APPENDIX H : EDUCATION

THE STUDY
ON
MODEL RURAL DEVELOPMENT
IN
NAM DAN DISTRICT, NGHE AN PROVINCE

FINAL REPORT

APPENDIX H : EDUCATION

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H.1 SUMMARY PRESENT CONDITIONS

H.1.1 General

(1) System and Overview of Education in Viet Nam

The national education system in Viet Nam includes as follows:

Pre-school Education
- Crèche ;3 years
- Kindergarten; 3 years

General Education
- Primary School; 5 years from 6 years old to 10 years old
- Lower Secondary School; 4 years from 11 years old to 14 years old
- Upper Secondary School; 3 years from 15 years old to 17 years old

Technical and Vocational Education; 1 to 4 years
- Technical School
- Technical Middle School
- Vocational Middle School

Higher Education
- College; 3 years
- Bachelor; 4-6 years
- Master
- Ph. D.

The education is the responsibility of the Ministry of Education and Training (MOET) which is organized by 15 departments, two national research institutes in educational sciences, and a variety of other institutes and agencies.

Each province and three cities have a Department of Education and Training divided into five sections of Pre-school Education, General Education, Vocational Education, Complementary Education, and Finance and Planning, and each district has the Bureau of Education and Training consisted of Inspection, Management and Facilities.

MOET is responsible for policy making, guidance and supervision of all educational programs and administration of higher education institutions. Some provinces administer some colleges with shortcouse programs. Lower secondary school and upper secondary school are administered at the provincial level, and primary school at the district/commune level. Technical and vocational education is administered by various ministries or by provincial administrations. Funding of the education system is a joint responsibility of each level with MOET providing most of the funds of salaries and scholarships. The provinces, districts and communes support most other expenditures, from construction of school to salary enhancements for teachers.

The education results in Vietnam is still poor as estimated by the drop out and repetition rate at each level of general education as follows:

	Repetition rate		Drop out rate	
Level of Education	1991-92	1992-93	1991-92	1992-93
Primary School	8.16%	7.94%	13.80%	9.24%
Lower Secondary School	2.70%	2.90%	32%	17.30%
Upper Secondary School	1.03%	1.00%	14.50%	12.90%

The school facilities and educational equipment are not adequate in quality and quantity. Most of schools are forced to accept double or triple number of pupils and students against the capacity of school and are not equipped with the regard teaching instruments and equipment at any level of general education. The facilities are seldom given maintenance and are sometimes temporary because of the shortage of classroom.

In recent years illiteracy rate in Vietnam, has been decreased thanks to mass literacy campaign and illiteracy eradication program especially for the ages of 15 to 35 years old. The target under the Education for all program was to reduce the illiteracy rate to 10% by the year of 2000. According to an estimation made by UNESCO, the average illiteracy rate in Viet Nam in 1995 was 6.3%. However it is still high in remote areas such as Northern Upland, Central Highland and Mekong River Delta regions and especially throughout the ethnic minority groups.

(2) Educational Aids

The establishment of textbooks, guidebooks and reference books etc., for schools in the nation is implemented by the Education Publishing House (EPH) and the production, purchasing and distribution of educational materials, teaching instrument and equipment are implemented by the General Company for Educational Equipment (GCEE) under the MOET. DOET in each province and three cities has its own Book and School Equipment Company which purchases educational equipment and textbook from EPH and GCEE to be provided to each school under them.

(3) School Constructions

The construction standard of schools in the nation is set up by the Institute of Architecture and Construction Standard and the Institute for Research and Design of School in cooperation with MOET. Beside this, the design of schools in rural area is sometimes executed by the Department of Construction (herein after refereed as DOC) in each province when some communes construct school building with small budget from the contribution of commune people. In these cases, a special design prepared by the DOC is used. MOET has a plan for the improvement of educational facilities for 610 primary schools in 30 Provinces. Among them, 60 primary schools in 6 Provinces have been constructed till 1997 by a Japanese Grant Aid Project.

H.1.2 Overview in Nghe An Province and Nam Dan District

(1) Education in Nghe An Province

Nghe An Province started in 1992 by becoming administratively independent from the former Ha Tinh Province. In 1995-96 SY, there were 280 crèches with 28,055 children, 434 kindergartens with 124,945 children, 608 primary schools with 463,163 pupils, 374 lower secondary schools with 183,055 students, 54 upper secondary schools with 46,108 students, 8 colleges for teacher training, 5 technical secondary schools and 10 vocational middle schools under the province's administration, and one University under MOET.

The province includes the Study Area of relatively high population density with favorable educational figures and a mountainous area including ethnic minority groups with low educational figures.

The education figure in the Province is shown in Tables H.1.1 to H.1.6.

(2) Education and Training in Nam Dan District

The education figure in the Province is shown in Tables H.1.7 to H.1.19.

1) Bureau of Education and Training (BOET)

The Bureau of Education and Training (BOET) is divided into three sections : a) General Education covering primary, lower secondary education and universalization and illiteracy; b) Pre-school Education covering Crèche and Kindergarten; and c) Administration covering accountant, cashier and school facility, library and teaching equipment. The upper secondary education is administered by the DOET in the province.

2) General Education

There are 31 pre schools covering crèche and kindergarten, 32 primary schools, 18 lower secondary schools and 2 upper secondary school, 1 combined lower and upper secondary school, 1 regular educational center for continuing education, and 1 vocational center in the District. The number of pupils at each educational level of pre-school, primary, lower secondary and upper secondary is 11,239 children, 24,234 pupils, 12,100 pupils and 3,911 pupils at the beginning of the school year 1996-97 respectively. At present no higher education exist except part-time course for teacher training at the regular educational center. Facilities for 2 primary school are under construction in Nam Hung commune and Hung Tien commune through the assistance program of the Japanese Government.

There are one class in Primary School of the Town and one lower secondary school; there is a Nam Dan Secondary School for gifted pupils in the district set up following the instruction of DOET. MOET is promoting the expansion of semi public class which was introduced so that pupils might study from teachers

who graduated high level of education by paying additional money, through the province. In the district, 30 semi-public classes in the lower secondary and 19 semi-public classes in the upper secondary school are offered.

a) Educational Statistical Results

The net enrollment ratio in primary and lower secondary schools in the District is 99% and 75% respectively in the school year 1995-96. The net enrollment ration from primary to lower secondary school is 83%. This means that 83% of children from 6 to 14 years old go to school.. The rate of over aged pupils against total pupils is 15% in primary school. This proportion is still high. In Hanoi which is an advanced area as shown by the educational statistics, the enrollment rate of over aged pupils is less than 3% according to the DOET in Hanoi. If the over aged enrollment will be eradicated in the future, the net enrollment ratio will be maintained or it will go up, but the gross enrollment ratio will go down. The repetition rate and drop out rate are rather low in comparison with the national average as shown above.

b) Facilities and Equipment

Many of primary and lower secondary schools constructed with the contributions from commune people do not comply with the construction standard of schools in the district because of budgetary problem. The classrooms suffer from shortage of sunlight, having small windows without glasses.

The classrooms necessary for heavy repair or re-building in primary and secondary schools amount to 37% of total rooms and if the room necessary kind of repairing is included, it reaches 55% of total according to the data of BOET. Many classrooms with damages on walls and roofs can be observed and some of them are not safe to be used as classrooms for fear of collapse. Almost all schools have no laboratory, no library and no teaching staff room.

At any level of school including teacher retraining, no teaching aids is used and no printing system exists in the district. Educational aids such as instruction manuals for teacher, teaching instrument and equipment, laboratory equipment, books in library and supplementary textbook produced by the teachers largely relate to the quality of education. Based on the results of the survey of regular educational center for teacher re-training in the district and Vhin University mainly for teacher training, it was found that the shortage of teaching aids was serious.

3) Regular Educational Center

Regular educational center was established originally for continuing education at each provincial and district level. The education and training in Nam Dan District are as follows;

a) Training for teachers of lower secondary school (part-time course)
b) Bachelor course for teachers of lower secondary school(2.5 month/session, 3 years)

c) Teacher training middle course for teachers of primary school(8 school hours/session, 2 sessions/week, 2 years)
d) Teacher training for kindergarten(2 years in summer season only)
e) Complementary School(3 grades of 10 to 12, 2 years)
f) Training of commune officials
g) Training of agricultural officer(3 years diploma course and 5 month bachelor course)
h) English class(6 month and 10 month)

4) Vocational Center

Vocational center was established in 1989 through the assistance of UNICEF and the courses and fields opened are as follows;

a) Courses
- Training of pupils from grade 8 to 9 in lower secondary school located at the nearest area
- Vocational orientation of pupils from grade 11 to 12 (1 time/week, 1 year)
- Vocational training for handicapped people of age from 15 to 20 years old
- Sending trainers for the vocational orientation to the schools
- Training center for Integrated Pest Management Program and sending trainers for training farmers depending on the request from each commune (2-3 month or 6 month)

b) Fields
- Civil Electricity
- Electronic
- Motorbike Repairing
- Garment
- Technical Drawing
- Rice Plantation

c) Facilities and Equipment
The facilities are damaged by the lack of maintenance system and the equipment for training are equipped with poor condition.

5) Target

The targets in the year 2000 in the District are as follows;

- to ensure the improvement of educational facilities;
- to upgrade all teachers' ability based on the qualification standard;
- to mobilize public and private capitals for education;
- to popularize the lower secondary level for people 15 to 17 years old and expand the semi-public class;
- to provide vocational training for pupils who can not proceed to higher education;
- to select gifted students and provide them with adequate educational environment and high quality learning facilities and teachers; and
- to expand regular educational center to re-train teachers of primary school and then finally to upgrade to a University level.

The concrete targets before the year 2000 in the district are to universalize the

primary education by 100% for the children of 6 to 14 years old, to universalize the lower secondary education by 100% for the children of 14 to 17 years old, and popularize the upper secondary school by 50% for the school aged youth.

H.2 MASTER PLAN

H.2.1 Objective & Target

(1) Preconditions

Population growth rate is expected to decline to 1.7-1.8% by 2000 and to below 1.3% by 2010. Number of population in 2000 is expected to be 3,067,000 and in 2010 to be 3,530,000. Univertization of primary education for the school age group will be applied at district level (in mountainous area will be 3rd grade of primary school) and of lower secondary education will be applied at urban area. Eradication of Illiteracy is applied for the age group of 15 to 35 years old.

(2) Objective & Target

1) Pre-school Education
To maintain existing Crèches and Kindergarten
To diversify the system of public, semi-public and private
To up-grade the level of teacher by the training
To improve the welfare and condition of teachers, especially in mountainous area.

2) General Education

Primary Education

i) To speed up the univertization of primary education to mobilize all the children of school age group of 6 to 14 years old to primary school.
To univertize the primary education for these school age group to 100% by 2000 year

ii) Lower and Upper Secondary Education
To increase the semi-public and private school to meet the studying demand of youth.
To univertize the lower secondary education for inhabitants in plain, midland and low-mountainous areas.
To establish a network of specialized (high quality) schools in the province and some districts in order to train the gifted pupils of the province.

3) Literacy Education - Eradication of Illiteracy

To reach the target to eradicate of illiteracy people of 8,000 -10,000 per year of age group of 15 - 35 years old.

4) Technical and Vocational Education

To continue the planning and re-arranging for the reasonable vocational school network through out the province.
To expand the training in Vhin University in size as well as courses to meet the local economical demand.
To strengthen and diversify vocational training courses to ensure human force demand for socio-economic development of the province, to train skillful workers for socio-economic sectors, and at the same time to univertize occupation skill for laborers, especially young people.

(3) Priority Program in Education and Training

1) Education Development Program

Objective: To up-grade educational level of people
Contents: Improving facilities of schools
Supporting teacher training and vocational training
Expanding primary education and erasing illiteracy of children in school age group of 15 - 35 yeas old
Increasing quantity and improving quality of pupils and students in lower and upper secondary school
This program will be implemented in whole of the province.

2) Training and retraining management staff of economic and administration and skillful workers
Objective : To train and retrain staff in order to meet the requirement of socio-economic development
Contents: Establishing schools, classes to train in province
Sending staff to central schools, and going abroad for study

3) Policy for Human Development
The people is the core as well as the impulse to the development. Therefore the policy of developing human resources is on of the most important policies assuring the success of implementation of plan for socio-economic development of the province. The concrete policies as follows:

Policy for encouraging and attracting talent people : Nghe An has many great talents in the socio-economic field, who are now living in nationwide and some foreign countries. This force has attachment to their home land but hey have not the condition to contribute to the province. This is a great manpower source that have to be attracted early by concrete policies to create important impulse for socio-economic development of the province.

The training and refreshing policy to manpower source : The development requirement in a short term and long term require a great force of science staffs, management cadres and engineering workers. Thus, in a short-term there should be the policy for retraining, refreshing and using well the current manpower source. At the same time, it is necessary to pay more attention for the training to

the management staff, the force of technical experts, businessmen and workers with high skill in accordance with the development stage of the province's socio-economy.

In the other hand, a great attention should be paid to the systematic training of future generation from pre-school to general education schools of primary and lower/upper secondary, and vocational education, and the quality of training is very important. Education and training objectives should be coincided with economic development requirement.

The policy for renovating the manpower resources structure: one is to utilize the quality human resources in the rural and agricultural region and second is to draw partly agricultural labor to industry and service field.

II.2.2 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% secondary education covering children age between 6 to 14 and 50% high school education covering appropriate age group. To achieve these goals, following basic concepts are considered:

- improvement of education facilities
- increasing level of all teachers up to the qualification level
- introducing public and private found to education sector
- increasing semi-public classes and extension of entering to secondary education for children age between 15 to 17
- implementing vocational training for children who are not able to go to higher education
- education for the selected student who are advanced in studying with 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 of 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) Improving facilities of upper secondary school
It is necessary for extending upper secondary education in the future to build new schools or increase number of class rooms. Subjects to be taught in the schools should be selected with the consideration of general characteristics, industries and inhabitants' needs which are existed in the area, in order to facilitate the two functions of education and training to the facilities of upper secondary schools.

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

(4) Expansion of Vocational Center
Subjects to train will be expanded from students in lower secondary school to the general. The coverage of training which is presently limited within the near-by areas will be expanded by introducing vehicles. Also, number of class rooms and laboratories will be increased and equipment will be additionally provided. Subjects to train will be planned with the consideration of needs in the area.

H.2.3 Outline of Improvement

(1) Electricity Supply to Schools

There are about 930 classrooms (24% of total classrooms) which do not receive electricity services. To improve the poor lighting conditions in classrooms, the electricity supply will 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 expand facilities in upper secondary school, technical middle school will be constructed and necessary equipment will be provided.

- Building (5,800m2 in total) : 18 classrooms, laboratories, practice rooms, computer room, library, canteen, cooking room, teaching staff rooms, printing room, workshop, dormitory, gymnasium, etc..
- Equipment : furniture, experimental equipment for laboratories, equipment for practice rooms, computer equipment, book for library, utensils for canteen, utensils and cooking equipment for cooking room, printing equipment, workshop equipment, several kinds of map, sporting goods, etc.

(3) Rehabilitation of School Facilities

Poor school facilities at the present condition will 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 system will 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 will be built and equipment will be procured as show below:

- Building (2,600m^2 in total): 6 classrooms, laboratory, computer room, library, canteen, cooking room, teaching staff rooms, printing room, workshop, dormitory, etc..
- Equipment : Furniture, laboratory equipment, computer equipment, book for library, utensils and equipment for cooking room, printing equipment, equipment for workshop, geographic maps, historical maps, sporting goods, organ for music etc..

(6) Expansion of Vocational Center

To achieve the expansion of the Vocational Center, additional facilities will be built and equipment will be procured as show below:

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

H.2.4 Implementation Plan of Master Plan

(1) Criteria of Prioritization

The proposed projects 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 projects 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 which are used as countermeasures to solve present urgent problems in Nam Dan District
2. Realization	Projects implemented by a proposed executing agency or organization and which are envisaged to be implemented without any difficulty
3. Adaptability	Projects which are not in any kind of contradiction from higher-level plans such as the National Development Plan for other sectors' projects
4. Inhabitant needs	Projects which meet the most urgent needs of the Study Area inhabitants
5. Sustainability	Projects with sustainable development potential and which will not have a huge negative environmental impact
6. Impact	Projects which are 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 with high profits to the farmers
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 of 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.

(2) 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 with serious problems were considered as "a" rank and others were considered as "b" rank.

Inhabitant needs : "a" rank is given to the projects required for most of the inhabitants and "b" rank is given to the other projects which are

not.

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

Comprehensive Assessment:

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

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

Project	Urgency	Inhabitant Needs	Synergistic Effect	Comprehens ive 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

(3) Proposed Implementation Schedule of Master Plan

Based on the results of prioritization, implementation schedule was proposed as shown below.

Summary of Proposed Implementation Schdule

	Period		
Projekt Rank	1998 - 2002	2003 - 2006	2007 - 2010
A Projects			
B Projects			
C Projects			

Note : ☐ Preparation ■ Implementation

(4) Project Cost of Master Plan

Project cost and O/M cost for the Master Plan are estimated as shown below:

(mill. VND)

	A Rank	
	Project Cost	Annual O/M Cost
A Projects	23,628	0
B Projects	52,991	359
C Projects	26,439	209
Total	103,058	568

H.3 PRIORITY PROJECTS

H.3.1 Outline of Projects

The objective of these projects is to support the achievement of the target of education and training sector in the Nam Dan District by improvement of frail education facilities. The electricity supply to the school and lighting of class room based on the high inhabitant needs and rehabilitation of school facilities are executed in these projects. The supply of materials for the improvement/rehabilitation is considered and the rehabilitation work will be done by inhabitants participation under the supervising of administrative organization of the Nam Dan District and Commune.

