

CHAPTER 4 : MASTER PLAN

CHAPTER 4 : MASTER PLAN

4.1 Basic Development Concepts

4.1.1 Potential and Constraints on Rural Development

The common potential and constraints on rural development among related sectors are described below:

- Economic conditions of Nam Dan District are evolving from a self-sufficiency economy at farmer's level towards a free-market economy. The differences in degree of the development among the sectors are becoming apparent.
- The official stance towards development is increasingly oriented towards a policy of farmers' self-reliance. In one way, the farmers now are free to seek economic activities which are based on private profit-seeking motives. However, the supporting systems such as guidance of new farming technology, marketing information and farmer's credit are not sufficiently improved yet.
- Now, even though the number of agricultural and social infrastructures and facilities is not comparatively low, deterioration of those facilities is evident. This state of deterioration is one of the major constraints against rural development in Nam Dan District.
- It has become obvious that there are many problems that can not be solved by implementing solutions only inside Nam Dan District and that it is largely influenced by the trend of external factors such as improvements of road and marketing system in Nghe An Province.
- It is necessary to consider such external factors in addition to development potentials and constraints on each sector; the external factors will be more important factors for some sectors.

Potential and constraints on the objective rural development by sector and related external constrain factors are summarized below:

Sector	Potential	Constraints	External constrain factors
Agriculture	<p>There are about 11,000 ha of agricultural land and more than 9,000 of farmers with experience in irrigation practices. Irrigation systems have been installed since the times of the French colonization and there are more than 9,000 ha of irrigable area. Irrigation water is sufficient in the plain areas along the Lam river. The South Nghe An Irrigation Project covering around 3,500 ha of irrigated area supported by World Bank has been implemented. Farmers are eager to adopt new technologies and improved seeds and animal breeds.</p> <p>Farmers have experience of organized activities such as O/M of agricultural facilities and the farmers' organization system has been improved.</p> <p>Farmers are used to credit operations. Formal credit channels are available in the District. Micro-finance project is also known among the farmers.</p>	<p>Due to deterioration of irrigation facilities, about 50% of irrigable area are not irrigated. Agricultural production is dependent on rainfall condition. Irrigation water is not enough in the mountainous foot areas. Farmers do not have enough knowledge, technology, funds, etc. for diversification. Most of agricultural economic activities are still under self-sufficiency and facilities for marketing system are not sufficient. Budget for extension services is too small. Lack of extension workers, extension materials and model extension plots.</p> <p>The fund is not sufficient for the activities of the farmers' organizations.</p> <p>Insufficient amount of credit funds to satisfy the demand. Non-existence of long-term loans. Interest rates are set by the higher authorities and do not allow for flexibility which may encourage competition. Complicated credit procedures prevent poor farmers from easy access to credit.</p>	<p>Marketing system in market place such as Vinh City is not matured. Road conditions to access to market places are not good. Agricultural supporting systems such as extension service and rural credit are inadequate.</p> <p>The budget to support the farmers' organization is insufficient.</p> <p>A flexible interest rate policy must be implemented by the government to encourage competition in the credit markets.</p>

Sector	Potential	Constraints	External constrain factors
Health and Sanitation	<p>Every commune has a CHC as well as provision of village nurse at every village.</p> <p>The high educational attainment is another strong advantage for improvement in health and sanitary situations.</p> <p>Nam Dan District has experienced international cooperation programs such as the Integrated Project by JOICFP and Area Focused Project by UNICEF. Reproductive Health Project by JICA Project-type Technical Cooperation has just started on June 1997 and Nam Dan District is covered by this project.</p>	<p>Lack of safe water supply and shortage of water especially in dry season.</p> <p>Facilities and equipment at DHC and CHC are overused or outdated because of financial constraints. Management capacity of DHC is also an issue.</p> <p>Lack of sanitary facilities and information, education and communication (IEC) on sanitation resulting in poor sanitary practices. Woman's sanitation condition is very poor due to unsanitary bath and farming practices, resulting in woman's disease.</p> <p>Children's sanitation condition is also very severe; many of them have parasitic worm.</p>	<p>Supply of information and materials to health center and re-education to the staff are not sufficient.</p>
Education Facilities	<p>Strong desire from parents to provide their children with education.</p> <p>Enough facilities' capacity to universalize primary and lower secondary education.</p> <p>A high percentage of children from 6 to 14 years old are integrated into the educational system.</p> <p>Literacy rate is high.</p>	<p>Schools suffer from acute electricity shortage.</p> <p>Educational facilities are not adequate in quality and quantity.</p> <p>Shortage of facilities for adult education.</p> <p>Poor facilities and conditions for teachers' training.</p> <p>Lack adequate vocational center.</p> <p>Lack of facilities for regular literacy education and complementary education.</p>	<p>Facilities for upper secondary education are not enough.</p>
Rural Road	<p>The existing road network is comparatively well developed. Trunk roads are mostly well maintained.</p> <p>Nam Dan town is located on the way to other districts from Vinh City.</p>	<p>There is no bridge on the Lam river to connect with the right side of the river and many working days (about 50 days a year) are lost as the farmers can not cross the river due to heavy rain.</p> <p>Quality of road surface is low.</p> <p>Shortage of bridge width and loading capacity.</p> <p>Fragmentation of road network during rainy season.</p> <p>Lack of budget for regular maintenance of roads and bridges.</p> <p>Lack of a public transportation system.</p> <p>Insufficient road networks to introduce farming mechanization.</p>	<p>Roads of national and provincial levels are not paved well.</p>

Sector	Potential	Constraints	External constrain factors
Communications	The capacity of tele-communication line is enough under present conditions. There is a local broadcasting system established since long time ago.	Demand for telecommunication services is still low among the farmers due to low income of them. Differences in installation costs are too big. People living in far distant places can not join to the system due to high costs. Equipment of local public speaker system is old and not well maintained. Market information is neither reliable nor up-dated.	Supporting services to household are not sufficient. The telephone charge system is disadvantage for rural areas.
Rural Electrification	Electricity is distributed to every commune. The capacity of source for electric supply is sufficient under present conditions.	Due to poor distribution system, the amount of electricity is not enough for the end users and electricity tariffs are 2 to 3 times higher than other districts. Operation and maintenance system is not sufficient and the farmers do not have enough knowledge about electricity.	Supporting system for electrification is not improved. Payment system for electricity is disadvantage for rural areas.
Rural Water Supply	UNICEF is carrying out a program for improvement of shallow wells. There is potential of ground water resources to be used for deep wells.	There is a problem of water resources at some mountainous foot areas in dry season. Some of shallow wells located near the Lam river are not available due to inundation during the flood time. Some of facilities are too old to use their water for drinking.	Programs like the one being implemented by UNICEF or similar ones are required.
Environmental Conservation	There is no factors which notably influence the environment of the Study Area in a negative way.	There are some problems of gully erosion at mountainous foots and at some parts of the Lam river side.	River control program covering entire basin is required.

4.1.2 Targets and Strategies of Model Rural Development

(1) Model Rural Development

The Model Rural Development targeted in this Study shall fulfill the following:

- 1) To include the socioeconomic development factors in addition to agricultural development factors. This will allow to have an all-encompassing concept for increasing the living standards in rural areas;
- 2) Careful consideration must be given to improvement of social infrastructures related to education, medical system, health and sanitation. Also, the idea of development of agro-industries to increase farmers' income levels by creating employment opportunities must be examined. Improvement of agricultural infrastructures such as irrigation systems and road networks is a pre-requisite for removing the present basic development constraints;
- 3) Furthermore, the development methodology adopted in this Study for Nam Dan District could be adopted when analyzing the development of other areas.

Considering the above-mentioned conditions and present conditions of the Study Area, the final target of the Model Rural Development is set as the improvement of the living standards in the rural areas by the raise of farmers' income, improvement in nutrition, reducing regional economic gaps, etc.

(2) Target Year and Required External Conditions

Based on the discussions between the Vietnamese side and the Study Team, the year 2010, which is the same as the target year of the Master Plan of Socio-economic Development of Nghe An Province, has been set as the target year for the objective Master Plan Study for the Model Rural Development in Nam Dan District.

For the required external conditions, the predictions provided in the Master Plan of Socio-economic Development of Nghe An Province are also considered for the Model Rural Development.

(3) Proposed Targets and Strategies

The following targets, strategies and required external conditions are proposed for the Model Rural Development.

Sector	Targets	Strategies	Required External Conditions
Agriculture	Establishment of diversified farm management.	Diversify crops considering farmers' economy and available water resource.	Improvement of marketing system, road conditions, agricultural supporting system at provincial level.
	Establishment of new farming system which will enable the increase of agricultural production and effective economic activities introduced by the product increase.	Increase actual irrigated area with improvement of irrigation and drainage system. Introduce the effective use of irrigation water. Mitigate flood damage with flood prevention works. Improve marketing system and farmers' organization. Increase cropping rate. Establish new farming. Promote agricultural mechanization	
	Balanced development of agriculture, forestry, and fishery so to preserve environmental conditions.	Promotion of afforestation	
	Improvement of the extension services so to reach a bigger number of farmers and the quality of services.	Reinforcement of technical supporting system. Increase number of extension workers at District Extension Station.	Improvement of training system for extension workers at provincial level.

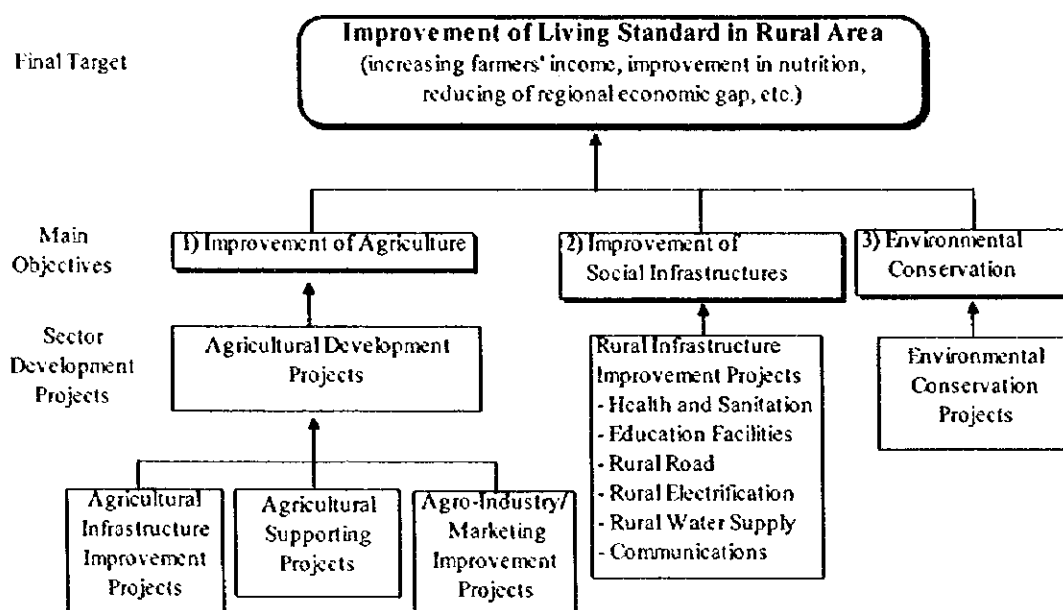
Sector	Targets	Strategies	Required External Conditions
	<p>Strengthen of farmers' organization, the main body of the activities.</p> <p>Increase of the number of farmers who will be benefited by rural credit. Improvement of credit channels in order to facilitate access to credit service.</p>	<p>Improve selection criteria of extension workers. Increase number of extension materials and equipment. Increase number of Model Extension Plots.</p> <p>Improve supporting system for farmers organization</p> <p>Simplify loan procedures. Increase availability of formal credit funds at regional level. Increase number of credit institutions which can compete under free-market conditions. Create joint liability groups which will facilitate access to credit.</p>	<p>Improvement of supporting system such as taxation at national level.</p> <p>Excessive control or regulation on financial instruments and institutions must be relaxed to allow more competition.</p>
Health and Sanitation	<p>Improvement of quality of health and medical care services and sanitary situation, resulting in decrease of incidence of infectious diseases.</p> <p>Improvement of farmer's consciousness and capability for maintaining good environmental health.</p> <p>Improvement of sanitary conditions for women and children.</p>	<p>Strengthen capacities of not only medical care but also managerial aspects to respond people's demand in effective and efficient ways. Create new public health-related extension service.</p> <p>Improve IEC activities on health and sanitation. Increase in awareness about linkage between agricultural activities and health/situation.</p> <p>Establish school-based health improvement system for children, especially for parasite control education. Increase women's political representation to decision making, especially for improvement of quality of life in rural areas.</p>	<p>Establishment of emergency department and provision of basic supply of materials and equipment. Retraining for post-graduate doctors and midwives. Support to the creation of a new public extension service schemes.</p> <p>Support the IEC activities on health and sanitation.</p> <p>Support the school-based health improvement system for children.</p>
Education Facilities	<p>Improvement of educational infrastructure and education quality.</p> <p>Avoidance of falling of literacy rate.</p>	<p>Electricity supply to school. Rehabilitation of facilities. Provision of required teaching materials. Expansion of vocational center.</p>	<p>Increase of facilities for high school.</p>

Sector	Targets	Strategies	Required External Conditions
Rural Road	Development of road network ready to bear heavy and high speed traffic under all weather conditions and improvement of transportation facilities to facilitate trade activities. Solution of regional differences caused by fragmentation of road networks.	Improve quality to meet future transportation system and demand. Enhance road management organization. Improve participation of inhabitants in road management. Improve and develop bridges and roads. Improve conditions for crossing the Lam river.	Rehabilitation of related national and provincial roads.
Communi- cations	Expansion of telephone lines to the rural areas. Enhancement of market information expansion function. Strengthening of public warning system.	Develop telecommunication system. Enhance the functions of market information through local broadcasting systems. Enhance the information transmission system. Rehabilitate public speaker system.	Development of information system in urban areas such as Hanoi and other near-by big cities.
Rural Electrification	Supply of electricity to 100 % of households in Nam Dan District. Supply of good quality electricity services with reasonable tariff for farmers.	Extend the distribution system. Rehabilitate/renovate the transmission and distribution systems. Supply technical service for farmers.	Increase capacity of electric supply. Improve supporting system for farmers.
Rural Water Supply	Provision of safe domestic water. Achievement of a stable and reliable water supply.	Introduce a water supply system for efficient water use. Introduce cost recovery schemes to support the implementation plan.	Assistance programs for rural water supply similar to UNICEF program must be implemented in parallel.
Environmental Conservation	Control of erosion for some parts at the mountainous areas	Apply countermeasures against erosion at mountainous area.	Entire basin control in Lam river is required.

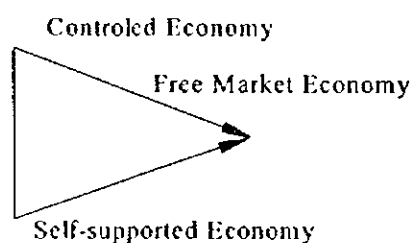
4.1.3 Basic Concepts for Model Rural Development

(1) Framework of the Proposed Development

As mentioned above, the final target of the Model Rural Development is set to improve the living standards in the rural areas including the raise of farmers' income, improvement in nutrition, reduction of regional economic gap, etc. For the attainment of this final target, three main objectives such as: 1) Improvement of agriculture, 2) Improvement of social infrastructures and 3) Environmental conservation are proposed, and the projects in the respective sectors should be formulated in accordance with these main objectives as shown in the following figure:



(2) An Image of Expected Farm Village in the Future



As previously mentioned, farmers are presently searching for a new agricultural management under free market economic conditions. In this sense, farmers have just begun to study economic activities of production, marketing and selling. However, the average of farm land managed by each farm household is only 0.3 ha and operations at such small scale private enterprises have limitation. The small scale operations is reflected in the method of products transportation used at present.

For an example of a typical method of product transportation, some farmers load their surplus of agricultural products on bicycles (or motor bikes) and transport them to nearby markets. Then, they sell their produce individually. It is necessary to transform

these conditions in order to distinctively improve the farm's economic situation. On the other hand, it is also necessary for farmers to achieve comfortable life by means of an increased income level and available free time in order to improve their living standards. To achieve these objectives, improvement of farm economy is indispensable. For this improvement, the expansion of small-scale management (private enterprises) into large-scale operations by grouped farmers is necessary. To create a suitable environment for the expansion, some conditions are required: in other words, strengthening farmers' organization, introducing farm machinery, building facilities for collection and distribution, improving system for transportation and selling, obtaining financial resources for management, etc. Furthermore, the know-how for management and building infrastructures such as irrigation/drainage, road network and improving electricity conditions are considered to become also important factors. In addition to them, improvement of health/sanitation and education has to be considered. The Model Rural Development concept is represented by the following catch-phrase represented by the transportation method of agricultural products:

“Change from Bicycle to Truck”

4.2 STUDY ON SECTOR PROJECTS

4.2.1 Basic Conditions

(1) Preconditions

Based on the development plan at national or provincial level for each sector, preconditions on each project have been considered. These preconditions are required in order to achieve the full-effects of the projects; some of the preconditions will be treated as recommendations based on the results of the Study. In addition, the population factor will indirectly influence each project and this factor is set in the Master Plan of Socio-Economic Development of Nghe An Province as shown below:

Population

(Unit: persons)

Year	1996	2000	2010
Nghe An Province	2,847,000	3,068,000	3,558,000
Nam Dan District	160,000	170,000	193,000

Labour Force in Nghe An Province

(Unit: persons)

Year	1996		2000		2010	
Total labour force	1,261,700	100.00%	1,447,200	100.00%	1,734,200	100.00%
Agriculture, Forestry, Fishery	1,012,800	80.27%	1,066,300	73.68%	1,110,600	64.04%
Industry, Construction	122,300	9.69%	183,600	12.69%	307,800	17.75%
Service	124,700	9.88%	194,200	13.42%	308,900	17.81%
Others	1,900	0.15%	3,100	0.21%	6,900	0.40%

Preconditions on the implementation of the project selected for respective sectors are summarized as shown below:

Sector	Item	Preconditions for Each Sector	Remarks
Agriculture	South Nghe An Irrigation Project	Irrigation area in this project area will be increased up to 3,750 ha.	This is estimated based on the F/S report of this project.
	Improvement of marketing system at national and provincial levels	Improvement of marketing system including establishment of related commercial laws. Improvement of marketing facilities at Vinh city. Improvement of the main trunk roads outside the District.	See Table 4.2.1
	Improvement of agricultural supporting system	Expansion of credit system	For the improvement of the agricultural management, improvement of edit system is recommended based on the result of the Study.

