7.2 Process of Preparation of Community Development Plans

7.2.1 Background of the Preparation of the Community Development Plans

In a post-conflict country like DRC, because of not only fragile governance and financial basis but also the limited availability of administrative organizations and human resources for sustainable community development, it is difficult to implement community development activities effectively in the entire country. Thus, such a county has to depend on assistance from aid organizations and other countries and cooperation from development partners for implementation of community development activities.

The area around Kimpese Sector in Cataractes District, in which the Study Area is located, is bordered between Zaire Province of Angola and the Angolan enclave of Cabinda Province. The area is characterized by the fact that the Angolans immigrated as refugees or in search of work from Angola, which had been in civil war since the 1960's, have semi-settled down and coexisted with the local Congolese. Because of underdeveloped community infrastructure and fragile basis of livelihood based on agricultural production, many residents in rural areas are subjected to poverty and forced to live in harsh conditions.

Improvement of such conditions requires not only continuation of cooperation from development partners in community development, but also human resource development and capacity development of administrative organizations in community development. In order to enhance sustainability of community development and maintain the functions of the repaired road, a comprehensive approach to the development incorporating a means to finance road maintenance is required. Therefore, adoption of "Kimpese Model" proposed in this Study, in which repair of the Kilueka Route and community development are to be implemented in an integrated fashion, is recommended.

From the above-mentioned viewpoint and with the aim of providing materials to the counterparts for preparation of their own community development plans, a series of the plan preparation methods, from implementation of the community profiling, an output of this Study, and workshops to identify people's needs and application of the verified items identified in PP to the plans of the preparation of participatory plans, will be applied to the actual process of the plan preparation. In the following, the process is summarized as guidelines.

7.2.2 Steps in Implementation of the Community Development

(1) Selection of target areas of the Plan

The commonly used method of selecting target areas for preparation of a plan is to decide a developmental priority order among candidate areas by implementing a development potential study of each candidate area and comparing the results of the study. However, in the cases where there are few actors in community development and human resources in community development is still being developed as is the case with DRC, target areas are often determined in accordance with a developmental priority order empirically given to the areas by a person in charge of community development at the national or provincial level, who have sufficient experience and information in the field and is well-connected to donors and development partners.

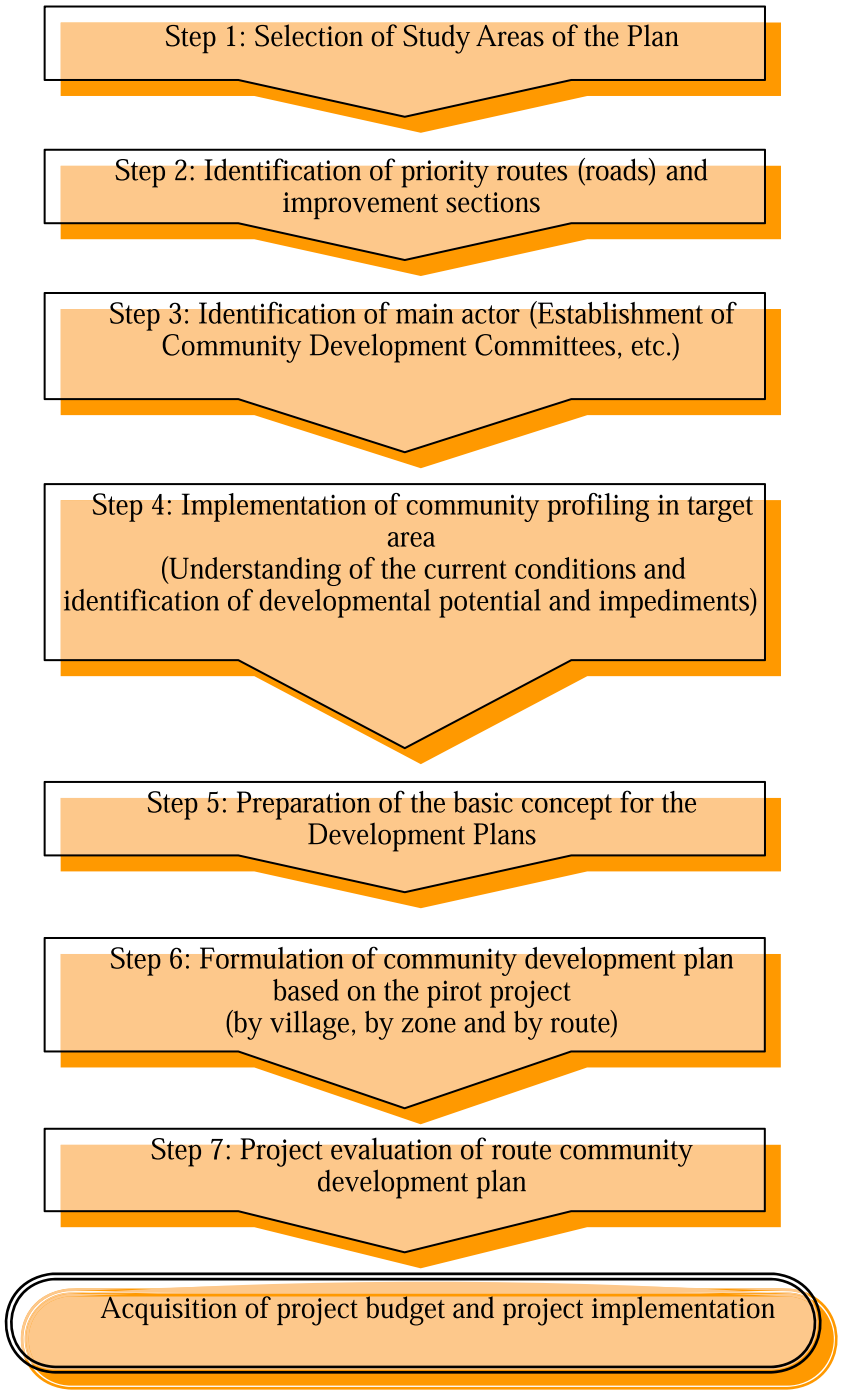


Figure 7.6 Steps in Implementation of Community Development

In the beginning, a policy on and a scenario of the community development is to be decided in accordance with the basic development policy of the country. A plan can be prepared in accordance with the plan and scenario at a different level, *e.g.* national, regional, provincial, district, territoire, sector, route, zone, *agglomération,* village or *quartier*, or group level. When considering project implementing bodies in the community development

proposed in this Study which gives priority to repair and maintenance of community roads (Kimpese Model), persons in charge in the departments responsible for rural development and agricultural road development are to prepare plans and implement and manage projects in cooperation. In the case of Bas-Congo Province, a development potential study at each candidate area within the province has revealed significant difference in the developmental priorities between the communities along community roads connected to the National Highway No.1, which traverses the province, and the other communities because of the difference in potential in distribution and market access. In the absence of definite instruction from or decision by central government or provincial authorities, these developmental priorities will be used in the selection of target areas (districts, territories, etc.) of the Plan.

(2) Selection of target routes and improvement sections

If Kimpese Model, which combines repair and maintenance of community roads connected to National Highway No.1 and development of the communities along the roads, has been adopted, the next step will be identification of high-potential routes (community roads) within the target areas and sections of the routes for road improvement. Selection of target routes will be made by comparing indices including distances from urban areas, extents of damage to existing roads, road gradients and sizes of beneficiary populations. Once routes have been selected, sections of the routes in which the roads are to be repaired will be established within the area of jurisdiction of a sector. Implementation of community development is associated with a concern over emergence of conflicts of interest, such as jealousy between villages and among residents in a village because of the difference in benefit they receive and problems concerning land use between landowners and land users derived from new land use arrangement. As chiefs of sectors have an authority to mediate such conflicts, their involvement is essential in the preparation of highly feasible and sustainable plans. In fact, during this Study, occurrences of several problems were averted with prompt mediation by sector chiefs when there were concerns over occurrences of such problems. From this experience, establishment of an improvement section extending over two sectors has been avoided.

(3) Identification of project owners

An organization responsible for the plans will be at the level of central government for the need to control the nationwide activities or the level of provincial government. However, as Kimpese Model requires beneficiaries to take the lead in maintenance of project and facilities, villagers' organizations consisting of residents of villages located within the improvement sections will be owners of projects. Therefore, after beneficiary villages have been selected, the Community Development Committee consisting of the chiefs of the beneficiary villages will be established. Persons in charge of rural development of administrative organizations at the district, territoire and sector levels, as well as a local NGO, CLER, which is implementing road maintenance activities with persons in charge of road

improvement of the administration, will take responsibility of providing technical assistance during project implementation.

Figure 7.7 shows the national highway, target routes of the plan, improvement sections, project owners, geographic relationships between roads and areas of jurisdiction of a sector and between the improvement sections and beneficiary villages schematically.

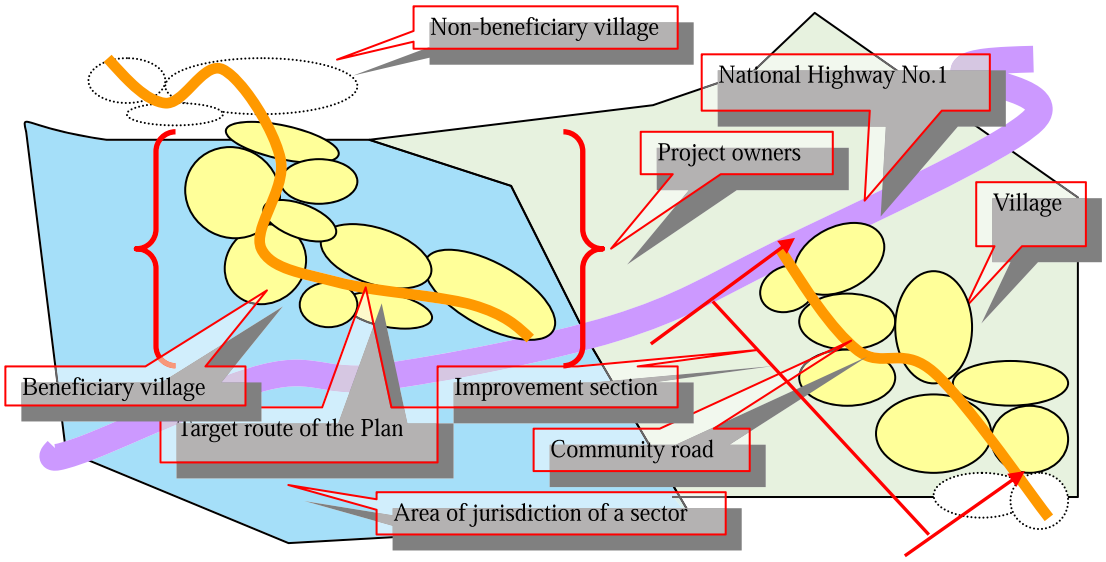


Figure 7.7 Target routes of the plan and the concept for the establishment of improvement sections and project owners

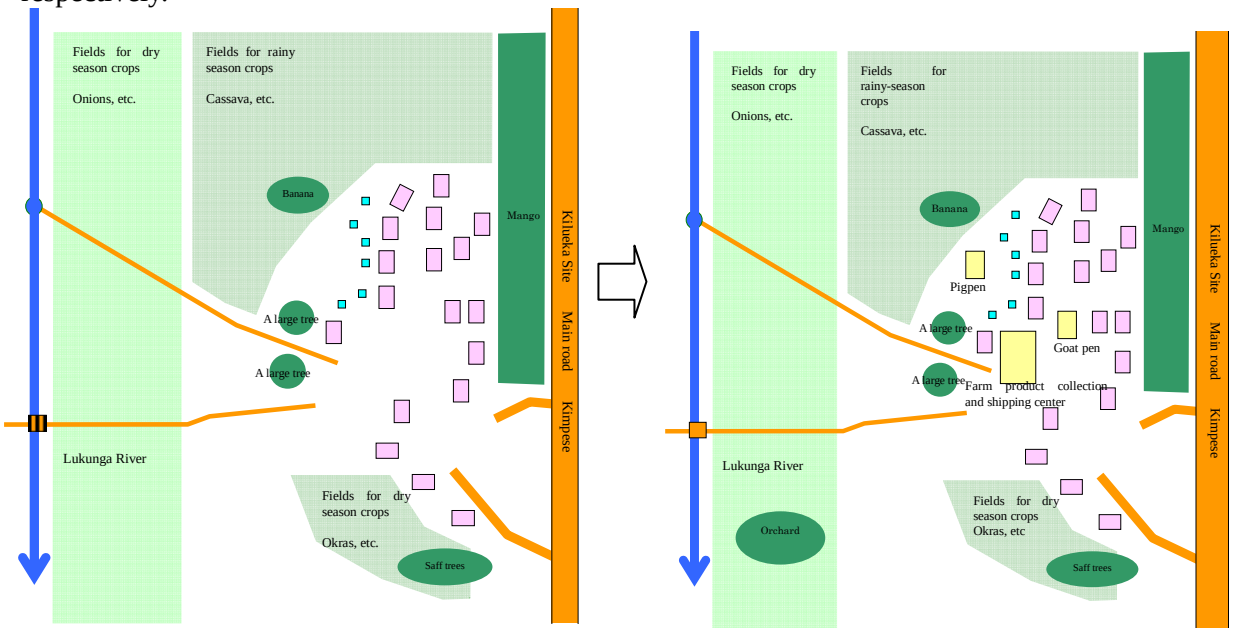
(4) Implementation of community profiling within the improvement sections and identification of developmental potential and impediments

Community profiling will be carried out in the villages within the established improvement sections to identify the current conditions and developmental potential and to understand the intentions of the residents. The current state of agricultural production in the beneficiary villages will be elucidated by analyzing the data obtained in the profiling and information on cultivation areas and periods by crop and the numbers of livestock in the villages.

