factors. The promotion and increase of fruit production especially in mid-hill area is one of the strategic measures for the agricultural development and thereby the rural development of Nepal.

- (a) With the increase in the knowledge about nutrition value of fruits, the greater number of population will start to consume the fruits.
- (b) In the total household expenditure, the amount spent in fruits and vegetables holds 6 to 10% of total which shows the encouraging trend in increasing consumption of fruits and vegetables.
- (c) Nepal Rastra Bank's urban consumer price index shows the spectacular rise of fruit and vegetable price index compared with other consumer goods. This is partly due to the insufficient supply of fruits in the main market area.

2. Justification for the major fruits-- the main objects of production under the project

Under this Horticulture Development Project, the production promotion of junar in Sindhuli and Ramechhap, grapes in Banke and Bardia and chestnut in Kathmandu (Kakani hill and surrounding) has been planned. These fruit crops has been considered as the promising products for the increase of income of local farmers and thereby the regional development of the country.

1) Junar

- a) Junar (orange) and suntala (mandarin) are the typical citrus fruits of Nepal.
- b) Suntala is mostly grown in the hilly area of Nepal (in the altitude of 800-1300m) and it is a very popular type of fruit.
- c) On the other hand, junar is indigenous variety of Nepal, but not grown in neighbouring countries at all. At present, it is being produced on a limited scale in small area of the country. It is very much similar to sunkist orange but quite high in market price. So, because of limited production, very few affordable people and the people who visit the production site could only enjoy the test of Junar. But recently, junar has started to be a familiar fruit among the Nepalese leading to the expanding demand and market.

- d) With specialities like sweet taste, juicy in nature and easiness to store make junar more competitive than mosambi that are imported from India at present.
- e) The marketing of junar can be thought of not only in Nepal's domestic market but also in Indian and other markets.
- f) At present (1985) in Sindhuli and Ramechhap the approximate area under junar is 342 ha. with the total 100,000 junar trees.

## 2) Grape

- a) Nepal could pay little attention to the horticulture development due to heavy concentration in the food grain production till now. So production of <sup>temperate</sup> fruits is almost negligible/especially fruits like table grapes.
- b) The little grapes we sometimes find in the markets of Pokhara, Nepalgunj, Birgunj and Janakpur are all imported from the neighbouring countries like India, Pakistan, and Iran. These grapes are being sold in higher prices inspite of its low taste and lacking freshness.
- c) But , in Nepal also the production of grapes and development of grape area has already been identified and initiated with the joint efforts of Japanese technical expert and concerned agricultural research station of Nepal. Now, few farmers in Banke and Bardia have started the production of grapes.



- d) In Nepal, grapes are still considered as the high standard fruit. At present, the Indian grapes are sold in the market with Rs. 30 to 40 per Kg, but the farmers assert that they can get profits if they will be able to sell at a rate of Rs. 15 to 20/kg.
- e) The expansion of production of grapes is not only contributing to a import substitution but it will be able to a exportable item to Indian markets. Especially, the varieties of high quality like Kyoho and Olympia and other Japanese cultivars of big berries which are not produced by neighbouring countries, can get not only big export market but also good prospect of domestic demand by hotels in tourism sector.
- f) In Banke and Bardia, the cultivation of grape has been started. The total area used for grape cultivation in Banke district is estimated to be 30 ha and in Bardia district: 28 ha, totalling to 60 ha approximately. If we include the dispersed cultivation by individual farmers, the total area under grape cultivation goes to approximately 90 ha.
- g) Both Banke and Bardia district are commercially suitable for grape production because of the fact that both the districts are accessible from

Kathmandu market. To Kathmandu by truck it takes about 10 hrs. But after the completion of road under construction now, will shorten this transportation time definitely.

- h) Since the grape is a new fruit crop to Nepalese farmers, to familiarize them with cultivation methods and to expand the area for grape cultivation, they are to be trained the basic cultivation technology, and about the popularization methods. Besides, they are to be educated on packing, storage and processing of grapes. The marketing system of grapes should also be institutionalized. Thus, the grape growers are to be supported with the general technical instructions and timely advices in grape cultivation.

### 3) Chestnut

- 1. Chestnut has great marketing prospect because of following reasons:
  - a) Chestnut tree starts to bear fruit comparatively earlier than the other fruits and the cultivation technique is not so difficult.
  - b) It grows even in the low fertile land and in the steep slopes and thus can help to control the surface soil erosion.
  - c) The transportation of chestnut is rather easier in the sense that it is not easily perishable fruit and thus, can be transported from far away and remote places of poor transport facilities. Besides, since chestnut can be stored for a quite long period it can be used as food for emergency period in the hills.

d) Chestnut has got religious value also traditionally in Nepal. During the biggest festival of Tihar (The Brother's Day), the chestnut is one of the essential ingredients for Nepalese. It also suggests that the domestic market prospect is quite high since Nepalese has the tradition of eating wild chestnut.

e) Trimmed branches of chestnut can be a good fuel source.

f) The fallen leaves are used as a good compost and it increase the fertility of soil.

2. Not only the chestnut is the good food material as such, depending on the method of processing, it can be used as good material for the preparation of different varieties of sweets and confectionaries as well.

### 3. Diversification of Agriculture and Promotion of Fruit Production

a) The introduction of fruits like Junar, grape and chestnut in new area, will never affect adversely in the cultivation and productivity of traditional harvest of cereals, pulses etc. it will contribute to the increase of those production as a whole.

b) Since these fruits are completely new to the farmers, they may have little knowledge about technology and sound technology has not been established yet in the region. So the cultivators of these fruits should be given sufficient guidance and advices on pruning, grafting, manuring, pesticide use etc.

c) With the introduction of new intensive cultivation of fruits in the land of existing practice of mono-cropping, the benefit of mixed-cropping and inter-cropping can increase the

production of per unit area of land including the food grain production also.

The cultivation of these fruits can help :

1. Increment in the whole agricultural production of the country.
2. Increase in the land use ratio.
3. Expansion of job opportunities.
4. Increase in the cash income of farmers.
5. Establishment of new agro-based industries.

d) The fruit cultivation in general requires the intensive management practices and it will also have favourable effect to other crop cultivation being subject to intensive management practices. In this regard, both the grains and fruits are inter-dependent in their relationship. Inter-cropping and mixed-cropping without hampering the existing crops will expand the fruit production. Besides, the irrigation facilities for fruit cultivation will help side-by-side for the more intensive cultivation.