Material Supply Program for Electricity Supply to Schools

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

- Wiring to schools (53 schools in total) : 32 primary schools, 18 secondary schools and 3 upper secondary schools
- Set up of electricity facilities at 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

Material Supply Program Rehabilitation of School Facilities

The present schools' poor-conditions facilities will be rehabilitated as shown below:

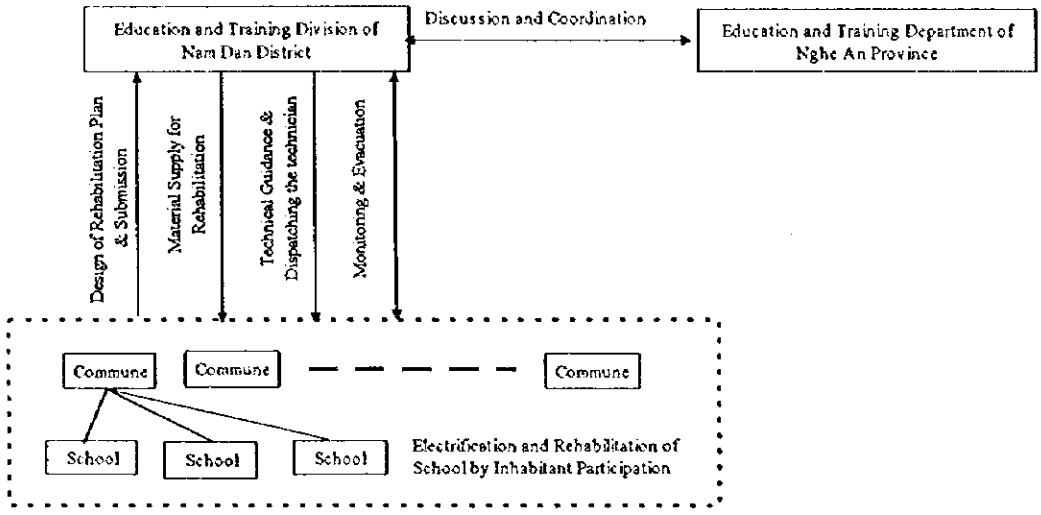
- Reconstruction of 56 classrooms : 24 at the primary schools and 32 at the lower secondary schools
- Heavy repair of 181 classrooms : 126 at the primary schools and 55 at the lower secondary schools
- Repair of 113 classrooms : 26 at the primary schools and 87 at the lower secondary schools

H.3.2 Implementation and O/M plan

(1) Form of Management for Program

It is considered the program should be executed based on the existing organizations for improvement and maintenance of education facilities and the Education and Training Division of Nam Dan District is executing agency for the primary and lower secondary school. Though the upper secondary school is under the Department of Education and Training of Nghe An Province, it is recommended that the electrification of upper secondary school is implemented by the Education and Training Division of Nam Dan District with keeping relation with the Province because of there is only 3 upper secondary schools in the District.

Management formation and organization is shown below:



Education and Training Division of the District requests the Communes to design and submit of rehabilitation plan, inspect these plans and supply the materials required with consideration of total balance of overall plan. The responsibilities of rehabilitation works using these materials is belonging to the Commune. Each Commune implements the program including after care with inhabitant participation.

(2) Arrangement of Human Resources

- Organizing of inhabitant for rehabilitation work
  The responsibility of rehabilitation work is belonging to the Commune and the Commune executes the rehabilitation work using supplied materials and labor supply from inhabitant with organizing inhabitant organization. In Viet Nam, the inhabitant participation for public works such as road maintenance and canal rehabilitation is organized and organizing of inhabitant is done by Commune. Therefore, there is no problem for organizing inhabitant for rehabilitation/improvement of education facilities. However, it is necessary to coordinate for human resources arrangement with other public work planed by the District.

- Dispatching of Technician and Technical Guidance
  Technical guidance by the technician of the District is essential for the implementation of construction work. Especially for the electricity work, as there are big problems such as construction accident and power loss caused by poor construction works of inhabitant who has no sufficient knowledge for electricity as mentioned in the rural electricity section, the work should be done under the supervision of technician dispatched by the District. Therefore, for implementation of school electrification program, it is necessary to coordinate with rural electrification projects for securing of the District technician including technical training for the technician.

(3) Monitoring and Evaluation

Education and Training Division of the District executes the monitoring and evaluation on the improvement conditions of each school through the Commune. Based on the results of evaluation, the District request the Commune to execute suitable maintenance and necessary repairing of education facilities.

H.3.3 Project Cost

The purchasing cost for recommendable material supply is below:

Description	Project Cost (mill. VND)
School Electrification	1,364
Rehabilitation of School Facilities	22,264

H.4 CALCULATION OF EDUCATIONAL INDEX

H.4.1 Calculation of Gross Enrollment Ratio of age group from 6 to 23 years old

(1) Data used in the calculation

It is difficult to collect the data on same day or month, therefore the data available during the school year period of September, 1995 to August, 1996 as follows:

Data of population by age from 6 to 23 years old - The projection of as of Dec., 1995 by the Dept., of Statistics in Nghe An Province

Data of pupils from 6 to 23 years old - The statistics of Nghe An Province and Nam Dan District at the beginning or at the end of school year of 1995-96

(2) Calculation of Gross Enrollment Ratio(GER) of age group from 6 to 23 years old

The Gross Enrollment Ratio in 1995-1996 school year as follows;

Name of Area	Population of 6 to 23	Total No. of pupil	Gross Enrollment
Nghe An Province	1,162,538	697,555	60%
Nam Dan District	66,595	42,372	64%

(3) Necessary Condition of GER for 2010 year

It is almost impossible to get the projection of number of age group from 6-23 in 2010 year. Therefore the progress based on the population in 1995-1996 is calculated for 2010.

As the target for 2000 in the district is to popularize the lower secondary school for

the age group of 12-17 years old, the target for 2010 is settled as follows:

In case of without project

i) Universalization of primary and lower secondary education to 100% for the age group from 6 to 14 years old

ii) Universalization of upper secondary education to 60% for the age group from 15 to 17 years old

iii) Enrollment to the Higher Education of 8% of graduates from upper secondary school.

The figure of 8% is same increase rate as the increase rate of pupils from 1995 to 2010 in upper secondary school mentioned later.

Above increase is based on the natural increase of income in Nam Dan District.

In case of with project

i) Universlization of primary and lower secondary education to 100% for the age group from 6 to 14 years old

ii) Universalization of upper secondary education to 75% for the age group from 15 to 17 years old. 15% difference from "without project" is based on the improvement of income level in Nam Dan District through project.

iii) Enrollment to the Higher Education of 20% of graduates from upper secondary school.

The figure of 20% is the double one of same increase rate as the increase rate of pupils from 1995 to 2010 in upper secondary school mentioned below. The difference from "without project" is based on the improvement of income level in Nam Dan District through project. The external condition as to capacity of higher education may be solved through increase of private universities and colleges and up grade of middle vocational/technical school to universities and colleges.

Increase rate of graduates for higher education on same increase rate of pupils in upper secondary education from 1995 to 2010 with, without project and project used in this calculation.

Year	GER in U. Secon	No. of Pupils	Increased Rate	No. of higher Education	Percentage against 1995
1995(people of 15-17)					
1995(No. of pupils)		3,705	0%	186	5%
2010 w/o project	60%	5,800	57%	291	8%
2010 w/ project	75%	7,250	96%	364	10%
2010 w/ project (Projection with project used in this calculation)				74100%	20%

(4) Projection of GER in 2010 without project and with project

Year	Population of 6 to 231)	Total No.of pupil	Gross Enrollment Ratio
2010 without project	66,490	41,932	63%
2010 with project	66,040	43,382	66%

Remarks: 1) the number of pupils enrolled to higher education is deleted from the population of age group.

(5) Facilities Sufficiency against increase of pupils and projection in the Province.

The capacity of each school level is as follows;

Level	No. of class room	No. of shift	Pupils/class room	Capacity
Primary	388	2	65	50,440
L. Secondary	244	2	60	29,280
U. Secondary	56	2	60	6,720

The estimated numbers of pupils without project and with project in 2010 are as follows;

Year		Primary	L. Secondary	U. Secondary
1995	Population in 1995	19,948	12,583	9,666
2010	Population increased of age group in 1995 by 20%	23,539	14,848	11,599

From above, the capacity of facilities in primary and lower secondary education are enough to accept 100% of population of age group from 6 to 14 years old into grade 1 to 9 in the school. In case of upper secondary school, the overflow of pupils without project and with project are as follows;

No. of age group in 1995	No. of age group in 2010	No. of pupil w/o project	No. of pupil w/project
9,666	11,599	6,960	8,699

The overflow is 240 without project and 1,979 with project, therefore the shortage of class room is 2 class room without project and 17 class rooms with project.

Remark: Increase rate of population of age group from 6 to 23 years old

The Life Expectancy Rate is 65 years in 1995 and is projected as approx., 70 years for 2010. The increase rate according to this length of life expectancy rate is minimum 18% in each age group provided the total population, 2,791,887 in 1995 and 3,557,811 in 2010 year in the Province used in the Master Plan Report of Nghe An Province, will be applied. Therefore increase rate of 20% for each age is used here.

(6) Facilities Sufficiency against increase of pupils in Vietnam

The facility sufficiency of higher education will move depending on the needs of people and population pressure. The private universities is now being encouraged and it is expected that some kind of middle and technical school and provincial colleges may be expanded and graded up to universities in the future to meet the demand from the society. However this is one of external condition.

(7) The relation with Master Plan in the Province for 2010

The primary and lower secondary education will be same or over the projection because of the figure of 100% enrollment for the school age group from 6 to 14 years old. The estimation in upper secondary school is mentioned below. The figure in the District for 2010 will be clear the projection in the Province.

Projection in Nghe An Province	
Enrollment Ratio in 1995 for U. Secondary	28%
Enrollment Ratio in 2010 for U. Secondary	45%

* The number of pupil in 1995 in the Province is 173,720 and the increased number by 20% is 207,264. The number of pupils for 2010 in the projection is 93,500 in the Province. So the estimated net enrollment ratio of age group from 15 to 17 years old will be 45%. Both figure of without project and with project is over the projection in the Province.

(8) Repeaters and drop out

Drop out rate and repetition rate are decreased extremely these half decade, however these will exist at lower rate up to 2000. In the meanwhile, the net enrollment ratio will be lower than 100% due to intentional drop out, the existence of handicapped children and children in handicapped family. Therefore the existence of pupils over 17, it is considered the gross enrollment ratio of 100% in primary and secondary education will be valid by the off-set between a small number of repeaters and no enrolled children to any of educational level.

(9) Gross Enrollment Ratio on Educational Index in Human Development Index(HDI)

Gross Enrollment Ratio is the proportion of total number of peoples attending to any level of formal education against the total number of people of age group from 6 to 23 years. Therefor the ratio will increase by the strong enrollment promotion, however the rate will sometimes go down tentatively if the enrollment of over age group will be dissolved and the repetition rate will be improved. In Vietnam, by the universalization activity of primary and lower secondary education in this half decade, the gross enrollment ratio extended radically and the repetition ratio is currently being improved very much. In this respect the gross enrollment ratio may be dull during 2000 to 2010 year. On the ratio in the District, also enrollment ratio may go down before 2010 but by the increase of enrollment to higher education, the ratio may go up again.

H.4.2 Calculation of Illiteracy Rate of age group over 15 years old

(1) Data used in calculation

There is a data for the illiterate of age group from 15 to 35 in the District and Province for 1996.

The data collected from each district and Vhin city are also current one. Therefore the population data in total comes from the data in the Master Plan Report in Nghe An Province is used. However for the population by age group from 15 to 35 and over 35, the data of Bureau of Statistics in the Province for 1995 are used for this calculation because of no availability of population by age group of over 35 years old for 1996.

(2) Calculation of Illiteracy Rate of age group from 15 to 35 years old

The illiteracy rate using the number of illiterate in 1996 and the number of age group from 15 to 35 years old in 1995 are as follows;

Area	No. of 15-35	No. of illiterate	Illiteracy Rate
Nghe An Province	954,920	31,778	3%
Nam Dan District	56,639	777	1%

(3) Calculation of Illiteracy of age group over 35 in Nghe An Province

There is no data for number of illiterate of age group over 35 years old in the Provincial office. The main reason is in illiteracy eradication program targeted for age group from 15 to 35 years old. Therefore the number of illiterate of age group over 35 is estimated by the following method for the Province.

i) to divide the Province into 4 region depending on the geographical character of town and city, plain area, coastal area and mountainous area.
ii) to collect the number of illiterate in each typical district and city
iii)to estimate the number of illiterate in the region divided into 4 from the proportion of number of illiterate in the district and city

According above method, the total number of illiterate of age group over 35 is calculated as follows;

Area	No. of illiterate in the area	illiteracy rate for the total pop	Proportion of population	Population over 35 divided by prop	Estimated No. of illiterate
Vinh City City, Town	1000	0.51%	8.47%	63,160	1,211
Dien Chau Coastal Line	800	0.29%	28.65%	213,639	2,336
Nam Dan Plain	777	0.49%	25.74%	191,940	3,533
Con Cuong Mountainous	1,650	2.67%	37.14%	276,948	27,470
Total			100.00%	745,687	34,549

From above estimation , the total illiterate in the province regarded as 66,327 people against 1,700,607 people of age group over 15. Finally the illiteracy rate in the Province for age group over 15 years old in 1995-96 is calculated as 4%.

(4) Calculation of Illiteracy of age group over 35 in Nam Dan District

The total illiterate in the District is 1,577 people for 103,712 people of age group over 15 years old. The illiteracy rate in the District is calculated as 2%.

(5) Projection in 2010

The performance of illiteracy eradication is affected heavily by the illiteracy program started by the central government from 1990 and scheduled to finalize in 2000 year. After 2000, the illiteracy rate may increase slightly unless the program will be maintain or other measure will be taken. However by the popularization of general education the rate will not increase radically. The illiteracy rate for 2000 without project, therefore, maintained on 2% in the District and the rate with project increased by 1% based on the improvement of income level in the District. The program continuation, anyway, will be one of the external condition.

H.4.3 Calculation of Educational Index

The calculation results for 1995 in both of the Province and the District and for 2010 without project and 2010 with project are as follows;

Nghe An Province in 1995-96	((2x0.96) + 0.60)) /3 = 0.84
Nam Dan District in 1995-96	((2x0.98) + 0.64)) /3 = 0.87
Nam Dan District in 2010 without project	((2x0.98) + 0.63)) /3 = 0.86
Nam Dan District in 2010 with project	((2x0.99) + 0.66)) /3 = 0.88

APPENDIX H : TABLES

Table H.1.1 Number of Child, Pupil and Student, and Number of Teacher in Nghe An Province (Past 5 SY)

Education Level	Item	1991-92	1992-93	1993-94	1994-95	1995-96
Creches	No. of Children	39,609	34,490	31,821	25,093	28,055
	No. of Teacher	5,637	5,016	4,431	3,590	3,756
Kindergaraden	No. of Chidren	101,226	102,566	113,335	117,445	124,945
	No. of Class	3,842	3,905	4,044	4,327	4,456
	No. of Teacher	3,823	3,715	3,978	4,251	4,810
Primary School	No. of Pupil	368,884	395,050	425,176	447,332	463,163
	No. of School	802	877	935	966	1,009
	No. of Class	14,698	15,113	16,741	17,861	19,078
	No. of Teacher	11,830	12,209	13,159	13,308	14,285
Lower Secondary School	No. of Pupil	111,463	113,017	128,354	154,216	183,055
	No. of School	754	828	885	916	955
	No. of Class	14,235	14,638	16,114	17,124	18,197
	No. of Teacher	5,841	5,458	5,524	6,312	6,845
Upper Secondary School	No. of Pupil	18,281	19,700	28,734	36,451	46,108
	No. of School	48	49	50	50	54
	No. of Class	463	475	637	737	881
	No. of Teacher	1,258	1,446	1,474	1,509	1,726
Higher Education	No. of Student					3,802
	No. of Teacher					718
Technical Secondary School	No. of Student					1,427
	No. of Trainer					98
Total Pupulation participating in Educational System						697,555

Remark : The figure in 1995-96 is at the beginning of SY

Source : Dept of Education and Training, Nghe An Province

Table H.1.2 Pre-School Education of 1995-1996 in Nghe An Province

Level	Item	Number		
Creche	No. of Commune	460		
	No. of Creche	276		
	No. of Children	28,055		
	No. of Girl	15,000		
	Under 1 years old	9,702		
	1 year old	8,842		
	2 years old	6,272		
	Over 2 years old	3,239	Public	Private
	No. of Director		23	148
	Vice Director			98
	No. of Techer(Female)		720	3036
	Staff		27	2
Kindergarden	No. of Kindergarden	437		
	No. of Class	4,456		
	No. of Children	124,945		
	No. of Girl	62,061		
	Under 3 years old	3,286		
	3 years old	41,098		
	4 years old	78,173		
	5 years old	2,388		
	Over 5 years old		Public	Private
	No. of Director		410	
	Vice Director		34	319
	No. of Techer(Female)		708	4144
	Staff		44	33
Crech/Kinder	No. of Class room	5926		
	Newly Built	325		

Source : Department of Educationa and Training, Nghe An Province

Table H.1.3 Number of Pupil by Each Grade and Each Age, and Teaching Staff in Primary School of 1995-1996 SY in Nghe An Province

Grade	1 st	2nd	3rd	4th	5th	Total	
No. of Class	3,461	3,128	2,767	2,352	2,103	13,811	
No. of Pupil	107,027	101,146	94,282	84,717	75,731	462,903	
No. of Female	52,765	50,216	46,920	41,445	36,652	227,998	
5 years old	310	25				335	
6 years old	86,314	900	155			87,369	
7 years old	13,004	76,031	3,622	242		92,899	
8 years old	5,593	16,094	72,009	9,531	14	103,241	
9 years old	1,665	6,632	12,391	60,483	626	81,797	
10 years old	141	1,540	5,415	14,014	42,563	63,673	
11 years old		134	461	264	21,797	22,656	
12 years old			19	162	7,935	8,116	
13 years old				21	2,140	2,161	
14 years old					507	507	
15 years old					149	149	
Total	107,027	101,356	94,072	84,717	75,731	462,903	
No. of School						567	
No. of School combined with Lower Secondary School						41	
No. of Director						567	115 (Female)
No of Vice Director						587	394 (Female)
No. of Teacher						14,296	14,074 (Female)
No. of Staff						813	681 (Female)
No. of Teacher under Standard Qualification						2,696	2,696 (Female)
No. of Teacher with Standard Qualification						11,600	11,378 (Female)
No. of Teacher over Standard Qualification						1,194	1,185 (Female)
Student/Teacher						32.4	
Student/Class						33.5	
Class/Class Room						1.9	

Source : Dept of Education and Training, Nghe An Province

Table H.1.4 Number of Pupil by Each Grade and Each Age, and Teaching Staff in Lower Secondary School of 1995-1996 SY in Nghe An Province

Item	6th	7th	8th	9th	Total	
No. of Class	1,388	1,200	1,004	794	4,386	
No. of Pupil	61,789	51,524	40,172	30,575	184,060	
No. of Female	30,082	24,763	18,827	13,651	87,323	
10 years old	327	145			472	
11 years old	28,452	20,148			48,600	
12 years old	19,223	20,558	1,552		41,333	
13 years old	11,079	8,939	21,112	1,252	42,382	
14 years old	2,410	1,526	16,184	20,368	40,488	
Over 14 years old	298	208	1,324	8,955	10,785	
Total	61,789	51,524	40,172	30,575	184,060	
Number of School					347	
No. of Director					388	31 (Female)
No. of Vice-Director					280	87 (Female)
No. of Teacher					6,811	4,747 (Female)
Staff					522	487 (Female)
Student/Teacher					27.0	
Student/Class					42.0	
Class/Class Room					1.5	

Source : Dept of Education and Training, Nghe An Province

TableH.1.5 Number of Student by Each Grade and Each Age, and Teaching Staff in Upper Secondary School of 1995-1996 SY in Nghe An Province