(5) Preparation of the basic concept for the Development Plans

In the next step, current resource maps will be prepared with village residents to make them realize the potential that existing local resources have. At the same time, the (draft) basic concepts for the future development of the villages will be prepared. The residents will be requested to draw resource maps expected after the implementation of the Plans based on the basic concepts. By comparing the two resource maps, the residents will deepen their understanding of the changes in local community resources, concrete details of the basic concepts for the Plans and the establishment of the implementation system required for realization of the Plans including establishment of villagers'

organizations. Examples of the prepared resource maps are shown in Figure 7.4. The resource map of each of the villages along the Kilueka and Nkondo Routes are shown in Annexes 7.1 and 7.2, respectively.



Resource map before the implementation of the Development Plan.

Resource map after the implementation of the Development Plan.

Figure 7.8 Examples of resource maps (Nkondo on the Kilueka Route)

(6) Preparation of Community Development Plans using the verified items

Preparation of a community development plan requires designing of specifications, scales, appropriate improvement standards, etc. for the projects under planning. In this Study, project contents will be designed using the verified items, outputs of PP, and following the process described below.

1) Explanation to the residents of the contents of the Development Programs and the criteria for the evaluation of technical receptivity

In this Study, the components of PP were decided in a workshop attended by residents. In the workshop, the residents were asked to select priority components for implementation in the villages among the components of PP for each of the areas of “Livelihood Improvement” and “Improvement of Living Environment.” Conformity of the selected components to the evaluation criteria for technical receptivity of community groups implementing the components (Table 7.1) was verified. After excluding the components which had not conformed to the criteria, the components with high priorities (the top five) were selected as project components.

Since little difference in the current conditions is expected among rural areas in Bas-Congo Province, the project components selected in the above-mentioned process can be applied to other areas in the province. Thus, they will be considered as the contents of the Development Programs.

However, if the results of community profiling reveals that current conditions at an area are significantly different from those in the Study Area, a new development program will be added after confirmation of the intention of the residents as described below.

2) Confirmation of the intention of residents and developmental priority order decided from the technical viewpoint

A meeting will be held with several representatives of the villages, including the village heads, along the improvement sections on the target routes of the Plan. At the meeting, the route maintenance method will be explained and the contents and appropriate development standards of the Development Programs will be presented to the participants. Then, the intention of residents on the development at the village and zone levels will be confirmed and high-developmental-priority programs will be selected in each of the areas of "Livelihood Improvement" and "Improvement of Living Environment." If residents propose a development component not included in the presented contents or the results of the community profiling reveal that the area concerned has conditions significantly different from those in the Study Area, a project component incorporating the characteristics of the area will be included in the contents and presented to the residents.

Conformity of the selected programs to the evaluation criteria for technical receptivity will be verified. After excluding the project components which have not conform to the criteria, representatives of the residents (villages) will give developmental priorities to the contents of the Development Programs.

The evaluation criteria for technical receptivity by project have already been described in Chapter 6.

3) Design of project components

Community development plans will be prepared for the programs with high developmental priority in accordance with the appropriate improvement standards and appropriate scale implemented in PP. Meanwhile, plans will be prepared by route for road repair and maintenance, by zone for schools, health centers, improvement of auxiliary roads, energy and leisure activities and by village for the other components.

The standards and specifications of the improvement deduced from the verified items are as described in Chapter 6.

(7) Evaluation of the projects related to Route Development Plans

By calculating the production costs of and profit from the plans for livelihood improvement and improvement of living environment prepared at the village level at the current conditions and the project costs (production costs, costs for expansion of farm area, equipment maintenance costs, etc.) and project outputs after the completion of the plans, increase in benefit will be obtained. The

operation and maintenance costs of the public facility and infrastructure improvement plans prepared at the zone level at the current conditions and the project costs and operation and maintenance costs after the completions of the plans will be calculated.

Then, by adding up the project costs, maintenance costs and increases in benefit calculated at respective villages and zones, projects in the plans at the zone level will be evaluated and relevance of the development will be evaluated. However, the project costs related to the road rehabilitation projects will be excluded from the calculation of the project costs in the project evaluation considering that the roads, as being public assets, should be improved with financing or assistance from the central government.

The following section summarizes the results of the estimation of project costs, calculation of project outputs and increase in benefit and the results of the evaluation of projects for the Route Development Plan on the Kilueka Route.

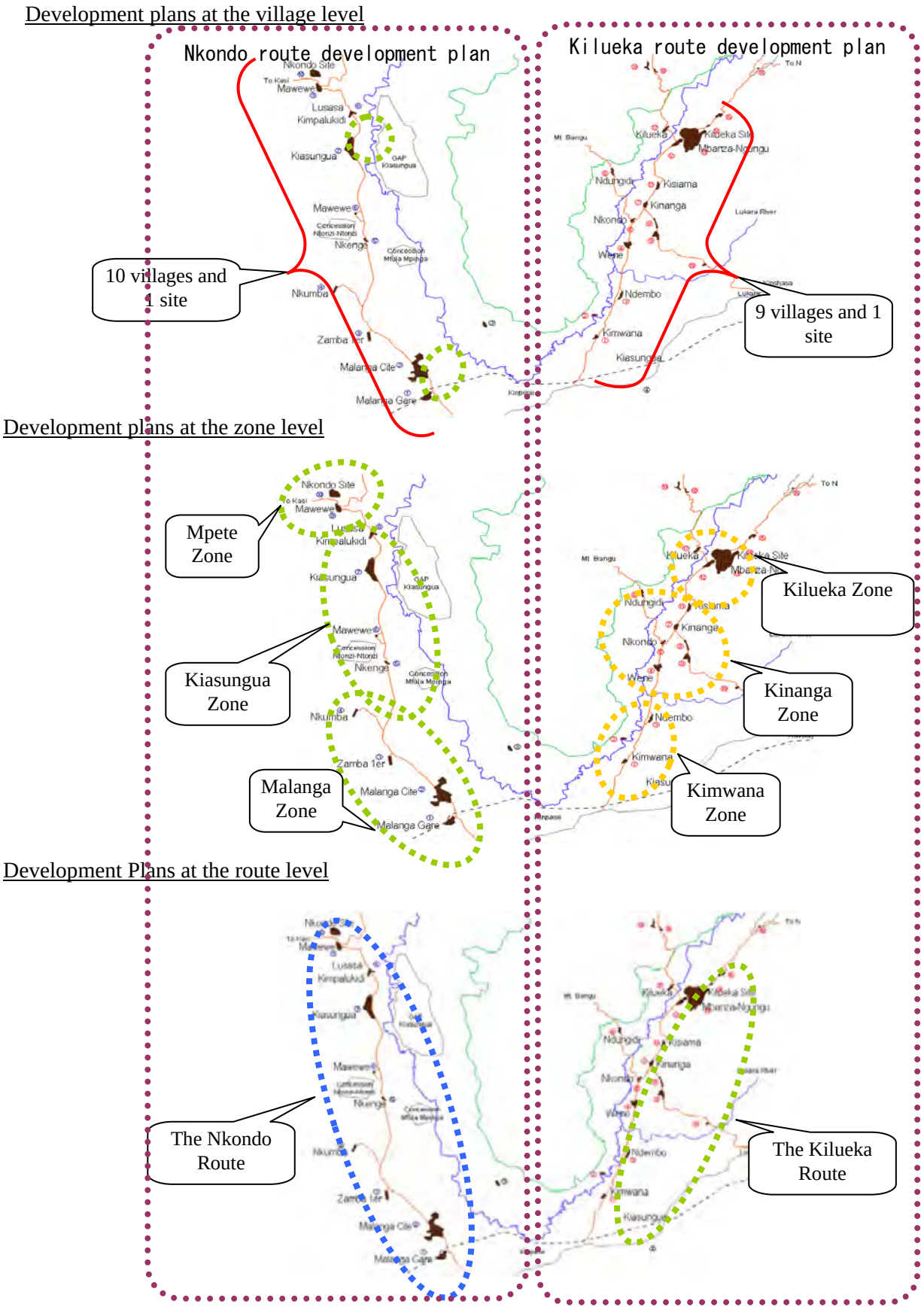


Figure 7.9 Plan preparation units and their geographic relationships

7.3 Preparation of Community Development Plan

The community development plan in the Study Area is formulated according to "7.2 Process of Preparation of Community Development Plans." The contents of survey and outputs following this process are shown below. Figure 7.2 shows outputs of each implementation step and its survey methods based on this process as a flow of preparation of community development plan

Steps 1 to 3 of figure 7.2 have been already decided as follows;

Step 1: Selection of target area: Kinpese sector ⇒Kilueka route

Step 2: Decision of priority route and section: Kilueka route

Step 3: Decision of main actor: Lukunga Valley Development Committee I

Moreover, the community profiling was executed to 21 villages about step 4 (Refer to Chapter 4).

Step 4: Implementation of community profiling in target area

The outcomes of the field reconnaissance, community profiling, workshops and interviews with relevant organizations will be used to identify the characteristics of the target communities, including population, numbers of households and cultivation area, developmental potential and impediments. Then, the results of the analysis of the existing problems which are to be solved will be sorted out.

Step 5: Preparation of the basic concept for the development plan

The information obtained in Step 4 will be sorted out and be used for establishing future vision (target) and development objectives (Project Objectives). Outline of the contents of the programs for community development will be decided and the targets for program implementation will be established in participatory workshops and discussion with relevant organizations. On the basis of the outcomes of these activities, outline of the policy for realization of the development objectives (target years (in short- and medium-terms)) will be developed.

Step 6: Formulation of community development plan based on the pirot project

The outcomes of PP will be collated with the feasibility criteria for plans and the improvement standards in order to materialize the plans and will be used for formulation of the Community Development Plan of each village, zone or route.

Items in the Development Plans related to livelihood improvement will be evaluated using the results of the calculation of benefits obtained in PP.

Step 7: Project evaluation of route community development plan

Items in the Development Plans related to livelihood improvement will be evaluated using the results of the calculation of benefits obtained in PP.