#### 4. Promotion of accessibility of the agricultural products to the market

a) The market structure for fruits in Nepal has not yet been institutionalized. Because of the lack of transportation system, the access to the market from the production area is very difficult and in practice, the products have to be consumed in the production area.

Thus, Nepal lacks economic interdependence and economic integration within the country itself, each production area taking the form of 'pocket economy' mainly due to

lack of transport facilities.

- b) This situation has been a big bottleneck to the commercial production of agricultural crops and fruits in particular.
- c) But in case of The Project area - Sindhuli, Ramechhap; surrounding area of Kathmandu; and Banke and Bardia, although the improvement in the existing road system is needed, the problem of access to the market place does not exist as such.
- d) In case of Sindhuli, the Sindhuli Road - link road to Mahendra Rajmarga is already under construction under Japanese grant aid. So the production of Junar of this area can get commercial value after transporting to near-by market. It will, ultimately contribute to the agricultural development of the country thereby promoting the income generating opportunities to the farmers.

#### 5. Others

For the successful fruit cultivation and production and for smooth distribution up to consumers, the following points should be emphasized together with the research and training on basic techniques of fruit cultivation.

- a) First of all, the land improvement such as making the terraces in the slopes, is a prerequisite for the mechanization of farms and also to reduce the soil erosion.
- b) With the extreme climate during dry season and monsoon, the land for fruit cultivation should be provided with the adequate irrigation facilities

as one of the basic needs.

- c) The improved road network will help to decrease the transportation cost of the agricultural products, reducing the transporting time, economizing the fuel, decreasing the damage of products during transportation and increasing the real volume of total transported amount.
- d) The lack of proper storage and processing facility greatly damages the products before it reaches to the market. Especially when the production area is quite far from the market place, the establishment of storage and processing facilities in the production area itself is rather advisable so that they can be transported to the market in the processed form. For example, in case of junar, the production amount seems to be increasing. Therefore, the establishment of storage and processing facility in the production area is quite important.
- e) Institutionalization of the marketing system is another important factor. Increase in the amount of production leads to increasing supply to the consumer's markets. Since the production is scattered among the individual farmers, it should be collected in a place like a collection center and should be transported with a appropriate volume at a time. For this, concept of "group marketing" comes in. The fruit growers will have to form a co-operative organization for channelization of marketing and should decide the proper place as collection center

and trading centers including wholesale market facilities of fruits:

Area and No. of trees (1984/85) of junar and grape in proposed project districts

|                        | Junar |         |       | Grape |        |       |
|------------------------|-------|---------|-------|-------|--------|-------|
|                        | Sindh | Rapecha | Total | Banke | Bardia | Total |
| Planted Area<br>(ha)   | 205   | 137     | 342   | 30    | 28     | 58    |
| No. of trees<br>('000) | 61.0  | 41.0    | 102.0 | 8.4   | 7.8    | 16.2  |

Schedule of Mr. C. Owaki, 1985

(The Economic Survey for the Horticultural Development Project in Nepal)

| Date     | Day       | Place     | Details of Study   |
|----------|-----------|-----------|--|
| April 30 | Tuesday   | Tokyo     | Leave Tokyo  |
| May 01   | Wednesday | Kathmandu | Arrival at Kathmandu   |
| " 02     | Thursday  | Kathmandu | Meeting with Chief of Fruit Development Division, and making detailed schedule.  |
| " 03     | Friday    | Kathmandu | Courtesy call on to Mr. Secretary of Ministry of Agriculture<br>Meeting with Director General, Department of Agriculture   |
| " 04     | Saturday  | Kathmandu | Rest (Holiday)   |
| " 05     | Sunday    | Kathmandu | Meeting with Director General, Department of Food and Agriculture Marketing Services<br>Central Bureau of Statistics   |
| " 06     | Monday    | Kathmandu | Meeting with General Manager of Agricultural Development Bank, Nepal<br>Meeting with senior Horticulturist of Agricultural Project Services Centre, Nepal<br>Regional Director of Regional Directorate of Agriculture Centre Region, Kathmandu |
| " 07     | Tuesday   | Kathmandu | Wholesale and Retail markets of fruits in Kathmandu  |
| " 08     | Wednesday | Kathmandu | Fruit Processing (Pvt) Plant, Kirtipur<br>Food Research Laboratory, HMG  |
| " 09     | Thursday  | Kathmandu | Visit to Horticulture Farm, Kakani   |
| " 10     | Friday    | Kathmandu | Visit to Hort. Research Centre Kirtipur, and Department of Agricultural Marketing Services<br>Compiling report   |
| " 11     | Saturday  | Kathmandu | Rest   |



| Date   | Day       | Place     | Details of Study   |
|--------|-----------|-----------|--|
| May 12 | Sunday    | Kathmadnu | Leave Kathmandu for Janakpur   |
| " 13   | Monday    | Janakpur  | Leave JADP for Sindhuli Agriculture Farm   |
| " 14   | Tuesday   | Sindhuli  | Study trek to Nakajhole Junar producing area   |
| " 15   | Wednesday | "         | Nakajhole to Sindhuli and Janakpur (JADP)<br>Visit to Hardinath Farm, Agriculture tool Factory (Pvt), Janakpur fruit market              |
| " 16   | Thursday  | Janakpur  | Arrival to Kathmandu   |
| " 17   | Friday    | Kathmandu | Compiling report   |
| " 18   | Saturday  | "         | Rest   |
| " 19   | Sunday    | "         | Leave to Nepalganj<br>Visit to Hort. Farm, ADO   |
| " 20   | Monday    | Nepalganj | Visit to the grape growers'  |
| " 21   | Tuesday   | Bardiā    | Visit to grape growers   |
| " 22   | Wednesday | Nepalganj | Arrival at Kathmandu   |
| " 23   | Thursday  | Kathmandu | Compiling the reports  |
| " 24   | Friday    | "         | Visit to Fruit Development Div., Kirtipur  |
| " 25   | Saturday  | "         | Rest   |
| " 26   | Sunday    | "         | Visit to the fruit growers and Agriculture Development office in Kathmandu   |
| " 27   | Monday    | "         | Visit to the fruit growers in Lalitpur District and ADO, Lalitpur  |
| " 28   | Tuesday   | "         | Visit to the fruit growers in Bhaktapur District and ADO, Bhaktapur  |
| " 29   | Wednesday | "         | Visit to Fruit Development Division, Kirtipur and compiling the report   |
| " 30   | Thursday  | "         | Visit to Cooperative Department, Nepal Rastra (National) Bank, Department of Food and Agriculture Marketing Services<br>Compiling report |
| " 31   | Friday    | "         | Compiling report   |