	10th	11th	12th	Total	Classes of semi-public and private school are calculated from school year 1994-95
No. of Class	341	306	235	882	
No. of Pupil	18,641	15,896	11,571	46,108	
No. of Female	7,855	6,620	5,089	19,564	
14 years old	131			131	
15 years old	18,382	1,259		19,641	
16 years old	128	10,645	132	10,905	
17 years old		3,992	1,643	5,635	
Over 17 years old			9,796	9,796	
Total	18,641	15,896	11,571	46,108	
Number of School				54	
No. of Director				54	
No. of Vice-Director				66	8 (Female)
No. of Teacher				1,698	676 (Female)
Staff				216	185 (Female)
Student/Teacher				27.2	
Student/Class				52.3	
Class/Class Room				1.3	

Source : Dept of Education and Training, Nghe An Province

TableII.1.6 Teacher Training College, Technical Secondary School and Vocational Midle School in Nghe An Province(Past 4 SY)

		1992-93	1993-94	1994-95	1995-96	Entrence Qualificaton	Duration
College for Teacher Training							
Teacher Training College	No. of Student	1,776	2,235	2,888	2,868	U.Secondary	3 years
(for Teacher for Lower Secondary School)	No. of Teacher	158	173	175	189		
Tan Ky Teacher Training Middle School	No. of Student	647	1,056	1,573	189		2 years
(for Teacher for Primary School)	No. of Teacher	44	53	62	71		
Ky Son Teacher Training Middle School	No. of Student	201	143	340	367		2 years
(for Teacher for Primary School)	No. of Teacher	14	14	16	13		
Que Phong Teacher Training Middle School	No. of Student	40	82	120	111		2 years
(for Teacher for Primary School)	No. of Teacher	10	12	12	13		
Teacher Training School for Creche/Kindergarden	No. of Student	142	220	359	941		18 month
	No. of Teacher	31	31	30	31		
Training School for Educational Management Officer	No. of Student	-	228	394	593		3-6 month
	No. of Teacher	69	18	21	30		&1 year
Part-time College after Teacher Training Middle School	No. of Student	1,010	1,446	1,820	1,785		4-5 years
	No. of Teacher	6	6	10	6		
Teacher Training School for Disabled People	No. of Student	-	-	-	-		3 years
	No. of Teacher	-	-	-	-		
Technical Secondary School							
Economic Middle School	No. of Student	530	535	917	1,533	L.Secondary	2 years
	No. of Teacher	31	45	39	44		
Art & Literature Middle School	No. of Student	147	261	318	401		2 years
	No. of Teacher	21	23	22	22		
Health Middle School	No. of Student	935	1,240	800	660		2 years
	No. of Teacher	45	49	37	53		
Agriculture & Forestry Middle School	No. of Student	305	778	338	691		2 years
	No. of Teacher	25	27	27	31		
Trade Middle School	No. of Student	441	-	-	-		2 years
	No. of Teacher	21	-	-	-		
Vocational Middle School							
Viet-Duc(Vietnum-German)Technical Middle School	No. of Student	350	250	550	930	L.Secondary	6month-
	No. of Teacher	30	23	25	25		2years
Electrical Engineering Middle School	No. of Student	251	182	250	574		6month-
	No. of Teacher	40	32	43	43		2years
Communication Middle School	No. of Student	200	200	220	146		6month-
	No. of Teacher	14	14	12	12		2years
Transportation Middle School	No. of Student	60	230	450	550		6month-
	No. of Teacher	4	7	6	6		2years
Water Resources Middle School	No. of Student	154	160	74	94		6month-
	No. of Teacher	4	4	4	4		2years
Sports Middle School	No. of Student	92	82	114	87		6month-
	No. of Teacher	13	13	13	13		2years
Police Middle School for Driver	No. of Student	-	122	200	228		6month-
	No. of Teacher	-	7	8	6		2years
Teacher Training Technical School No. 3	No. of Student	480	777	950	1,165		6month-
	No. of Teacher	80	98	90	96		2years
Technical Middle School for Construction No. 6	No. of Student	200	223	310	370		6month-
	No. of Teacher	20	15	12	13		2years
Technical Middle School for Transportation No. 4	No. of Student	350	421	405	664		6month-
	No. of Teacher	32	34	32	41		2years

Source : Dept of Education and Training, Nghe An Province

Table H.1.7 Number of Pupil, Dropout and Repetition in Primary School in Nam Dan District (Past 5 SY).

Grade	Item	1991-92		1992-93		1993-94		1994-95		1995-96	
		Total	Female	Total	Female	Total	Female	Total	Female	Total	Female
1st	No. of Pupil	5,654	2,952	4,933	2,621	4752	2372	5,001	2,510	4,953	2,583
	Drop-out Rate(%)	3.0	1.2	1.0	0.4	1.0	0.6	2.0	1.2	1.5	0.5
	Repetitiom Rate(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
2nd	No. of Pupil	4,754	2,412	5,471	2,700	4802	2436	4,712	2,500	4,876	2,389
	Drop-out Rate(%)	0.5	0.2	1.0	0.4	1.2	0.5	1.0	0.4	0.5	0.1
	Repetitiom Rate(%)					0.1					
3rd	No. of Pupil	4,438	2,200	4,759	2,312	5420	2510	4,709	2,400	4,757	2,503
	Drop-out Rate(%)	0.8	0.3	0.9	0.5	0.7	0.3	1.0	0.4	0.6	0.2
	Repetitiom Rate(%)									0.1	
4th	No. of Pupil	3,931	2,000	4,400	2,118	4206	2284	4,551	2,231	4,700	2,404
	Drop-out Rate(%)	1.3	0.2	1.1	0.5	1.3	0.8	1.0	0.4	0.8	0.4
	Repetitiom Rate(%)	0	0	0	0	0	0	0	0	0.1	0
5th	No. of Pupil	3,126	1,561	3,869	1,812	4361	2116	4,631	2,301	4,504	2,251
	Drop-out Rate(%)	1.4	0.4	0.8	0.3	0.7	0.4	0.5	0.2	0.05	0.01
	Repetitiom Rate(%)	1.0	0.52	1.5	0.6	2.2	1.0	2.0	1.0	4.0	2.0
Total of Pupil		21,903	11,125	23,432	11,563	23,541	11,718	23,604	11,942	23,790	12,130

Table H.1.8 Number of Pupil, Dropout and Repetition in Lower Secondary School in Nam Dan District (Past 5 SY)

Grade	Item	1991-92		1992-93		1993-94		1994-95		1995-96	
		Total	Female	Total	Female	Total	Female	Total	Female	Total	Female
6th	No. of Pupils	2,314	1,113	3,034	1,552	3439	1518	4,607	2,400	4,724	2,159
	Drop-out Rate(%)	0.2	0.5	0.6	0.5	0.3	0.2	0.8	0.3	0.2	0.4
	Repetitiom Rate(%)	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0
7th	No. of Pupil	2,026	1,112	2,302	1,100	3024	1531	3,115	1,500	4,570	2,231
	Drop-out Rate(%)	0.8	0.5	1.0	0.4	1.8	0.6	0.5	0.2	0.4	0.2
	Repetitiom Rate(%)	0.0	0.0	0.0	0.0	3.0	1.0	1.5	0.5	0.4	0.2
8th	No. of Pupil	1522	812	2008	1100	2112	1011	2821	1428	3048	1509
	Drop-out Rate(%)	1.0	0.4	1.1	0.5	2.0	0.6	2.8	0.5	0.5	0.2
	Repetitiom Rate(%)	0.0	0.0	2.6	1.2	5.0	2.0	6.0	2.0	1.2	0.5
9th	No. of Pupil	1102	518	1435	1217	1932	918	1918	987	2535	1248
	Drop-out Rate(%)	0.5	0.2	0.4	0.2	0.5	0.3	0.0	0.0	1.5	0.5
	Repetitiom Rate(%)	3.0	1.6	2.0	1.0	3.0	1.2	4.0	2.0	8.0	3.0
Total of Pupil		6,964	3,555	8,779	4,969	10,507	4,978	12,461	6,315	14,877	7,147

Table H.1.9 Number of Student, Dropout and Repetition in Upper Secondary School in Nam Dan District (Past 5 SY)

Grade	Item	1991-92		1992-93		1993-94		1994-95		1995-96	
		Total	Female	Total	Female	Total	Female	Total	Female	Total	Female
10th	No. of Student	1012	546	1002	511	1339	693	1400	211	1100	600
	Drop-out Rate(%)	1.0	0.6	0.4	0.2	0.5	0.3	0.0	0.0	0.1	0.0
	Repetitiom Rate(%)	0	0	1.5	0.5	1.52	0.7	1.8	0.8	0.5	0.2
11th	No. of Pupil	950	451	989	512	1002	506	1302	612	1322	706
	Drop-out Rate(%)	1	0.6	1.2	0.7	0.8	0.5	0.5	0.2	0.1	0
	Repetitiom Rate(%)	0	0	0	0	0.3	0.1	1.3	0.5	0	0
12th	No. of Student	912	421	942	400	970	450	978	450	1283	603
	Drop-out Rate(%)	1.1	0.6	0.8	0.4	0.8	0.5	0.6	0.2	0.2	0.1
	Repetitiom Rate(%)	3.0	1.0	5.0	3.0	8.5	5.0	10.0	5.0	22.0	12.0
Total of Student No. of Class	No. of Student	2,874	1,418	2,933	1,423	3,311	1,649	3,680	1,273	3,705	1,909
Total Student 1-12 Grade		31,741	16,098	35,144	17,955	37,359	18,345	39,745	19,530	42,372	21,186

Table H.1.10 Number entered to University and College within the students graduated from 1995-1996 SY in Nam Dan District

	University		College		
Year	Total	Female	Total	Female	G.Total
92	50	12	31	15	81
93	28	39	33	12	61
94	95	25	30	12	125
95	118	30	50	36	168
96	140	48	46	30	186

Table H.1.11 Educational Background of Teachers(as of 1996) in Nam Dan District

Level of Education	Creche	Kinder-garten	Primary	Lower Seocndary	Combined P. & L. Sec	Combinod L. & U. Sec	Upper Secondary	Total
University			57	489	7	48	102	703
Middle(12+3, 10+3)	13	15	672	30				730
Collge for Kindergarten(12 + 18 month)	98	275						373
Upper Secondary	362							362
Total	473	290	729	519	7	48	102	2,168
			806	428			151	

Table H.1.12 Number of School and Class Room of 1995-1996 SY in Nam Dan District

Level of Education	No. of School	No. of Class Room	No. of Class
Primary School	32	388	677
L. Secondary School	18	244	290
U. Secondary School	3	56	66
Combined L & U Secondary	1		

Table H.1.13 Student - Class Room - Class Rate of 1995-1996 SY in Nam Dan Distrcit

Level of Eduction	Teacher-Student Rate	Class Room - Student Rate	Class Room - Class Rate	Class-Student Rate
Primary School	32.20	60.84	1.74	34.87
L. Secondary School	22.57	51.07	1.19	42.97
U. Secondary School	30.67	65.71	1.18	55.76

Table H.1.14 Number of Pupil of Primary and Lower Secondary School and Number of Child by Age of 6 to 14 in 1996-1997 SY in Nam Dan District

Year of Birth	Age	Primary	L.Second	Population
1990	6	4,416		4,439
1989	7	4,323		4,344
1988	8	4,049		4,143
1987	9	4,023		4,080
1986	10	3,773	54	3,880
1985	11	2,617	1,517	4,196
1984	12	851	2,984	3,949
1983	13	204	3,657	3,937
1982	14	52	3,775	3,926

Table H.1.15 Net Enrolment Ratio of Primary, Lower Secondary School and Combined of 1996-1997 SY in Nam Dan District

Total population of 6 to 10	54	Net Enrollment Ratio of Primary School	74.07%
Total student of 6 to 10	40		
Total population of 11 to 14	11,933	Net Enrollment Ratio of L. Secondary	31.21%
Total student of 11 to 14	3,724		
Total populationof 6 to 14	11,987	Net Enrollment Ratio of Primary & L.Secondary	63.29%
Total Student of 6 to 14	7,587		

Source : Bureau of Education and Training, Nam Dan District

Table H.1.16 Classification of Facilities of Primary School as of 1996 in Nam Dan District

Primary School								
Name of School	Commune	Class	No. of Classroom					
			Total	Well Built	Good	To be repaired	Heavy repair	To be rebuilt
Lang Sen	Kim Lien	A	23	15	8			
Kim Lien 2	Kim Lien	A	12	12	0			
Khanh Son 2	Khan Son	A	19	12	7			
Nam Loc	Nam Loc	A	13	7	6			
Primary school of Town	Nam Dan	A	22	8	14			
Nam Hung	Nam Hung	A	16	8	8			
Nam Hung	Nam Hung	A	11	8	3			
Xuan Hoa	Xuan Hoa	B	13		9	4		
Nam Trung	Nam Trung	B	20		10	10		
Nam Giang	Nam Giang	B	18		15	3		
Nam Anh	Nam Anh	B	11		11	0		
Van Dien 2	Van Dien	B	15		10	5		
Xuan lieu	Nam Anh	B	12		8	4		
Nam Tan	Nam Tan	C	12		4		8	
Nam Cat	Nam Cat	C	12		0		12	
Nam Son 1	Nam Linh	C	10		0		10	
Nam Dien 1	Nam Xuan	C	10		3		7	
Nam Kim 1	Nam Kim	C	7		2		5	
Nam Thai	Nam Thai	C	9		0		9	
Nam Nghia	Nam Nghia	C	10		4		6	
Nam Phuc	Nam Phuc	C	6		3		3	
Nam Thanh 2	Nam Thanh	C	10		3		7	
Nam Lam 2	Nam Lam	C	10		3		7	
Nam Lam 1	Nam Lam	C	7		0		7	
Nam Thanh 1	Nam Thanh	C	9		0		9	
Nam Linh	Nam Linh	C	12		6		6	
Nam Xuan	Nam Xuan	C	14		4		10	
Nam Cuong	Nam Cuong	C	10		0		10	
Hong Long	Hong Long	C	10		0		10	
Nam Kim 2	Nam Kim	D	11		1			10
Nam Tien	Hung Tien	D	6		0			6
Nam Lac	Hung Tien	D	6		0			6
Nam Thuong	Nam Thuong	D	2		0			2
Total			388	70	142	26	126	24

Table H.1.17 Classification of Facilities of Lower Secondary School as of 1996 in Nam Dan District

Lower Secondary school									
Name of School	Commune	Class	No. of Classroom						
			Total	Well Built	Good	Slight repair	To be repaired	Heavy repair	To be rebuilt
Secondary school of Town	Nam Dan	A	12		12	0			
Kim Lien	Kim Lien	A	24		0	24			
Hung Tien	Hung Tien	A	15		8	7			
Xuan Hoa	Xuan Hoa	A	10		10	0			
Nam Giang	Nam Giang	A	11		10	1			
Anh Xuan	Nam Xuan	B	11				5		
School for gifted students	Xuan Hoa	B	8				8		
Van Dien	Van Dien	B	20				20		
Nam Thanh	Nam Thanh	B	14				10		
Khanh Son	Khanh Son	B	17				7		
Thai Nghia	Nam Hung	B	8				5		
Tan Loc	Nam Loc	C	12					10	
Hong Long	Hong Long	C	8					8	
Nam Cat	Nam Cat	C	12					12	
Phuc Cuong	Nam Cuong	C	11					11	
Regular Education Centre	Xuan Hoa	C	4					2	
Vocational Centre	Kim Lien	C	3					3	
Nam Linh	Nam Linh	C	9					9	
Nam Kim	Nam Kim	D	11						11
Xuan Lam	Xuan Lam	D	11						11
Nam Thuong	Nam Thuong	D	15						10
Total			246	0	40	32	55	55	32

Table H.1.18 Classification of Facilities of Upper Secondary School as of 1996 in Nam Dan District

Upper Secondary school								
3 schools	Commune	Class	No. of Classroom					
			Total	Good	Slight repair	Tobe repaired	Heavy repair	To be rebuilt
Total	3 Commune	A	56	56				

Table H.1.19 Classification of Facilities of Pre School as of 1996 in Nam Dan District

Kindergarten				
No. of Classroom				
Total	Good	Slight repair	Heavy repair	To be rebuilt
245	75	55	92	23
Creche				
No. of Classroom				
Total	Good	Slight repair	Heavy repair	To be rebuilt
239	39	102	80	18

Remark: Class A, B, C, D classified by the grade of entire condition of school
Source : Bureau of Education and Training, Nam Dan District

APPENDIX I : RURAL ROAD

THE STUDY
ON
MODEL RURAL DEVELOPMENT
IN
NAM DAN DISTRICT, NGHE AN PROVINCE

FINAL REPORT

APPENDIX- I RURAL ROAD

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APPENDIX I RURAL ROAD

I.1 PRESENT CONDITION OF ROAD SYSTEM AND TRANSPORTATION

I.1.1 General Description of Road Network in and around Study Area

In the Nghe An Province, 4 national roads, i.e., No.1, No.7, No.46 and No.48, run through. The national road No.1 runs from the Hanoi City to the Ho Chi Minh City though the coastal area of Viet Nam, which is considered as a nationwide basic road to connect the northern part and southern part of the country. The national road No.7 starts the coast area of the Province and reaches to the boundary of Viet Nam - Laos. Together with national roads, 538 km of provincial roads are developed and function as inter district roads. The road network in and around the Province is shown in Fig. I.1.1.

The road network in the Province is fairly dense and concentrated in the plain region, and the mountainous region has undeveloped conditiol. Even in the plain region, the road surface condition is still poor except for major national roads, and it restricts transportation development in the Province because of the low speed and high cost of transportatiol. Furthermore, the limitation of river crossings caused by low loading capacity of bridge or low performance of ferry service constraints on the economic development in the Province seriously.

In Nam Dan District, the national road No.46 and the provincial road No.15A are considered as the basic road, crossing the District from east to west and from south to north passing Nam Dan Towl. The former provincial road No.549 is reorganized into the national road No.46, and the former national road No.15A is now operated by the Province. In addition to the national and provincial roads, 333 km of district and commune roads have been developed. The road network of the District is shown in Fig. I.1.2.

The density of the road network in the District is considered as well developed in the Province. However, the network has following issues at present.

a) The network dose not function in rainy season because of insufficient road protection, even though the effort to maintain by inhabitants.
b) The standard of the roads dose not correspond to the expected motorization and farming mechanization in the in near future.
c) The network is divided to two region by the Lam River, and the left bank region is isolated. This restricts the economic activity in the region seriously and will be a major constraints of the economic development in the region because they can not meet the expected motorization in future.

I.1.2 Road System in Study Area

Roads in the Province are divided into 4 types by the administration, i.e., national roads, provincial roads, district roads and commune roads. The total length of roads in the Province is 9,220 km and the density is 0.56 km per km^2. On the other hands, total length of roads in the Study Area is 403 km and the road density is 1.37 km/km^2,

which higher than the density of the Province. The length of roads in each types is shown below and the break down in communes is shown in Table I.1.1.