In Nkondo Route, the road used by the communities along the route is a provincial road

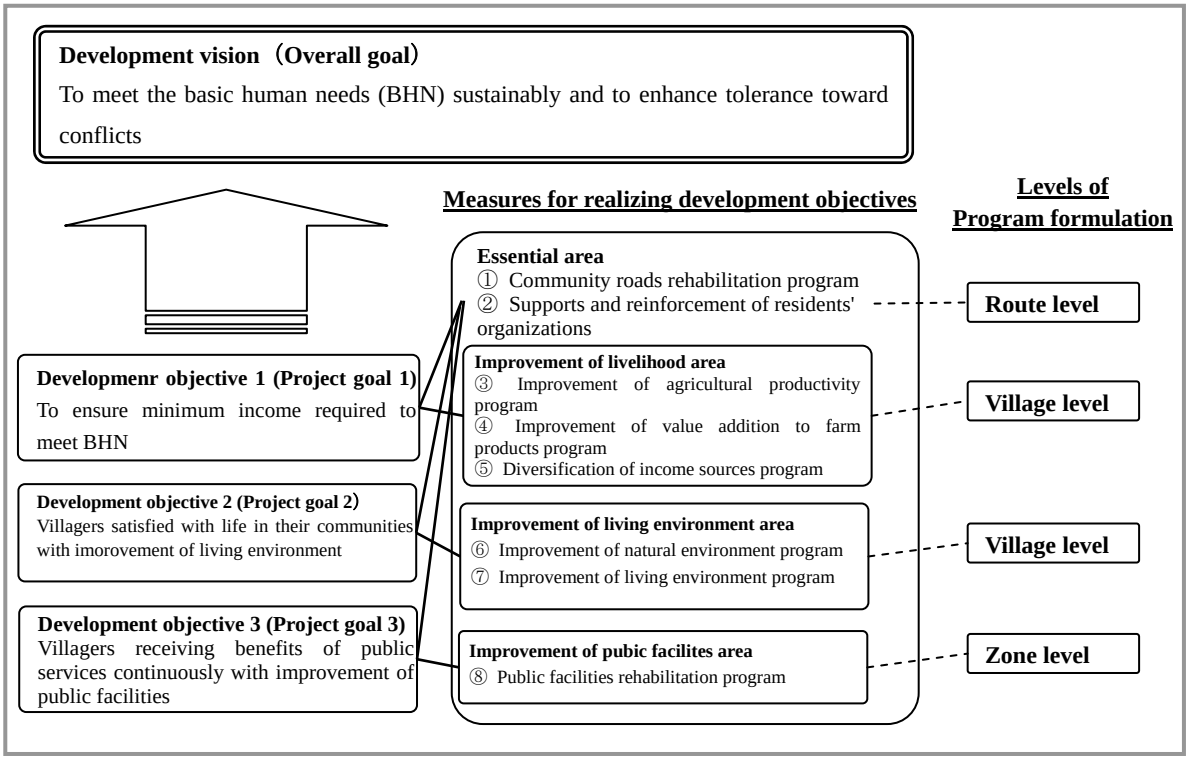
maintained on the ground by CLER. Meanwhile, the road in Kilueka Route is a community road requiring regular maintenance by villagers. Therefore, the Development Plan for Kilueka Route includes a road maintenance project, which is not included in the plan for Nkondo Route.

7.3.1 Development Vision and Development Objectives

The development vision (Overall Goal) and development objectives (Project Objectives) for the Projects in the short- and medium-term plans have been established through the activities in Steps 4 and 5. The development objectives have been established based on the measures against the problems identified in the community profiling and other activities. Achievement of the development objectives will be measured by the indicators described in "7.1.3 Basic concepts of the Community Development Plans." The development vision (Overall Goal) will be the state of the communities in future (development vision) achieved by meeting the development objectives (Project Objectives). The development vision (Overall Goal) and development objectives (Project Objectives) for the Study Area are described below.

The measures to realize the development objectives consist of programs in each area. Among the programs, ① Community Road Rehabilitation Program is to establish road networks in the Study Area and, thus, is essential for achieving the development objectives. (Rehabilitation of the community roads in Kilueka Route has been implemented in the Study as an emergency reconstruction project.) ② Program for Assistance and Empowerment of Villagers' Organizations intends to assist and empower the villagers' organizations, the implementing bodies, and to develop capacity of administrative services to guarantee sustainability of the programs. The programs in the Livelihood Improvement Area consist of ③ Program for Improvement in Agricultural Productivity, ④ Program for Additional of Values to the Products and ⑤ Program for Diversification of Income Sources. The programs in the Living and Natural Environment Improvement Area consist of ⑥ Program for Improvement of Natural Environment and ⑦ Program for Improvement of Living Environment, and ⑧ Program for Improvement of Public Facilities is the program in the Public Facility Improvement Area.

The programs mentioned above are classified into those formulated at the level of each village (the programs in the Livelihood Improvement and Natural and Living Environment Areas), at the zone level (the programs in the Public Facility Improvement Area) and at the route level (the programs in the Essential Area).



7.3.2 Projects to be Implemented in the Community Development Plans

The Community Development Plans consist of projects to be implemented by each village, by each zone and by each route as shown in the table below. The projects have been selected on the basis of the outcomes of (1) Explanation to villagers of the contents of the development programs and the evaluation criteria for technical receptivity and (2) Confirmation of villagers' intentions and the developmental priorities assessed on a technical basis.

However, since the projects to be implemented in the Living Environment and Public Facility Improvement Areas are required for ensuring the basic living environment and the projects to be implemented at the route level are required for realizing outputs of the community development, these projects will be implemented in all the communities in the Plan.

Target villages	Priority projects			
	Projects implemented in each village		Projects implemented in each zone	Projects implemented in each route
	Improvement of livelihood area	Living environment area	Improvement of public facilities area	Essential area
Kimwana	Promotion of rice cultivation, Cattle ploughing, animal husbandary, acquculture, vegetable cultivation	Replantation, water facilities, improved cooking stoves, handicrafts	Health promoters (Improvement of health and educational facilities are not applicable since those of Kimpese are used)	Maintenance of community roads Supports and reinforcement of villagers' organizations
Ndembo	Cattle ploughing, animal husbandary, vegetable cultivation	Replantation, water facilities, improved cooking stoves, handicrafts		

Wene	Cattle ploughing, animal husbandary, vegetable cultivation	Replantation, water facilities, improved cooking stoves, handicrafts		
Ndunguidi	Animal husbandary, beekeeping, vegetable cultivation	Replantation, water facilities, improved cooking stoves, handicrafts		
Nkondo	Animal husbandary, vegetable cultivation	Replantation, water facilities, improved cooking stoves, handicrafts	Health promoters Improvement of health facilities Improvement of educational facilities	
Kinanga	Cattle ploughing, animal husbandary, beekeeping, vegetable cultivation	Replantation, water facilities, improved cooking stoves, handicrafts		
Kisiama	Cattle ploughing, animal husbandary, promotion of rice cultivation promotion, vegetable cultivation	Replantation, water facilities, improved cooking stoves, handicrafts		
Mbanza Ndamba	Cattle ploughing, animal husbandary, acquaculture, beekeeping, vegetable cultivation	Replantation, water facilities, improved cooking stoves, handicrafts		
Kilueka	Cattle ploughing, animal husbandary, vegetable cultivation	Replantation, water facilities, improved cooking stoves, handicrafts	Health promoters Improvement of health facilities Improvement of educational facilities	
Kilueka Site	Animal husbandary, vegetable cultivation	Replantation, water facilities, improved cooking stoves, handicrafts		

7.3.3 Setting of Project Scales and Standards

(1) Contents of programs implemented in each village

As stated previously, programs of improvement of livelihood and living environment are formulated for each village. Programs implemented in the village and their scales are shown in the table below. Projects contents in programs are indicated in the PP sheets (see Annex 6.10). The project scale of each project in the village was based on the PP sheets and the target year is set for 5 years according to the results obtained from this Study. Population and numbers of households in the table are based on the results of community profiling survey which has been completed.

① Project for Improvement of Livelihood area

The item and scope of project for improvement of livelihood program in each village are shown in below table. Project activities are decided as previously stated, and the scope of project is set for the average income of the day per person to improve by executing the project by 20 percent in five years.

Village	Number of households	Population	Cultivation area in rainy season (ha)	Project	Project scale (target value)	Input cost	Ground for culculation	PP implimentation (Blank: Not introduced yet)
Kimwana	44	172	0.36 ha	①Promotion of rice cultivation	・1 unit 2.0ha	3,410 US$	・Implementer：25 households ・Input：cost of seeds, paddy fields construction cost ・Expected benefit：25 households×6 people×0.2(US$/ day) ×365 days=10,950(US$/ year) Increased benefit per unit calculated by PP：2,640US$/ 2.0ha ・Volume of project：10,950(US$/ year)/2,640(US$/ha)/2 times(= double cropping, 2 times/ year)=2.1ha≒2ha ・Input cost：336(US$/0.2ha)×2.0ha/0.2ha=3,360US$（labor cost for preparation of paddy fields）＋50US$(cost of rice seeds for 2.0ha)	Practiced
				②Animal husbandry	・1 unit 1 male and 3 female pigs	886 US$	・Implementer：7 households ・Input：cost for purchasing adult pigs, maintenance cost, preparation cost of pig pen ・Expected benefit：7 households×6 people×0.2(US$/ day)×365 days=3,066 (US$/ year) ・Volume of project：in case of introducing 1 male 3 female pigs: 1 pair×646(US$/ pair)+2 heads×885(US$/ 1 female)×2 times delivery/ 1 female=4,832US$ ・Input cost：443,000Fc÷500Fc/US$= 886US$	
				③Aquaculture		50 US$	・1 place: 50US$, fry	
				④Cattle ploughing	・Cultivation area increased in rainy season：12.7 ha（0.29 ha/ household） ・1 pair of cattle	1,700 US$	・Implementer：172 people（44 households） ・Input：cattle(1 pair), tools for cattle ploughing ・Expected benefit：172 people × 0.2(US$/ day) × 365 days=12,556 (US$/ year) ・Volume of project：cultivation area increased in rainy season ：12,556(US$/ year)/987(US$/ha)＝12.7 (ha)→ 12.7ha/44 households＝0.29(ha/ household)≒ 0.05(ha/ person) ・Input cost：1 pair of cattle 1,700 US$（need 12.6ha/year of new area, while 1 pair of cattle can cover 21.6ha/year → 1 pair is enough）	
				⑤Vegetable cultivation	・2.4ha（0.11ha/ household）	440 US$	・Implementer：22 households（half of all households) ・Input：seeds ・Expected benefit：22 households×6 people×0.2(US$/ day) ×365 days=9,636 (US$/ year) ・Volume of project：9,636 (US$/ year)/4,000(US$/ha)＝2.4(ha) 2.4ha/22 households＝0.11(ha/ household) ⇒Community field: 2.4ha ・Input cost：22 households×20 US$＝440 US$	already introduced for 16 households
Ndembo	28	130	0.52 ha	①Cattle ploughing	・Cultivation area increased in rainy season ：9.6 ha（0.34 ha/ household） ・cattle: 1 set	1,700 US$	・Implementer：130 people（28 households） ・Input：cattle(1 pair), tools for cattle ploughing ・Expected benefit：130 people × 0.2(US$/ day) × 365 days=9,490 (US$/ year) ・Volume of project：cultivation area increased in rainy season ：9,490(US$/ year)/987(US$/ha)＝9.6(ha)→9.6ha/28 households＝0.34(ha/ household) ・Input cost：1 pair of cattle 1,700 US$	1 set already introduced
				②Animal husbandry	・1 unit 1 male and 3 female pigs	886 US$	・Implementer：7 households ・Input：cost for purchasing adult pigs, maintenance cost, preparation cost of pig pen ・Expected benefit：7 households×6 people×0.2(US$/ day)×365 days=3,066 (US$/ year) ・Volume of project：in case of introducing 1 male 3 female pigs: 1 pair×646(US$/ pair)+2 heads×885(US$/ 1 female)×2 times delivery/ 1 female=4,832US$ ・Input cost：443,000Fc÷500(Fc/US$)= 886US$	