Sector	Item	Preconditions for Each Sector	Remarks
Education Facilities	Expansion of facilities for upper secondary school	There is no administrative difficulty for implementation of the projects for Nam Dan District.	Upper secondary school and middle technical school are under the provincial administration.
	Increase of payment capacity of farmers	This will be estimated based on the study results for agricultural development plan.	Costs of school facility rely on the contribution by inhabitants.
Health and Sanitation	Establishment of first aid system at provincial level.	First aid system will be established by the year 2010.	This is estimated based on the present medical condition.
	Procurement of basic medical equipment.	This will be done at Vinh City and Nam Dan Town.	ditto
	Strengthening of the supporting system for activities of health and sanitation improvement	Project-type Reproductive Health Project by JICA has started since June 1997 and Nam Dan District is included in the objective area.	Present supporting activities by international organization and NGO will be continued.
Rural Road	Improvement of related national and provincial roads.	Route No. 46 (stage 1: 65 km) will be improved by the year 2000.	This project is under implementation.
Communications	Use of marketing information	Using system will be studied with agricultural development project.	
Rural Electrification	Increase of supply capacity.	Supply capacity will be increased (350MW to 500MW) by the year 2010 with construction of Ban Mai Dam.	F/S report of the Ban Mai Dam was prepared and loan agreement is under discussion with French organization.
	Improvement of service system for end-users.	Adequate service system will be recommended based on the Study results.	
Rural Water Supply	Continuous implementation of supporting activities by UNICEF.	US\$ 300,000 per year of assistance is carried out for Nghe An Province.	Assistance by the year 2000 has been determined.
Environmental Conservation	Basin control for Lam river.	Another study will be recommended for entire Lam river basin control.	

(2) Criteria of Prioritization

The proposed projects for each sector have been prioritized based on the comparison of degree of the following factors. In the comparison of the projects in a sector, the factors which are judged to produce the same effect on the objective project are excluded from the comparison factors. Furthermore, the synergistic effect was studied in the prioritization for entire Master Plan.

Factor	Basic consideration on prioritization
1. Urgency	Projects expected to be the countermeasures against the present problems that should be solved urgently
2. Realization	Projects expected to be implemented by a proposed executing agency or organization without any difficulty
3. Adaptability	Projects expected not to have any kind of contradiction with the plans at higher-level such as the National Development Plan for other sectors

Factor	Basic consideration on prioritization
4. Inhabitant needs	Projects expected to meet the most urgent needs of the inhabitants in the Study Area
5. Sustainability	Projects expected to have sustainable development potential and not to have a huge negative environmental impact
6. Impact	Projects expected to have a high socio-economical impact
7. Model	Projects expected to be used as model projects for other areas
8. Economy	Projects expected to provide the farmers with high profits
9. Synergistic effect	Projects expected to have a high synergistic effect through the combination of those projects with others of the same or different sector

The ranking for the proposed projects in each sector has been carried out based on the following criteria.

Rank	Conditions
A	Early implementation of the project is strongly recommended.
B	Early implementation of the project is recommended.
C	Implementation of the project is recommended.
D	Recommendation of the project shall be canceled.

4.2.2 Agriculture

(1) Land Use Plan

The agricultural land in the Study Area is categorized into 5 major categories, i.e., hilly zone, middle zone, upland crop zone, rice zone and flood plain zone. In the category of rice zone, the following three sub-categories are defined to identify the agricultural environment in consideration of irrigation and drainage conditions:

- Rice zone suffering from water shortage
- Rice zone having drainage or inundation problem
- Rice zone suffering from inundation and water shortage

In addition to the above sub-categories, the project area of the South Nghe An Irrigation Project supported by the World Bank is considered as an independent sub-category of the rice zone. It is denominated as Rice Area with the South Nghe An Irrigation Project. The regional potential and constraints of each category are shown below (see Fig. 4.2.1 and Fig. 4.2.2):

Zone	Category	Potential	Constraints	Suggested Activities for Agricultural Development
1	Hilly Zone	<p>Contribute to preserve the environment as it is or rehabilitate the environment as it should be from the viewpoint of the watershed management and the protection of agricultural land.</p> <p>Can be used for agroforestry-type agriculture that is: production forestry, fuel trees and livestock feed production.</p> <p>Some of hilly land has a capability to be developed for tree crops.</p>	<p>Large-scale development is not suitable due to the lands being scattered in the area.</p> <p>Development of social erosion due to excessive cut of trees can be observed.</p> <p>Land sliding is observed in some hilly land and it damages agricultural lands.</p> <p>Considering reforestation program, infertile soil on granite sandy stone, which is dominant in the area, restricts forest growth.</p>	<p>The land use of hilly land consists of protection and conservation areas. In the protection area, agricultural activity is prohibited and reforestation shall be promoted.</p> <p>In the conservation area shall be prohibited in consideration of agricultural constraints in the area.</p>
2	Middle Zone	<p>Land is suitable for tree crops and upland crops. This land is to be used for perennial crops such as orange, lemon, persimmon and banana. In particular, perennial crops will contribute to raise farmer's income as they will become effective cash crops.</p> <p>For the land not unsuitable for cropping, it is expected to be used as grazing lands for livestock.</p>	<p>Middle Land is not suitable for large-scale development, because it is scattered in the Study Area in small pocket areas.</p> <p>The soil is generally infertile and water sources are limited.</p> <p>Erosion and land sliding are observed in this kind of land and it damages agricultural land in the plain area.</p>	<p>Perennial crops such as orange, lemon and persimmon shall be maintained as to raise up cash income for those farmers who do not face environmental problems in their areas.</p> <p>The areas suffering from erosion or land sliding shall be classified as conservation areas and must be developed with careful consideration for environmental aspects.</p>

Zone	Category	Potential	Constraints	Suggested Activities for Agricultural Development
3	Upland Crop Zone	<p>This area is expected to be a cultivation area of upland crops instead of rice because of the disadvantage of water supply and topographic conditions.</p> <p>Vegetables and forage crops are major crops in this area.</p> <p>The cultivation area of vegetables can be expanded by installing appropriate irrigation system. With an adequate irrigation system, quality will be improved and yields will be raised.</p> <p>Taking into account the regional crop diversification goal, this area will play an important role in agricultural production in the Study Area.</p>	<p>Due to practice intensive cultivation, this area has less fertile soil. Water is short due to lack of irrigation facilities and water resources.</p> <p>Rice crop is not suitable due to the unevenness of the land and steep slope.</p> <p>Furthermore, damages from erosion are observed in the area.</p>	<p>The area is expected to be an intensive area of upland crops, vegetables and forage crops with development of irrigation where the potential of water resources exist.</p> <p>In the areas which suffer from agricultural land erosion, protection against erosion shall be introduced.</p>
4	Rice Zone Suffering from Water Shortage	<p>The yield of summer-autumn rice is expected to increase significantly by improving water supply conditions during the planting period. Rice production in the area will increase by raising the yield of summer-autumn rice.</p> <p>Furthermore, the combined cultivation of vegetables or forage crops and rice is possible over the area if water shortage problem is solved.</p>	<p>The area suffers from water shortage in May and June.</p> <p>This area is developed as an intensive rice crop area. However, rice production in the area is restricted by water shortage for cultivation of summer-autumn rice; consequently the yield of Su-Au rice is low.</p> <p>Irrigation system can be found in the area; however the equipment do not work properly.</p>	<p>The area shall be targeted for intensive and high yield rice production by introducing irrigation system improvements and efficient water use.</p> <p>New development of water resources is required wherever the potential exists.</p>

Zone	Category	Potential	Constraints	Suggested Activities for Agricultural Development
5	Rice Zone Having Drainage or Inundation Problems	This area has potential to increase production if a drainage system is developed and inundation is mitigated. The development of a drainage system will contribute to improve soil saturation conditions and make it possible to cultivate vegetables or forage crops with rice.	The area suffers from inundation in September and October. This area is developed as an intensive rice crop area; however, the cropping is restricted by inundation problems during the storm season. This causes deterioration of rice yield for the Summer-Autumn rice cropping.	The area shall aim at intensive and high yield rice production by developing a drainage system. For the areas where it is difficult to solve inundation problems, the introduction of deep water tolerant varieties of rice shall be studied.
6	Rice Zone Suffering from Inundation and Water Shortage	This area has well fertile soil and a high potential to produce rice. In this area, it is difficult to solve inundation problems due to the severe degree of inundation. However, efforts to mitigate damages from inundation are essential. Irrigation water supply during the rice planting period will make it possible to shift cropping pattern and to avoid damage from inundation. By irrigation and drainage development, cultivation area will be expanded and rice production will be increased significantly.	The area suffers from water shortage in May and June as much as frequent heavy inundation in September and October. The heavy inundation deteriorates rice production during the summer season and restricts most of the farmers to one rice crop in the Winter-Spring season. On the other hand, there is water shortage in rice planting period of Summer-Autumn rice. It compels farmers to give up cultivation of Summer-Autumn rice, and to cultivate Summer rice even though it has disadvantage in yield.	The area shall be targeted for intensive and high yield rice production by developing a drainage system to mitigate inundation as well as improving the irrigation system. Cultivated area of Summer-Autumn rice is expected to be expanded and the production will increase through an irrigation and drainage development.

Zone	Category	Potential	Constraints	Suggested Activities for Agricultural Development
7	Flood Plain Zone	The soil of this area is very fertile and suitable for cultivating because of sedimentary materials from the Lam River. Flooding from the Lam River is unavoidable due to topographic condition. Hence, the present land use for water tolerant crops adapted to the area should be continued.	This area is considered as a flood prone area and suffers from frequent direct floods from the Lam River.	This area shall be used as it is, because this area is reserved as flooding area in original and used for cultivation during low water season by the farmers. A careful cropping program considering water tolerant crops is necessary to be implemented in this area.
8	Rice Zone with South Nghe An Irrigation Project	This area is the project area of the South Nghe An Irrigation Project and the improvement works is now going on. When the Project is completed, this area will become a rice intensive cultivation area with high yield and production.	Most of this zone has the same characteristics of Zone 4 and some parts have same characteristics of Zone 5.	It is an intensive rice crop area (Land use is almost the same as Zone 4, although style of Zone 5 is partially included).

The present land use for each zone is summarized below:

(ha)

Zone	Category	Agricultural land		Sub Total	Forest land	Others	Total
		Paddy field	Upland field				
1	Hilly zone	150	130	280	4,840	1,650	6,770
2	Middle zone	200	700	900	390	730	2,020
3	Upland crop zone	800	800	1600	650	810	3,060
4	Rice zone, W.S.	1,500	100	1600	160	1,290	3,050
5	Rice zone, D. or I.	600	50	650	40	360	1,050
6	Rice zone, I & W.S.	1,500	150	1650	100	1,160	2,910
7	Flood plain zone	200	1000	1200	120	3,170	4,490
8	Rice zone, W/B	3,500	150	3650	90	2,340	6,080
Total		8,450	3,080	11,530	6,390	11,510	29,430

Note: Estimated from land use map (1995)

W.S.: suffering from water shortage, D. or I.: having drainage or inundation problems,

I & W.S.: suffering from inundation and water shortage,

W/B: with South Nghe An Irrigation Project

(2) Farming Plan

For the improvement of farming practice in Nam Dan District, the following basic considerations are applied:

Item	Basic Consideration for Improvement of Farming Practices
Establishment of Diversified Farm Management Systems	It is necessary to establish diversified farm management systems which will go along with the improvement of agricultural and social structures and economic system in Nam Dan District and its surrounding regions. The new systems will contribute to the increase of income level and improvement of nutrition of the inhabitants of the area. The new systems would aim to maintain self sufficiency in basic foods by an efficient use of limited land, to increase production of profitable crops, and to establish a balanced development with others aspects like animal husbandry, fruit gardening and aquaculture. Additionally, the development plan should include promotion of agro-industry.
Balanced Development of Agriculture, Forestry and Fishery	Clean and healthy natural environment is a precious resource for mankind. Thus, any rural development which affects adversely the natural environment should not be overlooked. It is necessary to prepare a harmonious development plan for agriculture, forestry and fishery which will contribute to the conservation of natural environment, water resources, land resources and living environment of residents of Nam Dan District.
Improvement of Cropping Pattern	Maintaining present cropping pattern basically, agricultural production is considered to be increased by introducing new farming technology. The introduction of cash crops with high returns is also considered.
Effective Water Use	Water shortage is one of the most serious limiting factors of crop production. Present irrigation facilities do not fulfill their function well enough and it restricts cropping and decreases yield. Rehabilitation and additional construction of irrigation facilities are indispensable. This will contribute to increase cropping rate as well as yield levels.
Introduction of Crop Varieties Adaptable for Environmental Condition, Development of Farming Technology and Their Extension	One of the major reasons of low yield of crops in Nam Dan District is shortage of good varieties of crops. For example in rice, every farmer demands good varieties with characteristics of high yield, disease tolerance and insect resistance. Selection and introduction of adaptable varieties are necessary. On the other hand, development of farming technology for getting high yield such as fertilizer application and plant protection and extension of their results are important. Supplying of high quality seeds to the farmers is also very important.
Promotion of Agricultural Mechanization	Land preparation, transplanting, harvesting and weeding are major works in farming practice, and land preparation and transplanting are the hardest works above all. Introducing agricultural machinery will reduce severe work and improve farmers' working conditions. At the same time, agricultural production will be increased and stabilized by planting appropriate varieties in appropriate time, which is achieved by shortening working days for those practices. Furthermore, limited land resources can be shifted from keeping draft animals to raising beef cattle by agricultural mechanization. It will contribute for farm management diversification and increase to farm income. Introduction of mechanized agriculture has also a potential to provide labor force from agricultural sector to industrial sector when the strong demand of labor force from industrial sector is raised in future.
Promotion of Production	Animal products, fruits and fishes are major resources of cash income for the farmers and important nutrition resources for residents. Increase of

Item	Basic Consideration for Improvement of Farming Practices
Increase of Livestock, Fruits and Fishes	production of feed crops depends mainly on increase of yield. Preparation of supply system of superior calf, piglet and chicken is necessary for animal production. Preparation of supply system of superior seedling is necessary for orchard. Reinforcement of actual supply activity of fry for aquaculture is also necessary.
Promotion of Afforestation	More than 40% of forest area is bare land which causes flood in the Lam river basin, seasonal water shortage of reservoirs, soil erosion and shortage of firewood for residents. Thus, afforestation in order to develop water resources, to conserve river basin, to conserve sloping land and to produce firewood is an urgent matter. It is necessary to prepare nurseries for that purpose. In addition, acceleration of undergrowth is necessary because undergrowth of forest is the major feed resources for cattle. The potentiality of forest land use as grazing forest should be assessed.
Establishment and Reinforcement of Agricultural Supporting Systems for Agricultural Development	In order to carry out effectively the above-mentioned projects, it is necessary to institute and reinforce the supporting systems like extension system of new technology, reinforcement of existing supply systems of high quality materials used for production such as fertilizer and agro-chemicals, seed and fry, reinforcement of existing plant protection system, etc.
Promotion of Group Farm Management	To change the farm management from small-scale farming to group farming is important for establishment of new farm management system corresponding to advancing marketing condition and for increasing farmers' income.

(3) Proposed Production plan

Based on the basic considerations for farming practices mentioned above, the increase of crop yield and the conversion of crop varieties from Summer rice with low yield to Summer-Autumn rice with higher yield as possible as admitted by water supply shall be promoted. The main cropping patterns for each zone are proposed as shown below:

Proposed Cropping Pattern

(ha)

Zone	W. - Sp.		Su - Au.		Summer		Winter		Year Total		Total
	Rice	Upland Crop	Rice	Upland Crop	Rice	Upland Crop	Rice	Upland Crop	Rice	Upland Crop	
1	91	178	0	102	114	0	0	100	208	380	588
2	150	730	71	150	50	0	0	411	271	1,291	1,562
3	500	1,100	600	400	200	0	0	700	1,300	2,200	3,500
4	1,150	450	1,200	100	150	0	0	500	2,500	1,050	3,550
5	400	250	400	50	0	0	0	50	800	350	1,150
6	1,250	400	1,200	100	100	0	0	400	2,550	900	3,450
7	150	1,050	150	150	0	0	0	600	300	1,800	2,100
8	3,150	500	3,150	150	0	0	0	400	6,300	1,050	7,350
Total	6,844	4,658	6,771	1,202	614	0	0	3,161	14,229	9,021	23,250

Note: W. - Sp. is from late January to May.

Su. - Au. is from early June to middle September.

Summer is from early July to middle November. Winter is from late September to middle January.