ROAD TYPES AND LENGTH

Road Types	In Nghe An Province (Total Area 16,370 km²)		In Nam Dan District (Total Area 295.2 km²)	
	Total Length (km)	Road Density (km/km²)	Total Length (km)	Road Density (km/km²)
National Roads	394	0.02	16.0	0.05
Provincial Roads*	538	0.03	43.7	0.15
District Roads	1,917	0.12	85.0	0.29
Commune Roads	6,371	0.39	258.6	0.88
Total	9,220	0.56	403.3	1.37

* : Including national roads operated by the Province.
Source : Nghe An Province and Nam Dan District

I.1.3 Modes of Road Transportation

(1) Number of Vehicles

The number of vehicles in the Study Area is as follows, and the number in communes is shown in Table I.1.2. In general, the number of modern vehicle such as cars or trucks is significantly small and the majority of motored vehicle is still motor cycles. Small truck called Cong Nong, which has capacity less than 2 ton and is very slow comparing to modern vehicles, has an important role in transportation in the area. As shown in Table I.1.2, motored vehicle for transportation such as truck, small truck and car diffuses mainly in the region in the central and east part of the Study Area and there is very few in the right bank region.

NUMBER OF VEHICLE

Items	Types of Vehicle					Total
	Motor Cycle	Car	Small Truck	Truck	Bus	
Total Number fo Vehivle						
Nam Dan District	1,619	5	182	57	27	1,890
Number of Vehivle per 1,000 Persons						
Nam Dan District	10.25	0.03	1.15	0.36	0.17	11.96

Source : Study Team, 1996

(2) Key Facilities in Study Area

In the purpose of clarifying the movement of goods and people, the key facilities in economic and living activities are identified as shown in Fig. I.1.3.

(3) Transportation of Agricultural Products

For agricultural products which is a predominant mode of transportation in the Study Area, motor cycle and bicycle are considered as a major transports. Agricultural products are sent to markets by farmers and collected by commission merchants by motor cycle or bicycle individually, and gathered shipping system or organization is not developed.

There are 17 commune level markets and 1 district level markets in the Study Area, and the district market and some of major commune markets, i.e., Sanam Market, Chua Market, Rong Market and etc., have a function of district wide or inter-commune wide market, while most of commune level markets are distinguished as local restricted market and the scale of those market is small. Some farmers go to Vinh Market as to sell products by higher price than local markets.

The major of market in daily use of farmers for agricultural products is shown in Table I.1.3, and Fig. I.1.4 shows the movement of agricultural products.

(4) Farming Activity

Farming machinery has not yet introduced earnestly in the Study Area to date, as the number of tractors indicates. 8 large tractors and 47 small tractors are possessed in Nam Dan District, which are 0.02 and 0.14 tractors per 100 rural households besides 0.05and 0.09 in the Province and 0.24 and 0.63 in the whole country. The major power source in the field is man power and water buffalo, and transport on farming activity relies on bicycles and improved carts. Small trucks called Cong Nong are sometimes used for heavy transport.

NUMBER OF TRACTORS

Item	Large Tractor	Small Tractor
Total Number of Tractors		
Entire Viet Nam	28,643	75,286
Nghe An Province	234	2,934
Nam Dan District	8	47
Number of Tractors per 100 Rural Households		
Entire Viet Nam	0.24	0.63
Nghe An Province	0.05	0.09
Nam Dan District	0.02	0.14

Source : Statistical Data of Basic Situation and Infrastructure of Rural Region in Viet Nam

(5) Passenger Transportation

Public transportation of passengers is not well developed in the Study Area. Only mini-bus, which has 8 persons of capacity, services a public passenger transportation in the Study Area. 15 mini-buses are registered and supply approximate 30 services a day between Nam Dan Town and Vinh City with 40

minutes of necessary time. Public transportation supplying access within the District is not provided. Due to lack of public passenger transport services, people in communes depend on private motor cycle taxi.

While mini-bus service between Nam Dan District and Vinh City is planned to be replaced to large buses from 1997, the Nam Dan Bus Terminal is not well prepared and difficult to use in the rainy season because of no pavement.

(6) Inland Water Transportation

At present, inland water transportation occupies very small part of the total in the Province because of unsuitable river condition. Now there are some inland water transportation on the Lam River and transiting in the rivulet mouth such as Quynh Luu, Nghi Loc, Hung Nguyen and Nam Dan District, however, the amount of inland water transportation in recent years are not worth considering.

In the Study Area, inland water transportation is used for transporting wooden materials from the mountain region in the upper reach, construction materials such as sand and pebble from Nam Thuong Commune, agricultural products such as sugarcane and rice from communes in the right bank of the Lam River. Those transports are considered as a substitution of land transportation due to the poor road conditions.

PRESENT CONDITION OF INLAND WATER TRNSPORTATION

River and Sections	Length (km)	River Grade	Water Depth Max (m)	Water Depth Min (m)	Hindrance Shoal	Boat Avairable
Lam River						
Ben Thuy - Nam Dan	43	III	1.5	1.2	3	Boat 10 ~ 20 tons cap.
Nam Dan - Do Luong	62	V	0.8	0.7	14	Boat 5 ~ 10 tons cap.

Source : Master Plan for Transportation and Communication of Nghe An Province

1.1.4 Road Conditions

(1) Road Conditions

In general, the road condition in the Study Area is poor in terms of future motorization especially in rainy season, while road network itself is considered well developed in road density. The major constraints on road conditions are summarized as follows;

- Low pavement ratio
- Insufficient road width
- Traffic interruption by flood or inundation

The surface types of roads in each category are shown in Table 1.1.4 by communes. The pavement ratio, which consists of asphalt pavement and macadam penetration pavement, is 9.6 %. The ratio is higher than 7 % of the province average, but it is still low in terms of coping with future motorization.

The lack of pavement has a direct negative effect on the road condition in the rainy season.

The road having width more than 4.5 m, which is recommended as minimum for future motor way, is only 15.7 %. 47.7 % of roads are occupied the road width less than 3.5 m, and they are considered insufficient for vehicle traffic except for village roads. The condition of road width of existing roads is shown in Table I.1.5.

Flood and inundation in the rainy season deteriorate traffic condition severely in the depressed area or river side regions. The condition of traffic interruption by flood or inundation is shown in Table I.1.6 and summarized below. 54 km of total length suffers traffic interruption by flood or inundation after heavy rain over 15 days a year, and 25 km suffers over 30 days. The road network in the Study Area is considered as not to cope with motorization in rainy season.

ROAD INTERRUPTION BY FLOODING/INUNDATION

Road Types	Over 15 Days		Over 30 Days		Over 60 Days	
	Route (pcs)	Distance (km)	Route (pcs)	Distance (km)	Route (pcs)	Distance (km)
National Road and Provincial Road	4	5.3	3	5.0		
District Road and Commune Road	35	48.6	12	20.0	4	3.1
Total	38	53.9	14	25.0	4	3.1

Source : Study Team, 1996

Criteria : Route suffered by flooding/inundation over 15, 30 and 60 days a year with more than 30 cm i

The road condition was evaluated by the criteria prepared by the Study Team for rural roads, that is shown in Table I.1.7. The criteria is examined in terms of future motorization in the rural area.

Based on above criteria, roads in the Study Area are evaluated by the Study Team. The results of evaluation are shown in Table I.1.9 and 10. 79 % of total length is in good or fair condition in the dry season, however, the rate decreases to 20 % during the rainy season. 43 % of the roads are inadequate for transit of vehicles during that season.

(2) Bridge Conditions

Bridges observed in the Study Area are consists of following type of structure:

- Wooden Bridge
- Reinforced Concrete Slab Bridge (Small Scale)
- Reinforced Concrete Girder Bridge
- Steel Girder Bridge

- Steel Temporary Bridge

The bridges have fair or poor structural condition, however, the maintenance of bridges is observed not sufficient especially for steel bridges. In addition, bridges crossing rivers do not have adequate revetment to protect river shore, so that some of then suffered damaged by flooding.

Existing bridges in the study Area are classified as shown in Table I.1.11 by bridge width and loading capacity. In general, bridges in the Study Area are considered insufficient in width and loading capacity to cope with heavy traffic condition caused by motorization in future, even though they allow the present traffic condition mainly composed by bicycle, motor cycle and vehicles.

In the purpose to evaluate existing bridges, the Study Team prepared the criteria for bridge evaluation, which is shown in Table I.1.8. Existing bridges are classified into 3 categories as below by the criteria.

Category A : Bridges in Category A is considered sufficient and possible to cope with future motorization without renovation or rehabilitatiol. They are recommended to be used as it is.

Category B : Bridges in Category B is considered insufficient for future motorization but the lack of capacity is not severe. Bridges in this category is recommended to be used for the time with minor rehabilitatiol.

Category C : Bridges in Category C is considered unsuitable for vehicle usage and are to be replaced by new bridge to cope with future motorizatiol.

The result of bridge evaluation is shown in Table I.1.12.

(3) River Crossing

The Study Area is divided into 2 region, i.e., the left bank region and the right bank region, by the Lam River. The left bank region includes the center of the district and connected to the center of the province by the National Road No. 46. On the other hand, the right bank region, which consists 7 communes, is located solitarily and land transportation to the main side is not prepared.

In the Study Area, there are 1 ferry service and 5 small boat services are provided to pass the Lam River. The location of the river crossings are shown in Fig. I.1.2. The ferry port is locate nearby Nam Dan Town and connects the Provincial Road No.15A, which is recognized as a back bone of economic and living activity of the right bank region. However, it obstacles transportation of the right bank region due to high cost and inconvenience.

The Nam Dan Ferry Service is operated by the Province and around 900 vehicles passed the Lam River by the ferry on 1995. Table I.1.13 shows the service record on 1995. The ferry boat, which is classified as barge and boat type, was replaced on 1995. The operation cost is owned mainly by the provincial subsidy at present.

The Nam Dan Ferry suffers service interruption by the Lam River flooding for around one and half months a year. The operation of Nam Dan Ferry is decided based on the water level of the Lam River. From the aspect of safety in the river, the ferry itself can be operated up to E.L. 6.90 m. However, the operation of the ferry is restricted by the external condition that is the traffic interruption at the Mong Submerged Bridge of Route 15A. The condition of ferry operation is summarized below.

E.L. 3.00 m at Ferry Station	:	Mong Bridge is submerged but vehicles can pass it with slow speed.
E.L. 3.40 m at Ferry Station	:	Small cars are interrupted at Mong Bridge with 40 cm of water depth on the bridge. The ferry stops service for small cars.
E.L. 3.70 m at Ferry Station	:	All vehicles including large trucks are interrupted at Mong Bridge with 70 cm of water depth on the bridge. The ferry stops all service.
E.L. 5.40 m at Ferry Station	:	Warning Grade C1 of the Lam River is declined by the Disaster Management Office. The ferry boat itself can be operated but the ferry port can not be used because of the structural limit.
E.L. 6.90 m at Ferry Station	:	Warning Grade C2 of the Lam River is declined by the Disaster Management Office. The ferry boat itself can not be operated due to the high water velocity in the river.

The average days of each water level of recent 20 years are analyzed based on the hydrological records. The traffic interruption for small cars is 56 days a year and for trucks is 44 days as shown in Table I.1.14. If Mong Bridge is renovated and the traffic restrict of the bridge is dissolved, the ferry interruption days will be reduced to around 2 weeks a year with existing ferry facilities.

Small boat services crossing the Lam River is owned and operated by privates and bring person, goods, bicycles and motor cycles. For the people passing the river with bicycle or motor cycle, small boat service occupies major transport mode.

In addition, the Yen Xuan Railway Bridge located the south end of the Study Area is utilized for river crossing by people in the south part of the right bank region. The bridge has a 1.5 m width of pedestrian and it is used for people and light traffics such as bicycle, motor cycle and some of primitive vehicles.

I.1.5 Organization of Road Management

(1) National Road and Provincial Road

National roads are operated and managed by the national government directly. The Ministry of Transportation and Communication (MOTC) has regional road management offices under the Road Management Bureau. The Road Management Department No.4 has a responsibility for the operation and management of national roads in the Nghe An Province. Road No. 46 in Nam Dan District is also operated and maintained by the Department.

For the provincial roads, the provincial government dose operation and management through the Transportation and Communication Department of the Province. The Nam Dan Transportation Office located in the Nam Dan Town covers provincial roads in the Nam Dan District, i.e., Route 15A, Route 539 and Route 540, which has 43.7 km of total length. The office has a road maintenance team consisting of 40 persons and some construction equipment for maintaining road, i.e., 1 motor grader, 2 macadam rollers and 1 truck, and conduct maintenance works by themselves. This office also operates the Nam Dan Ferry Service.

(2) District Road and Commune Road

As a rural road, district roads and commune roads are managed by the District and each commune authority. The Transportation and Communication Division of the District conducts planning, construction and operating of district roads. For maintenance of district roads, the District works together commune authorities. Commune roads are operated and maintained by commune authorities under the subsidy from the Province and District.

Even the local system for road management is well organized, the maintenance of roads is considered as insufficient especially for bridge and drainage due to lack of enough capital.

I.1.6 Operation and Maintenance of Road

(1) National Road and Provincial Road

The operation and maintenance budget for national roads is taken burden by the Central Government and the budget for provincial roads is taken by mainly the Provincial Government with support from the Central Government. The surface condition of national and provincial roads is kept fair condition by the continuous maintenance works. However, fundamental improvement such as asphalt pavement dose not proceed adequately in provincial roads due to the lack of capital.

The historic budget expenditure for national roads and provincial roads in the Nghe An Province is shown in Table I.1.15.

(2) District Road and Commune Road

In the Study Area, almost of district roads and commune roads do not have permanent pavement on surface even some of them has gravel or macadam pavement. It makes road maintenance works expensive. The predominant maintenance work in the Study Area is leveling work and fill up with mountainous soil to date.

The major part of road maintenance works is owned by labor contribution of farmers, that is regulated by the law for all adults to participate local public construction works for 10 days a year. The farmers contribution for road maintenance works occupy almost of 80 % of the total capital. Table I.1.16 shows the maintenance cost on 1995 of district and commune roads by capital source.

I.2 CONSTRAINTS AND POTENTIAL OF RURAL ROAD NETWORK

I.2.1 Constraints of Rural Road Network in the Study Area

- Insufficient quality of road system for future transportation condition

The present transportation is considered as low speed and high cost because of unpaved and uneven road surface. Furthermore, narrow width and insufficient loading capacity of road and bridge are not suitable for modern vehicles such as trucks. These causes difficulty to introduce new transportation and restrict change of transportation to be high speed and low cost mode to meet future demand.

- Inadequate traffic condition in the rainy season

Due to the muddy and slippery condition of unpaved road surface, almost of district roads and commune roads are difficult for modern vehicles to pass in the rainy season. In addition, some of distance are interrupted frequently by flooding and inundation due to lack of drainage system and road embankment. The fragmented road network in the rainy season restrict economic and living activity in the region severely.

- Lack of river crossing

The lack of the Lam River crossing, the right bank region of the Area is isolated in modern transportation system even in the ordinal season while the river crossing is interrupted for 50 days a year in the flooding season. The isolation restricts economic activity in the region severely and causes unevenness of economic condition behind the left bank region.

I.2.2 Potential of Rural Road Network Development

- Introducing the modern transportation system

  The road network in the Study Area is considered as well developed from the aspect of road density even the quality is low and insufficient and the constraints from the quality is observed. By improving existing major roads, it is possible to introduce the change of transportation to the modern system which is stable through year and having high speed and low cost transportation.

- Supporting and enhancing economic activity

  The introduction of modern transportation system will achieve high speed, low cost and stable mass transportation of agricultural products and input. The reduction of transportation period make products marketing flexible due to enlarge possible market. The reduction of transportation cost will decrease production cost and increase benefit of farmers. And the stable transportation through year which is not influenced by weather or flooding will solve unstable condition of economic activity of the Study Area in the rainy season.

- Raising up living condition

  By the rural road network improvement, inhabitants can easily reach to key facilities of living activity such as market, health center, public tap, school and etc. The improvement of accessibility and to provide through-year access to above facilities contributes to the overall raise-up of living condition in the rural area especially in the rainy season.

- Solution of regional unevenness of economic and living condition

  By improving access of the right bank region to the district center, the opportunity of solution or mitigation of regional unevenness of economic and living condition of the region. Reduction of isolated period is essential to proceed economic development of the region.

I.3 RURAL ROAD DEVELOPMENT PLAN

I.3.1 Future Transportation Condition

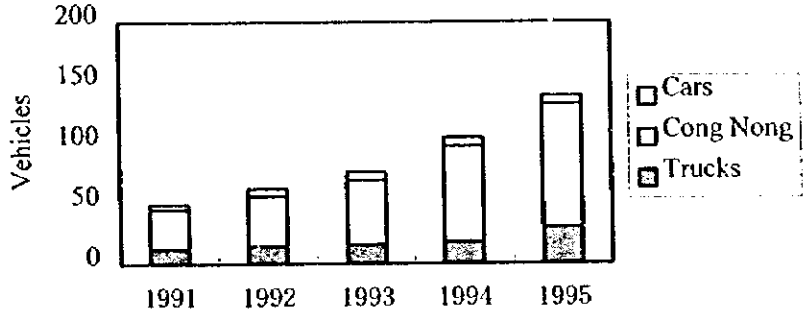
As mentioned in the section of the present condition, the majority of transportation means in the Study Area is two wheeled vehicles such as bicycle, motor cycle and primitive vehicles at present. The modern transportation means which achieve efficient transportation with high speed and low cost increase rapidly mainly in urban area in the country, while the introduction in the rural area is still slow. However, concerning the target year 2010, the change of transportation modes in the rural area is considered inevitable.

The major changes of transportation mode in the Study Area is expected as below;

- The majority of transportation means will be replaced by four wheeled trucks instead of two wheeled vehicles such as bicycle and motor cycles.
- The shipping mode of agricultural products will be grouped and mass transportation is introduced in the rural area instead of individual and small shipping and transportation.
- Efficient transportation means will be introduced instead of primitive vehicles powered by livestock or slow speed motored vehicle like Cong Nong.

In the Study Area, the number of 4 wheeled vehicles, these are cars, trucks and small trucks called Cong Nong, increases significantly in recent years. During this 5 years, the total number of those transportation means reached almost 3 times of the number. However, the majority of those means is still occupied by Cong Nong, which is considered as a inefficient vehicle due to the capacity and speed.

In the Trading Development Master Plan of Nghe An Province, the total number of modern vehicles in year of 2010 is projected as 18 % of households in the urban area and 2 % of households in the rural area. This means that around 700 vehicles will be registered in the Study Area.