Village	Number of households	Population	Cultivation area in rainy season (ha)	Project	Project scale (target value)	Input cost	Ground for culculation	PP implimentation (Blank: Not introduced yet)
				③Vegetable cultivation	・1.5ha（0.11ha/ household）	280 US$	・Implementer：14 households ・Input：seeds ・Expected benefit：14 households×6 people×0.2(US$/ day) ×365 days=6,132 (US$/ year) ・Volume of project：6,132 (US$/ year)/4,000(US$/ha)＝1.5ha 1.5ha/14 households＝0.11（ha/ household） ・14 households×20 US$＝280 US$	already introduced for 20 households
Wene	120	628	0.43 ha	①Cattle ploughing	・Cultivation area increased in rainy season：46.4 ha（0.39 ha/ household） ・2 pairs of cattle	3,400 US$	・Implementer：628 people（120 households） ・Input：cattle(1 pair), tools for cattle ploughing ・Expected benefit：628 people × 0.2(US$/ day) × 365 days=45,844 (US$/ year) ・Volume of project：cultivation area increased in rainy season ：45,844(US$/ year)/987(US$/ha) ＝ 46.4(ha) → 46.4ha/120 households＝0.39(ha/ household) 46.4(ha)/21.6(ha/ pair)＝2.1 pairs≒2 pairs ・Input cost：1 pair of cattle 1,700 US$×3=5,100 US$	
				②Animal husbandry	・1 unit 1 male and 3 female pigs	886 US$	・Implementer：7 households ・Input：cost for purchasing adult pigs, maintenance cost, preparation cost of pig pen ・Expected benefit：7 households×6 people×0.2(US$/ day)×365 days=3,066 (US$/ year) ・Volume of project：in case of introducing 1 male 3 female pigs: 1 pair×646(US$/ pair)+2 heads×885(US$/ 1 female)×2 times delivery/ 1 female=4,832US$ ・Input cost：443,000Fc÷500(Fc/US$) =886US$	
				③Vegetable cultivation	・6.6ha（0.11ha/ household）	1,200 US$	・Implementer：60 households（half of all households) ・Input：seeds ・Expected benefit：60 households×6 people×0.2(US$/ day) ×365 days=26,280 (US$/ year) ・Volume of project：26,280 (US$/ year)/4,000(US$/ha)＝6.6(ha) 6.6ha/60 households＝0.11(ha/ household) ・Input cost：60 households×20 US$＝1,200 US$	already introduced for 23 households
Ndunguidi	20	74	0.46 ha	①Animal husbandry	・1 unit 1 male and 3 female pigs	886 US$	・Implementer：7 households ・Input：cost for purchasing adult pigs, maintenance cost, preparation cost of pig pen ・Expected benefit：7 households×6 people×0.2(US$/ day)×365 days=3,066 (US$/ year) ・Volume of project：in case of introducing 1 male 3 female pigs: 1 pair×646(US$/ pair)+2 heads×885(US$/ 1 female)×2 times delivery/ 1 female=4,832US$ ・Input cost：443,000Fc÷500(Fc/US$)=886US$	
				②Beekeeping		810 US$	1 place/ 1 village, 1 place: 810US$, boxes for gathering bees and honey, etc.	
				③Vegetable cultivation	・1.1ha（0.11ha/ household）	200 US$	・Implementer：10 households（half of all households) ・Input：seeds ・Expected benefit：10 households×6 people×0.2(US$/ day) ×365 days=4,380(US$/ year) ・Volume of project：4,380 (US$/ year)/4,000(US$/ha)＝1.1(ha) 1.1ha/10 households＝0.11（ha/ household） ・Input cost：10 households×20 US$＝200 US$	already introduced for 5 households
Nkondo	46	220	0.46 ha	①Animal husbandry	・1 unit 1 male and 3 female pigs	886 US$	・Implementer：7 households ・Input：cost for purchasing adult pigs, maintenance cost, preparation cost of pig pen ・Expected benefit：7 households×6 people×0.2(US$/ day)×365 days=3,066 (US$/ year) ・Volume of project：in case of introducing 1 male 3 female pigs: 1 pair×646(US$/ pair)+2 heads×885(US$/ 1 female)×2 times delivery/ 1 female=4,832US$	Introduced

Village	Number of households	Population	Cultivation area in rainy season (ha)	Project	Project scale (target value)	Input cost	Ground for culculation	PP implimentation (Blank: Not introduced yet)
							・Input cost：443,000Fc÷500(Fc/US$) =886US$	
				②Vegetable cultivation	・2.5ha（0.11ha/ household）	460 US$	・Implementer：23 households（half of all households) ・Input：seeds ・Expected benefit：23 households×6 people×0.2(US$/ day) ×365 days=10,074 (US$/ year) ・Volume of project：10,074 (US$/ year)/4,000(US$/ha)＝2.5（ha） 2.5ha/23 households＝0.11（ha/ household） ・Input cost：23 households×20 US$＝460 US$	already introduced for 24 households
Kinanga	68	408	0.45 ha	①Cattle ploughing	・Cultivation area increased in rainy season：30.2 ha（0.44 ha/ household） ・1 pair of cattle	1,700 US$	・Implementer：408 people（68 households） ・Input：cattle(1 pair), tools for cattle ploughing ・Expected benefit：408 people × 0.2(US$/ day) × 365 days=29,784 (US$/ year) ・Volume of project：cultivation area increased in rainy season ：29,784(US$/ year)/987(US$/ha) ＝ 30.2(ha) → 30.2ha/68 households＝0.44(ha/ household) 30.2(ha)/21.6(ha/head)＝1.4 pairs≒1 pair ・Input cost：1 pair of cattle 1,700 US$×2=3,400 US$	2 pairs already introduced
				②Animal husbandry	・1 unit 1 male and 3 female pigs	886 US$	・Implementer：7 households ・Input：cost for purchasing adult pigs, maintenance cost, preparation cost of pig pen ・Expected benefit：7 households×6 people×0.2(US$/ day)×365 days=3,066 (US$/ year) ・Volume of project：in case of introducing 1 male 3 female pigs: 1 pair×646(US$/ pair)+2 heads×885(US$/ 1 female)×2 times delivery/ 1 female=4,832US$ ・Input cost：443,000Fc÷500Fc/US$= 886US$	
				③Beekeeping	・1 unit	810 US$	・Implementer： ・Input：beehive, beekeeping box, etc ・Input cost：810 US$/unit	
				④Vegetable cultivation	・3.7ha（0.11ha/ household）	680 US$	・Implementer：34 households（half of all households) ・Input：seeds ・Expected benefit：34 households×6 people×0.2(US$/ day) ×365 days=14,892 (US$/ year) ・Volume of project：14,892 (US$/ year)/4,000(US$/ha)＝3.7(ha) 3.7ha/34 households＝0.11(ha/ household) ・Input cost：34 households×20 US$=680 US$	already introduced for 20 households
Kisiama	27	151	0.72 ha	①Animal husbandry	・1 unit 1 male and 3 female pigs	886 US$	・Implementer：7 households ・Input：cost for purchasing adult pigs, maintenance cost, preparation cost of pig pen ・Expected benefit：7 households×6 people×0.2(US$/ day)×365 days=3,066 (US$/ year) ・Volume of project：in case of introducing 1 male 3 female pigs: 1 pair×646(US$/ pair)+2 heads×885(US$/ 1 female)×2 times delivery/ 1 female=4,832US$ ・Input cost：443,000Fc÷500Fc/US$= 886US$	
				②Cattle ploughing	・Cultivation area increased in rainy season：11.2 ha（0.41 ha/ household） ・1 pair of cattle	1,700 US$	・Implementer：151 people（27 households） ・Input：cattle(1 pair), tools for cattle ploughing ・Expected benefit：151 people × 0.2(US$/ day) × 365 days=11,023 (US$/ year) ・Volume of project：cultivation area increased in rainy season ：11,023(US$/ year)/987(US$/ha) ＝ 11.2(ha) → 11.2ha/27 households＝0.41(ha/ household) ・Input cost：1 pair of cattle 1,700 US$	

Village	Number of households	Population	Cultivation area in rainy season (ha)	Project	Project scale (target value)	Input cost	Ground for culculation	PP implimentation (Blank: Not introduced yet)
				③Promotion of rice cultivation	・1 unit 2.0ha	3,360 US$	・Implementer：23 households ・Input：cost of seeds, paddy fields construction cost ・Expected benefit：23 households×6 people×0.2(US$/ day) ×365 days=10,074(US$/ year) ・Volume of project：10,074(US$/ year)/3,000(US$/ha)/2 times=1.7ha≒2.0ha	
				④Vegetable cultivation	・1.5ha（0.11ha/ household）	280 US$	・Implementer：14 households ・Input：seeds ・Expected benefit：14 households×6 people×0.2(US$/ day) ×365 days=6,132 (US$/ year) ・Volume of project：6,132 (US$/ year)/4,000(US$/ha)＝1.5（ha） 1.5ha/14 households＝0.11（ha/ household） ・Input cost：14 households×20 US$=280 US$	already introduced for 20 households
Mbanza Ndamba	91	494	0.34 ha	①Cattle ploughing	・Cultivation area increased in rainy season：36.5 ha（0.40 ha/ household） ・2 pairs of cattle	3,400 US$	・Implementer：494 people（91 households） ・Input：cattle(1 pair), tools for cattle ploughing ・Expected benefit：494 people × 0.2(US$/ day) × 365 days=36,062 (US$/ year) ・Volume of project：cultivation area increased in rainy season：36,062(US$/ year)/987(US$/ha) ＝ 36.5(ha) → 36.5ha/91 households＝0.40(ha/ household) 36.5(ha)/21.6(ha/ pair)＝1.69 pairs≒2 pairs ・Input cost：1 pair of cattle 1,700 US$×2=3,400 US$	1 pair already introduced
				②Animal husbandry	・1 unit 1 male and 3 female pigs	886 US$	・Implementer：7 households ・Input：cost for purchasing adult pigs, maintenance cost, preparation cost of pig pen ・Expected benefit：7 households×6 people×0.2(US$/ day)×365 days=3,066 (US$/ year) ・Volume of project：in case of introducing 1 male 3 female pigs: 1 pair×646(US$/ pair)+2 heads×885(US$/ 1 female)×2 times delivery/ 1 female=4,832US$ ・Input cost：443,000Fc÷500(Fc/US$)= 886US$	
				③Aquaculture		50 US$	・1 place: 50US$, fry	
				④ Beekeeping		810 US$	・Implementer： ・Input：beehive, beekeeping box, etc ・Input cost：810 US$/unit	
				⑤ Vegetable cultivation	・5.0ha（0.11ha/ household）	920 US$	・Implementer：46 households ・Input：seeds ・Expected benefit：46 households×6 people×0.2(US$/ day) ×365 days=20,148(US$/ year) ・Volume of project20,148 (US$/ year)/4,000(US$/ha)＝5.0(ha) 5.0ha/46 households＝0.11(ha/ household) ・Input cost：46 households×20 US$＝920 US$	already introduced for 24 households
Kilueka	91	455	0.58 ha	①Cattle ploughing	・Cultivation area increased in rainy season：33.7 ha（0.37 ha/ household） ・2 pairs of cattle	3,400 US$	・Implementer：455 people（91 households） ・Input：cattle(1 pair), tools for cattle ploughing ・Expected benefit：455 people × 0.2(US$/ day) × 365 days=33,215 (US$/ year) ・Volume of project：cultivation area increased in rainy season：33,215(US$/ year)/987(US$/ha) ＝ 33.7(ha) → 33.7ha/91 households＝0.37(ha/ household) 33.7(ha)/21.6(ha/ pair)＝1.56 pairs≒2 pairs ・Input cost：1 pair of cattle 1,700 US$×2=3,400 US$	1 pair already introduced