The proposed crop production produced by the above mentioned cropping pattern is shown in Table 4.2.2 and is summarized as follows:

Crop	Cropping Season				Total (ton)
	W-Sp	Su-Au	Summer	Winter	
Rice(Irrigated)	24,346	31,494	0	0	55,840
Rice(Rainfed)	7,285	0	1,044	0	8,329
Sub Total	31,631	31,494	1,044	0	64,169
Maize	2,090	0	0	2,690	4,780
Sweet potato	5,497	0	0	6,367	11,864
Ground nut	3,417	0	0	0	3,417
Green bean*	0	500	0	0	500
Sesame	0	35	0	0	35
Vegetables	1,440	3,830	0	3,462	8,732
Chili	74	0	0	0	74
Sugar cane	12,180	0	0	0	12,180
Mulberry	1,300	0	0	0	1,300

(4) Irrigation and Drainage Improvement Plan

Actual irrigation area in the Study Area is less than 50 % of the designed irrigation area and major reasons are low water use efficiency caused by old irrigation facilities and lack of water sources. Therefore, it is important to increase actual irrigation area for improvement and stabilization of agricultural productivity in the area and the actualization of effective water use by improvement of irrigation facilities (renovation/new construction of facilities and development of new water sources) is the basic countermeasure. However, as annual rainfall in the area is expected as more or less 2,000 mm and paddy rice can be cultivated in the non-irrigated area, it is necessary to make a plan with consideration of adequate balance of benefit and investment. For the drainage improvement, the damage mitigation plan without producing bad influence on the area outside the Study Area is the basic countermeasure and it is also important to make a plan with consideration of adequate balance of benefit and investment.

From the above viewpoint, several irrigation and drainage facilities (including new construction) which have high technical feasibility have been selected for the Master Plan and prioritization of them has been studied based on the factors such as urgency, impact and economy.

- Urgency : Present facilities which have serious problems are considered as "a" rank and others are considered as "b" rank.
- Impact : Based on the net benefit for 30 years, ranking is considered as follows:
- more than 5 billion VND : "a" rank
 - 1 to 5 billion VND : "b" rank
 - less than 1 billion VND : "c" rank
- Economy : Based on the benefit cost ratio (B/C), ranking is considered as follows:

more than 1.5	: "a" rank
1.0 to 1.5	: "b" rank
0.5 to 1.0	: "c" rank
less than 0.5	: "d" rank

Comprehensive Assessment:

If ranking of urgency is "a", the project rank is A.

If ranking of economy is "d", the project rank is D.

For other cases, considering economic ranking as the main factor, the comprehensive assessment is made based on the impact factor.

The location of projects is shown in Fig. 4.2.3 and projects digest is given in Table 4.2.3. The result of prioritization is summarized below:

Proposed Reservoir Irrigation Projects

No.	Project Name	Irrigation area (ha)	Net Benefit (mill. VND, for 30 years)	Cost (mill. VND, including O/M)	B/C Ratio	Urgency	Impact	Economy	Comprehensive Assessment
R01	Vung Huyen	20	2,120	890	2.38	b	b	a	B
R02	Ho Thanh	100	10,990	6,970	1.58	b	a	a	A
R04	Vuc Mau	50	4,780	1,190	4.02	b	b	a	B
R05	Hao Hao	20	1,630	830	1.96	b	b	a	B
R06	Trang den	100	16,990	11,030	1.54	b	a	a	A
R07	Thung Pheo	15	990	3,050	0.32	b	c	d	D
R09	Cua Ong	150	14,750	9,300	1.59	b	a	a	A
R10	Thanh Thuy	100	5,010	5,220	0.96	b	a	c	C
R11	Rao Bang	160	14,780	7,640	1.93	b	a	a	A
R17	Khe Dinh	60	4,750	1,700	2.79	b	b	a	B
R19	Khe Bo	35	3,290	1,980	1.66	b	b	a	B
R20	O O	15	650	1,240	0.52	b	c	c	D
RN1	Khe Dien	30	3,510	6,210	0.57	b	b	c	D
RN2	Da Han	250	22,530	32,180	0.70	b	a	c	C
RN3	Ba Khe	150	20,170	40,350	0.50	b	a	d	D

Proposed Pumping Irrigation Projects

No.	Project Name	Irrigation area (ha)	Net Benefit (mill. VND, for 30 years)	Cost (mill. VND, including O/M)	B/C Ratio	Urgency	Impact	Economy	Comprehensive Assessment
P01	Duong dap	100	4,590	4,750	0.97	b	b	c	D
P07	Nam Cuong 1	140	8,580	6,230	1.38	b	a	b	B
P09	Nam Trung	500	21,900	22,640	0.97	b	a	c	C
P10	Du DU	80	5,970	4,110	1.45	b	a	b	B
P13	Khanh Son 2	70	3,430	3,910	0.88	b	b	c	D
P16	Nam Dong	800	70,290	36,660	1.92	b	a	a	A

No.	Project Name	Irrigation area (ha)	Net Benefit (mill. VND, for 30 years)	Cost (mill. VND, including O/M)	B/C Ratio	Urgency	Impact	Economy	Comprehensive Assessment
P17	Nam Loc	100	3,870	5,700	0.68	b	b	c	D
P19	Nam Tan	200	14,210	10,400	1.37	b	a	b	B
P20	Dai Dong 1	90	5,640	4,010	1.41	b	a	b	B
P21	Dai Dong 2	60	4,870	3,230	1.51	b	b	a	C
P22	Hong Son	80	3,590	3,620	0.99	b	b	c	D
P23	Ru Dun	200	12,490	9,980	1.25	b	a	b	B
P26	Nam thai	100	3,880	5,690	0.68	b	b	c	D
P27	Sen doi	80	4,900	3,570	1.37	b	b	b	C
P28	Ghenh station	320	20,500	13,840	1.48	b	a	b	B
P29	Hong Long 1	135	6,710	6,840	0.98	b	a	c	C
P30	Hong Long 2	200	9,040	9,800	0.92	b	a	c	C
P31	Xuan Lam	330	17,630	14,760	1.19	b	a	b	B
P33	Ru Doi	50	3,260	2,710	1.20	b	b	b	C
PN1	Nam Cuong 2	120	16,880	11,080	1.52	b	a	a	A

Proposed Inundation Mitigation Projects

No.	Project Area	Benefited area (ha)	Net Benefit (mill. VND, for 30 years)	Cost (mill. VND, including O/M)	B/C Ratio	Urgency	Impact	Economy	Comprehensive Assessment
F1	Nam Nam Dike	1,920	21,450	14,134	1.52	b	a	a	A
F2	North the Lam River	1,750	4,530	8,575	0.53	b	b	c	D
F3	Tan Loc Thuong	808	4,180	131,275	0.03	b	b	d	D
F4	Thien Nhan Mauntain	750	1,950	6,500	0.30	b	b	d	D

Proposed Drainage Improvement Projects

No.	Project Area	Benefited area (ha)	Net Benefit (mill. VND, for 30 years)	Cost (mill. VND, including O/M)	B/C Ratio	Urgency	Impact	Economy	Comprehensive Assessment
D1	Nam Nam	1,400	14,780	15,840	0.93	b	a	c	C
D2	Hong Long	950	4,880	7,408	0.66	b	b	c	D

(5) Agricultural Supporting Service

In consideration of lack of farming land to be developed, it is necessary to increase yield through introduction of new technology and input of effective materials and to rise cropping rate through intensive cropping in order to increase agricultural production in the District. The project summary for the agricultural supporting services is given in Table 4.2.4. Objective area of Agricultural Mechanization Service Center is set as about 20% of the total maximum of paddy area of 6,800 ha; that is, the priority irrigation improvement project area of 1,400 ha has been selected in consideration of efficiency, demonstration effect etc. of the project, because agricultural mechanization is very effective under complete irrigation facility. Prioritization of those projects have been studied based on inhabitant needs, impact and synergistic effect in the agricultural sector.

- Inhabitant needs : "a" rank is given to the projects required for most of the farmers and "b" rank is given to the other projects which are not.
- Impact : "a" rank is given to the projects which largely influence agricultural management and "b" rank is given to the other projects which do not.
- Synergistic effect : "a" rank is given to the project which largely influence agricultural production in the District and "b" rank is given to the other projects which do not.

Comprehensive Assessment:

If "a" rank is given for all items above mentioned, the project rank is A.
For other cases, the project rank should be B.

Project Name	Project Target	Expected Effect	Inhabitant Needs	Impact	Synergistic Effect	Comprehensive Assessment
Agricultural Extension Center	All Nam Dan: approx. 11,500 ha	Increase of agricultural production with applying new technology, and improvement of productivity with increasing of cropping area	a	a	a	A
Seed Supply Center	All paddy: approx. 8,450 ha	Increase of paddy production with supplying high quality seed	a	a	a	A
Nursery Center	Perennial crop in zone 2: 100 ha/year	Increase of production of cash crop	b	b	a	B
Agricultural Mechanization Service Center	Priority project area for irrigation improvement: approx. 1,400 ha	Increase of agricultural production with applying the adequate crop season	a	a	a	A

Regarding the improvement of living standards in the rural area, it is essential to continue supporting public extension activities which include extension of know-how

and technology for improvement of life style and agricultural management to women, and promotion of study and/or practice groups by women and active operation.

(6) Agro-industry and Marketing Improvement

Under the process that Viet Nam is promoting free market economy, the farmers in the Nam Dan District have started to convert the production system from self-sufficiency type production to market-correspondence type one. In this circumstances, it is necessary to have a development plan with policy induction model having the following objectives for the farmers being the majority of population in the District.

- To change a way of thinking of the farmers to the new and advanced one adapted to free market economy.
- To prepare the situation in which farmers can advance their activities into the field of agro-processing and trade as a down-stream field of agricultural production.
- To create new group activities of farmers along with the above objectives.
- To display these activities as the model of an advanced farmers' activities and induce other areas to introduce them.

The projects for agro-industry and marketing improvement which are suggested from above view points are summarized in Table 4.2.5. The relation between the proposed project and future agricultural activities, required input and expected output in the flow from the production stage to market stage are illustrated as shown on Fig. 4.2.4.

Prioritization of those projects has been studied based on inhabitant needs, impact, model, economy and synergistic effect in the agricultural sector.

Inhabitant needs	:	"a" rank is given to the projects required for most of the farmers and b rank is given to other projects which are not.
Impact	:	"a" rank is given to the projects which are related to most of the farmers, "c" rank is given to the projects which are related to special-interest farmers and "b" rank is given to other projects which are not.
Model	:	"a" rank is given to the projects which can be applied to other districts, c rank is given to the projects which can be applied only for Nam Dan District and "b" rank is given to other projects which can not.
Economy	:	"a" rank is given to the projects which have the potentiality for high return and "b" rank is given to other projects which do not have it.
Synergistic effect	:	"a" rank is given to the projects which largely influence to the agricultural production in the District and "b" rank is

given to other projects which do not.

Comprehensive Assessment:

If "a" rank is given for all items above mentioned, the project rank is A.

For other cases, the project rank is B.

Project Name	Inhabitant Needs	Impact	Model	Economy	Synergistic Effect	Comprehensive Assessment
Agro-processing Complex	a	a	a	a	a	A
Market-oriented Forwarding Center	a	a	a	a	a	A
Improvement of Confectionery Factory	a	a	a	a	b	B
Group Communal Facility for Silk Yarn Production	b	b	b	b	c	B
Pine Tree Gum Processing Facility	b	b	c	b	c	B
Group Communal Facility for Soy-sauce Production	b	c	c	b	c	B

(7) Rural Credit

It is clear to see the inevitability of an improvement of the rural financial system as an important step towards achieving an efficient agricultural system. However, this problem including the improvement of related laws should be solved at national level and the review of rural financial system for whole country is recommended.

Based on the experiences of other developing countries and the requirements of the development plan proposed in the Study, a basic framework has been formulated below:

Item	Basic Ideas on Rural Credit
Beneficiaries	Credit should be granted on a priority basis to projects related to agricultural production, even though credit for consumption purposes should not be neglected.
Flexibility	In order to achieve production diversification, improvement in aquaculture, agro-industry, marketing, etc., it is necessary that the loan terms (amount, period, interest, etc.) must be enough flexible to meet the requirements of each sector.
Relaxation of Financial Regulations	Make each financial institution work under free-competition conditions in order to promote the diversification and improvement of the services to the farmers.

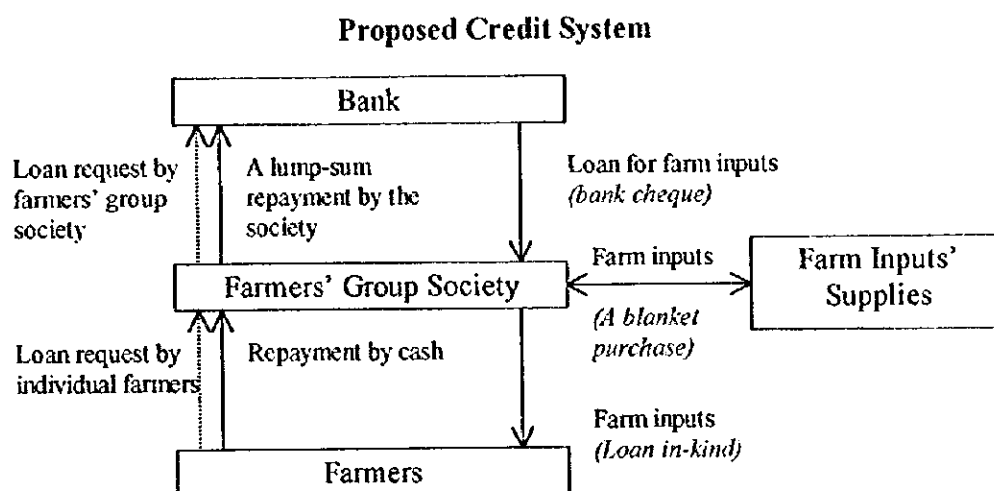
For the promotion and suitable function of rural financial system, it is necessary to increase the suitable staff of official credit institute and development of human

resources in the credit cooperatives by staff training, etc. Furthermore, the following two types of systems are recommended.

1) Group Loan System Administered by Farmers' Groups

Layout of the Group Loan System and Procedures

The purpose of the proposed credit system explained below is to provide loans to the farmers who will need them in order to purchase necessary farm inputs at the initial stage of the Project. The proposed system is based on a group loan system, which will be managed by a Farmers' Group Society; this system not only covers agricultural credit but also encompasses marketing and technical guidance. This credit system is directly related to the marketing system proposed. The figure below shows the outline of the proposed credit system:



The loan procedures under the system are as follows:

- i) The loan is limited only to the purchase of farm inputs, and its ceiling amount is set depending on the type of crops.
- ii) To receive a loan, the farmers have to form a group and select a representative. The members of such group are jointly and severally responsible for repayment of the loan for defaulters.
- iii) Farm input requirements are estimated for the group together with the required loan amount. The extension worker will provide necessary guidance to the group regarding the required inputs etc.
- iv) The bank provides a loan to the group on a lump sum basis or dividing it into two portions. Then the group purchases farm inputs in one lot.
- v) The bank provides the loan amount to the suppliers of farm inputs, and the group receives farm inputs in kind from the suppliers. In this case, the group and its representative do not need to deal with cash money, but confirm that the bank cheque be issued to the suppliers.
- vi) The representative collects the loan payment amount from each farmer, and repays it to the bank in a lump sum. The bank does not collect the loan payment amount from individual farmers.

Requisites for the Group Loan Operation

- i) The farmers themselves must thoroughly understand the credit operations involved in the system. They must also be able to carry out the procedures for obtaining the loan and have managerial and accounting knowledge for administering and monitoring the received loan.
- ii) By-laws concerning the operation of the group loan must be formulated with the agreement of all members and they must be formalized. The by-laws must specify the rights and duties of all members and the penalties in case of default.
- iii) The bank must lecture the farmers' group about the specific banking procedures for obtaining and repaying the loans.
- iv) The bank should grant a loan to the farmers' group with an interest rate lower than the normal market rate; this is because the group will take care of the administrative operations of the loan i.e., distribution, follow-up, and collection of the loans, lowering the operational costs for the bank.