Historic Number of Vehicles in Study Area

Source : Nam Dan District

I.3.2 Targets and Objectives of Road Network Development

The following targets of the road network development is proposed to aim raise up economic and living condition in the Study Area;

- To develop road network ready to heavy and high speed traffic condition in all season to cope with expected change of transportation mode in future
- To dissolve regional difference caused by fragment of road networks and to remove restricts on even economic growth in regions
- To cope with expected mechanization of farming practice
- To rise up living condition in rural area

To achieve above targets, the road network development shall be formulated with attention as below;

- To develop basic road network to link regions systematically and connect to the exterior economic sphere
- To develop major road networks to link each commune to the basic road network with roads corresponding to heavy and high speed traffic conditions
- To develop inter-commune road networks to link communes in region to support the basic road network
- To improve access to the social and economic key facilities in the area
- To improve access to farming field to reduce farmers' trouble to reach fields and to introduce mechanization of farming practice

I.3.3 Concept for Rural Road 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 sytem and enhancement of road management systems.

<u>To Improve Road Quality to Accommodate Future Transportation System and Demand</u>

- Rehabilitation and upgrading of road surface
- Expansion of road widths
- Rehabilitation and improvement of bridges
- Construction of bridge interfacing between the right bank region and the center part

<u>To Enhance Road Management Activities</u>

- 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 Improvement and Development

Road improvement and rehabilitation of basic, major and inter-commune road networks should focus into achieving all weather road for vehicle traffic. For above improvement, road embankment to avoid interruption by flood, asphalt pavement to keep traffic condition in the rainy season and road drainage improvement are proposed.

(3) Bridge Improvement and Development

The bridge construction concept focuses for bridges to cope with future vehicle traffic and to reduce effort to maintenance. Hence, all renovated or newly constructed bridges are proposed to be concrete bridge, which is much easier to maintain than steel bridges.

Bridges in Viet Nam is designed based on VIETNAMESE BRIDGE DESIGN CODE, and the minimum loading capacity of H13-X60 is applied at present. The existing bridges were evaluated according to their widths and loading capacities shown in Table I.1 8 as to decide necessity of renovation or rehabilitation. Some of bridges in the good condition are recommended to be used as is with minor rehabilitation even they have widths and loading capacity less than above criteria.

I.3.4 Justification of Road Networks

(1) Justification and Prioritization of Routes

Priority routes which are to be included in the Master Plan are selected based on utility and function in the area at present and projection. The beneficiaries relying to each in the area are shown in Table I.3.1.

To achieve systematic road network in the Study Area, basic road network and major road networks to link each commune to the basic road network are focused to priority routes due to the impact for function of road network. The selected priority routes are listed and justified in Table I.3.2.

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

Evaluation Factors for Rural Road Improvement

Factor	Contents	Priority in 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.	√

Factor	Contents	Priority in factors
Model-wide	No evaluation because developing adequate rural road network system itself is considered as a model for other area.	
Economic 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 priority evaluation of routes are shown below:

Results of Priority Evaluation of Routes

Route	Factors						Comprehensive Assessment
	Urgency	Realization & Sustainability	Adaptability	Inhabitant Needs	Impact	Economic & 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

I.4 PRIORITY PROJECTS

I.4.1 Required Activity for Priority Routes

The priority routes and targets selected based on the evaluation on I.3 and required major activity in the road improvement are listed below.

Route	Objectives	Major Activity	Work Amount
Route 15A (North)	To improve to the district center and the exterior area access of the north west region by improving the basic road to be all weather road.	• asphalt pavement	• 14.4 km
Route 15A (South)	To solve traffic isolation of the right bank region by developing all weather road and connecting to the left bank. To shorten traffic interruption period by road embankment and small and middle bridge construction.	• road embankment • bridge construction • asphalt pavement	• 3.0 km • 4 new bridges • 19.4 km

Route	Objectives	Major Activity	Work Amount
42 Dike Road	To improve access to the Nam Dan Town of communes in the left bank side of the Lam River including 3 communes in Hung Nguyen District by developing all weather road.	• asphalt pavement • road widening	• 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 all weather road.	• asphalt pavement • road widening • bridge renovation	• 7.2 km • 7.2 km • replace 1 bridge
Hung Tien - Nam Linh Road	To improve access of Hung and Nam Linh Commune by developing all weather road network.	• asphalt pavement • road widening • bridge renovation	• 8.8 km • 8.8 km • replace 2 bridge
42 Dike - Kim Lien Road	To improve access to the Route 46 from communes along 42 Dike by developing all weather road network.	• asphalt pavement • road widening • bridge renovation	• 4.2 km • 4.2 km • replace 2 bridge
Kim Lien - Nam Cat Road	To improve access to the Route 46 through Kim Lien Commune and to Vinh City through the September 12th Road from Nam Cat Commune by developing all wether road network.	• asphalt pavement • road widening • road embankment • bridge renovation	• 7.6 km • 7.6 km • 2.8 km • replace 1 bridge
Nam Tan - Nam Loc Road	To improve access of densely populated area of Nam Tan and Nam Loc Commune by developing all weather road network.	• asphalt pavement • road widening • bridge renovation • drainage improvement	• 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 all weather road network.	• asphalt pavement • road widening • road embankment • bridge renovation	• 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 a evacuation road of the region at inundation period.	• gravel surface • road widening • road embankment • bridge renovation	• 7.0 km • 7.0 km • 4.8 km • replace 4 bridge

I.4.2 Facility Plan

(1) Design Criteria

For the design of the rural road improvement, the following design criteria and Vietnamese standard are applied with some modifications made based on the Japanese Design Standards.

- 22 TCVN 4054-85 Design Standard for Motorway
- 22 TCN 210-92 Design Standard for Rural Road
- 22 TCN 171-87 Design Standard for Geological Survey and Solution for Road Bed Stability in Erosion Area
- 22 TCN 211-93 Design Standard for Soft Road Surface
- 22 TCN 220-95 Design Standard for Flooding Discharge Calculation
- 22 TCN 221-95 Design Standard for Transportation Structure in Earthquake Influence Area

Table I.4.1 and I.4.2 shows the summary of Design Standard for Motorway and Design Standard for Rural Road.

(2) Typical Design of Road

Cross Section

From the expected traffic volume and character of priority routes, the typical cross section for road structure is designed following the Grade VI of the Vietnamese Design Standard for Motorway. The recommended basic dimensions of typical cross section is as follows:

Item	Typical Design	Remarks
Road Width	6.0 m	
Road Surface	Asphalt Pavement 3.5 m width or Gravel Covered 3.5 m width	Surface Structure
Cross Sectional Slope of Road Surface	2 % for As Pavement 3 % for Gravel	
Slope of Road Embankment	1:1.5	
Road Surface Drainage	Earth drainage protected by gravel along the road 40cm-40cm with 1:1.0 slope	Distance in the mountainous area

Typical cross section of road improvement is shown in Fig. I.4.1.

Geometric Design

Geometric design of road is decided from the aspect of traffic safety. In the rural road improvement plan, the alignment of roads are designed as following the existing route because the routes are planed to improve existing roads.

Pavement

To achieve all weather road for vehicle traffic, asphalt concrete is recommended for the material of the pavement layer because of the initial cost and maintenance cost.

(2) Design of Bridge Structure

The following general design conditions are applied to the bridges considered to be renovated or newly constructed in the project.

Item	Condition
Design Loading Capacity	H13-X60 in TCVN4054-85
Effective Bridge Width	4.5 m (1 - lane)

The bridge type will be decided based on the economic aspect in each construction site. For instance, the following criteria of bridge type selection is applied based on the experiences of constructions in the part of Vietnam and the ability of construction works.

Span Length	Bridge Type
L < 3.0 m	Culvert
3.0 m ≤ L ≤ 6.0 m	Slab Bridge
6.0 m < L < 12.0 m	RC Beam Bridge with Concrete Slab
12.0 m ≤ L< 20.0 m	Pre-tension Hollow Core Beam Bridge with Concrete Slab
20.0 m ≤ L	Post-tension T-Beam Bridge with Concrete Slab

(3) Facility Plan

In the design of road improvement, the distance to be improved and appropriate structure have been studied. The plan in the Interim Report has been modified based on the topographic map scaled 1/5,000 and the results of the field survey. The summary of the design is shown in the following table:

Route	Distance to be Improved	Distance to be Widened
1. Route 15A (North)	14.8 km	-
2. Route 15A (South)	19.4 km	-
3. 42 Dike Road	11.0 km	11.0 km
4. Phan Boi - Chua Road	7.2 km	7.2 km
5. Hung Tien - Nam Linh Road	8.8 km	8.8 km
6. 42 Dike - Kim Lien Road	4.2 km	4.2 km
7. Kim Lien - Nam Cat Road	7.6 km	7.6 km
8. Nam Tan - Nam Loc Road	8.7 km	8.7 km
9. Nam Nam Dike Road	9.4 km	1.8 km
10. Nam Kim - Nam Phuc - Nam Cuong Road	7.0 km	7.0 km

Note : (1) Total distance of Route 15A (South) is 21.6km.
(2) Improvement of Nam Nam Dike Road includes new construction of 2.9km.
(3) The pavement of the roads is of asphalt except for Nam Kim-Nam Phuc-Nam Cuong Road which is to be paved with gravel.

To maintain traffic function in the rainy season and to avoid damage of road itself by inundation, some distance of road is proposed to be raised for the surface elevation. The major road embankment plan is as follows:

Route	Distance to be Upraised	Target Elevation and Embankment Height
Route 15A (South)	Distance around the Mong Bridge L = 3.0 km	To cope with the level 3 flood water level of the Lam River (E.L. 7.9 m at Nam Dan). H = 0 ~ 1.9 m (Average 1.0 m)
Nam Nam Dike Road	Distance in Nam Cuong Commune L = 6.0 km	To cope with the level 3 flood water level of the Lam River. H = 0 ~ 2.2 m (Average 0.9 m)
Kim Lien - Nam Cat Road	Distance after the Nam Ha Bridge L = 2.8 km	To cope with frequently inundation level. Road Surface E.L. = 3.5 m H = 0 ~ 1.0 m (Average 0.8 m)
Nam Kim - Nam Phuc - Nam Cuong Road	Distance in Nam Nam Dike L = 4.8 km	To cope with frequently inundation level. Road Surface E.L. = 4.5 m H = 0 ~ 1.7 m (Average 1.0 m)

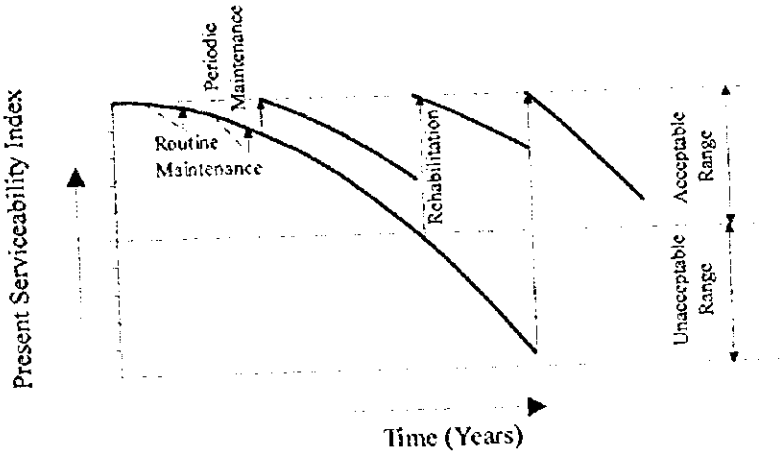
The facility plan of road improvement and profiles of routes are shown in Fig. I.4.2 and I.4.3. And the bridge improvement plan is listed in Table I.4.3.

I.4.3 Road Management Plan

(1) Definition of Road Management Activity

Road management activity consists of road maintenance and rehabilitation works and that is defined as systematic activities to preserve and repair a road system with its elements according to accepted configurations. System elements include road surface, shoulders, road side areas, drainage facilities, bridge and so forth. Road management activities are developed to offset the effect of weather, vegetation growth, deterioration, traffic wear and damage. Maintenance of necessary buildings, stockpiles and equipment are also included. Road maintenance is divided into inspection work, routine maintenance work and periodic maintenance work.

For the road surface maintenance and rehabilitation, the serviceability of the road surface generally decreases due to traffic and aging as shown below.



Routine maintenance of the road surface by minor repairs is thus required in order to preserve its quality within the acceptable range. Routine maintenance work comprises repairs of potholes, patching, surface treatments and minor repairs of rutting and cracking.

Periodic maintenance of the road surface is needed so as to restore the road surface to a quality level close to the original standard considered as "perfect". Periodic maintenance includes repairs of rutting and cracking and asphalt overlays.

Rehabilitation is defined as work done on roads which have already fallen to unacceptable serviceability level, while maintenance is work done on roads which are still within the acceptable range of serviceability. Improvement is defined as the upgrading of road surface, width, alignments so as to increase trafficability beyond the road's original standard. Reconstruction is defined as renewal of deteriorated road structure.

(2) Road Rehabilitation and Improvement

Road surface rehabilitation is required for road sections in poor and very poor conditions based on the road inventory survey. Road improvement regarding road width and surface is needed for provincial and district roads. The rehabilitation and improvement of priority routes should be conducted by public investment because of the importance and cost. On the other hand, commune roads and village roads which are not included to the priority routes should be rehabilitated and improved by inhabitants participation for the construction works.

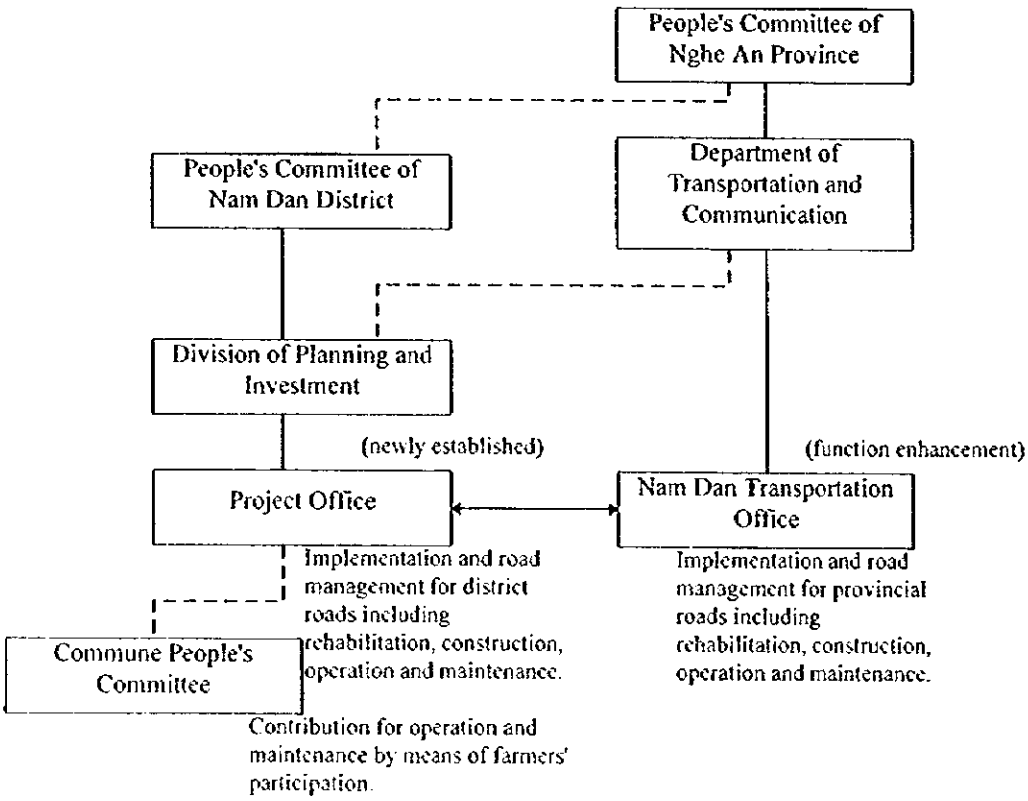
(3) Road Maintenance and Operation Works

The activity and schedule of road management is proposed as below:

Maintenance Work	Work Item and Period	Provincial Road	District Road
Road Inspection	Once a month	Carried out by Nam Dan Transportation Office	Carried out by District with contribution of Commune Authority
Routine Maintenance	Before and after the rainy season	Carried out by Nam Dan Transportation Office (Direct operated)	Carried out by District with farmers contribution
Periodic Maintenance	Every 5 years or depends on the road surface condition	Carried out under the contract with construction companies	Carried out under the contract with construction companies
Rehabilitation	Depend on the deteriorated condition of roads	Carried out under the contract with construction companies	Carried out under the contract with construction companies

(4) Road Management Organization

Road management organization for the rural road improvement project is proposed to be two types due to the present administrative organization for road types. Route 15A which is a provincial road should be managed by the Nam Dan Transportation Office of Nghe An Province. Other priority routes are classified as district roads and they should be managed by the District. In order to cope with distance increment of upgraded road to be maintained and to enhance the management ability for all distance of district roads, new project office for road management is proposed to be newly established under the Planning and Investment Division of Nam Dan District which has responsibility for road administration.



I.4.4 Implementation Plan of Rural Road Improvement

The preparation of adequate rural road network is considered as a basic condition of overall of the model rural development project. Thus, the implementation of the rural road improvement should be scheduled to be ahead from other sector projects so as to realize their effect quickly and efficiently.

The rural road improvement has two kind of road type, i.e., provincial road and district roads. Considering the present system of road administration in Viet Nam, it is considered better that road improvement be implemented by the present administration system. Thus, the improvement of Route 15A is proposed to be implemented by the Provincial organization and other roads to be implemented by the District.

I.4.5 Construction Cost and Road Management Cost

The project cost which direct and indirect cost is estimated as below. The detail of the cost estimation for rural road improvement is shown in Table I.xx.

SUUMARY OF PROJECT COST FOR RURAL ROAD IMPROVEMENT

Route	Project Cost		
	L/C (mill.VND)	F/C (mill.VND)	Total (mill.VND)
1 Route 15A Nothern Part	14,791	2,763	17,554
2 Route 15A Southern Part	31,240	10,193	41,433
3 42 Dike Road	11,011	3,779	14,790
4 Phan Boi - Chua Road	11,995	4,088	16,083
5 Hung Tien - Nam Linh Road	11,126	2,290	13,416
6 42 Dike - Kim Lien Road	6,866	1,895	8,761
7 Kim Lien - Nam Cat Road	9,767	3,279	13,046
8 Nam Tan - Nam Loc Road	12,779	3,841	16,620
9 Nam Nam Dike Road	11,860	4,260	16,120
10 Nam Kim- Nam Phuc - Nam Cuong Road	13,245	7,223	20,468
TOTAL	134,679	43,612	178,291

The cost for operation and maintenance consists of construction material, equipment operation and labor cost and the annual cost is estimated as below.