Village	Number of households	Population	Cultivation area in rainy season (ha)	Project	Project scale (target value)	Input cost	Ground for culculation	PP implimentation (Blank: Not introduced yet)
				②Animal husbandry	・1 unit 1 male and 3 female pigs	886 US$	・Implementer：7 households ・Input：cost for purchasing adult pigs, maintenance cost, preparation cost of pig pen ・Expected benefit：7 households×6 people×0.2(US$/ day)×365 days=3,066 (US$/ year) ・Volume of project：in case of introducing 1 male 3 female pigs: 1 pair×646(US$/ pair)+2 heads×885(US$/ 1 female)×2 times delivery/ 1 female=4,832US$ ・Input cost：443,000Fc÷500Fc/US$= 886US$	
				③ Vegetable cultivation	・5.0ha（0.11ha/ household）	920 US$	・Implementer：46 households ・Input：seeds ・Expected benefit：46 households×6 people×0.2(US$/ day)×365 days=20,148(US$/ year) ・Volume of project：20,148 (US$/ year)/4,000(US$/ha)＝5.0(ha) 5.0ha/46 households＝0.11（ha/ household） ・Input cost：46 households×20 US$＝920 US$	already introduced for 27 households
Kilueka Site	230	1,385	0.20 ha	①Animal husbandry	・1 unit 1 male and 4 female pigs	886 US$	・Implementer：7 households ・Input：cost for purchasing adult pigs, maintenance cost, preparation cost of pig pen ・Expected benefit：7 households×6 people×0.2(US$/ day)×365 days=3,066 (US$/ year) ・Volume of project：in case of introducing 1 male 3 female pigs: 1 pair×646(US$/ pair)+2 heads×885(US$/ 1 female)×2 times delivery/ 1 female=4,832US$ ・Input cost：443,000Fc÷500(Fc/US$)= 886US$	
				②Vegetable cultivation	・6.4ha（0.11ha/ household）	1,160 US$	・Implementer：58 households ・Input：seeds ・Expected benefit：58 households×6 people×0.2(US$/ day)×365 days=25,404(US$/ year) ・Volume of project：25,404 (US$/ year)/4,000(US$/ha)＝6.4(ha) 12.6ha/115 households＝0.11(ha/ household) ・Input cost：58 households(1/4 of all households, assuming that one half of the households will return to Angola)×20 US$＝1,160 US$	already introduced for 20 households
Total (mean)	765	4,117	(0.46 ha)	Cattle ploughing	・Cultivation area increased in rainy season：180.3ha（0.24ha/ household） ・10 pairs of cattle	17,000 US$	Targeted village and volume of project ・Kimuwana：1 set ・Ndembo：1 set (already introduced) ・Wene：2 sets ・Kinanga：2 sets (already introduced) ・Kisiama：1 set ・Mbanza Ndamba：2 sets (1 set already introduced) ・Kilueka：2 sets (1 set already introduced)	
				Vegetable cultivation	・35.7ha（0.11ha/ household）	6,540 US$	Targeted village and volume of project ・Kimuwana：22 households（16 aldready introduced） ・Ndembo：14 households（20 aldready introduced） ・Wene：60 households（23 aldready introduced） ・Ndunguidi：10 households（5 aldready introduced） ・Nkondo：23 households（24 aldready introduced） ・Kinanga：34 households（20 aldready introduced） ・Kisiama：14 households（20 aldready introduced） ・Mbanza Ndamba：46 households（24 aldready introduced） ・Kilueka：46 households（27 aldready introduced） ・Kilueka Site：58 households（20 aldready introduced）	
				Promotion of rice cultivation	・4.0ha	6,770 US$	Targeted village and volume of project ・Kimwana：2.0ha（0.2a: practiced） ・Kisiama：2.0ha	
				Beekeeping	・3 sets	2,430 US$	Targeted village and volume of project ・Ndunguidi：1 set	

Village	Number of households	Population	Cultivation area in rainy season (ha)	Project	Project scale (target value)	Input cost	Ground for culculation	PP implimentation (Blank: Not introduced yet)
							・Kinanga：1 set ・Mbanza Ndamba：1 set	
				Animal husbandry	・10 sets	8,860 US$	Targeted village and volume of project ・Kimwana：1 set ・Ndembo：1 set ・Wene：1 set ・Ndunguidi：1 set ・Nkondo：1 set（introduced） ・Kinanga：1 set（introduced） ・Kisiama：1 set ・Mbanza Ndamba：1 set ・Kilueka：1 set ・Kilueka Site：1 set	
				Aquaculture	・2 sets	100 US$	Targeted village and volume of project ・Kimwana：1 set ・Mbanza Ndamba：1 set	

② Project for improvement of living environment area

Living environment such as water supply etc. and the natural environment will be improved in five years for the project of the improvement of the living environment, and it will be contributed to the improvement of the quality of living environment

Village	Number of households	Population	Project	Project scale (target value)	Input cost	Ground for culculation	PP implimentation (Blank: Not introduced yet)
Kimwana	44	172	Drinking water facilities	0	－	Continue to us the warer supply of Resideso	
			Replantation	1 unit	100 US$	50 seedlings x 2 US$	
			Health promoter	1 person	100 US$	1 promotor/ 50 households	
			Cooking stoves improvement	22 households	－	Using locally available materials。	2 stoves after PP
			Literacy education	1 set	100 US$	Text books and blackboads	
			Handicraft	1 set	100 US$	Material costs（Knitting sticks etc.）	
			Leisure activities	1 set	20 US$	Events costs（transportation fee8 US$, Food and drinks12 US$）	Done
Ndembo	28	130	Drinking water facilities	1 unit	7000 US$	Quantity demanded：population130 people × 8 ℓ/person・day＝1,040 ℓ ≒ 1,000ℓ Quantity of supply：available constant supplies; 1,000ℓ with 7m depth of shallow well (0.6 m of well-water level) Construction cost：7,000US$/ well	
			Replantation	1 unit	100 US$	50 seedlings ×2 US$	Seedlings already introduced by PP
			Health promoter	1 person	100 US$	1 promotor/ 50 households	
			Cooking stoves improvement	14 households	－	Using locally available materials	36 stoves after PP
			Literacy education	1 set	100 US$	Text books and blackboads	
			Handicraft	1 set	100 US$	Material costs（Knitting sticks etc.）	
			Leisure activities	1 set	20 US$	Events costs（transportation fee8 US$, Food and drinks12 US$）	Done

Wene	120	628	Drinking water facilities	5 units	35,000 US$	Quantity demanded：population628 people × 8 ℓ/person・day ＝5024 ℓ Quantity of supply：available constant supplies; 1,000ℓ with 7m depth of shallow well (0.6 m of well-water level) Construction cost：7,000US$/ well	1 well constructed by PP
			Replantation	1 unit	100 US$	50 seedlings × 2 US$	
			Health promoter	2 people	200 US$	120 households/50 households=2.4≒2 people	
			Cooking stoves improvement	60 households	－	Using locally available materials	1 stove after PP
			Literacy education	1 set	100 US$	Text books and blackboads	
			Handicraft	1 set	100 US$	Material costs（Knitting sticks etc.）	
			Leisure activities	1 set	20 US$	Events costs（transportation fee8 US$, Food and drinks12 US$）	Done
Ndunguidi	20	74	Drinking water facilities	1 unit	7,000 US$	Quantity demanded：population74 people × 8 ℓ/person・day ＝592 ℓ<1,000ℓ Quantity of supply：available constant supplies; 1,000ℓ with 7m depth of shallow well (0.6 m of well-water level) Construction cost：7,000US$/ well	
			Replantation	1 unit	100 US$	50 seedlings × 2 US$	Seedlings already introduced by PP
			Health promoter	1 person	100 US$	1 promotor/ 50 households	
			Cooking stoves improvement	10 households	－	Using locally available materials。	2 stoves after PP
			Literacy education	1 set	100 US$	Text books and blackboads	Done
			Handicraft	1 set	100 US$	Material costs（Knitting sticks etc.）	
			Leisure activities	1 set	20 US$	Events costs（transportation fee8 US$, Food and drinks12 US$）	Done
Nkondo	46	220	Drinking water facilities	2 units	14,000 US$	Quantity demanded：population220 people × 8 ℓ/person・day ＝1760 ℓ Quantity of supply：available constant supplies; 1,000ℓ with 7m depth of shallow well (0.6 m of well-water level) Construction cost：7,000US$/ well	
			Replantation	1 unit	100 US$	50 seedlings × 2 US$	Seedlings already introduced by PP
			Cooking stoves improvement	23 households	－	Using locally available materials。	8 stoves after PP
			Handicraft	1 set	100 US$	Material costs（Knitting sticks etc.）	
			Leisure activities	1 set	20 US$	Events costs（transportation fee8 US$, Food and drinks12 US$）	Done
Kinanga	68	408	Drinking water facilities	2 units	14,000 US$	Quantity demanded：population408 people × 8 ℓ/person・day ＝3264 ℓ Quantity of supply：available constant supplies; 1,000ℓ with 7m depth of shallow well (0.6 m of well-water level) Construction cost：7,000US$/ well	3 wells including an existing one
			Replantation	1 unit	100 US$	50 seedlings × 2 US$	
			Health promoter	1 person	100 US$	1 promotor/ 50 households	
			Cooking stoves improvement	34 households	－	Using locally available materials。	10 stoves after PP
			Literacy education	1 set	100 US$	Text books and blackboads	
			Handicraft	1 set	100 US$	Material costs（Knitting sticks etc.）	Done
			Leisure activities	1 set	20 US$	Events costs（transportation fee8 US$, Food and drinks12 US$）	Done
Kisiama	27	151	Drinking water facilities	2 units	14,000 US$	Quantity demanded：population151 people × 8 ℓ/person・day ＝1208 ℓ Quantity of supply：v Construction cost：7,000US$/ well	1 well already constructed by PP
			Replantation	1 unit	100 US$	50 seedlings × 2 US$	
			Health promoter	1 person	100 US$	1 promotor/ 50 households	

			Cooking stoves improvement	14 units	－	Using locally available materials。	1 stove after PP
			Literacy education	1 set	100 US$	Text books and blackboads	
			Handicraft	1 set	100 US$	Material costs（Knitting sticks etc.）	
			Leisure activities	1 set	20 US$	Events costs（transportation fee8 US$, Food and drinks12 US$）	Done
Mbanza Ndamba	91	494	Drinking water facilities	4 units	28,000 US$	Quantity demanded：population494 people × 8 ℓ/person・day ＝3952 ℓ Quantity of supply：available constant supplies; 1,000ℓ with 7m depth of shallow well (0.6 m of well-water level), construction cost: 7000 US$/ well	
			Replantation	1 unit	100 US$	50 seedlings × 2 US$	
			Health promoter	2 people	200 US$	91 households/50 households=1.8≒2 people	
			Cooking stoves improvement	46 units	－	Using locally available materials。	4 stoves after PP
			Literacy education	1 set	100 US$	Text books and blackboads	Done
			Handicraft	1 set	100 US$	Material costs（Knitting sticks etc.）	
			Leisure activities	1 set	20 US$	Events costs（transportation fee8 US$, Food and drinks12 US$）	Done
Kilueka	91	455	Drinking water facilities	1 unit	7,000 US$	Quantity demanded：assuming that one half of the population will return to Angola: 113 people × 8 ℓ/person・day＝910 ℓ (1 本) Quantity of supply：available constant supplies; 1,000ℓ with 7m depth of shallow well (0.6 m of well-water level) Construction cost：7,000US$/ well	
			Replantation	1 unit	100 US$	50 seedlings × 2 US$	
			Health promoter	2 people	200 US$	91 households/50 households=1.8≒2 people	
			Cooking stoves improvement	46 units	－	Using locally available materials。	1 stove after PP
			Literacy education	1 set	100 US$	Text books and blackboads	
			Handicraft	1 set	100 US$	Material costs（Knitting sticks etc.）	
			Leisure activities	1 set	20 US$	Events costs（transportation fee8 US$, Food and drinks12 US$）	Done
Kilueka Site	230	1,385	Drinking water facilities			Using existing wells	
			Replantation	1 unit	100 US$	50 seedlings × 2 US$	
			Health promoter	2 people	200 US$	Assuming that one half of the households will return to Angola: 115 households/50 households=2.3≒2 people	
			Cooking stoves improvement	115 units	－	Using locally available materials。	1 stove after PP
			Literacy education	1 set	100 US$	Text books and blackboads	Done
			Handicraft	1 set	100 US$	Material costs（Knitting sticks etc.）	
			Leisure activities	1 set	20 US$	Events costs（transportation fee8 US$,Food and drinks12 US$）	Done
Total	765	4,117	Drinking water facilities	・16sets	112,000 US$	Target village and Volume of project ・Ndembo：1 set ・Wene：2sets（Done for a well） ・Ndunguidi：1 set ・Nkondo：2sets（Done for a well） ・Kinanga：3sets ・Kisiama：2sets（Done for a well） ・Mbanza Ndamba：4 pairs ・Kilueka：1 set	
			Replantation	・10set	1,000 US$	Target village and Volume of project ・Kimwana：1 set ・Ndembo：1 set（Done） ・Wene：1 set ・Ndunguidi：1 set（Done） ・Nkondo：1 set（Done） ・Kinanga：1 set ・Kisiama：1 set ・Mbanza Ndamba：1 set ・Kilueka：1 set ・Kilueka Site：1 set	