2) Mutual Aid Credit Association

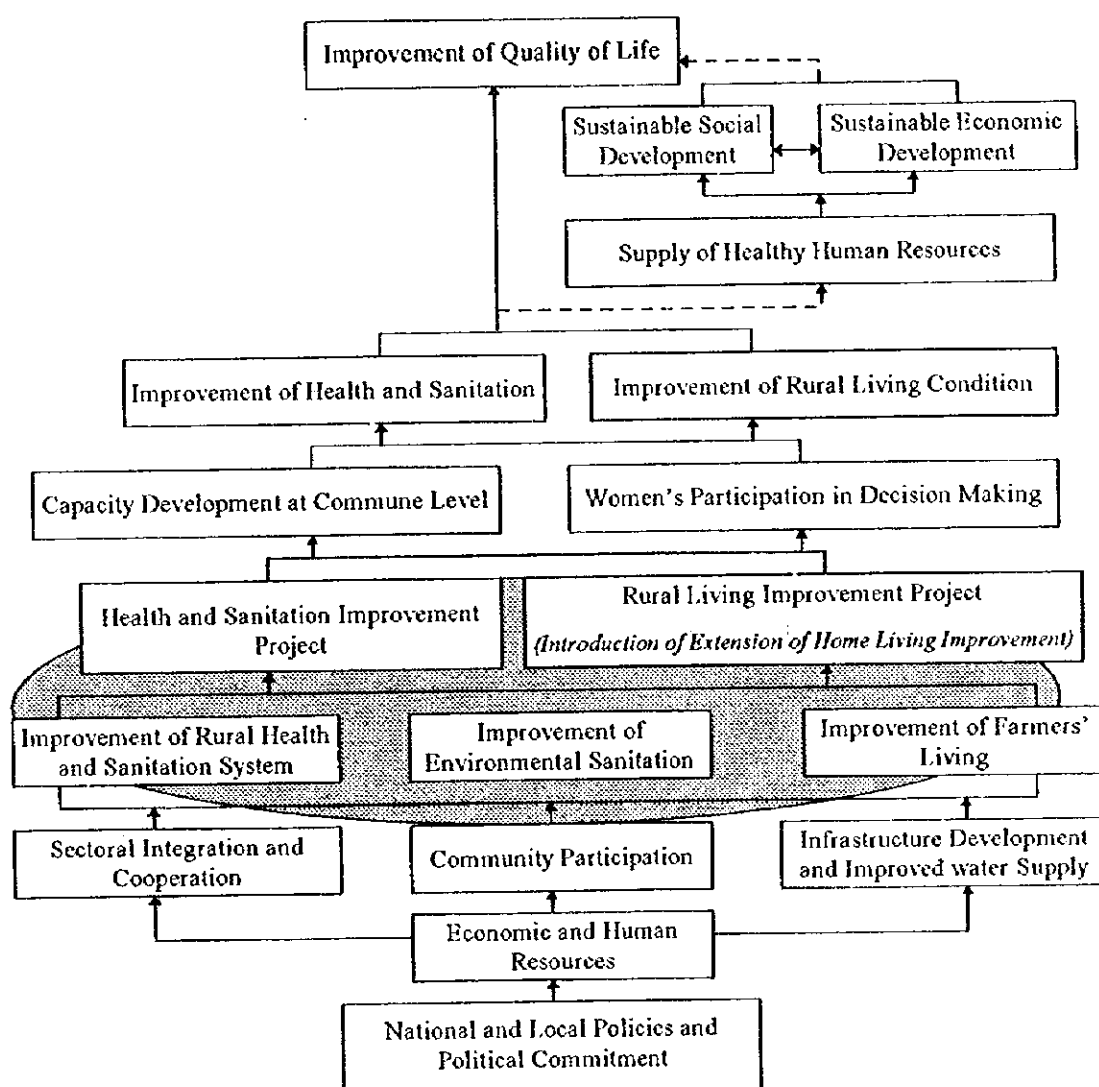
Although the above system is to be applied for duly organized and registered groups, it is also important and necessary that the farmers have a simple credit organization like the one denominated "rotating-funds credit association". This type of credit organizations, which are more modest in purpose than the system above explained, aims to provide the farmers with funds to cover loans not necessarily for production purposes but also for emergencies or consumption purposes. The implementation of these associations will help to educate the farmers on using mutual aid mechanisms. The rotating-funds credit association could be formed by about 20 members from which an association head is selected and is in charge of the administration of the system.

The members of a rotating-funds credit association, by means of monthly fixed deposits decided by all the members, make up a communal fund from which each in turn withdraws certain amounts at regular intervals. The assignment of these sums can be made through a "lottery" system or decided by mutual agreement among the members. The deposits and withdrawals continue until each member receives the agreed sum of money. The duration of the associations may be unlimited or pre-determined. The association can be open or closed, in the sense that it admits or does not admit the entrance of new members or the departure of existing ones. Penalties for defaulting must be established in the rules governing the association. These rules must be clearly defined and enforced. The peers' pressure plays an important role for the enforcement of the rules.

4.2.3 Health and Sanitation

(1) Conceptual Framework

The purpose of activities in the health and sanitation sector in a rural area is to establish a healthy society based on a healthy living of people by improving health, medical and sanitary conditions in the area. For achieving the purpose, it is necessary to take actions in the health and sanitation sector with the three points of view, a) improving health and medical system in the area, b) improving environmental sanitation and c) improving farmers' living. Since these activities are closely related with people's living in the area, it is important to introduce integral approaches, not to implement each program independently. A conceptual framework which is expected in this sector is illustrated as follows:



(2) Outline of Necessary Activity

1) Improvement of Rural Health and Medical System

a. Background

The private health care practice is not common in Nam Dan District and the majority of people rely on CHCs as the first-contact health care facility. The CHCs also play a significant role of a center to promote primary health care (PHC) through many disease prevention programs at commune level. If the nearest health care facilities are able to provide better services, the impact on improving people's health conditions will be great.

Facilities and equipment of CHCs have been deteriorating or lacking due to lack of budget and the level of technique and knowledge has been also declining due to lack of retraining of staff. So it faces difficulties to provide health services which satisfy the needs of people in the area. It would be necessary for providing effective and efficient services not only to provide direct services such as treatment and disease prevention in CHC but also to improve managing ability of services and activities. For implementing the proposed project, close coordination with the JICA's technical cooperation, "Reproductive Health Project" (RH) and the project implemented by World Bank, etc. will be necessary.

b. Objectives

- Improvement of quality and capacity of health and medical care services of CHCs in order to provide reliable health care services.
- Increase of capacity for management and monitoring related to health and sanitation activities in order to serve people effectively and efficiently.
- Improvement of poor health conditions of women and medical care services of women to prevent gynecological diseases.
- Improvement of poor health conditions of children and increase of medical care services to prevent parasite diseases aiming at reduction of youth mortality.

c. Contents

- Renovation of CHC : Building materials and necessary knowledge to renovate deteriorated facilities in CHC shall be provided. Construction works shall be conducted by local people in each commune. Priority on construction should be given to inpatient room, examination room, delivery room and sanitary facilities (well, sanitary latrine and bathroom) for patient use.
- Basic equipment and supplies which are insufficient at present shall be provided.
- Increase capacity for the management and monitoring system of health and sanitation activities shall be supported.
- A study on an appropriate users charge scheme for farmer (to supplement lack of finance by the public health sector) shall be conducted.

d. Expected Benefit

- Quality and capacity of health and medical care services for inhabitants at commune level will be improved.
- Capacity for management and monitoring related to health and sanitation activities will be improved.
- Poor health conditions of women and children will be improved.

2) Improvement of Environmental Sanitation

a. Necessity

The sanitation facilities such as well, latrine and bathroom are severely deteriorating or lacking not only at each household but also at schools. So, most of these facilities should be rehabilitated or constructed. At the same time, spread of information, education and communication (IEC) activities about health and sanitation in order to improve people's sanitary practice continuously is critically important.

Those IEC activities are the ones operated with the participation of the people in the area at commune or village level and will aim to integrate all health and sanitary related projects including the rural water supply project, and will ensure the effect and sustainability of those target projects. Especially for improvement in health and sanitation situation for children, an introduction of school-based approach along with the experiences in other countries like Japan should be considered.

b. Objectives

- Decrease in infectious diseases like diarrhea, parasite and Reproductive Tract Infections (RTI) for women which are closely related to lack of safe water, shortage of water, poor excreta management and unsanitary practice.
- Support to ensure good health and sanitation conditions by themselves in a sustainable way.
- Support to IEC which integrates all health and sanitation related projects and facilitate the benefits of the related projects like safe water supply project.

c. Contents

- Implementation of IEC activities for inhabitants based upon the consideration of building model latrines and model bathrooms as a part of CHC improvement plan.
- Including construction of sanitary facilities (latrine and well) at each school in the school improvement plan and promoting education of sanitary improvement for children.
- Support to rotating funds credit scheme for sanitary facility construction (sanitary latrine and bathroom) at households.
- Execution of developing teaching materials and allocating human resources in order to extend IEC activities. Extension of knowledge regarding sanitary (sending experts, organizing seminars and training) to people in order to support IEC activities on health and sanitation.

d. Expected Benefit

- Health and sanitation conditions of inhabitants will be improved by the decrease in infectious diseases.
- Inhabitants' self-sanitary management will be improved by the spread of information and improvement of living conditions.
- Health and sanitation conditions of children will be improved . The sanitary education received by the children will have a positive effect on the family as they will practice at home what has been learned at school.

3) Home Living Improvement

a. Necessity

For establishing healthy society in rural areas, introducing sanitary living practice in each family is the basic necessity. And it is indispensable for achieving sanitary living environment and good healthy conditions to implement health and sanitary activities at family level. At present, no formal public services for integrating the projects of improvement of living conditions with the ones regarding sanitation improvement are prepared and projects in each sector have been implemented without clarifying a priority of them. Regarding increase of agricultural production, there is a extension service. However, implementing new integrated activities is necessary in the view of improving living conditions at family level. For these activities, farmers' participation especially positive participation of women who hold an important role in rural family will be a precondition.

b. Objectives

- Improve living conditions in rural areas through linking between living standard improvement activities and health and sanitary condition changes in rural areas.
- Introduce an approach integrating many different sectors in order to improve living standard in rural areas.
- Increase women's political representation to decision making, especially for improvement of quality of life in rural areas.

c. Contents

- Support to create new public extension service scheme (sending experts, education of related organizations and their staff and organizing seminars) in order to improve living standard in rural area including health and sanitation sector.
- Support to capacity improvement in carrying out managerial activities at a commune level, particularly through participation and empowerment of women.

d. Expected Benefit

- Living conditions in rural areas will be improved in a sustainable way.
- Personal activities for sanitary management in rural areas will be increased.

(3) Proposed Projects

All projects which aim to realize the objectives mentioned above should be implemented focusing on CHC under the control of DIHC. Since development of an integrated approach is necessary for the implementation, it would be appropriate that the all proposed projects in this sector be implemented as a "Rural Health and Sanitation Project".

Project Element	Overall Activity
Improvement of Commune Health Centers (CHCs)	Rehabilitation of CHC facilities and procurement of supplement basic medical materials and equipment.
Improvement of Environmental Sanitation	Support to establishing extension system for each household.
Introduction of New Extension Service for Home Living Improvement	Support to the public extension activities for improving living standards in rural areas.

The evaluation of this project is shown below:

- Inhabitant needs** : Needs are very high for many inhabitants.
- Urgency** : In Nam Dan District, this task is considered to be achieved urgently.
- Impact** : Impact of this project is large for society and economy in the area. Impact for improving rural living standards in other areas is expected.
- Model** : Similar method of this projects can be applied in other districts.
- Comprehensive Assessment**
: Evaluation of this project is high based on the overall assessment of above-mentioned elements and ranking of this project is A.

Presently, Nam Dan District is included within the project areas of the JICA's Project-type Technical Cooperation, "Reproductive Health Project (RH Project)", which was started in June, 1997. The activities of this "RH Project" are as shown below:

Objective	Overall Goal : improving women's RH in Nghe An Province Project Purpose : improving women's RH in project model area in Nghe An Province
Activities	Cooperation for Improving Nghe An Province Maternal and Child Health & Family Planning Center (MCH/FP) <ul style="list-style-type: none"> - procurement of equipment for re-education of midwives and associate doctors and for normal deliveries in the center, including office equipment and vehicles for monitoring and visiting services - technical cooperation to project staff by Japanese experts focusing on MCH/FP center Cooperation for improving RH services of CHC located in 244 communes in the model area (Nghe An Province) <ul style="list-style-type: none"> - re-education of midwives and associate doctors (for 1 month, JICA's technical cooperation) - procurement of medical equipment for sanitary/safe delivery and family planning

	<ul style="list-style-type: none"> - procurement of materials (cement, steel, tile, etc.) for rehabilitating delivery rooms, latrines and wells (grass-root program, Ministry of Foreign Affairs in Japan) - procurement of medical materials, contraceptive devices and medicines (Viet Nam side)
Dispatching Japanese Experts	(long term expert : 3 (leader, coordinator, midwife) Short term expert : a few (for investigating present condition, operating and managing facility, managing health-related information, etc.)
Training on Counterpart Personnel	Candidate : responsible personnel of Ministry of Health (Ha Noi), Nghe An People's Committee Department of Health-MCH/FP Center, etc. Sector : health and sanitation administration, operation and management, information management, midwife education, activity of farmers' Organization, family planning, RH, etc.

The activities of RH Project do not cover all the activities of the proposed project. However, the Project covers all the activities which are considered to be implemented urgently in the proposed Project. Under these circumstances, it is concluded that the activities of the proposed project in this Master Plan are expected to be covered by the "RH Project". Regarding "Improvement of Farmers' Living", the Master Plan of this sector will take a part to support public extension activities for improving living conditions especially the activities executed by women's groups in coordination with agriculture sector.

4.2.4 Education Facilities

(1) Basic Concept for Improving Education Facilities

Under the direction of Nghe An Province, the education sector in Nam Dan District is aiming to achieve 100% lower secondary education covering child's age between 6 and 14, and 50% upper secondary education covering appropriate age group. To achieve these goals, the following basic concepts are considered:

- improvement of education facilities
- increasing level of all the teachers up to the qualification level
- introducing public and private funds to education sector
- increasing semi-public classes and extension of entering to secondary school for children aged between 15 and 17
- implementing vocational training for children who cannot go to higher education
- education for the selected students who are advanced in studying by providing better environment and high quality teachers and facilities
- providing regular education for teachers at primary schools to improve their level up to university level

In order to support to achieve these goals in education sector in Nam Dan District, the following improvement and/or construction of education facilities are proposed in this plan:

- 1) Providing school facilities and educational materials/equipment
 Improvement of general education facilities by providing electricity to the schools in which electricity is not provided, rehabilitating poor school facilities, procuring deficient education equipment in laboratory is proposed.

2) Establishment of technical middle school

It is necessary for extending technical and vocational education in the future to build new schools or increase number of class rooms. Technical middle school should be established. Subjects to be taught in the technical middle school should be selected in consideration of regional characteristics and industries and inhabitants' needs in which exist in the area, in order to have two main functions of education and training.

3) Expansion of general education center

Class rooms, educational materials and equipment which are insufficient in the general education center for training of teachers shall be expanded. At the same time, poor facilities at the center shall be improved.

4) Expansion of vocational center

Subjects to train shall be expanded from students in lower secondary school to the general. The coverage of training which is presently limited within the nearby areas shall be expanded by introducing vehicles. Also, number of class rooms and laboratories will be increased and equipment additionally provided. Subjects to train shall be planned in consideration of needs in the respective areas.

(2) Outline of Improvement

1) Electricity Supply to Schools

There are 930 classrooms (about 24% of total classrooms) which do not receive electricity services. To improve the poor lighting conditions in classrooms, the electricity supply shall be provided as shown below:

- Wiring to schools (53 schools in total) :
32 primary schools, 18 secondary schools and 3 upper secondary schools
- Wiring within schools (53 schools)
- Supplying 1,380 lighting equipment as 2 lights per classroom :
388 classrooms for primary schools, 246 classrooms for lower secondary schools and 56 classrooms for upper secondary schools

2) Establishment of Technical Middle School

In order to improve the technical and vocational education, technical middle school shall be constructed and necessary equipment shall be provided.

- Building (5,800m² in total) :
18 classrooms, laboratories, practice rooms, computer rooms, libraries, canteens, cooking rooms, teaching staff rooms, printing rooms, workshops, dormitories, gymnasium, etc..
- Equipment :

Furniture, experimental equipment for laboratories, equipment for practice rooms, computer equipment, books for library, utensils for canteens, utensils and cooking equipment for cooking rooms, printing equipment, workshop equipment, several kinds of maps, sporting goods, etc.

3) Rehabilitation of School Facilities

Present poor school facilities shall be rehabilitated as follow:

- Reconstruction of 56 classrooms :
24 at the primary schools and 32 at the lower secondary schools
- Heavy repair of 181 classrooms :
126 at the primary schools and 55 at the lower secondary schools
- Repair of 113 classrooms :
26 at the primary schools and 87 at the lower secondary schools

4) Providing Teaching Aids for Schools (primary, lower secondary and upper secondary schools)

To secure the quality of education, teaching aids and printing equipment shall be provided as shown below:

- Equipment for 32 primary schools:
geographical map, printing equipment, organ for music, books, sporting goods, furniture to install equipment etc..
- Equipment for 18 lower secondary schools:
geographical map, historical map, printing equipment, organ for music, books, sporting goods, furniture to install equipment etc..
- Equipment for 3 upper secondary schools:
geographical map, historical map, printing equipment, organ for music, books, sporting goods, furniture to install equipment etc..

5) Expansion of Regular Educational Center

To expand the regular educational center, additional facilities shall be built and equipment procured as show below:

- Building (2,600m² in total):
6 classrooms, laboratories, computer rooms, libraries, canteens, cooking rooms, teaching staff rooms, printing rooms, workshops, dormitories, etc..
- Equipment :
Furniture, laboratory equipment, computer equipment, books for library, utensils and equipment for cooking room, printing equipment, equipment for workshop, geographic maps, historical maps, sporting goods, organs for music etc..

6) Expansion of Vocational Center

To achieve the expansion of vocational center, additional facilities shall be built and equipment procured as show below:

- Building (3,600m² in total):
3 classrooms, practice rooms, computer rooms, library, canteens, cooking rooms, training staff rooms, printing rooms, workshops etc.
- Equipment:
Furniture, equipment for computer, books for library, utensils and equipment for cooking room, printing equipment, equipment for workshop, vehicles etc.

(3) Prioritization of the Project

Over all prioritization of the projects has been studied based on urgency, inhabitant needs and synergistic effect in the education sector.

Urgency : Present facilities which have serious problems are considered as "a" rank and others as "b" rank.

Inhabitant needs : "a" rank is given to the projects required for most of the inhabitants and "b" rank to other projects which are not.

Synergistic effect : "a" rank is given to the projects which have big influence on the improvement of living standards and "b" rank to other projects which do not.

Comprehensive Assessment:

If ranking of urgency is "a", the project rank is A.

For other cases, the project rank is B or C depending on the ranking of inhabitant needs and synergistic effect.