| Date    | Day       | Place     | Details of Study                                 |
|---------|-----------|-----------|--|
| June 01 | Saturday  | Kathmandu | Rest, Compiling report                           |
| " 02    | Sunday    | "         | Compiling report                                 |
| " 03    | Monday    | "         | Discussion at Kirtipur                           |
| " 04    | Tuesday   | "         | Discussion at Kirtipur                           |
| " 05    | Wednesday | "         | Discussion at Department of Agriculture          |
| " 06    | Thursday  | "         | Report to Mr. Secretary, Ministry of Agriculture |
| " 07    | Friday    | "         | Report to Embassy and JICA                       |
| " 08    | Saturday  | "         | Rest   |
| " 09    | Sunday    | "         | Leave Kathmandu for Tokyo                        |
| " 10    | Monday    | Bangkok   | Arrival at Tokyo                                 |

Name List of Official Concerned

Mr. P. N. Rana . Secretary, Ministry of Agriculture

Mr. K. B. Rajbhandary Senior Agricultural Advisor, Ministry  
of Agriculture

Mr. P.P. Gorkhali Director General, Dept. of Agriculture

Mr. A.M. Pradhanang Deputy Director General (Crop Science)  
Dept. of Agriculture

Mr. H.P. Gurung Deputy Director General in charge of  
Horticulture and Fisheries Development,  
Dept. of Agriculture

Mr. P.P. Shrestha Chief Pomologist  
Fruit Development Div., Dept. of  
Agriculture

Mr. Jai N. Rana Horticulturist, (Farm Manager)  
Horticulture Research Station, Kirtipur

Mr. K.B. Shrestha Counterpart  
Farm Manager, Horticultural Farm, Daman.

|                           |  |
|---------------------------|--|
| Mr. Srikrishna Upadyaya   | Chairman and General Manager<br>A.D.B Nepal  |
| Miss Sadhana Sharma       | Act.Chief, Food Research Laboratory  |
| Mr. C.P. Sharma           | Assistant, Project In-Charge<br>Agricultural Census, Census<br>Beauraw of Statistics.                    |
| Mr. P.L.Chitrakar         | Agricultural Office,<br>Regional Directorates of<br>Agriculture, Kathmandu<br>(Act.Regional Director)    |
| Mr. Khalil Miyan          | Senior Horticultural Specialist,<br>Agricultural Projects Services<br>Center (APRSOC)                    |
| Dr. P.B. Mathema          | Director General, Department of<br>Food and Agricultural Marketing<br>Services, Ministry of Agriculture. |
| Mr. Rameswar Lal Shrestha | Division Chief, Agricultural<br>Statistics Division, DFAMS   |
| Mr. Narayan Das Joshi     | Farm Manager, Agricultural Farm,<br>Kakani, District, Nuwakot.   |

|                             |  |
|-----------------------------|--|
| Mr. S. Birendra Bikram Shah | Horticulturist, Project Manager,<br>HMG/Nepal Janakpur Zone<br>Agricultural Development Project,<br>Nakatajhij, Janakpur |
| Mr. Kenro Ezaki             | Team Leader, Japanese Expert J.A.D.P   |
| Mr. Yasumasa Oizumi         | Planning Extension Officer,<br>Japanese Expert, J.A.D.P.   |
| Mr. Bhairab Raj Kaini       | Farm Manager, Sindhuli Agricultural<br>Farm, J.A.D.P.  |
| Mr. K.B. Neupane            | Agricultural Development Officer,<br>Agriculture Development Office,<br>Sindhuli   |
| Mr. Raj Bahadur Shrestha    | Chief Research Coordinator,<br>Agricultural Research Station,<br>Nepalgunj, District Banke.                              |
| Mr. Ranga Nath Joshi        | Horticulturist, Farm Manager<br>Hort. Unit, Agricultural Research<br>Station, Nepalgunj, District Banke.                 |
| Mr. Khalid Ahmad Khan       | Agricultural Development Officer<br>A. D. O., Banke  |
| Mr. Gorakh Prasad Chaudhary | Asstt. Agricultural Development<br>Officer, A. D. O., Banke.   |

Mr. Madhu Sudan Kharel J.T. Horticulture Farm,  
Agri. Research Station,  
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Mr. Anand Bahadur Manandhar Agricultural Development Officer,  
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Mr. Dharendra Karki Asst. A.D.O., Kathmandu

Mr. Y.B. Basnet Asst. Agricultural Development  
Officer  
A.D.O., Lalitpur

Mr. Nim Bahadur Adhikari Agricultural Development Officer  
A.D.O., Bhaktapur

Mr. Jeet Bahadur Subarnakar Asstt. A.D.O., Bhaktapur

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Map of Kathmandu Valley

Kathmandu City (Map)

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A Proposal for Horticultural Development in Nepal

February, 1984.

## A Proposal for Horticultural Development in Nepal.

### General Introduction

Nepal, with 141 thousand sq. km is a landlocked country shaped like a rectangle of approximately 800 km long 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 plains of the terai (70 meters above near sea level). The country rises in several chains of hills running in an east-west direction finally terminating in the Himalayas, including Sagarmatha (Mt. Everest) 8848 meters. Three-fourth of country is covered with hills and mountains with temperate to tundra type of climate. It is only the southern part of the country which lies north of the Gangetic plain is more or less a flat plain areas. 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 annual rate of economic growth is 2.1% at constant prices during 1970-81 period. The per capita income is estimated to be US \$ 150 in 1981.

The 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. The 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 maintaining the ecological balance in the hill environment. On the other hand fruit development programme in the terai has also both economic and nutritional importance.

In view of the above mentioned fact His Majesty's Government of Nepal (HMG/N) is keen to encourage horticultural development programme in Nepal. Horticultural development programme both for tropical and temperate regions have been proposed for support with the assistance of the Government of Japan and EEC. It is also proposed that the programme for tropical fruits

development be undertaken with the assistance from EEC and the programme for temperate fruits development from Japanese assistance. The project duration is envisaged to be of 5 years. The total investment of the project is estimated to be 15 million US dollars.