			Health promoter	14 people	1,400 US$	Target village and project costs ・Kimwana：1 person（Done） ・Ndembo：1 person（Done） ・Wene：2 people（Done for a person） ・Ndunguidi：1 person（Done） ・Nkondo：1 person（Done） ・Kinanga：1 person（Done） ・Kisiama：1 person（Done） ・Mbanza Ndamba：2 people（Done for a person） ・Kilueka：2 people（Done for a person） ・Kilueka Site：2 people（Done）	
			Cooking stoves improvement	・384 households	—	Target village and Volume of project ・Kimwana：22 households（Done for 2 households） ・Ndembo：14 households ・Wene：60 households（Done for 1 houuse hold） ・Ndunguidi：10 households（Done for 2 households） ・Nkondo：23 households（Done for 8 households） ・Kinanga：34 households（Done for 10 households） ・Kisiama：14 households（Done for 1 household） ・Mbanza Ndamba：46 households（Done for 4 households） ・Kilueka：46 households（Done for 1 household） ・Kilueka Site：115 households	
			Literacy education	・10set	1,000 US$	Target village and Volume of project ・Kimwana：1 set ・Ndembo：1 set ・Wene：1 set ・Ndunguidi：1 set（Done） ・Nkondo：1 set ・Kinanga：1 set ・Kisiama：1 set ・Mbanza Ndamba：1 set（Done） ・Kilueka：1 set ・Kilueka Site：1 set（Done）	
			Handicraft	・10set	1,000 US$	Target village and Volume of project ・Kimwana：1 set ・Ndembo：1 set ・Wene：1 set ・Ndunguidi：1 set ・Nkondo：1 set ・Kinanga：1 set（practiced） ・Kisiama：1 set ・Mbanza Ndamba：1 set ・Kilueka：1 set ・Kilueka Site：1 set	
			Leisure activities	・10set	200 US$	Target village and Volume of project ・Kimwana：1 set（practiced） ・Ndembo：1 set（practiced） ・Wene：1 set（practiced） ・Ndunguidi：1 set（practiced） ・Nkondo：1 set（practiced） ・Kinanga：1 set（practiced） ・Kisiama：1 set（practiced） ・Mbanza Ndamba：1 set（practiced） ・Kilueka：1 set（practiced） ・Kilueka Site：1 set（practiced）	

(2) Project implemented in zone

The health facilities improvement project and the educational facilities improvement project included in the improvement of living environment program area are executed in each zone.

The health facilities improvement project aims a decrease of the disease because of nurse's settling down and the educational facilities improvement project aims continuously executed education because the teacher is settling down. The scope of project and input are shown as follows.

① Improvement of health facilities project

Zone	Utilization situation	Project scale(target value)	Total inputs	Inputs by each village	
Zone 4	Using the hospital of Kimpese	-	None （Continue to Use the hospital of Kimpese ）	Kimwana	—
				Ndembo	—
Zone 5	Using the health center of Kinanga	1	200US$（Paint etc.）	Wene	40US$ （shared by 5 villages）
				Ndunguidi	40US$ （shared by 5 villages）
				Nkondo	40US$ （shared by 5 villages）
				Kinanga	40US$ （shared by 5 villages）
				Kisiama	40US$ （shared by 5 villages）
Zone 6	Using the health center of Kilueka	1	210US$（Paint etc.）	Mbanza Ndamba	70US$ （shared by 3 villages）
				Kilueka	70US$ （shared by 3 villages）
				Kilueka Site	70US$ （shared by 3 villages）

② Improvement of educational environment project：teachers are settled, classrooms continuously opened

Zone	Utilization situation	Project scale（target value）	Total inputs	Inputs by each village	
Zone 4	Using the school of Kimpese	-	— （Continue to use the school of Kimpese）	Kimwana	—
				Ndembo	—
Zone 5	Using the school 1 km away from Kinanga	1	200US$（Paint etc.）	Wene	40US$ （shared by 5 villages）
				Ndunguidi	40US$ （shared by 5 villages）
				Nkondo	40US$ （shared by 5 villages）
				Kinanga	40US$ （shared by 5 villages）
				Kisiama	40US$ （shared by 5 villages）
Zone 6	Using the school of Mbanza Ndamba and Kilueka Site	1	210US$（Paint etc.）	Mbanza Ndamba	70US$ （shared by 3 villages）
				Kilueka	70US$ （shared by 3 villages）
				Kilueka Site	70US$ （shared by 3 villages）

(3) Project executed in route

The community road maintenance & management project to maintain the community road for the development of the community is indispensable. Therefore, it must be included in the project item of the community development plan.

Route	Project	Project scale（target value）	Activities
Kilueka route	Community road maintenance project	・The time spent by a car between Kimpese－Kilueka is unchanged (about 40 minutes)	・ The maintenance system is established by community development committee ・Cleaning and simple repairs of allocated section (1.8 km/village) to a village are weekly implemented by Salongo in each village. ・The road maintenance is implemented by supervisors of each village.
	Cooperative shipping of agricultural products project	・Installed to 4 places(1 center (Nkondo) has been installed by Agrisud)	・3 collective collection and shipping centers are installed by local level grand aid. （Mbanza Ndamba, Ndunguidi, Kimwama） and 1 center is installed (Nkondo) by Agrisud. ・Agricultural products are collectedly collected and shipped under the initiative of community development committee.

7.3.4 Community Development Plan of Routes and Each Village

The community development plan of the Kilueka route is consisted of village community development plan including the whole route community development plan and community development plan of zones, as shown below, according to above mentioned project scale and standards. The route community development plan is summarized as PDM in table 7.2. Besides, each village development plan is shown in table 7.3.

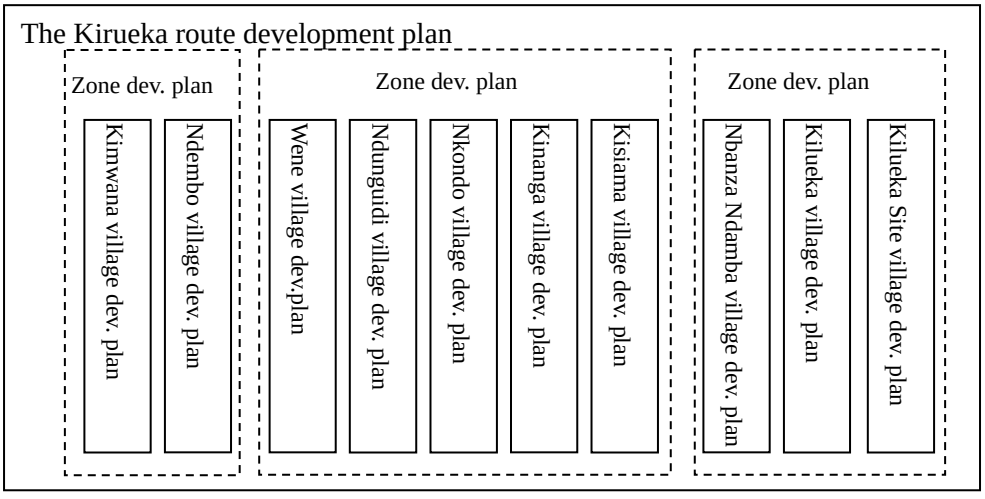


Table 7.2 PDM Development plan for Kilueka route

Development plan for Kilueka route（Whole Kilueka route） PDM-0 Dec, 2009

Study Area : Kilueka Route

Target Period : 2010 ～ 2014 (including the Study period)

Target Group : Residents around Kilueka Route and DECO･DVDA workers in the province, 4100 people

Summary of the project		Main indicators	External Condition
Super Goal	Benefits of community development are distributed in the Study Area	Community development plan is prevailed by residents.	
Project Goal	Residents to conflicts will be strengthened through A) Improvement of livelihood, B) Living environment, C) Organization Empowerment of the community.. Assistance and monitoring power of the DECO･DVDA of the province will be improved.	･An average income is risen by livelihood improvement. ･Residents are satisfied the life in community on following items by living environment improvement: ①XX% of residents can have access to drinking water ②Disorderly lighting is disappeared by rising awareness of conservation of natural environment. ③Classrooms are regularly opened through teachers' settlement. ④Residents can be received the medical services through settlement of nurses. XX% of residents understand knowledge regarding prevention. ･Projects are continued by organizational capacity development. ･ The supports for communities are continued by capacity development of C/P.	
Achievements	【Achievements through the Village Development Plan】 A-1) Agriculture produce increases. A-2) Income increase through the improvement of agricultural techniques and the diversification of agriculture products.. A-3) Rice production increase through the extension of paddy field. A-4) Livestock, fish and bee production increase.. A-5) Non-agriculture income increase through the non-agriculture activities. B-1) Nourishment improves through livelihood improvement.. B-2) Importance of forestry protection is recognized and broadcast burning is reduced.. B-3) Wells are placed and the number of people who can access to the safe water increase.	 Area cultivated by cattle ploughing：average cultivation area of the rainy season per household increases average 0.4ha. Sales of agricultural products: season for sale of vegetable Area of rice cultivation：2ha Number of sales of pigs：60 heads/groups Fish catch： Honey produce：150ℓ/group Processed food produce： Frequency of transportation of farm products： Nutritional improvement： Replanting area Number of constructed wells	 People in the target area can continue their activities. Angolans are not sent to Angola. Congolese in Angola are not sent. Dynamic natural disaster does not occur. Policy for community development promotion does not change.

Summary of the project		Main indicators	External Condition
	B-4) Morbidity rate decreases through health promoters' activity..	Number of patients with malaria and diarrhea	
	B-5) Labor burden of firewood collection and cooking pan washing is reduced through extension of utilization of improved cooking stoves..	Number of improved cooking stoves	
	B-6) Literacy rate is improved through literacy education..	Number of days of classes	
	C-1) Organization empowerment is strengthened by activated group activities..	Changes in the number of participants of the projects	
	C-2) Financial base is established by operation of community field..	Proceeds from community fields	
	【Achievements through the Zone Development Plan】		
	B-7) Function of the health center is maintained through villagers' organization.	Number of health center rehabilitation	
	B-8) Function of the school is maintained through villagers' organization	Number of school rehabilitation	
	【Achievements through the Route Development Plan】		
	A-6) Income increases by cooperative collection and shipment of agriculture produce..	Number of strage users	
	C-3) Function of the road is maintained by continuous road maintenance and operation through villagers' organization.	Number of participants for road maintenance Time required from Kimpese to Kilueka	
Activities	【Activities of the Village Development Plan】	Input	Pre-condition
	A-1-1) Cultivation area extend through cattle ploughing project..		
	A-1-2) Agricultural techniques are improved and improved varieties are introduced through introduction of new varieties and soil improvement projects.	Human resources Staff of DECO, DVDA, SENATRA, SNHR, SNCOOP within the province（province・prefecture・territory・sector）, Technical staff of rice cultivation of INERA, and staff of health zone	Dynamic conflict does not occur. People wish to implement projects.
	A-2-1) Production is diversified through introduction of new varieties project.		
	A-3-1) Increase rice cultivation area and rice production through promotion of rice cultivation project..		
	A-4-1) Number of pigs increase through animal husbandry project.	Money	
	A-4-2) Number of fish increase through aquaculture project..	Operating cost	Government is positive for the development of the target area.
	A-4-3) Honey production increase through beekeeping project..	Cattle ploughing：17,000US$（10 sets, 4 sets already introduced by PP）	
	(A-5-1) Processed foods are produced through treatment and processing for postharvest project..）	Introduction of new varieties：7,680US$（384 households×20US$, cost of seeds）	
	(A-5-2) Products are carried through transportation of farm products project..）	Promotion of rice cultivation:6,770US$（1 place: 50US$, cost of seeds）	
	B-1-1) Activities of A-1-1)～A-5-2) are conducted.	Animal husbandry：8,860US$（1 place: 886US$, 1 male and 3 female pigs）	
	B-2-1) Planting method is understood and tree seedlings are planted through forestry preservation and replantation project..	Aquaculture：100US$（1 place: 50US$, fry）	
	B-3-1) Wells are installed through maintenance and management of drinking water facilities project.	Beekeeping：2,430US$（1 place: 810US$, honey gathering box, etc.）	
	B-3-2) Well maintenance by beneficiaries is reinforced through maintenance and management of drinking water facilities project..	Transportation of farm products：250US$（already practiced by PP）	