Project	Urgency	Inhabitant Needs	Synergistic Effect	Comprehensive Assessment
Electricity Supply to Schools	a	a	b	A
Establishment of Technical Middle School	b	a	a	B
Rehabilitation of School Facilities	a	a	b	A
Providing Teaching Aids for Schools	b	a	a	B
Expansion of Regular Educational Center	b	b	a	C
Expansion of Vocational Center	b	b	a	C

4.2.5 Rural Road

(1) Basic Concept for Road Network Improvement

1) Basic Concept

The road network improvement project is formulated based on the basic concept of developing a road network adequate to accommodate future transportation system and enhancement of road management systems.

To Improve Road Quality to Meet Future Transportation System

- Rehabilitation and upgrading of road pavement
- Expansion of road widths
- Rehabilitation and reconstruction of bridges
- Construction of a bridge providing a permanent access from the right bank area to the center of the District.

To Enhance Road Management Organization

- Implementation of regular and reliable programs of road maintenance and repairing by district and communes
- To secure road maintenance and repairing budget of district and commune level road management

2) Road and Bridge Improvement Plan

Road Improvement and Development

Improvement and rehabilitation of basic, major and inter-commune road networks should focus on achievement of all weather roads for vehicle traffic by pavement. For the above road networks, based on the Class VI of ROAD DESIGN STANDARD FOR MOTOR WAY (TCVN 4054-85), the dimensionS of road structure shown below are proposed.

Number of Lanes	:	1 lane
Width of Lane	:	3.5m
Width of Pavement	:	3.5m
Surface Type	:	Asphalt Pavement
Total Width	:	6.0m

Bridge Improvement

Bridges in Viet Nam are designed based on VIETNAMESE BRIDGE DESIGN CODE, and the minimum loading capacity of H13-X60 is applied as design load at present. The following bridge dimensions are recommended for renovation of old bridges or construction of new ones.

Design Load Capacity	:	H13-X60 in Vietnamese bridge design code
Bridge effective width	:	4.5 - 6.0m for basic roads 4.5m for major and inter-commune roads 3.5m for minor commune roads
Structure	:	Concrete Bridge

The existing bridges were evaluated according to their widths, loading capacities and structural safety. As a result of the evaluation, the existing bridges have been classified into 3 groups: 1) bridge to be used as it is; 2) bridge requiring minor repair; 3) bridge to be replaced (see 3.1.6(1)).

(2) Selection of Routes to be Improved

The routes to be improved are selected based on the following aspects;

- Improvement of basic road network of the area,
- Improvement of major road network of the area,
- Improvement of inter-commune road network,
- Improvement of inhabitants' access to the social and economic key facilities,
- Improvement of farmers' access to their farms,
- Inhabitants' needs.

The selected routes are justified as below and their locations are shown in Table 4.2.5.

National Road No. 46	The basic road runs through the area from east to west and link the district to the exterior economic sphere through Vinh City. This route is planned to be improved by the national and provincial government, by the year 2000.
Provincial Road No. 15A	The basic road runs through the area from northwest to southeast. The route interfaces the right bank region to the main part of the district.
42 km Dike Road	The inter-commune road links communes located at the left bank side of the Lam River and main access to the district center.
Phan Boi - Chua Road	The main access to the Chua Market, which is the second largest market in the district. The route connects Hung Nguyen and Nghi Loc District to the market and the District.
Hung Tien - Nam Linh Road	One of the main vertical access in the east region crossing Route 46. The route consists a ring road in the center of the east region together with 42 Dike Road, Route 539, Cau - Sao Road and 42 Dike - Kim Lien Road.
42 km Dike - Kim Lien Road	One of the main vertical access in the east region. Most of communes along 42 Dike including Hung Nguyen District rely access to Route 46 on this route.
Kim Lien - Nam Cat Road	The main access of Nam Cat Commune to the Route 46. The route links the east region of the study area to the Can Market located in Hung Nguyen District.
Cau - Sao Market Road	The access of communes along the left bank of the Lam River to Sao Market. The road contributes as a bypass of Kim Lien Road, a tourism road, when it is crowded in high season.
Nam Thanh Road	The inter-district road that connects Nghi Loc District to the district center of Nam Dan and Vinh City through the Route 15A and 46.
Nam Thai Road	The main access of Nam Thai Commune. It suffers from frequent and severe flooding and can not be used during the rainy season.
Northern Ring Road	The inter-commune road that links 4 communes nearby the semi-mountainous area. The route runs through densely populated area of those communes.
Nam Tan - Nam Loc Road	The main access of Nam Tan and Nam Loc Commune through densely populated area. The route will be used as a main access to the center of the Nam Thuong Commune.
Nam Nam Dike Road	The major road of Nam Nam communes connected to the Route 15A, the Xuan Lam - Khanh Son Boat Station and the Yen Xuan Railway Bridge. The route is identified as an evacuation road of flood.
Nam Kim - Nam Phuc - Nam Cuong Road	The main access of Nam Kim, Nam Phuc and Nam Cuong Commune to connect to the Route 15A and the Yen Xuan Railway Bridge. The route is identified as an evacuation road during a flood.
Nam Phuc - Nam Trung Road	The inter-district road that connects communes in Duc Tho District to Nam Nam communes. The route is identified as an evacuation road during a flood.

Other District Roads Connecting to Commune Center	Other roads which connect each commune center to the basic road network, i.e., the Route 15A.
---	---

(3) Contents of Road Improvement Plan

On the formulation of the road improvement plan, the following routes are excluded from the plan because of specific circumstances described below:

- Route 46 :

The central government and Nghe An Province have already started upgrading the route in the National Road Improvement Plan, and the improvement is planned to be completed by the year 2000.

- Route 15A Bridge crossing the Lam River :

Route 15A is justified as a basic road in the Study Area, and is also essential especially for the right bank region. Even though the route has a high priority in the Plan, the construction of a bridge crossing the Lam River is considered to be infeasible for the improvement of the rural road network in this area which has a small population and only a few economic activities compared with the scale of the investment.

However, this route has an important role for economic development of the inland area of the Province that is not developed well taking into consideration the scale of economic activities at a provincial level. To cope with the province-wide basic road network development, the route shall be improved as one complete route including the the northern section up to Route 7 and the section in Ha Tinh Province to the Route 8. In order to improve the southern section, a bridge crossing the La river, one of the main tributaries of the Lam river, has also to be constructed.

Because of the circumstances mentioned above, it is recommended that the bridge crossing the Lam River should be developed in the province-wide or larger scale development plan and it is concluded that the bridge is excluded from the Master Plan.

- Major Commune Roads

Commune roads are being improved by each commune authority with inhabitants labor participation based on their own plan. The Plan copes with district roads or higher, and communes are recommended to concentrate on the improvement of commune roads.

The contents of the rural road network improvement are as shown below:

Contents of Rural Road Network Improvement

Route	Objectives	Major Works	Quantity
Route 15A (North)	To improve access to Nam Dan Town and Vinh City from the northwestern communes by developing an all-weathered road.	<ul style="list-style-type: none"> asphalt pavement 	<ul style="list-style-type: none"> 14.8 km
Route 15A (South)	<p>To solve traffic isolation of the right bank region by developing all-weather road and connecting to the left bank.</p> <p>To shorten traffic interruption period by road embankment and small to middle size bridge construction.</p>	<ul style="list-style-type: none"> road embankment bridge construction asphalt pavement 	<ul style="list-style-type: none"> 3.0 km 4 new bridges 19.4 km
42 Dike Road	To improve access to the Nam Dan Town from communes in the left bank side of the Lam River including 3 communes in Hung Nguyen District by developing an all-weathered road.	<ul style="list-style-type: none"> asphalt pavement road widening 	<ul style="list-style-type: none"> 11.0 km 110 km
Phan Boi - Chua Road	To improve access to the Chua Market which is the second largest market in Nam Dan District by an all-weathered road.	<ul style="list-style-type: none"> asphalt pavement road widening bridge renovation 	<ul style="list-style-type: none"> 7.2 km 7.2 km replace 1 bridge
Hung Tien - Nam Linh Road	To improve access of Hung and Nam Linh Communes by developing an all-weathered road network.	<ul style="list-style-type: none"> asphalt pavement road widening bridge renovation 	<ul style="list-style-type: none"> 8.8 km 8.8 km replace 2 bridge
42 Dike - Kim Lien Road	To improve access to Route 46 from communes along 42 Dike by developing an all-weathered road network.	<ul style="list-style-type: none"> asphalt pavement road widening bridge renovation 	<ul style="list-style-type: none"> 4.2 km 4.2 km replace 2 bridge
Kim Lien - Nam Cat Road	To improve access to Route 46 through Kim Lien Commune and to Vinh City through the September 12 th Road from Nam Cat Commune by developing an all-weathered road network.	<ul style="list-style-type: none"> asphalt pavement road widening road embankment bridge renovation 	<ul style="list-style-type: none"> 7.6 km 7.6 km 2.8 km replace 1 bridge
Cau - Sao Market Road	To improve access to the Cau and Sao Market from communes along the Lam River Left Bank.	<ul style="list-style-type: none"> asphalt pavement bridge renovation 	<ul style="list-style-type: none"> 3.5 km replace 3 bridge
Nam Thanh Road	To improve access of Nam Thanh Commune by developing an all-weathered road network.	<ul style="list-style-type: none"> asphalt pavement road embankment 	<ul style="list-style-type: none"> 7.5 km 0.5 km
Nam Thai Road	To improve access of Nam Thai Commune by developing all weather road network.	<ul style="list-style-type: none"> asphalt pavement road widening road embankment bridge renovation 	<ul style="list-style-type: none"> 4.7 km 4.7 km 3.7 km replace 1 bridge
Northern Ring Road	To improve access of densely populated area of northern semi-mountainous area by developing all weather road network.	<ul style="list-style-type: none"> asphalt pavement road widening road embankment bridge renovation 	<ul style="list-style-type: none"> 15.0 km 11.0 km 3.5km replace 5 bridge

Route	Objectives	Major Works	Quantity
Nam Tan - Nam Loc Road	To improve access of densely populated area of Nam Tan and Nam Loc Commune by developing an all-weathered road network.	<ul style="list-style-type: none"> • asphalt pavement • road widening • bridge renovation • drainage improvement 	<ul style="list-style-type: none"> • 8.7 km • 8.7 km • 1 bridge replace and 1 new bridge
Nam Nam Dike Road	To improve access to reach the Route 15A , to the Xuan Lam - Khan Son Boat Station and to the Yen Xuan Railway Bridge from Nam Nam Communes by developing an all weathered road network.	<ul style="list-style-type: none"> • asphalt pavement • road widening • road embankment • bridge renovation 	<ul style="list-style-type: none"> • 9.4 km • 1.8 km • 2.8 km • replace 1 bridge
Nam Kim - Nam Phuc - Nam Cuong Road	To improve access of the low land of Nam Nam Communes, where the traffic condition in the rainy season is severely influenced by inundation. To develop an evacuation road of the region during inundation period.	<ul style="list-style-type: none"> • gravel surface • road widening • road embankment • bridge renovation 	<ul style="list-style-type: none"> • 7.0 km • 7.0 km • 4.8 km • replace 4 bridge
Nam Phuc - Nam Trung Road	To develop road network runs through the Nam Nam Region and to improve access from Duc Tho District.	<ul style="list-style-type: none"> • asphalt pavement • road widening • road embankment • bridge renovation 	<ul style="list-style-type: none"> • 3.5 km • 3.5 km • 3.0 km • replace 6 bridge

(4) Project Prioritization

The route priority in the Rural Road Improvement is evaluated with the following factors. In the comprehensive assessment of routes, higher priority factors is given to sustainability, inhabitant needs, impact and synergistic effect, because of the characteristic of the road sector as a basic infrastructure for rural development.

Evaluation Factors for Rural Road Improvement

Factor	Contents	Priority factors
Urgency	High priority is given to the route that influences harmfully to social and economic activity in the region due to the poor road condition and that is required to be improved quickly.	
Realization and Sustainability	High priority is given to the route that is envisaged to be implemented, operated and maintained by proposed organization without any serious difficulty.	√
Adaptability	High priority is given to the route that is not in any kind of contradiction from the road network improvement plan of the Province or District.	
Inhabitant needs	High priority is given to the route that meets inhabitant needs from the aspects of living, economic and production activities.	√
Impact	High priority is given to the route that impacts on regional economy and agricultural production and that has large number of beneficiaries.	√
Model	No evaluation because developing adequate rural road network system itself is considered as a model for other area.	
Economy and Synergistic effect	High priority is given to the route that has an influence to the projects from agricultural sectors which are envisaged economic effect.	√

The results of prioritization of routes are shown below:

Results of Prioritization of Routes

Route	Factors						Comprehensive Assessment
	Urgency	Realization & Sustainability	Adaptability	Inhabitant Needs	Impact	Economy & Synergistic Effect	
1a Route 15A (North)	b	a	a	a	a	a	A
1b Route 15A (South)	a	a	a	a	a	a	A
2 42 Dike Road	a	a	a	a	a	b	A
3 Phan Boi-Chua Road	b	a	a	a	a	b	A
4 Hung Tien-Nam Linh Road	c	a	a	b	a	b	A
5 42 Dike-Kim Lien Road	c	a	a	b	a	b	A
6 Kim Lien-Nam Cat Road	c	a	a	b	a	b	A
7 Cau-Sao Market Road	c	a	b	b	c	c	B
8 Nam Thanh-Nghi Loc Road	c	a	b	b	b	c	B
9 Nam Thai Road	c	a	b	a	c	c	B
10 Northern Ring Road	c	a	b	b	c	c	B
11 Nam Tan-Nam Loc Road	a	a	b	a	b	c	A
12 Nam Nam Dike Road	a	a	a	a	a	a	A
13 Nam Phuc-Nam Trung Road	b	a	b	b	b	c	B
14 Nam Kim-Nam Phuc-Nam Cuong Road	a	a	b	a	b	a	A

4.2.6 Rural Electrification

(1) Basic Concept for Rural Electrification

The present electrification rate in Nam Dan District is high, 95.8%. However, the power supply is in extremely poor condition due to deterioration of the distribution facilities. This has caused low quality of electricity supplied, frequent power outage and high percentage of power losses. Furthermore, the large amount of power losses has triggered higher power tariffs; it is two to three times higher than those in other districts at present. In addition, it is necessary for inhabitants at non-power supplied areas to be electrified in order to solve and improve their living standards disparity from other districts.

The following three proposals are recommended for the rural electrification development considering the problems in existing power supply system.

1) Extension of Electrification

1,375 households in the Study Area not having power supply are under the following conditions:

- Although some households are located along the 0.4kV low voltage distribution lines, 220 volts hookups are not installed for them (approximately 20% of the non-power supplied households);

- b. There are some households located relatively close to the terminal points of the 0.4kV low voltage distribution lines. It is possible to supply power to those households by extending the 0.4kV low voltage distribution lines (approximately 40% of the non-power supplied households);
- c. Also, there are some households that are located at a far distance from the 0.4kV low voltage distribution lines. In this case, it is not possible to extend the power lines directly. Thus, it is necessary to build a substation and new 0.4kV low voltage distribution lines in order to supply those households with power (approximately 40% of the non-power supplied households).

Low voltage distribution lines are to be extended and substations and distribution lines are to be newly constructed in order to electrify non-power supplied areas, equivalent to approximately 5 % of total households.

2) Rehabilitation of Distribution Networks

The power supply to each commune in Nam Dan District is made through the distribution lines from Nam Dan Central Transformer Station in Nam Dan Town. However, the following problems are occurring as a result of over load at distribution lines due to small capacity of the lines in each commune.

- a) Excessive voltage drops:
The voltage drops are caused by the long low voltage main power lines and poor conditions of hookups. At some power line terminals, degree of voltage drops reaches approximately 36 to 50% of the rated voltage.
- b) Large power losses:
Large power losses occur due to the small size of the electric wire. The power losses in Regions 2 and 3 are particularly large and the degree of loss reaches approximately 35 to 60% of the supplied power.
- c) High electricity fee:
As the cost of power losses are included in the electricity fee, households in the rural areas are obliged to pay two to three times the national average of 500 VND/kWh.
- d) Power interruption and electric shock accidents:
Power interruption occurs frequently due to poor conditions of hookups. In addition, accidents of electrical shock increase in rainy seasons.

In order to improve the above situation, it is of primal need to reduce the power losses in the distribution network. It contributes to even out the disparity in power tariffs and to supply adequate electrical power services. For this reason, distribution lines are to be rehabilitated and distributing substations extended.

3) Up-grading of Distribution Network

It is necessary to increase power supply in order to meet the future increased power demand with the improvement of the living standards in the District, while the power supply is sufficient for the present power demand. Therefore, the existing central substation is to rehabilitated and the distribution lines and medium voltage lines newly constructed.