Horticultural Development Division of the Department of Agriculture would be the executing agency for implementing these programmes and will provide supporting services to all 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 both in terai for tropical fruits and in the mid-hills for temperate fruits.
- II. Strengthen and enlarge the nursery plant production in order to meet the growing needs of horticultural development.
- III. Strengthen the research and training facilities at Sarlahi and Kirtipur horticultural farms.
- IV. Establish and strengthen the marketing facilities at urban centres.
- V. Improve the horticultural development infrastructures 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 Kingdom. It is felt that the production of different horticultural crops needs to be accelerated in suitable pockets of the Terai and the hill regions on commercial scales. Though detailed programmes for this have to be worked out yet following are some of the programmes suggested for consideration.

1. Temperate fruits development programmes in Illam, Dhankuta, Dolakha, Kavre, Sindhuli, Ramechhap, Dhading, Gorkha, Tanahu, Kaski, Syanja districts.
2. Tropical fruits development programmes in the Terai districts of Mechi, Kosi, Sagarmatha, Janakpur, Narayani and Lumbini zones.
3. Grapes production programmes in Banke, Bardia and Manang districts.
4. Kathmandu valley fruits production programme.

The districts are potential for the production of the specified fruits due to their geo-climatic suitability and favourable location as they are nearer to the major market centres. Production of these fruits would be encouraged mainly for import substitution. However citrus (oranges) would be expected to be for export in later years when the production exceeds the domestic demand.

1. Temperate fruits development programmes under Japanese Grant Assistance would include.

A. Junar production programme in Sindhuli and Ramechhap districts.

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 has been felt that production of Junar fruits in these two districts needs to be intensified on commercial scale. It is recommended that its cultivation should further be expanded to an additional area of about 3000 hectares in a period of five years.

B. Mandarin (Suntala) production programme in the earlier mentioned mid-hill districts of Nepal.

Mandarin is a traditional citrus fruit which is cultivated in an extensive scale throughout the mid-hill regions in Nepal. It has a very great commercial importance and there is an increasing demand for the fruit. It is suggested that about 5000 hectares of mandarin orchards should be established in a period of five years and 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.

C. Grape production programme:

Grape growing is new to Nepal, however certain drier regions in the Western Nepal have indicated a great promise for commercial production of grapes. HMG/N has given high priority developing the potentials of grape production in favourable locations 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. The plantation of vineyards in Banke and Bardiya districts should be expanded to 200 hectares in a period of five years and plantation of vineyard in Manang district should be expanded to an area 120 hectares in a period of five years.

D. Chestnut production programme:

A preliminary trial with the chestnut varieties imported from Japan has shown a great promise for production of high quality large size chestnuts. This chestnut production programme should cover an area of 200 hectares in a period of five years.

E. Walnut production programme:

This programme should also be included for cultivating in the mid-hill region as walnut is a high value low volume fruit having a strong export potentiality. It should cover an area of about 150 hectares in a period of five years.

F. Kathmandu Valley fruit production programme:

The demand for different kinds of seasonal fruits in the Kathmandu markets is increasing very rapidly and much of the demand for fruits is met with imports from India. The Kathmandu valley and adjoining areas have a congenial climatic condition for the production of pear, persimon 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 1500 hectares under these fruit crops in a period of five years.

G. Strengthening Horticultural farm at Sarlahi:

This farm is located in Sarlahi district and is being supported by JADP for strengthening the facilities for the production of tropical horticultural crops. Support for improving the working facilities for research, training and development and strengthening the production programmes of the farm has been felt very necessary.

H. Horticulture Training and Research Centre at Kirtipur, Pokhara and Dhankuta.

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 various research programmes and 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 horticultural training centres should be established in the Horticultural Research Stations at Kirtipur, Pokhara and Dhankuta. It should have adequate accommodation for training facilities and should be well equipped with necessary teaching materials and equipment 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 Stations Kirtipur, Pokhara and Dhankuta so that technology development activities could effectively be carried out in order to support the horticultural production programmes at the national level. This component would be suggested to be financed under the Japanese grant.

#### I. Improvement of tracks and trails at Sindhuli and Ramechhap

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 mobility of the men and materials in the programme areas the people should be encouraged to make service roads (at least horse tracks) to connect the production areas and they should be assisted with necessary tools and equipment and some construction materials such as iron rods and cement. Japanese Grant should be made available for this activity.

#### J. Development of Small Irrigation System

In order to support the farmers in the hills for developing small irrigation system from streams and rivers for irrigating the orchards material help in terms of pipes, irrigation pumps, small dam making material: such as cement and iron rods should be made available to the farmers on easy terms. Japanese Grant should be utilized for this activity.

### 2. Tropical fruit production under EEC assistance.

#### A. Mango, Litchi, Banana, Pineapple production programme .

These are traditional tropical fruits cultivated in an extensive scale throughout the terai regions of Nepal. Commercial importance of these fruits is extensive and there is increasing demand for these fruits. It is suggested that additional resources should be mobilized to cover considerable area under these fruit crops. About 10,000 hectares under these fruits can be covered during the project period.

## B. Cashewnut production programme

Cashewnut is a high value tropical fruit. With wide ranging climatic conditions in terai region, it is likely that this fruit can be economically grown in some pockets of this region. This fruit is being imported in the Kingdom in a large scale to meet the local demand. Hence to meet the local demand as well as to export, it is a highly necessary to consider developing this fruit in the country itself as a cash crop. In this regard it may as well need some preliminary trials.

## C. Strengthening Horticultural farm at Sarlahi

Supplemental assistance for the strengthening of the horticultural farm at Sarlahi has been proposed under EEC grant. 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.

## 3. Programmes suggested to be jointly undertaken by Japanese Grant Assistance and EEC Assistance.

### A. 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 would 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 JT., 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 needs. Finance for these centres would be made available through Japanese grant in the hills and through EEC grant in the Tarai.

B. 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 perishable. Once the crops are harvested, they need to be immediately disposed off. They can not be stored in common stores for a 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, gading, 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 various 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 brought from the production areas, store rooms, handling space, cold storage, offices and sufficient space for the movement of the transport vehicles. Based on local situation 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. One main collection



centre would 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, stored, graded according to the size, 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, stockist or dealers. The culled fruits should be auctioned to the processing factories which will utilise them to manufacture suitable products. At some later date when the junar plantations at both the district 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 in the fourth year of the project period. Financing for the market yards in the Tarai would be done by EEC Grant and for the processing plant be done by the Japanese Grant. 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. One 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. The finance for this activity is suggested to be made jointly through EEC and Japanese grant.