ANNUAL UNIT COST OF ROAD MAINTENANCE

Item	Asphalt Paved Road	Gravel Road
Routine Maintenance	8 mil. VND/km-year	4 mil. VND/km-year
Periodic Maintenance and Rehabilitation	80 mil. VND/km-5years	20 mil. VND/km-2years

ANNUAL ROAD MAINTENANCE COST OF PRIORITY ROUTES

Route	Distance	Average Annual Cost* (million VND)	Road Surface Type
Maintained by Province			
1. Route 15A (North)	14.8 km	355	Asphalt Paved
2. Route 15A (South)	19.4 km	466	Asphalt Paved
Sub-total	34.2 km	821	
Maintained by District			
3. 42 Dike Road	11.0 km	264	
4. Phan Boi - Chua Road	7.2 km	173	Asphalt Paved
5. Hung Tien - Nam Linh Road	8.8 km	211	Asphalt Paved
6. 42 Dike - Kim Lien Road	4.2 km	101	Asphalt Paved
7. Kim Lien - Nam Cat Road	7.6 km	182	Asphalt Paved
8. Nam Tan - Nam Loc Road	8.7 km	209	Asphalt Paved
9. Nam Nam Dike Road	9.4 km	226	Asphalt Paved
10. Nam Kim - Nam Phuc - Nam Cuong Road	7.0 km	98	Gravel
Sub-total	63.9 km	1,464	
Grand-total	98.1 kn	2,285	

*: The road maintenance cost consists of routine maintenance, periodic maintenance and rehabilitation, and is indicated as an annual average cost.

I.5 SUPPLEMENTAL STUDY ON ROUTE 15A

I.5.1 General Condition of Province-wide Road Network System

The basic system of road network in and around the Province consists of the country-wide back-born runs from north to south in coastal area and off-branches connect mid and mountainous regions to the coastal area.

The National Highway No.1 is the back-born having the role to link the Province to country-wide markets such as Hanoi, Hai Phong, Ho Chi Minh and etc., and the route is the most important road not only for the Province but also for the country. The Highway is now under improvement by the national project.

The Route No.48, No.7 and No.46 are recognized as major off-branches to the mid and mountainous regions in the Province. The Route No.8 running through the boundary of Nghe An and Ha Tinh Province is also one of the major off-branch. On the above roads, the Route No.7 and No.8 have the role of an international trading road linking Lao and Thailand to the coastal area of Viet Nam. Goods transported from those countries are shipped to overseas countries through the international ports such as Cua Lo and Hai Phong.

The Route 15A runs through the Province from north to south links above off-branches in the mid region of the plane area. The Route is a basic access of the region where the road network has not yet developed densely.

I.5.2 Transportation in Nghe An Province

The National Highway No.1 is the most important road of the Province as mentioned

above, and the amount of the north-south transportation in the Province is 1,200,000 ton/year on 1995.

The total amount of goods transported in Nghe An Province is estimated as 3,000,000 ton/year, and it is forecasted to be 6,000,000 ton/year on 2000 and 11,000,000 ton/year on 2010 in the Transportation Sector Master Plan of Nghe An Province.

The Route No.7 has a role of international trading road with Lao and Thailand through Cua Lo International Port located near by Vinh City and the National Highway No.1. The total amount of in-export goods to those countries is 200,000 ton/year on 1995, and it is forecasted to be 1,000,000 ton/year on 2000 and 5,000,000 ton/year on 2010 in above Master Plan. The forecast anticipates the improvement of the Cua Lo Port facilities by the Province.

DAILY TRAFFIC VOLUME RECORD

Route	Point	Motorcycle	Truck	Bus	Total
No.7	Dien Chan	1,495	132	40	1,667
No.46	Vinh	861	133	20	1,014
No.15A	Do Luong	720	72	8	700
No.15A	Nam Dan Ferry		3		3

Transportation Sector Mater Plan 2010 , Transportation and Communication Department of Nghe An Province, 1995

I.5.3 Area and Population Relying to Route 15A

The Route 15A runs through 4 districts, i.e., Nghia Dan, Tan Ky, Do Luong and Nam Dan in the Nghe An Province, and through 1 district, i.e., Duc Tho in the Ha Tinh Province. Totally, the Route has 2,295 km^2 of acreage and 573,000 of population, and 543 km^2 and 277,000 in the distance between intersections with Road No.7 and No.8. The general information such as area, population and major towns are shown below.

AREA AND POPULATION ALONG ROUTE 15A

Province/District/Town	Distance	Area (km^2)	Population (people)
Nghe An Province			
Nghia Dan District		882.99	143,897
Thai Hoa Town			7,531
Tan Ky District		725.58	101,884
Tan Ky Town			4,675
Do Luong District		364.69	166,512
Do Luong relying distance 7-8		221.15	115,938
Do Luong Town			7,380
Nam Dan District		295.88	140,802
Nam Dan Town			5,913
Ha Tinh Province			
Duc Tho District		303.10	149,377
Duc Tho relying distance 7-8		25.61	19,995
Total		2294.75	573,090
Total in 7-8		542.64	276,735

I.5.4 Present Condition of Route 15A

(1) Road Structure

Route 15A is attained the Grade V for plain area mentioned in the Vietnamese Technical Standard for Motorway TCVN 4045-85, however, asphalt pavement achieves only 13 km even though the standard requires that to the Grade V road.

The major standard is as follows:

Road Bed Width	6.0 m
Road Surface	3.5 m
Surface Type	Asphalt Pavement
Loading Capacity	H13-X60

(2) Bridge and River Crossing

The summary of bridges

Total Number	18
Total Length	233 m (excluding spillway)
with width >=6m	8
with width 4~6m	10
Loading Capacity	H13-X60
Spillway	5

In the distance between intersection with Road No.7 and with Road No.8, there are 2 passes of the Lam River and its major tributary La River. The Route 15A crosses the Lam River at Nam Dan Town and the bridge crossing the river is not developed. At present, only barge type ferry provides the service for vehicles to cross the point, while people, bicycles and motor cycles pass the river by small boat service. Because of the cost and inconvenience of river crossing, the function of Route 15A is limited up to the intersection of Route 46 and the traffic to/from the right bank of the Lam River in Nam Dan District is severely restricted.

Furthermore, in Duc Tho District of Ha Tinh Province where the Route 15A intends to link Route No.8, traffic is interrupted by the luck of crossing service of the La River, which is one of the major tributaries.

(3) Flooding Condition of Route 15A

Total distance suffers flood or inundation is 25 km. The breakdown is ;

km 206 - 222 2.9 km length
km 230 - 288 14.0 km length (Hon Son)
km 334 - 355 8.0 km (Nam Dan)

(4) Mobility of the Route

Vehicle speed 20~25 km/h in dry season

I.5.5 On-going Project for Route 15A

According to the Provincial Master Plan to 2010 on Transportation Sector, Route 15A is planed to be improved as a Grade V in the distance from Do Long to Tan Ky up to 2000, and in the distance from Tan Ky to Tay Hieu up to 2010. However, The distance southern of Do Long which includes Nam Dan District and Ha Tinh Province is not scheduled to be improved.

I.5.6 Constraints and Potentials

From the aspect of the development of the right bank of the Lam Rive in Nam Dan District, it is essential to solve the isolation of the region in economic activity and living condition. On the other hand, the improvement of Route 15A in full distance is very important for the economic development of the middle regions of Nghe An Province where is not well developed from the aspect of transportation and it restricts regional economic development.

The interruption of Route 15A at the Lam River and the La River dose not only force the right bank area of Nam Dan District to be isolated in economic activity and living conditions but also restricts interaction between Nghe An and Ha Tinh Province in the middle region. The fact restricts development potential of the southern part of the middle region in Nghe An Province.

I.5.7 Conclusion

The Route 15A is justified as a basic road of the Study Area, and 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 a few economic activity comparing with the scale of investment.

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

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

I.6 RECOMENDATION

I.6 RECOMENDATION

Considering the function of road network in the economic and living activity and the contribution to the regional economic development, to prepare appropriate road network is essential of the rural development. To maximize and make efficient the effect of related projects included in the rural development plan, the road network improvement should be ahead of or implemented simultaneously with other subprojects in the plan even though a tangible economic effect from road improvement is not so high.

APPENDIX I : TABLES

Table I.1.1 Road Types and Length in Communes

Commune	Area (km^2)	Population (persons)	Household (household)	Village	National Roads (km)	Provincial Roads* (km)	District Roads (km)	Commune Roads (km)	Total Length (km)	Road Density (km/km^2)
1. Nghe An Province	16,370				394.0	538.0	1,917.0	6,371.0	9,220.0	0.56
2. Nma Dan District	294.3	157,957	33,742	310	17.9	43.4	71.3	248.9	381.5	1.30
1 Nam Hung	31.6	3,547	796	11	0.0	8.1	0.5	14.8	23.4	0.74
2 Nam Nghia	12.2	4,308	970	11	0.0	1.3	1.8	11.9	15.0	1.23
3 Nam Thai	11.7	3,061	621	7	0.0	2.7	0.0	13.7	16.4	1.40
4 Nam Thanh	25.9	7,990	1,798	18	0.0	0.0	7.5	13.2	20.7	0.80
5 Nam Anh	12.6	6,826	1,527	9	0.0	0.0	4.0	10.8	14.8	1.18
6 Nam Xuan	11.7	6,048	1,395	12	0.0	0.0	5.0	9.5	14.5	1.24
7 Van Dien	12.8	10,845	2,350	16	3.0	4.0	0.0	10.7	17.7	1.38
8 Nam Dan		6,398	1,328		3.0	0.0	2.7	2.1	7.8	
9 Xuan Hoa	6.5	5,918	1,331	11	2.4	0.0	4.3	6.2	12.9	1.99
10 Hung Tien	8.8	8,881	1,954	19	3.1	0.0	4.2	8.3	15.6	1.77
11 Nam Linh	8.9	5,964	1,286	13	0.0	0.0	2.0	8.3	10.3	1.16
12 Kim Lien	13.5	11,348	2,535	22	3.6	4.7	3.6	9.6	21.5	1.59
13 Nam Giang	12.7	6,166	1,207	12	2.8	4.0	0.0	10.4	17.2	1.36
14 Hong Long	7.0	5,074	1,006	13	0.0	0.0	4.0	8.6	12.6	1.80
15 Xuan Lam	9.1	9,026	1,785	22	0.0	0.0	7.2	7.9	15.1	1.66
16 Nam Cat	6.5	5,941	1,286	12	0.0	0.0	4.6	8.2	12.8	1.96
17 Nam Thuong	7.3	2,391	461	4	0.0	0.0	0.0	12.3	12.3	1.68
18 Nam Tan	11.9	4,293	713	7	0.0	2.2	0.0	10.3	12.5	1.05
19 Nam Loc	11.0	5,648	1,136	11	0.0	5.2	1.0	17.6	23.8	2.16
20 Khach Son	37.7	11,851	2,603	28	0.0	7.5	5.2	12.8	25.5	0.68
21 Nam Trung	6.5	7,295	1,547	14	0.0	0.0	5.9	7.3	13.2	2.02
22 Nam Kim	17.3	9,845	2,082	20	0.0	3.7	2.8	14.8	21.3	1.23
23 Nam Phuc	5.4	3,379	730	8	0.0	0.0	2.0	13.7	15.7	2.90
24 Nam Cuong	5.8	5,914	1,295	10	0.0	0.0	3.0	6.0	9.0	1.57

* : Including national roads operated by the Province.

**: Including duplication in communes.

Source : JICA Study Team

Table I.1.2 Types and Number of Vehicle in Communes as of 1996

Commune	Types of Vehicle					
	Imp. Cart	Motor Cycle	Car	Small Truck	Truck	Bus
District Total	**23,690**	**1,619**	**5**	**182**	**57**	**27**
1 Nam Hung	400	30				
2 Nam Nghia	400	80		1		
3 Nam Thai	500	30		2		
4 Nam Thanh	1150	52		7	3	
5 Nam Anh	1600	110	2	7	9	1
6 Nam Xuan	1170	36		4	1	1
7 Van Dien	1000	150		5	3	
8 Nam Dan	150	300	3	2	23	22
9 Xuan Hoa	1300	100		8	3	2
10 Hung Tien	2000	100		30	4	
11 Nam Linh	1300	30		17	3	1
12 Kim Lien	100	70		33	3	
13 Nam Giang	900	60		24	1	
14 Hong Long	800	30		5		
15 Xuan Lam	1600	47		15	2	
16 Nam Cat	1000	100		4	1	
17 Nam Thuong	400	4				
18 Nam Tan	800	15			1	
19 Nam Loc	1200	50		2		
20 Khanh Son	2300	20		3		
21 Nam Trung	120	63		7		
22 Nam Kim	2000	50		2		
23 Nam Phuc	700	17		2		
24 Nam Cuong	800	75		2		

Source : Survey by Study Team, 1996

Table I.1.3 Movement of Agricultural Products Transportation

Commune (Location)	Market in Daily Use (person/day)																	Total
	Sanam N. Dan	Rong N.Trung	Vinh *Vinh*	Chua N.Anh	Nam Nghia N.Ghia	Sao N.Giang	Lieu *H.Guyen*	Con But H.Long	Vac H.Tien	Ro N.Kim	Hom K.Son	Can *H.Guyen*	Cau K.Lien	Nam Loc N.Loc	Do N.Cuong	Dinh N.Tan	Nam Hung N.Hung	Con *D.Long*	
1 Nam Hung	100	-	-	-	300	-	-	-	-	-	-	-	-	-	-	-	300	100	800
2 Nam Nghia	100	50	50	-	800	50	-	-	100	-	-	-	-	-	-	-	-	-	1,150
3 Nam Thai	100	-	-	-	400	-	-	-	-	-	-	-	-	-	-	-	-	100	600
4 Nam Thanh	500	-	50	50	1,000	-	-	-	100	-	-	-	-	-	-	-	-	-	1,700
5 Nam Anh	200	-	100	1,100	-	100	-	-	100	-	-	-	-	-	-	-	-	-	1,600
6 Nam Xuan	300	-	200	900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,400
7 Van Dien	2,100	-	50	-	100	50	-	-	50	-	-	-	-	-	-	-	-	50	2,400
8 Nam Dan	1,200	-	100	-	50	-	-	-	50	-	-	-	-	-	-	-	-	-	1,400
9 Xuan Hoa	500	-	100	500	-	100	-	-	200	-	-	-	-	-	-	-	-	-	1,400
10 Hung Tien	200	-	400	-	-	100	-	800	400	-	-	-	-	-	-	-	-	-	1,900
11 Nam Linh	100	-	100	200	-	200	-	-	600	-	-	-	-	-	-	-	-	-	1,200
12 Kim Lien	300	-	900	-	-	500	-	-	-	-	-	-	900	-	-	-	-	-	2,600
13 Nam Giang	50	-	100	-	-	1,100	-	-	50	-	-	-	50	-	-	-	-	-	1,350
14 Hong Long	300	-	100	-	-	-	-	600	-	-	-	-	-	-	-	-	-	-	1,000
15 Xuan Lam	100	100	100	-	-	-	1,400	100	50	-	-	-	-	-	-	-	-	-	1,850
16 Nam Cat	50	-	-	-	-	-	300	-	-	-	-	1,000	-	-	-	-	-	-	1,350
17 Nam Thuong	400	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	500
18 Nam Tan	400	-	-	-	-	-	-	100	-	-	-	-	-	100	-	100	-	-	700
19 Nam Loc	100	-	-	-	-	-	-	300	-	-	-	-	-	800	-	-	-	-	1,200
20 Khanh Son	100	1,200	100	100	-	-	200	-	-	50	800	-	-	-	-	-	-	-	2,550
21 Nam Trung	-	900	200	-	-	-	100	-	50	200	50	-	-	-	100	50	-	-	1,650
22 Nam Kim	50	400	-	-	-	-	-	-	-	1,000	-	-	-	-	200	200	-	-	1,850
23 Nam Phuc	-	200	100	-	-	-	-	-	-	50	50	-	-	-	200	50	-	-	650
24 Nam Cuong	-	400	100	-	-	-	100	-	-	-	300	-	-	-	300	-	-	-	1,200
Total	7,250	3,250	2,950	2,850	2,650	2,200	2,100	1,900	1,750	1,300	1,200	1,000	950	900	800	400	300	250	34,000

Source : Survey by Study Team, 1996

Table I.1.4 Road Surface Types and Length of Existing Roads

Road Types	Surface Types (km)					Total
	Asphalt, Concrete	Macadam Penetration	Gravel	Earth / Gravel	Earth	
1. In Nghe An Province						
National Roads	64	237	93			394
Provincial Roads*	6	195	135	80	122	538
District and Commune Roads		143	616	4,805	2,724	8,288
Total	70	575	844	4,885	2,846	9,220
(%)	0.8%	6.2%	9.2%	53.0%	30.9%	
2. In Nam Dan District						
National Roads	11.9	3.7	-	-	2.3	16.0
Provincial Roads*	4.0	5.0	-	7.4	27.1	43.4
District Roads	-	8.9	3.0	10.7	49.1	71.7
Commune Roads	-	3.2	1.2	25.8	218.7	248.8
Total	15.9	20.7	4.2	43.9	297.1	379.9
(%)	4.2%	5.4%	1.1%	11.6%	78.2%	
1 Nam Hung	-	-	-	-	23.4	23.4
2 Nam Nghia	-	-	-	-	15.0	15.0
3 Nam Thai	-	-	-	-	16.4	16.4
4 Nam Thanh	-	-	-	-	20.7	20.7
5 Nam Anh	-	-	-	-	14.8	14.8
6 Nam Xuan	-	-	-	-	14.5	14.5
7 Van Dien	-	1.3	-	-	16.5	17.7
8 Nam Dan	-	4.2	-	-	3.9	8.1
9 Xuan Hoa	2.4	1.5	1.2	-	7.8	12.9
10 Hung Tien	3.1	0.9	-	-	11.6	15.6
11 Nam Linh	-	-	-	1.0	9.3	10.3
12 Kim Lien	3.6	8.3	-	-	9.6	21.5
13 Nam Giang	6.8	1.1	-	-	9.3	17.2
14 Hong Long	-	0.7	-	-	11.9	12.6
15 Xuan Lam	-	-	-	-	15.1	15.1
16 Nam Cat	-	-	-	2.0	10.8	12.8
17 Nam Thuong	-	-	-	-	12.3	12.3
18 Nam Tan	-	-	-	2.2	10.3	12.5
19 Nam Loc	-	-	-	5.2	18.6	23.8
20 Khanh Son	-	-	-	7.2	18.3	25.5
21 Nam Trung	-	-	-	6.3	6.9	13.2
22 Nam Kim	-	2.8	-	14.0	4.5	21.3
23 Nam Phuc	-	-	-	-	15.7	15.7
24 Nam Cuong	-	-	3.0	6.0	-	9.0

* : Including national roads operated by the Province.