(2) Outline of the Rural Electrification

1) Extension of Electrification

The following works will be required in order to provide electric service to all households in the District.

a) New distribution lines

(0.4 kV) : 84.35 km
(10 kV, 35kV) : 9.65 km

b) Total capacity of new distribution transformer : 1,300 kVA

The required works for respective power regions are shown below:

Region	Number of households requiring electricity	Required new substation (kVA)	Required new 0.4kV line (km)	Required new 10kV, 35kV line (km)
Region 1	363	300	25.3	2.5
Region 2	740	600	30.8	3.1
Region 3	272	400	28.25	4.05
Total	1,375	1,300	84.35	9.65

2) Rehabilitation of Distribution Network

The following rehabilitation plan of existing distribution lines and installation plan of new substations are required in order to improve the problems of power supply and the tariff disparity in Nam Dan District.

a. Rehabilitation of distribution lines : 133.8 km
b. Rehabilitation of medium voltage line : 34.9 km

The required works for respective power regions are shown below:

Region	Required rehabilitation of 0.4kV line (km)	Required rehabilitation of 35kV or 10KV line (km)
Region 1	62.0	16.6
Region 2	33.6	6.3
Region 3	38.2	12.0
Total	133.8	34.9

3) Up-grading of Distribution Networks

The following works are required in order to meet the increased power demand in the future:

1. Rehabilitation of central transformer station : 75 mVA, 110/22kV
2. Construction of new 110kV transmission lines : 1.7km
3. Construction of new 22kV lines : 111.7km
4. Construction of new distribution transformer : 62,500kVA (22/0.4kV)

The required works are shown below:

Region	New 110kV transmission line (km)	New 22kV distribution line (km)	Rehabilitation of 22kV distribution line (km)	New 22/0.4kV transformer & substation (kVA)	Rehabilitation of Central Transformer Station (mVA)
Region 1	1.70	0.28	52.3	29,283	75.0
Region 2	0.00	0.00	34.1	19,065	0.0
Region 3	0.00	0.00	25.3	14,152	0.0
Total	1.70	0.28	111.7	62,500	75.0

(3) Prioritization of the Project

Prioritization of the projects was studied based on factors of urgency, inhabitant needs, impact and synergistic effect for the electrification sector in order to improve the present and future power supply, and comprehensive assessment was conducted.

- Urgency: Rank "a" is given to the projects which have a big influence on the inhabitants and existing facilities, and rank "b" is given to others.
- Inhabitant needs: Rank "a" is given to the projects required for most of the inhabitants, and rank "b" is given to other projects which are not.
- Impact: Rank "a" is given to the projects which have a socio-economic impact, and rank "b" is given to other projects.

Synergistic effect: Rank “a” is given to the project which has a big influence on the production and living conditions, and rank “b” is given to other projects which do not.

Comprehensive Assessment:

If rank “a” is given for all the items above, the project rank is A.

For other cases, the project rank is B.

Prioritization Evaluation of each project

Project	Urgency	Inhabitant Needs	Impact	Synergistic Effect	Comprehensive Assessment
Complete Electrification	a	a	a	a	A
Rehabilitation of Distribution Network	a	a	a	a	A
Up-grading of Distribution Network	b	b	b	a	B

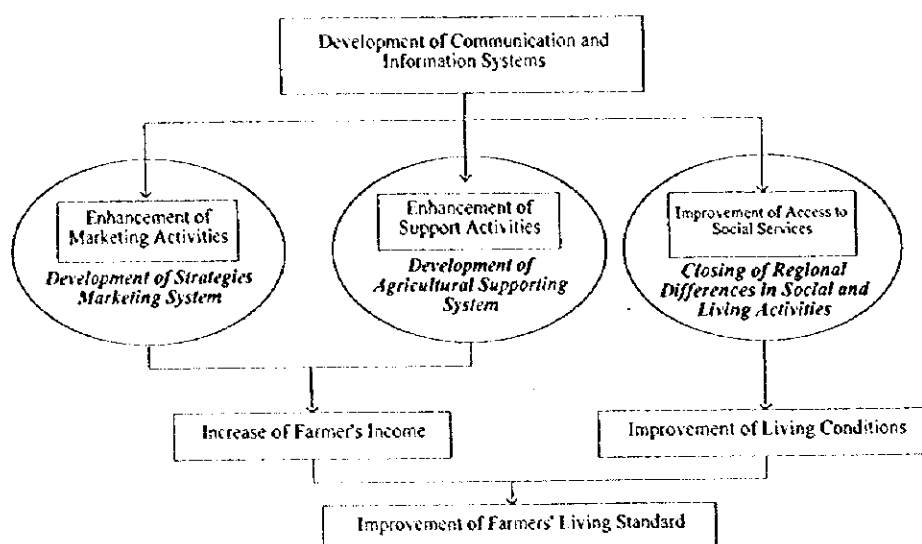
4.2.7 Communications

(1) Role and Function of Communication and Information Systems

Communication and information systems perform a very important role not only in economic development but also to close the regional economic gap, social and everyday activities in the rural areas. To achieve both economic development and regional equality, the development of a communication and information systems is indispensable. The communication and information system development contributes to improve farmers' living conditions by increasing farmers' income and betterment of living conditions. The major points concerning the role of the systems are as follows:

- To enhance farmer's marketing activity by supporting the marketing system development.
- To contribute to the effective agricultural supporting system and extension services by establishing and strengthening the communication and information systems.
- To improve living conditions in the rural areas by improving communications and facilitating access to social services.

The role and function of the proposed communication and information systems can be viewed as below.



(2) Telephone

The spread of telephone services depends mainly on the user's demand, and at present, there is a low level of demand in the rural areas due to the low income of farmers. Precisely, the spread of telephone services is expected to increase if farmers' income rises as an effect of economic growth in the rural areas. To develop a telecommunication network in the rural areas, it is essential to make an effort to implement the rural development projects for all sectors and to achieve economic growth in the region.

Furthermore, to accelerate the progress of telecommunication development in the rural areas, it is required to decrease the difference of installation costs in respective areas and to lower the installation cost itself of telephone services. It is recommended to introduce a subsidy system to cover the installation cost of telephone services from the commune center to villages or to make the public authorities and the post office to share such cost in order to reduce the gap of the installation cost.

(3) Local Broadcasting System

At present the District's TV and radio programs provide market information such as price of major agricultural products. However, the farmers seem not to use such information. The reason of not using the information may be lack of reliability and out-date of information.

The following actions are required to enhance the function of market information:

- a) To improve information quality and reliability, it is required to improve activities related to data collection.
- b) To cover the larger audience as much as possible, it is required to broadcast market information every day or once a couple of days and to increase the number of information items.
- c) To improve effective information usage on the farmers' side, it is strongly recommended to proceed with the formulation of the strategic commercial farmers' group and enhancement of its activities proposed in the marketing and agro-industry sector.
- d) For the improvement of the marketing system and promotion of its activities in the future, it is necessary to collect the adequate information and data regarding new market.

(4) Information Transmission

In the development of an agricultural supporting system especially for farming instruction and meteorological warning, the transmission of information is one of the key points. The communication and information system development should be proceeded in a closely related way with that sector. To support farming instruction, the local broadcasting services such as TV and radio will play an important role. The TV and radio programs for farming instruction should be developed together with the organization for agricultural extension proposed in the agricultural supporting sector. For transmission of meteorological warnings, the broadcasting services and public speaker system will play an important complementary role. To enhance this function, the district broadcasting and the public speaker system should work together with the organization in charge of issuing warning of disaster and relief information.

4.2.8 Rural Water Supply

(1) Basic Concept for Rural Water Supply Plan

1) Targets and Strategies

The proposed rural water supply plan aims to achieve a stable, reliable and year round continuous water supply. The highest priority in the plan is given to the improvement of areas where many people are suffering from contaminated water and shortage of safe water of wells. The following targets and strategies are set as the basic development concepts for the rural water supply projects:

a. Target:

- To provide stable, reliable and year round continuous water supply by implementing a public water supply system.
- To provide safe domestic water for the inundated area along the Lam river where shallow wells are infiltrated with flood water during rainy season.
- To provide stable and reliable domestic water for the dried-up areas located at relatively high elevation where shallow wells are dried up

during the dry season.

b. Strategies:

- To introduce deep groundwater development by providing deep wells which are expected to provide safe, stable and reliable water source.
- To introduce public water supply system effective in the use of water

2) Project Area

The Project Area is classified into 4 areas according to the topographical conditions, village distribution and water supply situation in the communes as follows:

1. Nam Dan Town area
2. Plain area
3. Inundation area along the Lam river where shallow wells are infiltrated with flood water during the rainy season.
4. Dried-up area at relatively high elevation where shallow wells are dried-up during dry season.

2) Groundwater Development

a. Available Water Sources

The available water sources in the Project Area are evaluated as stated below.

Shallow Groundwater

It is the main dominant water resource in the Project Area. It is extracted from dugwells and tubewells. The water quantity is insufficient and as for the quality, it is considered to be unsafe. Judging from the situation of water shortage in dry season, the capacity is considered to be not enough for usage through the year.

Deep Groundwater

It has not been utilized in the Project Area. However, availability of deep groundwater was identified by test boring in this Study. It is expected as the most desirable water source since deep groundwater can provide a year-round clean water in general.

Stream

There are two gravity flow intakes using streams flowing in Nam Ahn commune in the high elevations of semi-mountainous area. There are few streams water amount of which are large. Therefore, it is difficult to secure sufficient amount of water in the dry season.

River

The rivers in the Project Area have enough water for domestic use, though the water is extremely contaminated which domestic sewerage. If this source is to be utilized for domestic water supply, it is required to construct

intake facilities with treatment facilities. It is difficult to use the river water source for rural water supply systems because of high investment and O/M costs as the area has less than a certain number of population.

Reservoir

All the existing reservoirs have been developed for irrigation purpose and there are no availability to utilize them for domestic water supply. If this source is utilized, provision of an alternative water source in the dry season is required.

Rainwater

Rainwater is also considered as one of the available water sources in the Project Area. However, during the dry season, an alternative water source must be provided. Rainwater to be stored on the roof of public facilities may be utilized as a supplementary water source.

b. Groundwater Development

To solve the problems of shortage of safe water in the dry season and contaminated flood water in the rainy season, it is necessary to develop alternative water sources to supplement the shallow wells which are the main dominant water source in the area. The deep groundwater has not been utilized, because there is very little information about this aquifer, although the deep groundwater is considered of the most desirable water source. The proposed water supply plan is prepared based on the utilization of deep groundwater, although more detailed investigation and analysis are necessary before carrying out the project implementation.

(2) Water Supply Systems

1) Water Supply Methods

The following water supply methods are proposed considering the topographical condition, water source, village distribution conditions, etc.:

- | | | |
|-----------------------------|---|--------------------------------------|
| House connection method | : | Nam Dan Town area |
| Public water hydrant method | : | Plain, Inundation and Dried-up areas |

2) Water Supply Systems

Considering the topographical conditions, water sources, village distribution conditions and existing water supply situations, the following two new water supply systems and two improvement of existing water supply facilities are proposed. The water supply system proposed here is an independent water supply system to be operated and maintained by each commune.

a. New Water Supply Systems

System N-1:

House connection system using deep well. (Nam Dan Town area)

System N-2:

Public water hydrant system using deep well. (Plain, Inundation and Dried-up areas)

b. Improvement of Existing Water Supply Facilities

System I-1:

Improvement of existing gravity flow system (Nam Ahn commune)

System I-2:

Material supply of filter tank to the existing wells. (All the areas not covered by new water supply systems)

The summary of each water supply system is shown in Table 4.2.6.

3) Operation and Maintenance Plan

New proposed water supply systems are public water supply systems using deep wells. In these systems, the groundwater is pumped up from deep wells by using submersible pumps. The water is then treated and distributed through pipelines to individual houses and/or users via public hydrants. In principle, each system is independent and is not connected to other systems in adjacent communes. Therefore, the system is proposed to be operated and maintained by user's organizations under the people's committee in each commune. Water fee collection system is to be newly established for operation and maintenance of systems.

Material supply of filter tanks for the existing wells is planned in order to improve of the existing water supply facilities. Installation method of the filter tanks is taken to be same with UNICEF program which is constructed by peoples using the supplied materials with the assistance of the Agriculture and Rural Development Department under the people's committee of Nghe Anh Province.

(3) Prioritization of the Projects

Prioritization of the projects has been made based on urgency, inhabitant needs and synergistic effect in the sector.

- Urgency : Rank "a" is given to the projects which has problems to be solved immediately. Rank "b" is given to the projects to be implemented in early stage. Rank "c" is given to others.
- Inhabitant needs : Rank "a" is given to the projects required for most of the inhabitants. Rank "b" is given to others.
- Synergistic effect : Rank "a" is given to the projects which can reduce the workload for collection of drinking water in dry season and inundation period. Rank "b" is given to others.

Comprehensive Assessment:

If ranking of urgency is "a", the project rank is A. For other cases, the project rank is B or C depending on the ranking of inhabitant needs and synergistic effect.

Project	Factor			Comprehensive Assessment
	Urgency	Inhabitant Needs	Synergistic Effect	
N-1 House connection system (Nam Dan Town)	c	b	a	C
N-2a Public water hydrant system (Inundation area)	a	a	a	A
N-2b Public water hydrant system (Dried-up area)	a	a	a	A
N-2c Public water hydrant system (Plain area)	b	b	b	B
I-1 Improvement of existing gravity intake system	b	b	b	B
I-2 Materials' supply for filter tank	a	a	b	A

4.2.9 Environmental Conservation

(1) Environmental Issues in the District

The District faces serious environmental problems such as decrease of forest in the mountainous area and frequent soil erosion in barren lands. Mountainous areas in the District occupy a total of 7,706 ha of the land. However, forest areas have decreased to 4,394 ha (57%) in 1995 due to forest degradation by expansion of agricultural land, fuelwood consumption, commercial logging, war damages etc. The remaining 3,312 ha (43%) consist of barren lands. Forests in the District are covered with artificial forests; which almost all of them consist of pine, acacia and eucalyptus. Forest areas are classified into 3 types; namely special use forest, protection forest and production forest. Forest area and barren area for each classification are summarized as follows:

Forest Areas in the District in 1995			(Unit: ha)
Area	Total area	Forest area	Barren area
Production forest area	3,231	2,094	1,137
Protection forest area	3,870	2,002	1,868
Special use forest area	605	298	307
Total	7,706	4,394	3,312
(%)	(100)	(57.0)	(43.0)

Source: Nam Dan Afforestation Yards

(2) Necessity of Forest Conservation

Decrease of forest area changes the run-off characteristics of the basin during flooding and causes problems such as soil sedimentation at low land due to daily soil erosion. At the same time, recovery of forest becomes difficult due to soil erosion and the change to thin layer of surface soil in mountainous area. Therefore, effective countermeasures should be taken for forest conservation and prevention of soil erosion in mountainous area.

(3) Forest Conservation Plan in Nam Dan District

At present, forest lands in the District are managed based on the above 3 classifications. Felling of trees in protection forest areas is controlled completely; land use in special use forest area is production forest area are also regulated to prevent them from unplanned development. These regulations have recently shown their effects in Nghe An Province and Nam Dan District. Also, the "Barren Lands Regreening Program" (hereinafter referred to as the Decree 327 program), the national program for forest regeneration, has been carried out by GOV since 1993. The afforestation in the District also has been conducted by afforestation yard. The results of afforestation in the District is shown in the table below and Fig 4.2.6.

Achievement and Plan of Afforestation in Nam Dan District

	Achievement				Plan				
Year	1993	1994	1995	1996	1997	1998	1999	2000	Total
Area (ha)	68	85	192	340	(450)	(500)	(500)	(500)	-
Sub-total	684				(1,950)				2,634

Source: Department of Agriculture and Rural Development

According to the Decree 327 program, afforestation in barren lands of the District will be completed by the year 2000. The afforestation by Decree 327 program should consider the following items:

- 1) Afforestation in barren lands by Decree 327 program is very important for environmental conservation of the District. Therefore, prioritized provision of necessary budget and adequate staff should be made for the implementation of the proposed afforestation plan.
- 2) There are many reservoirs in the District. Some of them are located in barren land or in hinterland. In the rainy season, the storage capacity of these reservoirs may decrease due to soil sedimentation. Therefore, trees with stronger water retaining capacity should be planted in hinterlands.
- 3) A total 40 ha of forest areas in the District was lost due to the damage caused by harmful insects and forest fire in 1996. Damage by harmful insects covered 38 ha, and most of the damaged trees by insects were pine. Also, it is reported that cattle caused damage to saplings. Therefore, the expansion of these damages should be avoided by the implementation of a complete monitoring.

(4) Aims of Environmental Conservation Project

The basis of forest conservation is to carry out simultaneously the regulation for land use aiming the reduction of population pressure against the forest and forest generation program. However, afforestation in barren lands for forest generation requires a long term until its values are expected. Therefore, the aims of the

proposed environmental conservation are to reduce direct damages of fortune and farm land by erosion with short period's countermeasures in addition to the assistance to afforestation plan through the prevention of run-off of surface soil in barren lands and lands immediately after afforestation.

(5) Project against Gully Erosion

The project is covers the protection works against large-scale gully erosions which need urgent countermeasures. There are 3 erosion sites that need emergency countermeasures in the District. These sites are located in Khanh Son commune at the foot of the mountain along the provincial road Route15 A. These locations are shown on Fig 4.2.7. Present conditions of gully erosion at 3 sites are summarized as follows:

No.1 erosion site: This erosion was originated from bombing during the American War. Since then, this erosion has developed to the present scale. The profile of this erosion is about 50m long, maximum 10m wide in cross section and maximum 6.5m deep. In rainy season, soil run-off often covers the provincial Route15 A. There is a residential house located at the point about 10m from the erosion site.

No.2 erosion site: This erosion is in a small scale. However it is located on the steep slope of about 45 degrees in the mountain. Therefore, this erosion has the possibility of becoming wider and deeper. The present scale of this erosion is about 70m long, 5m wide in the cross section and 3 to 5m deep. A residential house is located at the point about 5m from the erosion site.

No.3 erosion site: This erosion is the biggest among the 3 sites. The profile of this erosion is about 60m long, a maximum 25m wide in the cross section and maximum 10m deep. There is a residential house at the point about 7m from erosion site. When inhabitants settled in the present location in 1990, scale of gully was about 10m wide.

On the other hand, countermeasures against small-scale gully erosions should be taken before the erosion develops. Small gullies of 0.5 - 1.5 m width are possible to be stabilized by the protection works to be able to carry out by local residents. Such protection works can be carried out using easy-to-implement methods as stone masonry works, fence, weir and vegetation works. Therefore, these works should be conducted by local inhabitants under the direction of specialists of the District.