C. Processing plant and Cold Storage Facilities at Sarlahi.

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 risk of losses through spoilage and market gluts. It is proposed that this plant be financed jointly under EEC and Japanese Government assistance.

D. Other facilities:

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

- i. 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. This should be financed jointly.
- ii. Transport vehicles such as Jeeps, Pickups, Trucks, Motor cycles, Bicycles and Horses (for the hills) will be needed for implementation of the proposed programmes. Joint finance is requested for this, Detail has to be worked out.
- iii. Necessary equipments such as plant protection equipments, chemicals, Meteorological instruments, Radio Wireless sets for the programmes will be required. Joint finance is requested. Detailed has to be worked out.

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 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 and the EEC. 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 sent from the Govt. of Japan to study relevance of these programmes for temperate fruits development in Nepal and help in formulation of detailed programmes and cost estimates. For the tropical fruits development, a Nepalese consulting firm (Agricultural Project Services Center) be engaged by the EEC. The cost of formulating the project is estimated to be 50,000 U.S.dollars.

Tentative Cost Estimate of the Project

Amount: US dollar

A. Japanese Grant Assistance for temperate fruits

B. EEC Assistance for Tropical fruits

Kirtipur, Pokhara, Dhankuta

Tarahara, Sarlahi, Banke

| <u>Components</u>                            | <u>Amount</u>    | <u>Amount</u>    |
|--|------------------|------------------|
| 1. Infrastructures including glass rooms     |                  |                  |
| a. Training Services                         | 3,00,000.        | 3,00,000         |
| b. Research Centres                          | 4,00,000         | 4,00,000         |
| 2. Equipment including lab.                  | 2,00,000         | 2,00,000         |
| 3. Processing Plant                          | 12,00,000        | 12,00,000        |
| 4. Cold Storage                              | 5,00,000         | 5,00,000         |
| 5. Extension Services                        | 4,00,000         | 4,00,000         |
| 6. Credits                                   | 9,00,000         | 9,00,000         |
| 7. Manpower                                  | 4,00,000         | 4,00,000         |
| 8. Vehicles, Machineries                     | 2,50,000         | 2,50,000         |
| 9. Support Services and Production marketing | 2,50,000         | 2,50,000.        |
| 10. Contingency                              | 3,00,000         | 3,00,000         |
|  | <u>50,00,000</u> | <u>50,00,000</u> |

The above tentative cost estimate of the project does not include the technical assistance in the form of expatriate and overseas training for the technical personnels of the project.

Also because of local cost constraint developmental programmes are usually hampered. Hence the incremental salaries and other expenses needed to run the programmes will be met by the Grant Assistance. However, existing facilities and salaries for the existing manpower will be borne by the Government and are not included here.

ネパール園芸開発プロジェクトのマスタープラン  
(近藤長期調査員の報告に基づき修正されたもの)

基本計画

1. 目的 ネパール山間丘陵地帯における農家経営の多角化により、農家所得の増大と国民栄養の改善に寄与することを目的として、同地帯に適した温帯果樹に関し、品種の改善と栽培技術の開発・確立等を行うため、適品種選抜・果樹増殖・栽培管理・病虫害防除等の技術開発を実施し、あわせて果樹技術者の育成のため研修を行う。さらにサブセンターにおいては、苗木の試験的増殖及び栽培展示を行う。
2. プロジェクトの担当機関：農業省
3. プロジェクトの実施機関：プロジェクトセンター（キルティプール園芸試験場）
  - ：サブセンター……シンドゥリ（柑橘）、ネパールガンジ（ブドウ）
  - ：巡回指導先……カカニ、ナカタジ
4. 協力期間：5年間
5. 対象作物：柑橘及びぶどうを主たる対象とし、その他有望果樹について行う。  
(クリが有望)
6. 協力分野：
  - (1) プロジェクトセンター；カウンターパートを通じて次の事項の技術開発を行うとともに、研修について指導助言を行う。さらにぶどうの振興をはかるためデモファームを設置する。  
〔果樹技術開発〕
    - ① 果樹導入と適品種選抜
    - ② 苗木増殖技術
    - ③ 果樹栽培技術
    - ④ 病虫害防除技術
    - ⑤ 土壌及び作物栄養
 〔研修広報〕
    - ① 果樹技術者の訓練（長期・短期）
    - ② 広報活動
  - (2) サブセンター；栽培適地において、現地適応試験及び適品種苗の試験的増殖の指導助言を行う。さらに、振興をはかるためデモファームを設置する。
  - (3) 巡回指導先
    - ① カカニ園芸試験場（クリ栽培適地）
    - ② ナカタジブドウ園（ネパール農業開発プロジェクトのブドウ園）
  - (4) デモンストレーションファーム；センターで開発された技術の実証試験、普及技術開発を行い、これを通じ農家への普及、農家からのフィードバックを図る。
    - ① センター付近 大規模 1ヶ所他（ブドウ 他）
    - ② シンドゥリサブセンター付近 小規模 2ヶ所（柑橘）
    - ③ ネパールガンジサブセンター付近 “ 1ヶ所（ブドウ）

## 7. 協力の方式

プロジェクト方式による専門家派遣、研修員受入れ及び機材供与の3本柱で行う。

### (1) プロジェクトセンター

- ① 長期・短期専門家による技術開発のための技術移転及び研修に係る指導助言
- ② 研修員(長期・短期・視察)の受入れによる技術移転
- ③ 機材供与

### (2) サブセンター

- ① 長期・短期専門家による定期的又は必要に応じた巡回指導
- ② 研修員(短期)の受入れ
- ③ 機材供与

## 8. 日本側の対応

- (1) 専門家派遣 ・長期 5名(チームリーダー、果樹(柑橘・ぶどう)2名  
農業機械、業務調整)  
・短期 病害虫、土壌肥料その他必要に応じて派遣
- (2) 研修員受入れ・視察 若干名(農業局関係者、園芸試験場長等)  
・長期・短期 年間2名程度
- (3) 機材供与 ・実験用機材、圃場用機材、サブセンター機材、車輛・事務機器、  
視聴覚機器等
- (4) その他 ・モデルインフラ整備、応急対策、中堅技術者養成対策等