Source : Survey by Study Team, 1996

Table I.1.5 Road Width of Exisiting Roads

Road Types	Road Width				Total
	4.5 m ~	3.5 m ~	2.5 m ~	Less than 2.5 m	
1. In Nam Dan District					
National Roads	11.9	6.0	-	-	17.9
Provincial Roads	30.7	4.0	8.7	-	43.4
District Roads	7.0	41.3	16.2	6.8	71.3
Commune Roads	10.2	88.5	142.9	7.4	248.9
Total	59.8	139.8	167.8	14.2	381.5
(%)	15.7%	36.6%	44.0%	3.7%	
2. In Communes					
1 Nam Hung	8.1	7.9	4.6	2.8	23.4
2 Nam Nghia	1.3	1.8	11.9	-	15.0
3 Nam Thai	2.7	-	13.2	0.5	16.4
4 Nam Thanh	-	18.7	2.0	-	20.7
5 Nam Anh	4.0	9.1	1.7	-	14.8
6 Nam Xuan	-	13.0	1.5	-	14.5
7 Van Dien	-	7.0	10.7	-	17.7
8 Nam Dan	-	6.4	1.1	0.3	7.8
9 Xuan Hoa	2.4	6.3	4.2	-	12.9
10 Hung Tien	3.1	4.2	8.3	-	15.6
11 Nam Linh	4.8	-	5.5	-	10.3
12 Kim Lien	3.6	3.5	14.4	-	21.5
13 Nam Giang	2.8	9.4	5.0	-	17.2
14 Hong Long	-	4.5	6.8	1.3	12.6
15 Xuan Lam	-	7.2	7.9	-	15.1
16 Nam Cat	-	-	12.8	-	12.8
17 Nam Thuong	-	-	12.3	-	12.3
18 Nam Tan	2.6	8.6	1.3	-	12.5
19 Nam Loc	11.2	12.6	-	-	23.8
20 Khanh Son	7.5	4.8	13.2	-	25.5
21 Nam Trung	-	-	9.4	3.8	13.2
22 Nam Kim	5.7	13.8	1.8	-	21.3
23 Nam Phuc	-	-	13.2	2.5	15.7
24 Nam Cuong	-	1.0	5.0	3.0	9.0

Table I.1.6 Condition of Road Interruption by Flood and Inundation

Commune	Commune Road		District Road		National and Provincial Road		Total	
	Route (pcs)	Distance (km)	Route (pcs)	Distance (km)	Route (pcs)	Distance (km)	Route (pcs)	Distance (km)
OVER 15 DAYS								
Nam Hung	1	0.0					1	0.0
Nam Nghia					1	0.3	1	0.3
Nam Anh	1	2.0					1	2.0
Nam Xuan	1	1.5					1	1.5
Nam Linh	2	0.2					2	0.2
Nam Giang	2	0.9					2	0.9
Xuan Lam			1	1.0			1	1.0
Nam Thuong	2	2.3					2	2.3
Nam Loc	6	1.9	1	0.5	1	2.0	8	4.4
Khanh Son					1	2.0	1	2.0
Nam Trung	3	3.1					3	3.1
Nam Kim	6	12.6	1	2.8	1	1.0	8	16.4
Nam Phuc	4	13.7	1	2.0			5	15.7
Nam Cuong	3	4.1					3	4.1
Total	31	42.3	4	6.3	4	5.3	39	53.9
OVER 30 DAYS								
Nam Hung	1	0.0					1	0.0
Nam Linh	2	0.2					2	0.2
Xuan Lam			1	1.0			1	1.0
Nam Loc					1	2.0	1	2.0
Khanh Son					1	2.0	1	2.0
Nam Trung	3	3.1					3	3.1
Nam Kim					1	1.0	1	1.0
Nam Phuc	4	13.7	1	2.0			5	15.7
Total	10	17.0	2	3.0	3	5.0	15	25.0
OVER 60 DAYS								
Nam Hung	1	0.0					1	0.0
Nam Trung	3	3.1					3	3.1
Total	4	3.1					4	3.1

Source : Survey by Study Team

Table I.1.7 Criteria for Evaluation of Existing Road Condition

CLASSIFICATION	ROAD CONDITIONS		
	SPEED LIMITATION	MOBILITY	FLOOD INTERRUPTION
GOOD	Vehicle speed is mainly limited by geometry and safety factors. Width at least 4.5 m	No restriction.	No traffic interruption in rainy season.
FAIR	Vehicle speed is partially restricted due to unevenness or slipperiness of riding surface. Width at least 3.0 m	Sometimes difficult for heavy vehicles (trucks) to move due to muddy surface or narrow width.	Sometimes suffered by partial traffic interruption by flooding/inundation in short terms. Interruption less than 3 times per year and less than 3 days per flood.
POOR	Vehicle speed is severely restricted by surface condition and road width. Width at least 2.0 m	Difficult for even small vehicles (cars, cong-nongs) to move due to muddy surface or narrow width.	Suffered by traffic interruption by flooding frequently with more than 7 days. Total day of interruption more than 30 days.
VERY POOR	Inadequate for vehicle moving. Only for motorbike or bicycle.		

Table I.1.8 Criteria for Evaluation of Existing Bridge Condition

Items	Road Classification			
	National Roads Provincial Roads	District Roads	Commune Roads	
			Inter-commune Roads Main Commune Roads	Minor Roads
Bridge Width				
4.5 m ~	A	A	A	A
3.5 m ~	C	B	B	A
3.5 m ~	C	C	C	B or C
Less than 2.5m	C	C	C	C
Loading Capacity				
13 ton	A	A	A	A
10 ton	C	B	B	A
8 ton	C	C	C	B
2.5 ton	C	C	C	B or C
Less than 2.5 ton	C	C	C	C

Notes A : To be used as it is
B : To be used for the time being with minor rehabilitation
C : To be replaced by new bridge

Table I.1.9 Present Road Condition in Dry Season (km)

Road Types	Road Condition				Total
	Good	Fair	Poor	Very Poor	
1. In Nam Dan District					
National Roads	11.9	6.0	-	-	17.9
Provincial Roads	10.8	28.9	3.7	-	43.4
District Roads	7.0	46.1	18.2	-	71.3
Commune Roads	0.5	169.9	70.1	8.5	248.9
Total	30.2	250.9	92.0	8.5	381.5
(%)	7.9%	65.8%	24.1%	2.2%	
2. In Communes					
1 Nam Hung	8.1	12.5	2.8	-	23.4
2 Nam Nghia	-	13.0	2.0	-	15.0
3 Nam Thai	2.7	11.2	2.0	0.5	16.4
4 Nam Thanh	-	15.7	5.0	-	20.7
5 Nam Anh	4.0	6.0	4.8	-	14.8
6 Nam Xuan	-	9.0	5.5	-	14.5
7 Van Dien	-	13.7	4.0	-	17.7
8 Nam Dan	-	7.8	-	-	7.8
9 Xuan Hoa	2.4	7.8	1.0	1.7	12.9
10 Hung Tien	3.1	12.5	-	-	15.6
11 Nam Linh	2.0	5.8	2.5	-	10.3
12 Kim Lien	3.6	16.3	1.6	-	21.5
13 Nam Giang	2.8	13.4	1.0	-	17.2
14 Hong Long	-	6.7	5.9	-	12.6
15 Xuan Lam	-	15.1	-	-	15.1
16 Nam Cat	-	8.6	3.4	0.8	12.8
17 Nam Thuong	-	5.0	4.3	3.0	12.3
18 Nam Tan	-	11.2	1.3	-	12.5
19 Nam Loc	1.5	14.7	7.6	-	23.8
20 Khanh Son	-	19.5	6.0	-	25.5
21 Nam Trung	-	9.4	3.8	-	13.2
22 Nam Kim	-	10.0	11.3	-	21.3
23 Nam Phuc	-	-	13.2	2.5	15.7
24 Nam Cuong	-	6.0	3.0	-	9.0

Source : Survey by Study Team

Table I.1.10 Present Road Condition in Rainy Season

(km)

Road Types	Road Condition				Total
	Good	Fair	Poor	Very Poor	
1. In Nam Dan District					
National Roads	11.9	3.0	3.0	-	17.9
Provincial Roads	-	12.7	27.0	3.7	43.4
District Roads	-	17.6	29.1	24.6	71.3
Commune Roads	-	19.7	100.6	128.7	248.9
Total	11.9	53.0	159.7	157.0	381.5
(%)	3.1%	13.9%	41.8%	41.1%	
2. In Communes					
1 Nam Hung	-	7.9	10.1	5.4	23.4
2 Nam Nghia	-	9.9	1.3	3.8	15.0
3 Nam Thai	-	-	8.1	8.3	16.4
4 Nam Thanh	-	-	20.7	-	20.7
5 Nam Anh	-	4.0	6.8	4.0	14.8
6 Nam Xuan	-	-	1.5	13.0	14.5
7 Van Dien	-	4.0	4.5	9.2	17.7
8 Nam Dan	-	3.3	3.9	0.6	7.8
9 Xuan Hoa	2.4	3.5	2.0	5.0	12.9
10 Hung Tien	3.1	-	5.0	7.5	15.6
11 Nam Linh	-	2.0	5.8	2.5	10.3
12 Kim Lien	3.6	6.7	5.1	6.1	21.5
13 Nam Giang	2.8	5.7	-	8.7	17.2
14 Hong Long	-	-	-	12.6	12.6
15 Xuan Lam	-	-	1.4	13.7	15.1
16 Nam Cat	-	4.6	-	8.2	12.8
17 Nam Thuong	-	-	-	12.3	12.3
18 Nam Tan	-	0.4	9.2	2.9	12.5
19 Nam Loc	-	1.0	10.7	12.1	23.8
20 Khanh Son	-	-	25.5	-	25.5
21 Nam Trung	-	-	6.6	6.6	13.2
22 Nam Kim	-	-	13.8	7.5	21.3
23 Nam Phuc	-	-	8.7	7.0	15.7
24 Nam Cuong	-	-	9.0	-	9.0

Source : Survey by Study Team

Table I.1.11 Width and Loading Capacity of Existing Bridges

1. National Roads

Width	Loading Capacity (bridges)					Total Length (m)
	13 ton	10 ton	8 ton	2.5 ton	Less	
4.5 m	2	-	-	-	-	90
3.5 m	-	-	-	-	-	-
2.5 m	-	-	-	-	-	-
Less	-	-	-	-	-	-
Total	2	-	-	-	-	90

2. Provincial Roads

Width	Loading Capacity (bridges)					Total Length (m)
	13 ton	10 ton	8 ton	2.5 ton	Less	
4.5 m	1	-	-	-	-	17
3.5 m	-	1	-	-	-	45
2.5 m	-	-	-	-	-	-
Less	-	-	-	-	-	-
Total	1	1	-	-	-	62

3. District Roads

Width	Loading Capacity (bridges)					Total Length (m)
	13 ton	10 ton	8 ton	2.5 ton	Less	
4.5 m	1	2	-	-	-	54
3.5 m	-	6	2	-	-	72
2.5 m	-	-	3	2	-	106
Less	-	-	-	-	-	-
Total	1	8	5	2	-	232

4. Commune Roads

Width	Loading Capacity (bridges)					Total Length (m)
	13 ton	10 ton	8 ton	2.5 ton	Less	
4.5 m	-	1	1	6	1	67
3.5 m	2	3	-	8	1	135
2.5 m	-	4	7	26	8	363
Less	-	-	-	5	6	130
Total	2	8	8	45	16	694

Unknown : 2 bridges and 14 m in length

Table I.1.12 Evaluation of Existing Bridges in Communes

Commune	Bridge Classification (bridges)			Total	
	A	B	C	Number	Length (m)
Nam Hung	-	1	3	4	36
Nam Nghia	-	1	2	3	21
Nam Thai	1	2	2	5	44
Nam Thanh	-	3	6	9	79
Nam Anh	1	1	-	2	82
Nam Xuan	-	-	4	4	99
Van Dien	1	3	6	10	46
Nam Dan	1	1	-	2	52
Xuan Hoa	-	-	1	1	45
Hung Tien	-	-	1	1	4
Nam Linh	-	2	2	4	81
Kim Lien	-	4	-	4	69
Nam Giang	1	1	2	4	141
Hong Long	-	-	-	-	-
Xuan Lam	-	-	3	3	74
Nam Cat	-	2	1	3	21
Nam Thuong	-	3	-	3	17
Nam Tan	-	3	-	3	16
Nam Loc	1	2	4	7	86
Khanh Son	-	4	4	8	42
Nam Trung	-	10	1	11	43
Nam Kim	2	3	2	7	66
Nam Phuc	-	2	5	7	46
Nam Cuong	-	-	3	3	7
Total*	8	48	52	108	1,215

* : Including Submerged Bridge, Excluding Culverts

Source : Study Team, 1996

Table I.1.13 Service Record of Nam Dan Ferry Service

Month	Number of Services (Services)	Number of Vehicles Carried (Vehicles)	Number of Operation Days (Days)	Number of Service Interruption Days (Days)
Jan.	61	95	31	0
Feb.	40	69	25	0
Mar.	64	110	31	0
Apr.	108	116	30	0
May.	100	132	31	0
Jun.	52	90	30	0
Jul.	40	94	31	0
Aug.	46	91	29	0
Sep.	5	10	4	26
Oct.	4	10	3	23
Nov.	31	42	25	0
Dec.	58	61	31	0
Total	609	920	301	49

Source : Nam Dan Transportation Office

Table I.1.14 Interruption Days of Nam Dan Ferry Service

ESTIMATED BY WATER LEVEL OF LAM RIVER (DAYS)

Condition / W.L.	Flooding at Mon Bridge EL 3.00 m	Ferry Interruption for Small Cars EL 3.40 m	Ferry Interruption for Trucks EL 3.70 m	Limitation of Existing Ferry Port (Warning Level C1) EL. 5.40 m	Limitation of Ferry Boat Operation (Warning Level C2) EL 6.90 m
1975	87	63	51	19	1
1976	34	19	14	3	0
1977	16	10	8	4	0
1978	115	95	84	38	17
1979	78	51	32	8	0
1980	89	69	57	25	11
1981	132	75	46	11	0
1982	124	97	80	22	4
1983	63	50	42	8	3
1984	65	48	37	7	0
1985	76	45	39	8	0
1986	50	27	18	5	0
1987	55	35	29	6	1
1988	46	31	27	13	10
1989	162	126	95	34	7
1990	140	95	73	17	4
1991	58	43	35	8	3
1992	34	22	18	4	0
1993	46	28	24	0	0
1994	115	93	78	17	3
Average	79	56	44	13	3

Table I.1.15 Historic Budget Expenditure for Road Management in Nghe An Province IN NGHE AN PROVINCE

Items/Road types		1991	1992	1993	1994	1995	Total Cost
Road Upgrading							
National Road	Quantity	15km	11km	12km	13km	37.5km	88km
	Capital (VND)	1529mill.	2136mill.	3726mill.	4429mill.	15,484mill	27,304mill.
Provincial Road	Quantity	**	1km	1km	1km	7km	10km
	Capital (VND)	**	192mill.	288mill.	287mill.	2878mill.	3645mill.
Road Rehabilitation and Maintenance							
National Road	Quantity	309km	309km	309km	309km	309km	1545km
	Capital (VND)	1236mill.	1236mill.	1854mill.	2163mill.	2472mill.	8961mill.
Provincial Road	Quantity	271km	271km	271km	271km	271km	1355km
	Capital (VND)	542mill.	542mill.	1084mill.	1355mill.	1626mill.	5419mill.
Bridge Renovtion							
National Road	Quantity	2 pcs	5 pcs	7 pcs	8 pcs	6 pcs	28 pcs
	Capital (VND)	421mill.	1197mill.	3343mill.	6572mill.	4168mill.	15,701mill.
Provincial Road	Quantity	**	**	**	1 pcs	2 pcs	3 pcs
	Capital (VND)	**	**	**	292mill.	978mill.	1270mill.

Source : Transportation and Communication Department of Nghe An Province

* : Budget excluding the National Road 1A

** : Unknown

Table I.1.16 Maintenance Expenditure of District and Commune Roads as of 1995

Commune	Capital Source			
	Farmer's Constribution		District Budget	Commune Badget
	In terms of capital (mil. VND)	Incresed amount of people (1000 person-days)	(mill. VND)	(mill. VND)
Nam Dan District Total	**2,776**	**278**	**2,460**	**1,045**
1 Nam Hung	43.8	4.4		
2 Nam Nghia	67.2	6.7	19.1	
3 Nam Thai	31.0	3.1	4.0	
4 Nam Thanh	97.9	9.8		35.0
5 Nam Anh	51.0	5.1		90.0
6 Nam Xuan	57.3	5.7	131.2	
7 Van Dien	260.0	26.0	103.0	36.0
8 Nam Dan		0.0	30.0	204.0
9 Xuan Hoa	259.0	25.9	383.0	157.0
10 Hung Tien	217.9	21.8		104.0
11 Nam Linh	175.0	17.5	227.0	
12 Kim Lien	328.0	32.8	94.0	30.4
13 Nam Giang	50.0	5.0	1,270.0	
14 Hong Long	140.0	14.0		40.0
15 Xuan Lam	251.3	25.1		37.0
16 Nam Cat	65.1	6.5	86.0	
17 Nam Thuong	68.0	6.8		
18 Nam Tan	68.4	6.8	17.4	
19 Nam Loc		0.0	24.0	62.0
20 Khanh Son	106.7	10.7		98.0
21 Nam Trung	122.3	12.2	35.0	24.7
22 Nam Kim	189.3	18.9		14.7
23 Nam Phuc	40.2	4.0	28.4	12.0
24 Nam Cuong	87.0	8.7	7.8	100.0

Source : Transportation and Communicatin Division of Nam Dan District

Table I.3.1 Beneficiary of Routes

Route	Number of Beneficiary Communes	Beneficiary Area (ha)	Number of Beneficiary Households	Number of Beneficiaries	Remarks
1 Route 15A (North)	5	8,165	7,246	35,907	
2 Route 15A (South)	7	9,740	11,171	50,880	
3 42 Dike Road	4	3,523	5,916	27,001	
4 Phan Boi-Chua Road	4	4,402	5,897	27,478	
5 Hung Tien-Nam Linh Road	4	4,324	5,720	26,601	
6 42 Dike-Kim Lien Road	3	2,988	2,496	11,234	
7 Kim Lien-Nam Cat Road	2	2,013	1,351	6,440	
8 Cau-Sao Market Road	2	2,397	2,025	9,293	
9 Nam Thanh-Nghi Loc Road	1	2,150	1,785	9,026	
10 Nam Thai Road	1	1,141	1,006	5,074	
11 Northern Ring Road	4	6,128	5,614	27,203	
12 Nam Tan-Nam Loc Road	3	3,347	4,720	20,864	
13 Nam Nam Dike Road	4	5,746	6,918	32,088	
14 Nam Kim-Nam Phuc-Nam Cuong Road	3	3,341	4,571	20,763	
15 Nam Trung-Nam Phuc Road	3	2,493	4,568	21,243	

Table I.3.2 Justification of Road Networks (1/4)