4.3 STUDY ON MASTER PLAN

4.3.1 Selection of Priority Projects

In consideration of the relation and balance among the priority projects selected from respective sectors under an all-encompassing viewpoint of the objective of the Master Plan, the prioritization of the projects has been re-evaluated and improved in addition to the comprehensive assessment of the projects in each sector. In the Master Plan as a whole, project relation and basis of prioritization and their synergetic effects of the projects in each sector are considered as follows:

Sector/Project	Project Relation and Basis of Prioritization	Synergetic Effects
Agriculture		
1. Irrigation/ Drainage	Facilities of irrigation and drainage are the basic infrastructure for agricultural production. So the presently out-dated facilities must be rehabilitated or replaced with new facilities. Based on the total evaluation in the sector, high priority is given to the projects which show a high project profitability and cost performance. Project benefit is measured based upon the following factors: <ul style="list-style-type: none"> - Improvement of irrigation : increase of production as an effect from irrigation - Improvement of drainage : increase of profit by changing cropping pattern 	Synergetic effects with projects of agricultural extension, marketing, rural road and rural electrification are expected to be great.
2. Supporting Service Agricultural Extension Center	High priority is given because the project plays an important role by providing a new agricultural management method.	Synergetic effects with the production related projects are expected to be great. However, it is impossible to measure the quantitative effects.
Seed Supply Center	High priority is given, because the improved high quality seed directly influences the increase of production over the District.	Synergetic effects with the irrigation projects are expected to be great.
Nursery Center	Because of the limited beneficiaries, impact of this project over the area is rather small compared with other projects.	Synergetic effects with marketing and rural road projects can be considered. However, the effects are expected to be low.

Sector/Project	Project Relation and Basis of Prioritization	Synergetic Effects
Agricultural Mechanization Service Center	High priority is given due to the expected effect on the following aspects: <ul style="list-style-type: none"> - Improvement of farmers' working conditions related to field preparation works, - Increase of farmers' income by introducing cattle raising instead of draft animals, and - To accelerate forming farmers' groups through the experience gathered through operation of agricultural machinery by cooperatives. 	Synergetic effects with the rural road project are expected to be great.
3. Agro-industry and Marketing		
Agro-processing Complex	High benefits are expected due to increase of added value of surplus agricultural products.	Synergetic effects with the production related projects are expected to be great.
Marketing-oriented Forwarding Center	This facility is necessary as the transition to the new farm management.	(same as the above)
Improvement of Confectionery Factory	This project has high model effect as a local industry. However urgency of its implementation in the District is low in consideration of the economic trend of Vinh City.	Synergetic effects on specific agricultural production are expected. However, the results are expected to be low.
Group Communal Facility for Silk Yarn Production	This project has high potential as a small scale agro-processing. However, economic impact in the area is rather small.	(same as the above)
Group Communal Facility for Soy-sauce Production	(same as the above)	(same as the above)
Pine Tree Gum Processing Facility	(same as the above)	(same as the above)
4. Rural Credit	This project is necessary for developing a new farm management but consideration at the national level is required. So, only a basic idea for this project is presented. Thus, even though its necessity is recognized, this project is excluded from the Master Plan.	Synergetic effects with the production related projects are expected to be great. However, it is impossible to measure the quantitative effects.

Sector/Project	Project Relation and Basis of Prioritization	Synergetic Effects
Health and Sanitation		
Rural Health and Sanitation Improvement	<p>This is an important project to support the improvement of health and sanitary conditions as a part of improving people's life.</p> <p>However, it is concluded that the activities in this project are expected to be covered by "Reproductive Health Project" supported by JICA's Project-type Technical Cooperation. Regarding "Improvement of Farmers' Living", this Master Plan will take a part to support public extension activities for improving living conditions especially the activities executed by women's groups etc. in coordination with agriculture sector.</p>	Synergetic effects with projects of other sectors can not be measured quantitatively.
Education Facilities		
School Electrification	Improving present conditions of educational environment is important in the view of improving quality of education. And this project shall be implemented before other projects in the view of enhancing motivation of learning.	Synergetic effects with the rural electrification project are expected to be great. However, it is impossible to measure the quantitative effects.
Rehabilitation of School Facility	(same as the above)	Synergetic effects with the projects in other sector are small and the effects can not be measured quantitatively.
Providing Teaching Aid for Schools	This project is required in order to improve quality of education. However, degree of urgency of this project is low.	(same as the above)
Establishment of Technical Middle School	This is the necessary project for fulfilling needs of future education. However, degree of urgency of this project is not recognized.	Synergetic effects can be considered in the view of development of human resources. However, it is impossible to measure the quantitative effects.
Expansion of Regular Educational Center	This is the necessary project for fulfilling residents' needs of education; however, degree of urgency for this project is not recognized.	(same as the above)
Expansion of Vocational Center	(same as the above)	(same as the above)

Sector/Project	Project Relation and Basis of Prioritization	Synergetic Effects
Rural Road	Road networks in the area must be improved step by step because the effects largely influence not only the development of local economy but also the health/sanitation, education and other residential activities in general. Based on the overall evaluation of the sector, priority is given to the projects which are highly matched with projects in other sectors.	Synergetic effects with the projects in other sectors are expected to be great. However, it is impossible to measure the quantitative effects.
Rural Electrification		
Electricity New Supply	Supply of electricity is necessary for improving people's life and electrification for the areas where there is no electricity.	Synergetic effects with the projects in other sectors are small and the effects can not be measured quantitatively.
Rehabilitation of Distribution Network	This project has a great impact over the District not only for reducing losses of supplied electricity but also improving quality of electricity supply. This is also important for activities of other sector's projects.	Synergetic effects with the projects in other sector are great.
Upgrading Distribution Network	Considering demands of electricity in the future, this project is necessary. However, urgency of this project is not recognized.	Synergetic effects with the projects in other sectors are small and the effects can not be measured quantitatively.
Communications	Based on the this characteristics of communication sector, this project is proposed to support projects in other sectors such as supporting services, and agro-industry and marketing improvement. Therefore, sector projects independent from other sectors are not proposed in the Master Plan.	
Rural Water Supply	Projects of rural water supply are important for basic human needs to be fulfilled and influences of the project to other sectors including health/sanitation are great. The projects have to be implemented in order. Based on the overall evaluation in the sector, priority is given to the projects which are highly matched with projects in other sectors.	Synergetic effects with the projects in other sectors are expected to be great. However, it is impossible to measure the quantitatively effects.

Sector/Project	Project Relation and Basis of Prioritization	Synergetic Effects
Environmental Conservation		
Erosion Control	This is important as a project related with land resources conservation.	Synergetic effects with the projects in other sectors are small and the effects can not be measured quantitatively.

As a result of re-study of comprehensive evaluation of the projects for each sector based upon the evaluation standard of overall prioritization mentioned above, there is no change in the priority order of the projects and the following projects have been selected as the priority projects.

List of Priority Projects (Priority A)

Project	Cost (million VND)	Remarks	Project	Cost (million VND)	Remarks
Irrigation/Drainage			Education Facilities		
Reservoir Irrigation Project		Irrigated area (ha)	School Electrification	1,364	
Ho Thanh	7,542	80	Rehabilitation of School Facility	22,264	
Trang den	12,032	100	Rural Road		Distance (km)
Cua Ong	10,252	150	Route 15A (North)	17,554	14.8
Rao Bang	8,408	160	Route 15A (South)	41,433	19.4
Pumping Irrigation Project			42 Dike Road	14,790	11.0
Nam Dong	22,661	800	Phan Boi-Chua Road	16,083	7.2
Nam Cuong 2	9,966	120	Hung Tien-Nam Linh Road	13,416	8.8
Inundation Mitigation Project, Drainage Improvement Project		Covering area (ha)	42 Dike-Kim Lien Road	8,761	4.2
Nam Nam Dike	3,952	1,920	Kim Lien-Nam Cat Road	13,046	7.6
Agricultural Supporting Services			Nam Tan-Nam Loc Road	16,620	8.7
Agriculture Extension Center	2,085		Nam Nam Dike Road	16,120	9.4
Seed Supply Center	21,719		Kim-N. Phuc-N.Cuong Road	20,468	7.0
Agricultural Mechanization Service Center	41,804		Rural Electrification		
Agro-industry and Marketing			Electricity Supply	37,625	
Agro-processing Complex	16,234		Rehabilitation of Distribution Network	75,965	
Market-oriented Forwarding Center	4,027		Rural Water Supply		
Health and Sanitation			Public Water Taps System for Inundation Area	53,617	
Rural Health and Sanitation Improvement	0		Public Water Taps System for Dried Up Area	16,052	

Project	Cost (million VND)	Remarks	Project	Cost (million VND)	Remarks
			Installation of Filter Tanks to All of Existing Wells	5,808	
			Environmental Conservation		
			Erosion Control	2,074	

Note :- Administration fee, engineering service fee, physical contingency are included in Project cost. Price escalation is excluded.

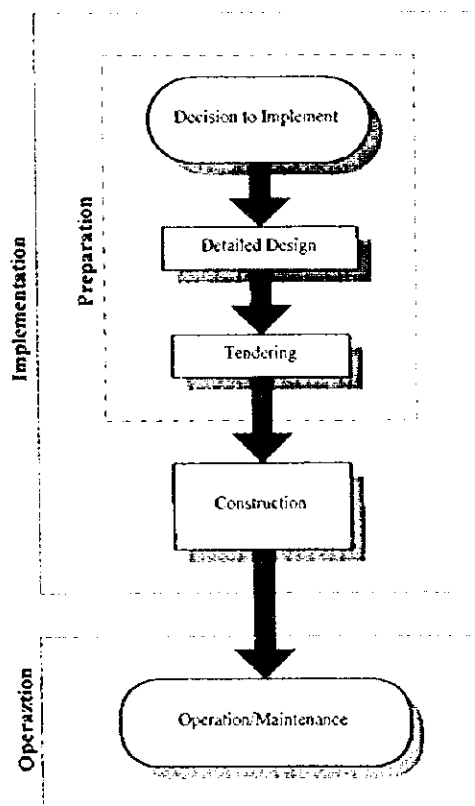
- The project cost of "Rural Health and Sanitation Improvement" is not considered in this Master Plan, since the activities in this project are expected to be covered by the on-going "Reproductive Health Project" supported by JICA's Project-type Technical Cooperation.

4.3.2. Implementation and Operation/Maintenance Plan

(1) Implementation System

The follow of implementation of each project proposed in each sector divided into implementation and operation stages is illustrated as the chart on the right:

The projects can be classified into two groups by their different focuses. One is the group of projects focusing on infrastructures and the other is the group of projects focusing on the support to farmers activities. The projects can also be classified into three groups by their necessity of technical and financial assistance from international organizations, their necessity of implementation at national or provincial level, and their possibility of implementation by the inhabitants themselves. Implementation system and operation / maintenance plan for each project should be examined by classifying the projects as public organization's project, private sector's project and crossover project (including enterprises) according to the characteristics of each project.

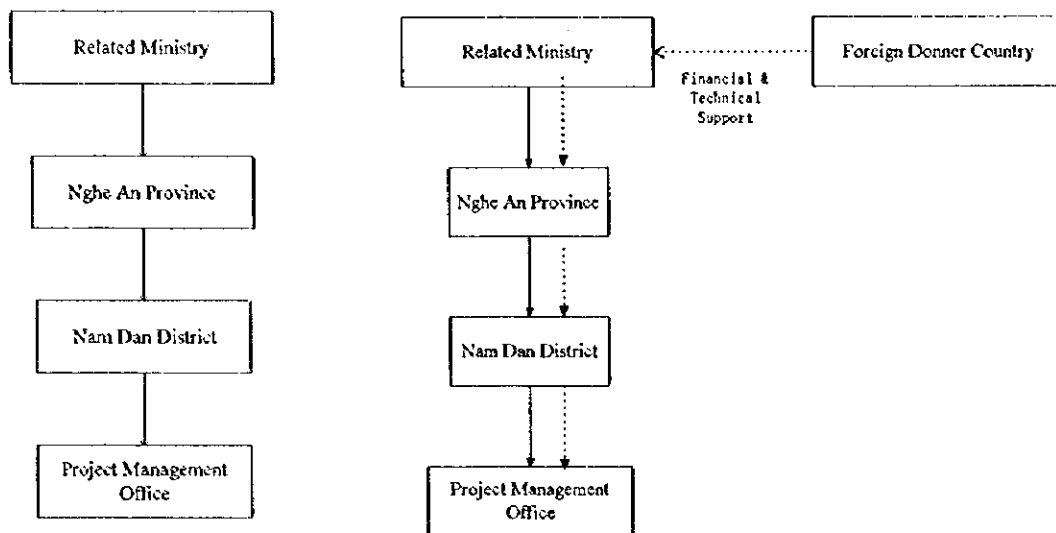


Flow of Implementation

Considering the above-mentioned conditions, the projects proposed in this study are classified into the following groups and their implementation and operation/maintenance systems are examined:

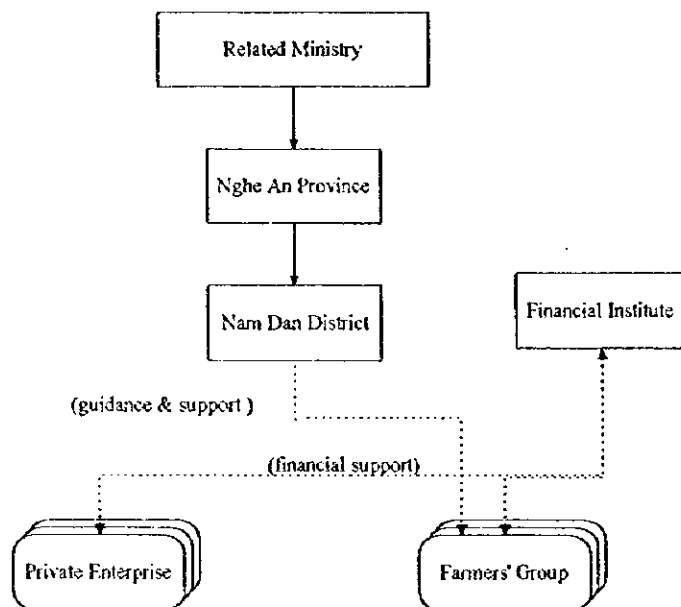
1. Projects which are possible to be implemented by Viet Nam herself,
2. Projects for which assistance from outside the country is necessary,
3. Projects which focuses on private organizations including enterprises.

The hypothetical organizational structures of implementation and operation/maintenance systems according to this classification are illustrated as follows:



1. projects which are possible to be implemented by Viet Nam herself

2. projects for which assistance from outside the country is necessary



3. projects which focuses on private organizations including enterprises

(2) Implementation Plan

The implementation plan of the projects proposed in each sector is studied based on the prioritization discussed in the previous section. In this process, implementation at each stage is considered in order to realize effects of each project efficiently by focusing on the relationship among projects and synergetic effects of the projects. The implementation plan as a result of study in consideration of construction schedule is shown in Fig. 4.3.1.

(3) Project Cost

The cost of the projects proposed in this Master Plan excluding price escalation is 553,744 million VND for the priority "A" projects, 341,958 million VND for the priority "B" projects, 1,023,449 million VND for the priority "C" projects and 1,029,361 million VND as the total for the whole projects.

Summary of Project Cost

Sector	Project Cost(million VND)			Total
	Priority "A"	Priority "B"	Priority "C"	
Agriculture				
Irrigation and Drainage	74,815	54,084	94,706	223,605
Supporting Service	65,608	5,085	-	70,693
Agro-industry/Marketing	20,261	10,643	-	30,904
Health/Sanitation	0-	-	-	0
Education Facilities	23,628	52,991	26,439	103,057
Rural Road	178,291	66,286	-	244,577
Rural Electrification	113,590	142,720	-	256,310
Rural Water Supply	75,477	10,150	6,602	92,229
Environmental Conservation	2,074	-	-	2,074
Total	553,744	341,958	127,747	1,023,449

*: Project cost includes administration cost, consultant fee and physical contingency, and excludes price escalation

*: The project cost of "Rural Health and Sanitation Improvement" is not considered in this Master Plan, since the activities in this project are expected to be covered by "Reproductive Health Project" supported by JICA's Project-type Technical Cooperation.