## 9. ネパール側の対応

- (1) プロジェクトサイト整備
- (2) カウンターパート及びプロジェクト要員の配置
- (3) プロジェクト運営費
- (4) 専門家の活動に必要な土地・建物・施設の提供

## 10. 合同委員会の設置

議長 農業省次官

構成員 ネパール側：農業省農業局長

：プロジェクトセンター所長

：プロジェクトセンター所長(シンドゥリ)

日本側：日本人専門家団長

： " " 長期専門家

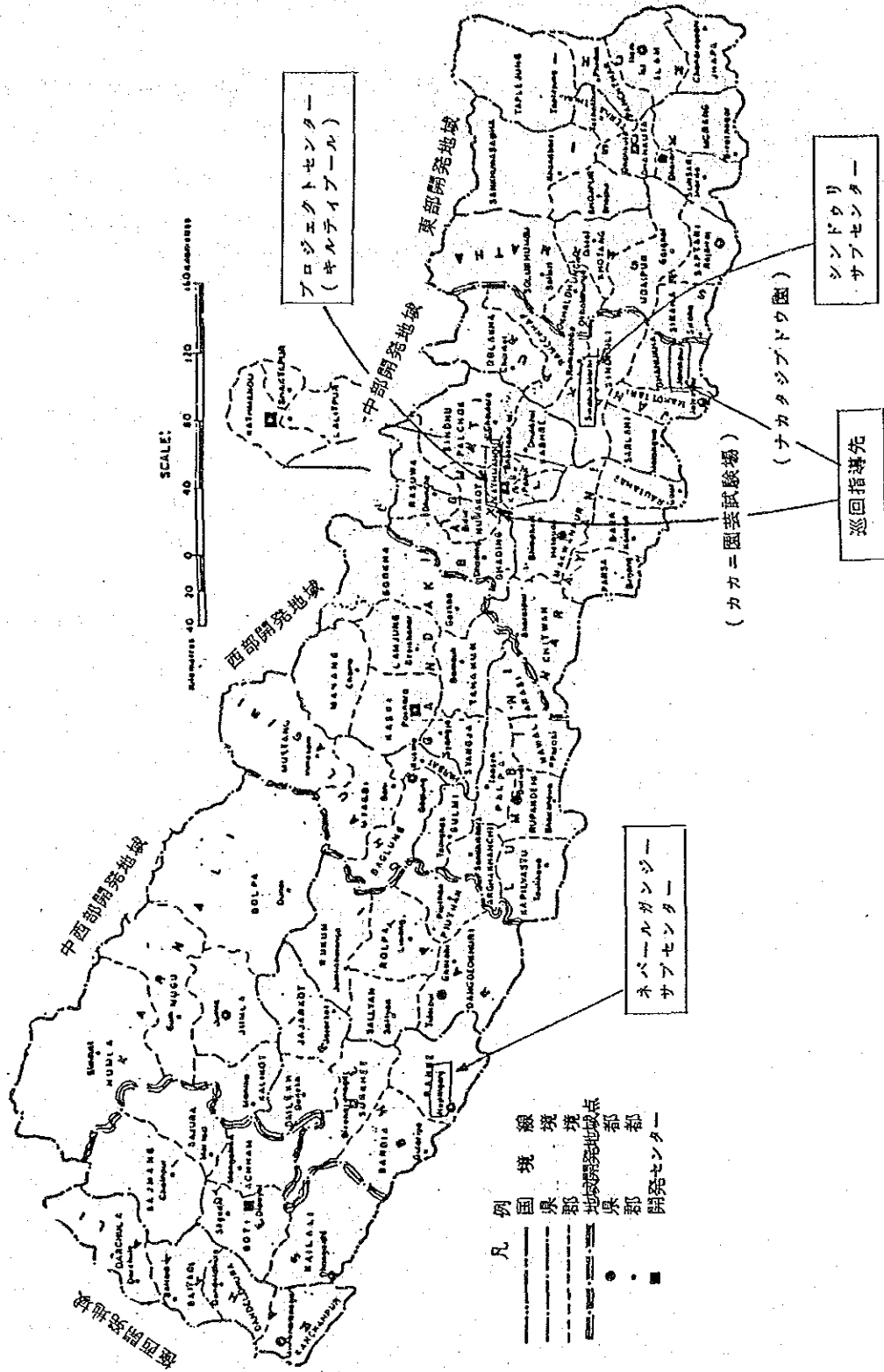
：JICAカトマンズ事務所

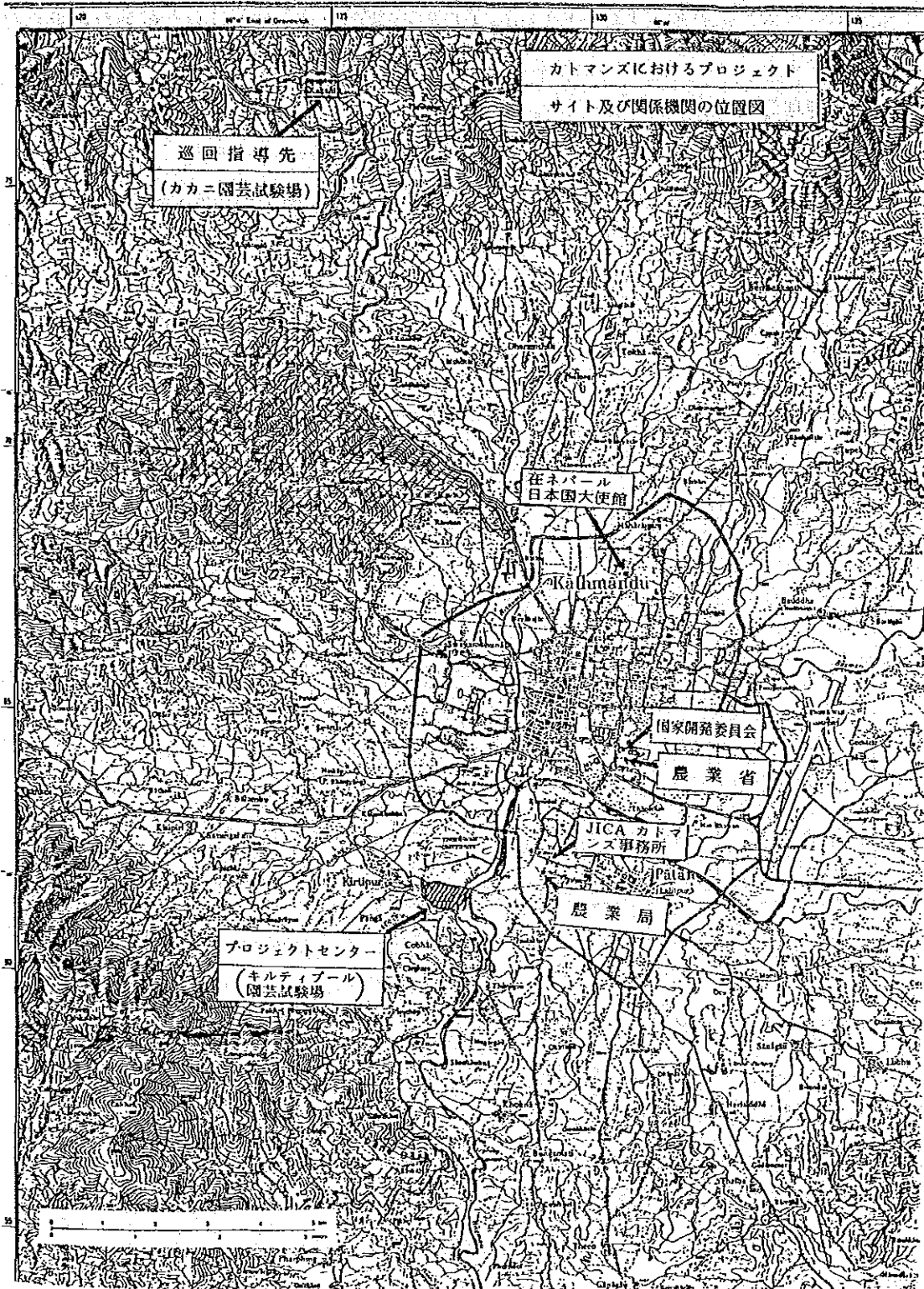
：在ネパール日本国大使館(オブザーバー)