Summary of the project		Main indicators	External Condition
	B-4-1) Health promoter training is implemented through improvement of health facilities project.. B-5-1) Improved cooking stoves extended through improvement of cooking stoves project.. B-6-1) Literacy education is implemented through literacy education project. C-1-1) Activities of A-1-1)～B-6-1) are conducted. C-1-2) Artisan products are produced by handicraft project.. C-1-3) Sports tournament is held through leisure activities project. C-2-1) Community field is operated through introduction of new varieties and soil improvement projects. 【Activities of the Zone Development Plan】 B-7-1) Health center is maintained through improvement of health facilities project. B-8-1) School is maintained through improvement of educational facilities project. 【Activities of the Route Development Plan】 A-6-1) Agricultural produce is collected and shipped cooperatively through grass-roots grant-aid project of cooperative shipping facility for agricultural products. C-3-1) Road maintenance activity is continued through organization strengthening program.	Replantation：1,000US$（1 place: 100US$, seedlings） Drinking water facilities：105,000US$（1 place: 7,000, 2 places were already constructed by PP） Health promoter : 1,400US$（1 place: ・1 people: 100US$, picturecard show, malaria test kit） Cooking stoves improvement：use of local utilizable materials Literacy education：1,000US$（1 place: 100US$, textbooks and blackboard） Handicraft：1,000US$（1 place: 100US$, knitting needles, etc., 1 village already practiced by PP） Laisure activities：200US$ （transportation/village: 8US$, refreshment: 12US$） Maintenance cost Health facilities：410US$ (200～210US$/5 years・ 1 place, paint, etc.) Educational facilities：410US$ (200～210US$/5 years・ 1 place, paint, etc.) Cost of community road maintenance：5,040US$/year	

Table 7.3 Village development plan（Kilueka route 1/10）

Community development plan for Kimuwana

Target period	2010～2014
Target group	Residents of Ndembo（172 people, 44 households ：at Sep. 2008）
Village's character	It is close to Kimpese. There is abundance of spring water
Zone's character	Villagers go to Kimpese for school and hospital.

Development objectives

Area	Program	Project	Index		
			Items	Current situation	***Dev. goal***
(1)Essential	①Rehabilitation of community roads	Rehabilitation of community roads	Time required to Kimpese by a car	20 min	***10 min***
	②Supports and reinforcement of resds' org.	Supports and reinforcement of residents' org.	Number of villagers' organizations		
(2)Improvement of livelihood	③Improvement of agricultural productivity	Cattle ploughing	Average cultivation area per capita	Rainy season：0.36ha Dry season：0.09ha	***Rainy season :0.65ha Dry season :0.11ha***
		Vegetable cultivation	Vegetable cultivation（shipment in off season）	0 households	***22 households***
		Promotion of rice cultivation	Cultivation area	-	***20a (after PP) 2.0 ha (3 years later)***
	④Improvement of value addition to farm products	（ Treatment and processing for postharvest）	Number of practitioners	-	-
		（ Transportation of farm products）	Number of practitioners	-	-
		Collective collection and shipment	Quantity of shipped farm products	-	-
	⑤Diversification of income sources	Animal husbandry	Number of heads of pigs	Non	***1 place: Male 1, female 3, 60 off-springs/year***
		Beekeeping	Quantity of honey product	-	-
		Aqcuaculture and fish processing	Number of cultivated fish	-	-
(3)Improvement of living environment	⑥Improvement of natural environment	Replantation	Number of replanted places	0 place	***1 place***
	⑦Improvement of living environment	Cooking stoves	Number of cooking stoves	0 place	***22 places***
		Literacy education	Number of participants		
		Handicrafts	Number of participants		
		Maintenance of drinking water facilities	Drinking water facilities（wells）	0 place	***0 place***
			Morbidity rate		
(4)improvement of public facilities	⑧Improvement of public facilities	Improvement of health environment	Number of health promoters	0 person	***1 person***
			Number of nurses（Zone）		
		Improvement of educational facilities	Number of teachers（Zone）		

Input

Human resource：DVDA Songololo, Technical staff of rice cultivation of INERA

Money

Operating cost

Cattle ploughing：1,700$（1 set：1,700 $（1 set already introduced）

Introduction of new varieties：440 $（half of all households：22 households × 20 $, cost of seeds, already introduced for 16 households by PP）

Promotion of rice cultivation：3,410 $（already practiced by PP）

Animal husbandry：886 $（1 place：886 $, 1 male and 3 female pigs）

Aquaculture：50 $（1 place: 50 $, fry）

Replantation：100 $（Seedlings 50 × 2 $, seedlings already introduced by PP）

Health promoters：100 $（1 place・1 person 100 $, picturecard show, malaria test kit）

Cooking stoves improvement：use of local utilizable materials

Literacy education：100 $（1 place 100 $, textbooks and blackboard）

Handicrafts：100 $（Knitting needles, etc）

Leisure activities：20 $（Transportation 8$, refreshment 12 $, already practiced by PP）

・Maintenance cost

Cost of community road maintenance

Table 7.3 Village development plan（Kilueka route 2/10）

Community development plan for Ndembo

Target period	2010～2014
Target group	Residents of Ndembo（130 population, 28 households ：at Sep. 2008）
Village's character	There is oldest villagers' organization in the Study Area, which grow and sell the seedlings of improved cassava. Duki is the vice president of the community development committee.
Zone's character	Villagers go to Kimpese for school and hospital. There is the lessons for grade 1 and 2 or primary school in the village.

Development objectives

Area	Program	Project	Index		
			Items	Current situation	***Dev. goal***
(1)Essential	①Rehabilitation of community roads	Rehabilitation of community roads	Time required to Kimpese by a car	40 min	***20 min***
	②Supports and reinforcement of resds' org.	Supports and reinforcement of residents' org.	Number of villagers' organizations		
(2)Improvement of livelihood	③Improvement of agricultural productivity	Cattle ploughing	Average cultivation area per capita	Rainy season：0.52ha Dry season：0.12ha	***Rainy season :0.86ha Dry season :0.12ha***
		Vegetable cultivation	Vegetable cultivation（shipment in off season）	0 households	***14 households***
		Promotion of rice cultivation	Cultivation area	-	-
	④Improvement of value addition to farm products	（ Treatment and processing for postharvest）	Number of practitioners	-	-
		（ Transportation of farm products）	Number of practitioners	-	-
		Collective collection and shipment	Quantity of shipped farm products	-	-
	⑤Diversification of income sources	Animal husbandry	Number of heads of pigs	Non	***1 place: Male 1, female 3, 60 off-springs/year***
		Beekeeping	Quantity of honey product	-	-
		Aqcuaculture and fish processing	Number of cultivated fish	-	-
(3)Improvement of living environment	⑥Improvement of natural environment	Replantation	Number of replanted places	0 place	***1 place***
	⑦Improvement of living environment	Cooking stoves	Number of cooking stoves	2 places	***14 places***
		Literacy education	Number of participants		
		Handicrafts	Number of participants		
		Maintenance of drinking water facilities	Drinking water facilities（wells）	0 place	***1 place***
			Morbidity rate		
(4)improvement of public facilities	⑧Improvement of public facilities	Improvement of health environment	Number of health promoters	0 person	***2 people***
			Number of nurses（Zone）		
		Improvement of educational facilities	Number of teachers（Zone）		

Input

Human resource：DVDA Songololo

Money

Operating cost

Cattle ploughing：1,700$（1 set : 1,700 $ (1 set already introduced）

Introduction of new varieties：280 $（half of all households : 14 households × 20 $, cost of seeds, already introduced for 20 households by PP）

Animal husbandry：886 $（1 place : 886 $, 1 male and 3 female pigs）

Replantation：100 $（Seedlings 50 × 2 $, seedlings already introduced by PP）

Drinking water facilities：7,000 $（Construction cost for 1 well : 7,000 $）

Health promoters：100 $（1 place・1 person 100 $, picturecard show, malaria test kit）

Cooking stoves improvement：use of local utilizable materials

Literacy education：100 $（1 place 100 $, textbooks and blackboard）

Handicrafts：100 $（Knitting needles, etc）

Leisure activities：20 $（Transportation 8$, refreshment 12$, already practiced by PP）

・Maintenance cost

Cost of community road maintenance

Table 7.3 Village development plan（Kilueka route 3/10）

Community development plan for Wene

Target period	2010～2014
Target group	Residents of Wene（628 people, 120 households：at Sep, 2008）
Village's character	
Zone's character	There is a primary school in the village. Villagers go to Kinanga for health center.

Development objectives

Area	Program	Project	Index		
			Items	Current situation	***Dev. goal***
(1)Essential	①Rehabilitation of community roads	Rehabilitation of community roads	Time required to Kimpese by a car	80 min	***30 min***
	②Supports and reinforcement of resds' org.	Supports and reinforcement of residents' org.	Number of villagers' organizations		
(2)Improvement of livelihood	③Improvement of agricultural productivity	Cattle ploughing	Average cultivation area per capita	Rainy season：0.43ha Dry season：0.18ha	***Rainy season :0.82ha Dry season :0.18ha***
		Vegetable cultivation	Vegetable cultivation（shipment in off season）	0 households	***60 households***
		Promotion of rice cultivation	Cultivation area	-	-
	④Improvement of value addition to farm products	（ Treatment and processing for postharvest）	Number of practitioners	-	-
		（ Transportation of farm products）	Number of practitioners	-	-
		Collective collection and shipment	Quantity of shipped farm products	-	-
	⑤Diversification of income sources	Animal husbandry	Number of heads of pigs	Non	***1 place: Male 1, female 3, 60 off-springs/year***
		Beekeeping	Quantity of honey product	-	-
		Aqcuaculture and fish processing	Number of cultivated fish	-	-
(3)Improvement of living environment	⑥Improvement of natural environment	Replantation	Number of replanted places	0 place	***1 place***
	⑦Improvement of living environment	Cooking stoves	Number of cooking stoves	0 places	***60 places***
		Literacy education	Number of participants		
		Handicrafts	Number of participants		
		Maintenance of drinking water facilities	Drinking water facilities（wells）	0 place	***5 places***
			Morbidity rate		
(4)improvement of public facilities	⑧Improvement of public facilities	Improvement of health environment	Number of health promoters	0 person	***2 people***
			Number of nurses（Zone）		
		Improvement of educational facilities	Number of teachers（Zone）		

Input

Human resource：DVDA Songololo

Money

Operating cost

Cattle ploughing：3,400$（1 set : 1,700 $ (2 sets : 3,400 $）

Introduction of new varieties：1,200 $（half of all households : 60 households × 20 $, cost of seeds, already introduced for 23 households by PP）

Animal husbandry：886 $（1 place : 886 $, 1 male and 3 female pigs）

Replantation：100 $（Seedlings 50 × 2 $, seedlings already introduced by PP）

Drinking water facilities：35,000 $（Construction cost for 5 well : 35,000 $, 1 well already installed by PP）

Health promoters：200 $（1 place・2 people 200 $, picturecard show, malaria test kit）

Cooking stoves improvement：use of local utilizable materials

Literacy education：100 $（1 place 100 $, textbooks and blackboard）

Handicrafts：100 $（Knitting needles, etc）

Leisure activities：20 $（Transportation 8$, refreshment 12$, already practiced by PP）

・Maintenance cost

Health facilities：70 $（210 $ / 1 facility shared by 3 villages, paint etc.）

School facilities：70 $（210 $ / 1 facility shared by 3villages, paint etc.）

Cost of community road maintenance

Table 7.3 Village development plan（Kilueka route 4/10）

Community development plan for Ndunguidi

Target period	2010～2014
Target group	Residents of Ndunguidi（74 people, 20 households：at Sep, 2008）
Village's character	Village sits at the foot of Mt. Bangu, and the people living in the mountain pass through frequently. Duki is woman.
Zone's character	Villagers go to Kinanga for health center and Betelemi for primary school.