Route	Communes Relying Route	Present Condition	Justification of Route
0. National Road No.46	All Communes	Road Types : National Road Well maintained with asphalt pavement from Vinh City to Nam Dan Town. Remaining part is planned to be improved by the national government up to 2000.	No.46 runs in the center of the District and connects the District to the province center, i.e., Vinh City. The route is considered as a basic in economic activity of whole District.
1. Provincial Road No.15A	Northern Part Nam Hung, Nam Nghia, Nam Thai, Van Dien, Nam Thanh	Road Types : Provincial Road Northern Part (in the left bank of the Lam River) Road surface is still earth road, but the surface condition is fair so that trucks can go through even in rainy season without difficulty.	The route is justified as a basic road runs through the area from north west to south east. The half of communes in the area, located in the north west regions and the right bank region, rely this route to access to the district center and the exterior area.
2. Provincial Road No.15A	Southern Part Nam Loc, Khanh Son, Nam Kim, Nam Phuc, Nam Trung, Nam Cuong	Southern Part (in the right bank of the Lam River) Interruption by flooding is severely restrict traffic in the region. This part is isolated from basic road network due to lack of bridge at Nam Dan Town, and river crossing by ferry limits access to the region.	Furthermore, the route has an important role for the southern part of the Province to link the southern coastal region and the national route No.7, which reaches to Laos, through Do Luong and Thanh Chuong District.
3. 42 km Dike Road	Xuan Hoa, Hung Tien, Hong Long, Xuan Lam *Communes in Exterior District* Hung Linh, Hung Long, Hung Xa	The route is controlled traffic by the District and no vehicle permitted to pass in rainy season due to protect road bed and road surface. In dry season, the road condition is fair for vehicle traffic.	The route links the communes in the left bank side of the Lam River including 3 communes in Hung Nguyen District. The route is a major access of those communes to the district center and Conbut Market. The communes in Nam Nam region are also rely access to the district center on this route through Xuan Lam Boat Station.
4. Phan Boi - Chua Road	Xuan Hoa, Hung Tien, Nam Anh, Nam Xuan *Link to Hung Nguyen and Nghi*	Road Types : District Road The distance from 42 Dike Road to Nam Anh commune center, the road condition is good for	The route is main access to The Chua Market, which is the second largest market in the area. The Chua Market collects people from 8 communes in the area, of which 5 communes rely as a major market of

Table I.3.2 Justification of Road Networks (2/4)

Route	Communes Relying Route	Present Condition	Justification of Route
	Loc District	heavy vehicle traffic even in rainy season due to the macadam penetration pavement. In the distance from Chua Market to the district boundary through Nam Xuan Commune, the condition in rainy season is not adequate to vehicle traffic due to the muddy and slippery surface. In the mountain area, the road width is insufficient.	communes, and some communes in the neighbor districts. The route reaches Hung Nguyen and Nghi Loc District has a function to link districts to the Chua Market and Nam Dan district center.
5. Hung Tien - Nam Linh Road	Hung Tien, Nam Linh, Nam Giang, Hong Long	Road Types : District Road and Commune Road In general, the route has fair condition in dry season and poor in dry season even though earth road at present. Some distance in Hung Tien Commune is inadequate to vehicle traffic in rainy season, and some distance in Nam Linh Commune suffered inundation problem in rainy season. The distance in Hung Tien Commune is not permitted for vehicle traffic by the District in rainy season.	The route links 42 Dike Road in Hung Tien Commune to the center of Nam Linh Commune, and is connected to the provincial road No.539 in Nam Giang Commune. The route consists a ring road crossing the Route 46 in the east region of the study area together with 42 Dike Road, Route 539, Cau - Sao Market Road and 42 Dike-Kim Lien Road. The Conbut Market is located at the intersection of 42 Dike Road and this route.
6. 42 km Dike - Kim Lien Road	Kim Lien, Xuan Lam, Hong Long *Communes in Exterior District* Hung Linh, Hung Long, Hung Xa	Road Types : District Road The distance in Kim Lien Commune is good condition for vehicle traffic through seasons with macadam penetration, however, the distance in Xuan Lam Commune is still poor and inadequate to vehicle traffic in rainy season. The distance in Hung Tien Commune is not permitted for vehicle traffic by the District in rainy season.	The route is one of the most important route to connect communes along 42 Dike to the basic road network. The route connects 42 Dike Road and the Route 540 (Kim Lien Road) through Xaun Lam Commune. Many people in the area along 42 Dike use the route to reach to the Route 46.
7. Kim Lien - Nam Cat Road	Kim Lien, Nam Cat *Connect to the September 12th Road in Hung Nguyen District*	Road Types : District Road The distance in Kim Lien Commune is good condition for vehicle traffic through seasons with macadam penetration, however, the distance in Nam Cat Commune is still poor and difficult to	The route is main access of Nam Cat Commune to the Route 46 through Kim Lien Commune. In addition, the route has a role to link communes in east region to the Can Market located along September 12th Road, to which people of Nam Cat

Table I.3.2 Justification of Road Networks (3/4)

Route	Communes Relying Route	Present Condition	Justification of Route
		vehicle traffic in rainy season. The distance in Hung Thuong Commune of Hung Nguyen district, the condition is poor even in dry season and inadequate to vehicle traffic in rainy season.	Commune mainly rely on economic activity.
8. Cau Market - Sao Market Road	Kim Lien, Nam Giang	Road Types : Commune Road The condition of the route is poor for vehicle traffic in dry season and inadequate in rainy season due to poor road surface and insufficient road width.	The route connects 42 Dike - Kim Lien Road, Kim Lien - Nam Cat Road and the Route 46 vertically. The route has a role of access of communes along 42 Dike to the Sao Market, which is one of the major market of the region. The role of bypass of the Kim Lien Road, which is justified as a tourism road and is clouded in high season, is expected to the route.
9. Nam Thanh - Nghi Loc Road	Nam Thanh, *Connect to Nghi Loc District*	Road Types : District Road In dry season, the distance from the Route 15A to the commune center is observed as fair but from the junction to the district boundary with Nghi Loc District is poor. In rainy season, the whole distance is poor and difficult to move heavy traffics.	The route is a inter-district road, which connect Nghi Loc District to the Nam Dan district center and Vinh City through the Route 15A and 46. The route is very important for the people in Nghi Loc and Do Luong District.
10. Nam Thai Road	Nam Thai	Road Types : District Road The road condition is poor in dry season and in adequate for vehicle traffic in rainy season. The route suffers flooding in rainy season frequently, and that restrict access in the commune severely.	The route is main access of Nam Thai Commune, which connects the Route 46 and 15A.
11. Northern Ring Road	Nam Thanh, Nam Anh, Nam Xuan Nam, Linh	Road Types : Commune Road The road surface condition in dry season is fair or poor, but the road width is insufficient for vehicle traffic in general. In rainy season, the condition is inadequate to vehicles.	The route connects communes of the north region through semi-mountainous area. In those communes, population is densely located in the southern part, which is close to basic access, and the mountain side due to avoid depressed land. There fore, the route is expected to perform important role

Table I.3.2 Justification of Road Networks (4/4)

Route	Communes Relying Route	Present Condition	Justification of Route
			as a main access for villages in the region.
12. Nam Tan - Nam Loc Road	Nam Tan, Nam Loc, Nam Thuong	Road Types : Commune Road The condition in dry season is fair but some distance is difficult to move in rain season. The route is interrupted at the southern end where is to be connected to the Route 15A due to bridge broken.	The route runs through densely populated area of Nam Tan and Nam Loc Commune, and aims as a major commune road of both communes. Furthermore, the route is expected to be major access to Nam Thuong Commune, which is isolated from any road network.
13. Nam Nam Dike Road	Khanh Son, Nam Trung, Nam Cuong	Road Types : District Road The present dike road is developed as utilizing dike crest, and the width is insufficient for vehicle traffic from the aspect of not only mobility but safety. The whole distance of the route is not permitted for vehicle traffic in rainy season by the District.	The route is the main access of Khanh Son, Nam Trung, Nam Phuc and Nam Cuong Commune to reach the Route 15A. The route is also the main access to the Xuan Lam - Khan Son Boat Station, on which Nam Nam Communes rely river crossing and reach to the district center, and to the Yen Xuan Railway Bridge, which is available only for motor cycle and bicycle This route is identified as a evacuation road of the region at flooding from the Lam River.
14. Nam Kim - Nam Phuc - Nam Cuong Road	Nam Kim, Nam Phuc, Nam Cuong	Road Types : Commune Road The road condition in rainy season is not adequate for vehicle traffic. The route suffers traffic interruption by flood frequently and severely.	The route is the main access of Nam Kim, Nam Phuc and Nam Cuong Commune to the Route AND Nam Nam Dike Road. This route is identified as a evacuation road of the region at flooding from the Lam River.
15. Nam Trung - Nam Phuc Road	Nam Trung, Nam Phuc, Nam Cuong *Connect to Duc Tho Province*	Road Types : District Road The distance in Nam Trung Commune is in fair condition for heavy vehicles in dry season, but many small bridges located in the route restrict heavy traffics. The distance in Nam Phuc and Nam Cuong Commune is inadequate for vehicle traffic even in dry season.	The route runs through Nam Trung, Nam Phuc and Nam Cuong Commune and connect Nam Nam communes to Duc Tho District. The route is identified as a inter-district road. The route is very important not only for above communes but commune in Duc Tho District as to reach to the district center of Nam Dan. This route is identified as a evacuation road of the region at flooding from the Lam River.

Table I.4.1 Summary of Design Standard for Motor Road (1/2)

1. Roads

Class of road /Specification	I		II		III	IV	V	VI
1. Necessity	- National road that is especialy important in economy, politic and defence, plays a vital role in international transportation. - International express way. (I + II)		- International express way. - Arterial roads that link national centers of politic, economy and culture. industrial zones. - Roads that link important transportation centers. (II + III)		- Secondary arterial roads that link local centers of the politic, economy and culture. - Roads that link major industrial and agricultural zones. - Roads that link major ports, railway stations and airport. (III + IV)		- Intercity local roads. - Roads that link median industrial, and agricultural zones. - Roads that link local centers of transportation. - Roads that link minor ports, railway stations and airport.	- Interdistrict local roads - Roads that link minor industrial zones, state farms and cooperative.
2. Estimated Traffic Volume	> 6000		3000 - 6000		1000 - 3000	300 - 1000	50 - 300	< 50
3. Estimated Speed: - Normal Topography - Complicated Mountainous Topography	120		100 80		80 60	60 40	40 25	25 15
4. Plain Topographic Type:	With Road for Bicycle	Without Road for Bicycle	With Road for Bicycle	Without Road for Bicycle				
- Number of Motor Lane	4	4	2	2	2	2	1	1
- Width of Lane(m)	3.75	3.75	3.75	3.75	3.5	3.0	3.5	3.5
- Width of Pavement(m)	2 x 7.5	2 x 7.5	7.5	7.5	7.0	6.0	3.5	3.5
- Length of Separator(m)	3.0	3.0						
- Safe Length(m)	4 x 0.5	4 x 0.5	2 x 0.5	2 x 0.5				
- Width of Shoulder(m)	2 x 6.5	2 x 3.0	2 x 6.5	2 x 2.5				

Table I.4.1 Summary of Design Standard for Motor Road (2/2)

Class of road /Specification	I		II		III	IV	V	VI
In which:								
- Length of Separator with Bicycle Lane(m)	2 x 3.0		2 x 3.0					
- Width of Bicycle Lane(m)	2 x 3.0		2 x 3.0		2 x 2.0			
- Width of Reinforced Section for Enlarging Pavement(m)					2 x 2(m)	2 x 1.0(m)	2 x 1.0	
- Width of Ground(m)	33.0	26.0	21.5	13.5	12.0	9.0	6.5	6.0
Complicated Mountainous Topography								
- Number of Motor Lane	4		2		2	2	1	1
- Width of Motor Lane(m)	3.75		3.5		3.0	2.75	3.5	3.5
- Width of Pavement(m)	2 x 7.5		7.0		6.0	5.5	3.5	3.5
- Width of Shoulder(m)	2 x 3.5		2 x 3.0		2 x 1.5	2 x 1.0	2 x 1.5	2 x 1.5
+ Width of Bicycle Lane(m)	2 x 3.0		2 x 2.5					
+ Width of Reinforced Section for Enlarging Pavement(m)					2 x 1.0	2 x 0.5	2 x 1.0	
Width of Ground(m)	22.5		13.0		9.0	7.5	6.5	6.0

2. Bridge.

Kinds of loading capacity:

1) H8: Mainly used for village roads in the past, but now H13 instead of H8. (Village roads - class A and B)

2) H10: Used for rural road grade 6 including district roads, intercommune roads; sometimes for village roads.

3) H13: Mostly used for road grade 5 and 6 now, also for culverts (it is not depended on the bridge length), bridge > 3m.

4) H18: Used for permanent bridges in national and provincial roads.

5) H30: Used for permanent bridges in vital national and provincial roads.

+ Span length > or = 20m; width > or = 7m sometimes used for bridge with total length is less than 20m.

+ Span length > or = 30m; width > or = 10m used for bridge with total length is > or = 100m.

Table I.4.2 Summary of Design Standard for Rural Road

	A		B	
	Roads that lead to village roads, intervillage roads and roads that link villages with farms (production area).			
	Speed: 10 - 15 km/hour Used for motorized means of transport.		Speed: 10 - 15 km/hour Used only for primitive verhicles.	
		Limited Condition		Limited Condition
Ground Width	5.0	4.0	4.0	3.5
Surface Width	3.5	3.0	3.0	2.5
Curve Radius (Minimum)	15(m)	15(m)	10(m)	10(m)
Vertical Gradient (Maximum)	10%	10%	6%	6%
Length of Slope (Maximum)	300(m)	300(m)	200(m)	200(m)
Bridge Width	3.5(m)	3.5(m)	2.5(m)	2.5(m)
Height of balustrade		6(tons)		2.8(tons)

Culvert class:

- Round culvert of steel-concrete:

+ Internal diameter: 0.5m, 0.75m, 1.0m .

- Stone curved culvert: 0.5m - 1.0m.

- Brick curved culvert: 0.5m - 1.0m.

- Steel concrete sheet culvert: 0.5m - 1.0m.

Table I.4.3 Bridge Improvement Plan

ROUTE	LOCATION	NAME OF BRIDGE	COMMUNE	IMPROVEMENT ACTIVITY	Bride Length (m)	Effective Bridge Width (m)	Bridge Height* (m)	Effective Surface Area (m^2)	Type of Bridgre Superstructure	Supplementaly Works	
Route 15A Noethren Part											
	No. 8 + 700	Gang Bridge	Nam Thai	Minor rehabilitaion of existing bridge					Steel		
Route 15A Urgent Plan (Southern Part)											
	No. 7 + 590	Mung Spillway	Nam Loc	Existing spillway will be replaced to new bridge	30.0	4.5	8.0	135.0	PC Single Span	Revetment L=	100 m
	No. 10 + 500	Haohao Spillway	Khanh Son	Existing spillway will be replaced to new bridge	24.0	4.5	7.0	108.0	PC Single Span	Revetment L=	60 m
	No. 15 + 180	Vuc Mau Spillway	Khanh Son	Existing spillway will be replaced to new bridge	19.0	4.5	4.0	85.5	PC Single Span	Revetment L=	60 m
	No. 17 + 280	Vuc Long Bridge	Khanh Son	Renovation of existing bridge	19.0	4.5	4.0	85.5	PC Single Span	Revetment L=	60 m
Phan Boi - Chua Road											
	No. 3 + 550	Phu Dong Bridge	Nam Xuan	Renovation of existing bridge	45.0	4.5	4.0	202.5	PC 2-span	Revetment L=	10 m
Xuan Lam - Kim Lien Road											
	No. 0 + 220	Bon Huu Bridge	Xuan Lam	Renovation of existing bridge	6.0	4.5	2.5	27.0	Slab Bridge	Revetment L=	60 m
	No. 2 + 750	Man Bridge	Xuan Lam	Renovation of existing bridge	18.0	4.5	3.0	81.0	PC Single Span	Revetment L=	60 m
Kim Lien - Nam Cat Road											
	No. 1 + 620	Mat Bridge	Nam Cat	Minor rehabilitaion of existing bridge							
	No. 4 + 200	Xay Bridge	Nam Cat	Renovation of existing bridge	4.0	4.5	2.5	18.0	Slab Bridge	Revetment L=	10 m
	No. 4 + 800	Nam Ha Bridge	Nam Cat	Minor rehabilitaion of existing bridge and development of revetment							
Nam Nam Dike Road											
	No. 1 + 510	Nha Thanh Bridge	Khanh Son	Renovation of existing bridge	5.0	4.5	2.5	22.5	Slab Bridge	Revetment L=	10 m
Hung Tien - Nam Linh Road											
	No. 0 + 80	Hung Tien Bridge	Hung Tien	Renovation of existing bridge	4.0	4.5	2.5	18.0	Slab Bridge	Revetment L=	10 m
	No. 4 + 500	Vac Bridge	Nam Linh	Renovation of existing bridge	6.0	4.5	3.5	27.0	Slab Bridge	Revetment L=	10 m
	No. 6 + 400	Nam Linh Bridge	Nam Linh	Minor rehabilitaion of existing bridge and development of revetment	30.0	5.0	3.0	150.0	RC 4 span	Revetment L=	40 m
	No. 7 + 700	Dong Ho Bridge	Nam Linh	Minor rehabilitaion of existing bridge and development of revetment	5.0	5.0	3.0	25.0	RC 1 span	Revetment L=	10 m
Nam Tan - Nam Loc Road											
	No. 1 + 620	Xi Phong Bridge	Nam Tan	Minor rehabilitaion of existing bridge and development of revetment	6.0	3.0	2.0	18.0	RC Slab Bridge	Revetment L=	10 m
	No. 5 + 710	Tan Loc 4 Spillway	Nam Tan	Renovation of existing bridge	14.0	4.5	3.5	63.0	PC Single Span	Revetment L=	60 m
	E.P.	Mung 2 Bridge	Nam Loc	New bridge construction	19.0	4.5	8.0	85.5	PC Single Span	Revetment L=	60 m
N.Kim - N.Phuc - N.Cuong Road											
	No. 1 + 200	Xuan My Bridge	Nam Kim	Renovation of existing bridge	28.0	4.5	4.0	126.0	PC Single Span	Revetment L=	100 m
	No. 2 + 900	Suy Bridge	Nam Phuc	Renovation of existing bridge	26.0	4.5	2.5	117.0	PC Single Span	Revetment L=	60 m
	No. 3 + 270	Small Bridge	Nam Cuong	Renovation of existing bridge	4.0	4.5	2.5	18.0	Slab Bridge	Revetment L=	10 m
	No. 5 + 750	Small Bridge	Nam Cuong	Renovation of existing bridge	4.0	4.5	2.5	18.0	Slab Bridge	Revetment L=	10 m

* : Bridge height from the elevation of design riverbed to brifge surface.