## 11. 協力開始までのスケジュール

- (1) 事前調査 1984年6～7月
- (2) 長期調査 1984年9～10月
- (3) 実施協議(R/D署名) 1985年7～8月
- " 1985年4～6月

プロジェクト関係位置図





資料No.4 ネパールの地域区分と地域開発計画の区域区分

(1) 行政区分

ネパール国は、行政上14の県(zone)と75の郡(District)に分けられ、県には4～5の郡がある。

(2) 自然地理的区分

ネパールは、自然地理的に3つに大きく区分することができる。(図6-1参照)

- ① 1つは、最北地域(extreme north region)で、国土全体の34.4%を占める山岳地帯で、標高は3,000mを越す岩はだのざらざらした不毛地域である。
- ② 国の南部は、緩傾斜のTarai平野で、国土の21.4%を占め、大部分が平地である。
- ③ 第3は、①のHimalyan地域とTarai地域の間にある農地と牧草地から構成されている丘陵地域(Hill Area)である。

この地域は、標高900～3,000mの間にあり、全国土の44.2%を占める。

- ④ なお、自然地理的地域別の人口分布と伸び率は、表6-1のとおりである。

表6-1 自然地理的地域別人口分布と伸び率

|         | 1971年      |       | 1981       |       | 年平均<br>伸び率 | 国土面積<br>の割合                          |
|---------|------------|-------|------------|-------|------------|--------------------------------------|
|         | 実数         | 構成比   | 実数         | 構成比   |            |                                      |
| 全ネパール   | 11,555,983 | 100.0 | 15,022,839 | 100.0 | 2.66       | (147,181 km <sup>2</sup> )<br>100.0% |
| 山岳地域    | 1,138,610  | 9.9   | 1,302,896  | 8.7   | 1.36       | 34.4                                 |
| 丘陵地域    | 6,071,407  | 52.5  | 7,163,115  | 47.7  | 1.67       | 44.2                                 |
| Tarai地域 | 4,345,966  | 37.6  | 6,556,828  | 43.6  | 4.20       | 21.4                                 |

出所: Central Bureau of Statistics "Statistical Handbook Nepal 1984"

(3) 地域開発計画上の地域区分

地域開発計画上は、国土は次の5つに区分されている。(図6-2参照)

- ① 東部開発地域(Mechi, Koshi, Sagarmatha)
- ② 中部開発地域(Bagmati, Narayani, Janakpur)
- ③ 西部開発地域(Gandaki, Dhaulagiri, Lumbini)
- ④ 中西部開発地域(Rapti, Bheri, Karnali)
- ⑤ 極西部開発地域(Seti, Mahakali)

・Kathmandu, Sindhuli, Ramechhap郡は、中部開発地域のhill regionに、また、Banke, Bardia郡は、中西部開発地域のTarai地域に属する。



- ・地域開発のセンターで、農業関係の地方局 (Regional Agricultural Directorate) は、東部は Dhankuta, 中部は Kathmandu, 西部は Pokara, 中西部は Sarket, 極西部は Doti に置かれている。