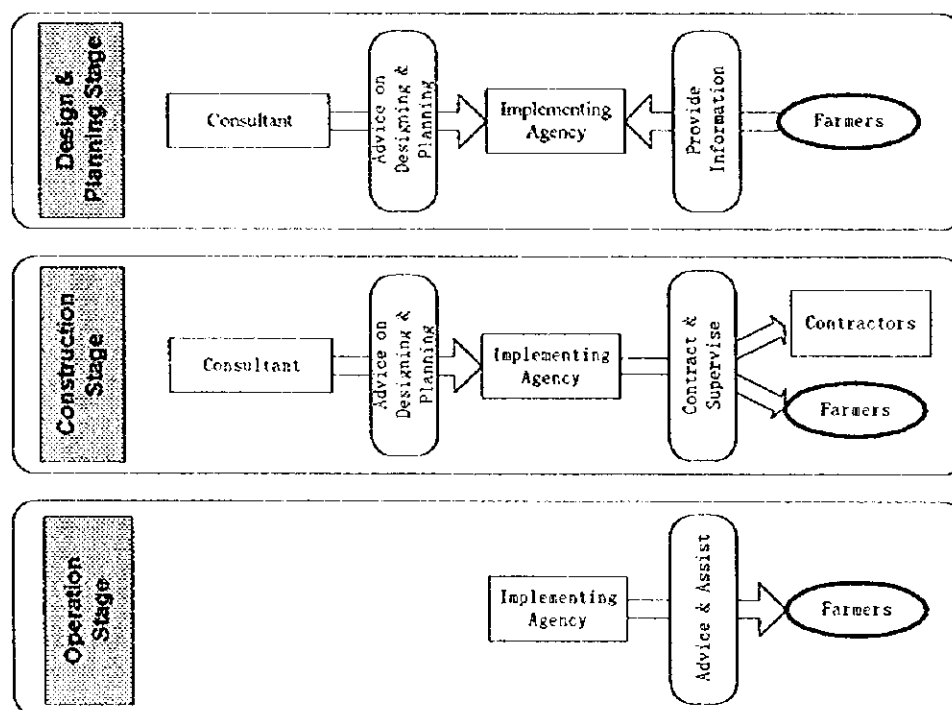
(4) Operation Plan

It is indispensable for the efficient and effective implementation of the proposed projects to facilitate the necessary system of operation/maintenance after the completion of construction works. Nam Dan District will be responsible for a part of operating / maintaining projects. However, each section of the District related to each project will be in charge actually. Operation/maintenance system differs for each project and it will be managed by responsible section. Operation/maintenance has been practiced in Viet Nam for irrigation and road facilities with farmers' participation. And, management system of farmers' organization centered by the people's committee in the district or commune has been relatively well established. Since organizations in this area have been relatively well

functioned as viewed in the example, the existing organizations are principally employed in the operation/maintenance system for the proposed projects. However, increasing number of staff, enhancing training and local management and allocating finances are necessary in the case that staff and ability of existing organization are insufficient. Especially for the project that operation by farmers' organizations and maintenance with farmers' participation are planned, it is necessary to consider carefully the available human resources, ability and financial resources of the organization.

(5) Farmers' Participation

This Project shall be implemented and managed in consideration of farmers' participation in order to reflect farmers' intention at each stage of its implementation. At the planning stage of the Project, farmers are to provide necessary information for planning and the implementing agency is to reflect farmers' intention to the planning. Also, farmers are directly involved in construction for some projects. At the operation stage, farmers are involved in the project as beneficiaries. On the other hand, guidance by the governmental organization for the farmers to positively participate in the operation of the project should be considered even at the stage of operation by the governmental organization in the case of the projects being expected to be managed by the farmers themselves. The concept of farmers' participation in each stage of "designing & planning", "construction" and "operation" is illustrated in the following chart:



Farmers' Participation on Implementation

4.4 INITIAL ENVIRONMENTAL EXAMINATION

4.4.1 Relevant Laws and Conventions

(1) Law on Environmental Protection

Law on environmental protection was ratified by National Assembly on December 27, 1993, and the statute was issued on January 10, 1994. In this law, there are very clear articles to prevent environmental pollution in general; there are also articles concerning the exploitation of agricultural land and water sources. Article 2 of their law concerns prevention and combat against environmental degradation, pollution and incidents. Article 14 deals with the exploitation of agricultural land, forest land and the use of chemical fertilizers and pesticides. Article 15 deals with protection of water sources and drainage systems. Article 38 defines responsibilities for environmental management.

(2) EIA (Environmental Impact Assessment) System and Procedures

MOSTE (Ministry of Science, Technology and Environment) signed the temporary guideline of EIA in September 1993 for the implementation of law on environmental protection. The guideline includes general conception, contents of EIA report, organizations responsible for EIA report and the schedule of approving EIA report.

The Government Decree (No.175 / CP) providing a guidance for implementation of the EIA was distributed in October 1994. According to this Decree, all socio-economic development projects should be implemented accompanied by EIA.

(3) Ratification to International Conventions

The Government of Viet Nam (GOV) recognizes the importance of the participation in and the implementation of international conventions. As GOV needs the assistance from international community, entry to international convention is inevitable.

Main international conventions that GOV has entered are as follows:

- 1) Convention on Wetlands of International Importance Especially as Waterfowl Habitat (RAMSAR), [Sep 20, 1988]
After entering this convention, Xuan Thuy area (Nam Ha Province) was designated on March, 1989 as Wetlands of International Importance.
- 2) Convention concerning the Protection of the World Cultural and Natural Heritage, [Oct 19, 1982]
After entering this convention, two historical sites were designated as World Heritage Sites, namely:
 - a) Halong Bay (Quang Ninh Province)
 - b) Hue City (Thua Thien Hue Province)

- 3) Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), [Jan 20, 1994]
- 4) United Nations Convention on the Law of the Sea, [Jul 25, 1994]

(4) National Parks and Protected Areas

1) National Parks and Protected Areas

There are 8 national parks, 50 protected areas and 29 cultural-historical and environmental reserves in Viet Nam (1993). Furthermore, two other national parks and three protected areas are proposed to become environmental reserves.

2) Historical Protected Area

There are 2,102 historical protected areas in Viet Nam (October, 1996). These protected areas are classified in the following 4 categories and 109 sites are designated as important cultural properties of the country.

a) Architectural and art relics	962	sites
b) Historical relics	1,062	sites
c) Landscape site	58	sites
d) Archeological relics	20	sites

4.4.2 Organizations related to Environment

The State Committee for Sciences (SCS) was restructured in October 1992 to form the Ministry of Science, Technology and Environment (MOSTE). The Law on Environmental Protection, approved by the National Assembly in December 1993 and the implementing regulations to it (Decree 175 / CP) promulgated in October 1994, sets out the function of MOSTE.

MOSTE is the main central government agency responsible for the overall environmental management in the country. The government has instructed the sectoral ministries to include environmental protection in the mandates of their science and technology departments. Except for MOSTE, sectoral ministries have direct technical links with the provincial services for their respective sectors. Although the sectoral ministries play an important role in establishing policies, programs, etc. for investment, they are not directly in charge of control of implementation at the field level except for projects implemented by the central government. Much of the implementation responsibility rest on the province and district governments.

4.4.3 Initial Environmental Examination (IEE)

Main objective of IEE is to evaluate whether EIA (Environmental Impact Assessment) is necessary for the further study or not. Table 4.4.1 summarizes the estimation of the environmental changes and assessment of the influence by the changes. The

environmental items to be assessed correspond to "Environmental Guideline for JICA's Development Study on Agricultural and Rural Development Projects".

The results of IEE are as follows:

(1) Social Environment

The proposed development plan seldom affects: 1) Social aspects; 2) Demographic issues and 3) Economic activities or socio-economic issues. The reasons are as follows: Main economic activities in the District are agriculture-related ones and most of the inhabitants in the District are farmers who can be benefited by the rural development. Average annual population growth rate in the District is 1.4 % and this is lower than that of Nghe An Province (2.5%). This trend is estimated to prevail for the time being.

Concerning the item (2) Involuntary resettlement of the category 1) Social aspects, there is a possibility that some of the inhabitants lose their lands and houses partially due to the expansion of road width. Also, 8 residential houses will be obliged to move out due to the establishment of a new pumping station. Therefore, its effects should be kept at minimum and supporting measures such as land guarantee and resettlement guarantee for those affected should be given.

For items (11) Adjustment of regulation of water or fishing rights and (12) Changes in social and institutional structures of category 4) Institutional and Custom related Issues, these will be slightly affected by the development plan. As the irrigation aimage plan includes rehabilitation of irrigation canals, rehabilitation/construction of reservoirs and rehabilitation/construction of pumping stations are proposed, there will be a change in water requirements. Thus, irrigation networks will need adjustment of water rights. However, any troubles have out been reported.

According to the agricultural supporting plan, establishment of agricultural machinery supply center, reinforcement of supply system of agricultural materials and farmers' organizations, etc. are proposed. Social structures such as farmer's organizations have to be changed.

Concerning the health and sanitation items (15) Outbreak of endemic diseases and (16) Prevalence of epidemic diseases, they should be paid attention. In the District, 4 schistosomiasis and 174 malaria cases were recorded in 1995. Thus, specific consideration is required regarding the inadvertent creation of habitats of pathogenic insects due to irrigation development.

According to the farming program, utilization of agrochemicals in the development plan is almost the same level as the present. Thus, the items (14) Increased use of agrochemical and (17) Residual toxicity of agrochemical should not present any problem.

12 ruins and cultural properties found in the District including Kim Lien Village, which are important cultural assets of the country, will not be affected by the development plan due to no works being carried out at those sites.

(2) Natural Environment

Most of the District consists of cultivated land such as paddy field and upland field and artificial forests of pine, acacia and eucalyptus. Thus, valuable species and endemic species are seldom found in the District. The Lam river has a mangrove forest of 100 ha near its estuary. However, this mangrove will be not directly affected by the development plan. No coral reefs can be found near the estuary.

Soil erosion should be paid attention. At present, some erosions are observed at the foot of the mountains in the District and most of these erosions are gully erosion. As the development plan needs a large quantity of soil for road, reservoir and flood protection works, excavation works should be carried out adopting a suitable excavation and treatment methods for excavated pits to avoid future soil erosion.

The development plan does not affect hydrological conditions, water quality, water temperature and atmosphere. However, soil sedimentation at the irrigation facilities sites should be considered. Especially, the storage capacity of the reservoirs which have barren land in hinterlands may decrease due to soil sedimentation.

(3) Conclusion and Recommendation

Based on the results of the study, the degree of the possible impact is assessed using the following three categories.

- A: Impact is deemed strong
- B: Some impact
- C: Impact is very small

Table 4.4.1 summarizes the estimation of the environmental changes and assessment of the influence by those changes. The results of IEE are as follows:

- (1) 40 items out of total 47 items are evaluated as falling into "C" category.
- (2) 7 items are evaluated as falling into "B" category.
- (3) No item is evaluated as falling into "A" category.

Thus, it is concluded that due to the reasons explained below, the environment will not be seriously affected by the implementation of the proposed project. As a consequence, EIA is not necessary during further stages of the study.

The reasons supporting the above conclusions are as follows:

- 1) Most of the Study Area consists of cultivated land and artificial forests. Thus, the implementation of the development does not directly affect the natural environment, especially concerning valuable species and protected areas.

- 2) In the agricultural development plan, mostly rehabilitation or renovation of existing facilities (especially irrigation facilities) is proposed. Thus, the implementation of the development does not seriously affect the environment.
- 3) Main economic activity in the District is agriculture. Agricultural population represents 94 % of total population of the District. Thus, this rural development benefits almost all the inhabitants and the implementation of the development does not seriously affect the social environment.
- 4) There is a possibility that some of people may be obliged to move out of their houses due to the expansion of the road width. However, they can be directly benefited by the expansion of the road width; this problem can be solved with a proper land guarantee for those who are affected. Also, the resettlements of 8 residential houses are planned due to the establishment of a new pumping station. However this problem also can be solved with an enough resettlement guarantee and their living assistance.

However, the excavation of soil material and soil erosion should be paid attention. At present, there are some former sites of excavation to get soil material in the District. These sites are located at the foot of the mountains and soil erosion may be originated from these sites.

Soil material is needed for the following projects.

- New road construction and rehabilitation of existing roads
- Rehabilitation/renovation and new construction of reservoirs
- Rehabilitation/renovation and new construction of dikes for flood control

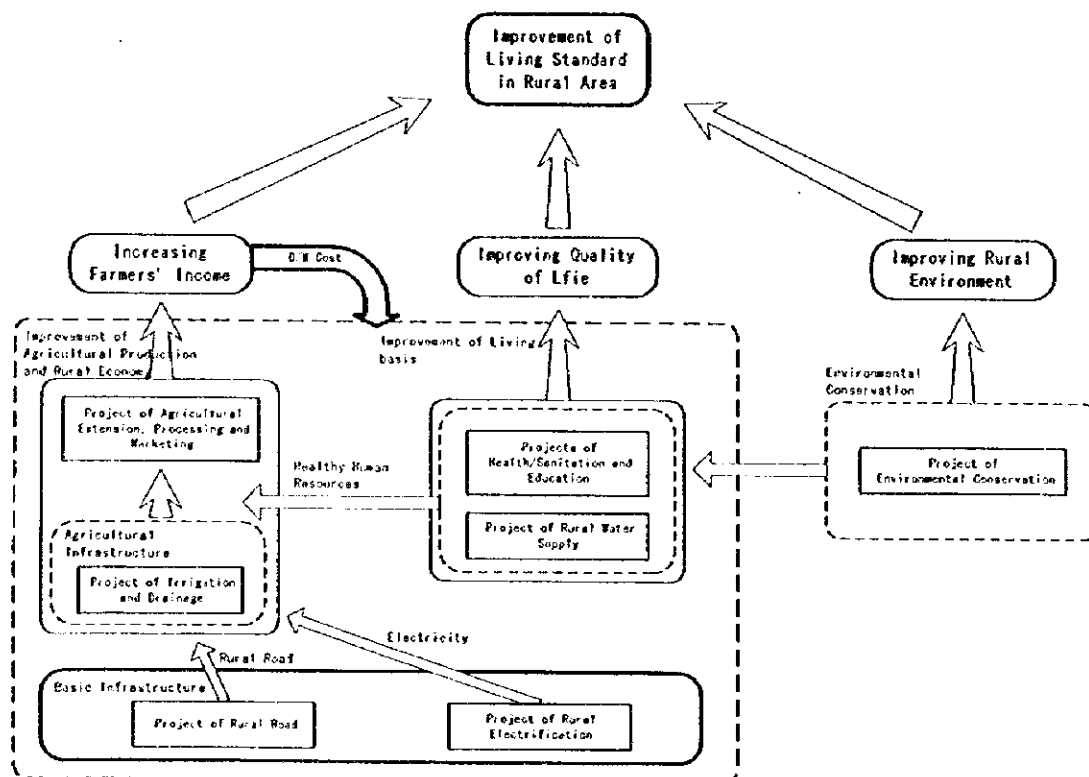
Thus, regulations regarding the excavation and the implementation of monitoring activities are needed for protection against future soil erosion.

4.5 SUGGESTION FOR THE IMPLEMENTATION OF MASTER PLAN

This Master Plan is composed of the proposed projects that are necessary to realize the goal of rural economy, life and environment set for the year 2010 in the development plans of Nam Dan District and Nghe An Province. The projects in this plan are prioritized by considering their urgency, reality, adaptability, farmers' needs, sustainability, model-wise, economic and synergetic effects, while considering the relationship with the development plans in Nghe An and Nam Dan.

The concept of the expected effects by implementing this Project is illustrated below. Accordingly, living standards in rural area are improved with the increase of income and improvement of living conditions by improving basis for living and improving agricultural production and rural economy. At the same time, it is indispensable for a stable development of rural area to improve rural environment. Also, appropriate maintenance and management will become possible with economic increase of farmers and rural area. And these conditions also make the re-investment to building infrastructure possible. This cycle of resources is essential for the sustainable rural development. By implementing this Master Plan, a future model of rural society will be realized with the harmonic balance of farm households, rural economy, rural living conditions and rural environment.

However, in order to implement the projects in the Master Plan on schedule, the project budget of VND1,023,449 million is necessary. So, an early complete implementation of the M/P may be difficult in consideration of present annual budget of Nam Dan District. The step by step implementation of the projects which have higher priority in consideration of the balanced development as a rural development would be one of the choices, even though resulting positive effects are delayed.



(1) Agriculture

Increase of agricultural production with the realization of efficient land use by expanding agricultural infrastructure and technical support is extremely important. However, if a part of farming management expressed as “how to sell produces” are not improved, increase of farmers’ income in a drastic scale can not be expected. It is necessary for improving farming management to improve farming scale under the present condition. For this, farming practice by farmers’ group will be the basic condition. It is very important for individual farmers to understand such condition and to contribute their efforts for extending new farming practice. Also, supporting system for such activities of individual farmers will be important.

On the other hand, technical consideration on supporting system is important. However, financial consideration is also important and application at national level is indispensable. Financial supporting system for the farmers is expected to be established.

Furthermore, improving rural living conditions is essential for developing high quality human resources which will take agriculture themselves and for realizing balanced rural development. To fulfill these essentials, it is necessary to support public extension activities (extension of know-how and technology for improvement of life style and agricultural management to women, and promotion of study and/or practice groups by women and active operation).

(2) Health and Sanitation/Education Facilities

Improvement of health and sanitation and education facilities is also indispensable for achieving balanced rural development. Since inhabitants are expected to bear a large part of promoting this improvement, it is better to obtain understanding of inhabitants regarding the purpose of the improvement and to implement the project in the way for inhabitants to be able to positively take their responsibilities.

(3) Rural Water Supply

Rural water supply is largely related with supply of safe water as Basic Human Needs (BHN) and it is an important sector in the rural development. Activities in this sector should be also implemented by inhabitants themselves. It is better that sufficient support by public organization is provided until technical and financial conditions of inhabitants are stabilized.

(4) Rural Road

Rural road is one of the important sectors influencing all other sectors as a basic infrastructure in rural communities. So, facilities in this sector should be implemented prior to those of other sectors as far as necessary balance of budget is maintained in the plan.

(5) Rural Electrification

Facilities in this sector affect largely not only qualitative increase of farmers' living conditions but also improvement of pump irrigation and agricultural processing. Rehabilitation of out-dated facilities is important. However, improvement of the system itself like appropriate allocation of responsibility for each facility, improvement of fee schedule and etc. are also necessary.

(6) Environmental Conservation

Forest Conservation Plan in Nam Dan District is extremely important for conserving environmental conditions in the area and it is better to be implemented as scheduled by the year 2000. Erosion at bank of the Lam river is necessary to be considered as a problem of the river system as a whole. Drastic countermeasures against this problem are expected to be considered in the watershed management covering whole river system. Countermeasures against small-scale gully erosions is expected to be established with inhabitants' participation before they occur in a large scale. These activities should be continued with the initiative of Forestry Section in Nghe An Province.