図 6-1-1 ネパールの自然地理的地域区分

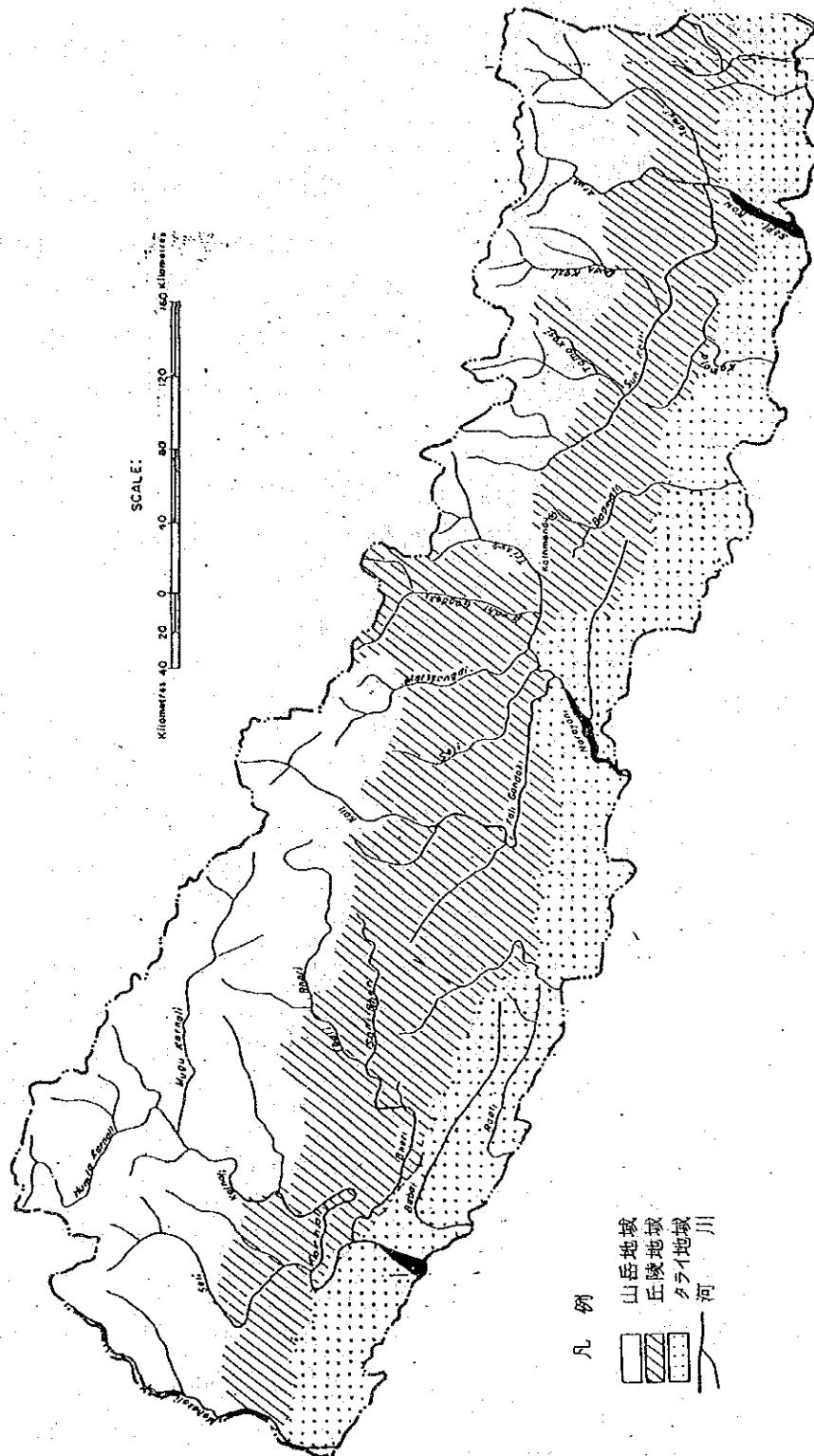
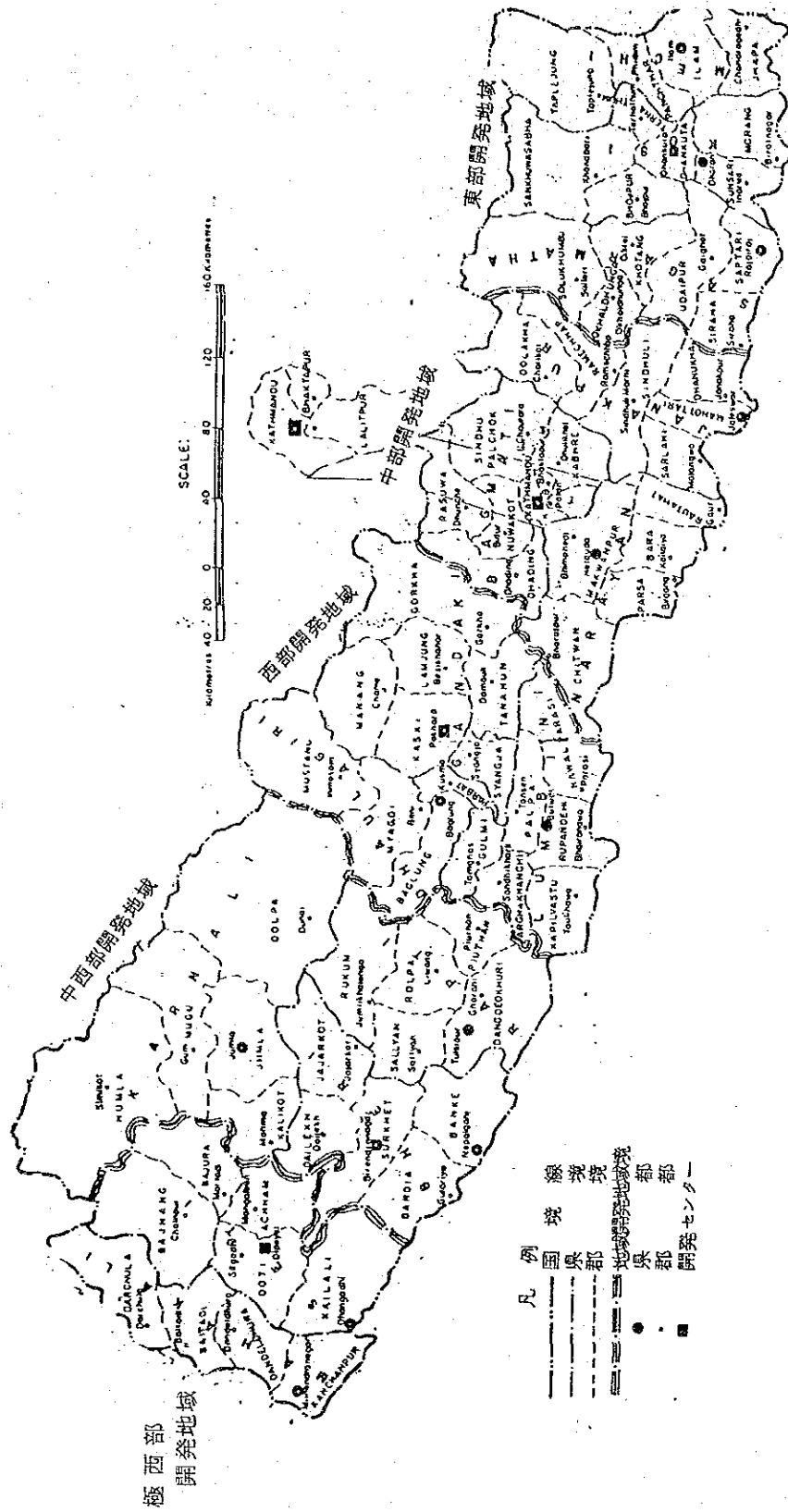


図6-2 ネパールの行政区分と地域開発計画地域区分







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