Development objectives

Area	Program	Project	Index		
			Items	Current situation	***Dev. goal***
(1)Essential	①Rehabilitation of community roads	Rehabilitation of community roads	Time required to Kimpese by a car	170 min	***50 min***
	②Supports and reinforcement of resds' org.	Supports and reinforcement of residents' org.	Number of villagers' organizations		
(2)Improvement of livelihood	③Improvement of agricultural productivity	Cattle ploughing	Average cultivation area per capita	Rainy season：0.46ha Dry season：0.12ha	***Rainy season :0.46ha Dry season :0.12ha***
		Vegetable cultivation	Vegetable cultivation（shipment in off season）	0 households	***10 households***
		Promotion of rice cultivation	Cultivation area	-	-
	④Improvement of value addition to farm products	（Treatment and processing for postharvest）	Number of practitioners	-	-
		（Transportation of farm products）	Number of practitioners	-	-
		Collective collection and shipment	Quantity of shipped farm products	-	-
	⑤Diversification of income sources	Animal husbandry	Number of heads of pigs	Non	***1 place: Male 1, female 3, 60 off-springs/year***
		Beekeeping	Quantity of honey product	0 l	***1 place 150l/year***
		Aqcuaculture and fish processing	Number of cultivated fish	-	-
(3)Improvement of living environment	⑥Improvement of natural environment	Replantation	Number of replanted places	0 place	***1 place***
	⑦Improvement of living environment	Cooking stoves	Number of cooking stoves	0 place	***10 places***
		Literacy education	Number of participants		
		Handicrafts	Number of participants		
		Maintenance of drinking water facilities	Drinking water facilities（wells）	16 places	***16 places***
			Morbidity rate		
(4)improvement of public facilities	⑧Improvement of public facilities	Improvement of health environment	Number of health promoters	0 person	***2 people***
			Number of nurses（Zone）		
		Improvement of educational facilities	Number of teachers（Zone）		

Input

Human resource：DVDA Songololo

Money

Operating cost

Introduction of new varieties：200 $（half of all households : 10 households × 20 $, cost of seeds, already introduced for 5 households by PP）

Animal husbandry：886 $（1 place : 886 $, 1 male and 3 female pigs）

Beekeeping：810US$（1 place: 810US$, boxes for gathering bees and honey, etc.）

Replantation：100 $（Seedlings 50 × 2 $, seedlings already introduced by PP）

Drinking water facilities：7,000 $（Construction cost for 1 well : 7,000 $）

Health promoters：100 $（1 place・1 person 100 $, picturecard show, malaria test kit）

Cooking stoves improvement：use of local utilizable materials

Literacy education：100 $（1 place 100 $, textbooks and blackboard）

Handicrafts：100 $（Knitting needles, etc）

Leisure activities：20 $（Transportation 8$, refreshment 12$, already practiced by PP）

・Maintenance cost

Health facilities：70 $（210 $ / 1 facility shared by 3 villages, paint etc.）

School facilities：70 $（210 $ / 1 facility shared by 3villages, paint etc.）

Cost of community road maintenance

Table 7.3 Village development plan（Kilueka route 5/10）

Community development plan for Nkondo

Target period	2010～2014
Target group	Residents of Nkondo（220 people, 46 households：at Sep, 2008）
Village's character	It is located in the halfway point of the route. Cooperative shipping facility was constracted. Duki is the president of community development committee.
Zone's character	Villagers go to Kinanga for health center and Betelemi for primary school.

Development objectives

Area	Program	Project	Index		
			Items	Current situation	***Dev. goal***
(1)Essential	①Rehabilitation of community roads	Rehabilitation of community roads	Time required to Kimpese by a car	90 min	***30 min***
	②Supports and reinforcement of resds' org.	Supports and reinforcement of residents' org.	Number of villagers' organizations		
(2)Improvement of livelihood	③Improvement of agricultural productivity	Cattle ploughing	Average cultivation area per capita	Rainy season：0.46ha Dry season：0.11ha	***Rainy season :0.46ha Dry season :0.11ha***
		Vegetable cultivation	Vegetable cultivation（shipment in off season）	0 households	***23 households***
		Promotion of rice cultivation	Cultivation area	-	-
	④Improvement of value addition to farm products	（Treatment and processing for postharvest）	Number of practitioners	-	-
		（Transportation of farm products）	Number of practitioners	-	-
		Collective collection and shipment	Quantity of shipped farm products	-	-
	⑤Diversification of income sources	Animal husbandry	Number of heads of pigs	Non	***1 place: Male 1, female 3, 60 off-springs/year***
		Beekeeping	Quantity of honey product	-	-
		Aqcuaculture and fish processing	Number of cultivated fish	-	-
(3)Improvement of living environment	⑥Improvement of natural environment	Replantation	Number of replanted places	0 place	***1 place***
	⑦Improvement of living environment	Cooking stoves	Number of cooking stoves	0 place	***115 places***
		Literacy education	Number of participants		
		Handicrafts	Number of participants		
		Maintenance of drinking water facilities	Drinking water facilities（wells）	0 place	***2 places***
			Morbidity rate		
(4)improvement of public facilities	⑧Improvement of public facilities	Improvement of health environment	Number of health promoters	3 people	***1 person***
			Number of nurses（Zone）		
		Improvement of educational facilities	Number of teachers（Zone）		

Input

Human resource：DVDA Songololo

Money

Operating cost

Introduction of new varieties：460 $（half of all households : 23 households × 20 $, cost of seeds, already introduced for 24 households by PP）
Animal husbandry：886 $（1 place : 886 $, 1 male and 3 female pigs）
Replantation：100 $（Seedlings 50 × 2 $, seedlings already introduced by PP）
Drinking water facilities：14,000 $（Construction cost for 2 wells : 14,000 $）
Health promoters：100 $（1 place・1 person 100 $, picturecard show, malaria test kit）
Cooking stoves improvement：use of local utilizable materials
Literacy education：100 $（1 place 100 $, textbooks and blackboard）
Handicrafts：100 $（Knitting needles, etc）
Leisure activities：20 $（Transportation 8$, refreshment 12$, already practiced by PP）

・Maintenance cost

Health facilities：70 $（210 $ / 1 facility shared by 3 villages, paint etc.）
School facilities：70 $（210 $ / 1 facility shared by 3villages, paint etc.）
Cost of community road maintenance

Table 7.3 Village development plan（Kilueka route 6/10）

Community development plan for Kinanga

Target period	2010～2014
Target group	Residents of Kinanga（408 people, 68 households：at Sep, 2008）
Village's character	There is a chief of clan who is carpenter. There is the man who can understand about cattle ploughing. There is an advanced agricultural organization.
Zone's character	There is a health center within the village, and primary school in Betelemi which is about 1.5km from the village. Those facilities are shared with the villagers of Wene, Ndunguidi, Nkondo and Kisiama.

Development objectives

Area	Program	Project	Index		
			Items	Current situation	***Dev. goal***
(1)Essential	①Rehabilitation of community roads	Rehabilitation of community roads	Time required to Kimpese by a car	95 min	***35 min***
	②Supports and reinforcement of resds' org.	Supports and reinforcement of residents' org.	Number of villagers' organizations		
(2)Improvement of livelihood	③Improvement of agricultural productivity	Cattle ploughing	Average cultivation area per capita	Rainy season：0.45ha Dry season：0.19ha	***Rainy season :0.89ha Dry season :0.19ha***
		Vegetable cultivation	Vegetable cultivation（shipment in off season）	0 households	***34 households***
		Promotion of rice cultivation	Cultivation area	-	-
	④Improvement of value addition to farm products	（ Treatment and processing for postharvest）	Number of practitioners	-	-
		（ Transportation of farm products）	Number of practitioners	-	-
		Collective collection and shipment	Quantity of shipped farm products	-	-
	⑤Diversification of income sources	Animal husbandry	Number of heads of pigs	Non	***1 place: Male 1, female 3, 60 off-springs/year***
		Beekeeping	Quantity of honey product	0 l	***1 place 150 l/year***
		Aqcuaculture and fish processing	Number of cultivated fish	-	-
(3)Improvement of living environment	⑥Improvement of natural environment	Replantation	Number of replanted places	0 place	***1 place***
	⑦Improvement of living environment	Cooking stoves	Number of cooking stoves	0 place	***34 places***
		Literacy education	Number of participants		
		Handicrafts	Number of participants		
		Maintenance of drinking water facilities	Drinking water facilities（wells）	1 place	***3 places***
			Morbidity rate		
(4)improvement of public facilities	⑧Improvement of public facilities	Improvement of health environment	Number of health promoters	0 person	***2 people***
			Number of nurses（Zone）		
		Improvement of educational facilities	Number of teachers（Zone）		

Input

Human resource：DVDA Songololo

Money

Operating cost

Cattle ploughing：1,700$（1 set : 1,700 $（1 set already introduced）

Introduction of new varieties：680 $（half of all households : 34 households × 20 $, cost of seeds, already introduced for 20 households by PP）

Animal husbandry：886 $（1 place : 886 $, 1 male and 3 female pigs）

Beekeeping ：810 $（1 place: 810 $, boxes for gathering bees and honey, etc.）

Replantation：100 $（Seedlings 50 × 2 $, seedlings already introduced by PP）

Drinking water facilities：14,000 $（Construction cost for 2 well : 14,000 $）

Health promoters：100 $（1 place・1 person 100 $, picturecard show, malaria test kit）

Cooking stoves improvement：use of local utilizable materials

Literacy education：100 $（1 place 100 $, textbooks and blackboard）

Handicrafts：100 $（Knitting needles, etc）

Leisure activities：20 $（Transportation 8$, refreshment 12$, already practiced by PP）

・Maintenance cost

Health facilities：70 $（210 $ / 1 facility shared by 3 villages, paint etc.）

School facilities：70 $（210 $ / 1 facility shared by 3villages, paint etc.）

Cost of community road maintenance

Table 7.3 Village development plan（Kilueka route 7/10）

Community development plan for Kisiama

Target period	2010～2014
Target group	Residents of Kisiama（151 people, 27 households：at Sep, 2008）
Village's character	The secretary of village development committee is carpenter.
Zone's character	Villagers go to Kinanga for health center and Betelemi for primary school.

Development objectives

Area	Program	Project	Index		
			Items	Current situation	***Dev. goal***
(1)Essential	①Rehabilitation of community roads	Rehabilitation of community roads	Time required to Kimpese by a car	80 min	***40 min***
	②Supports and reinforcement of resds' org.	Supports and reinforcement of residents' org.	Number of villagers' organizations		
(2)Improvement of livelihood	③Improvement of agricultural productivity	Cattle ploughing	Average cultivation area per capita	Rainy season：0.72ha Dry season：0.19ha	***Rainy season :1.13ha Dry season :0.19ha***
		Vegetable cultivation	Vegetable cultivation（shipment in off season）	0 households	***14 households***
		Promotion of rice cultivation	Cultivation area	-	***2.0 ha (3 years later)***
	④Improvement of value addition to farm products	（ Treatment and processing for postharvest）	Number of practitioners	-	-
		（ Transportation of farm products）	Number of practitioners	-	-
		Collective collection and shipment	Quantity of shipped farm products	-	-
	⑤Diversification of income sources	Animal husbandry	Number of heads of pigs	Non	***1 place: Male 1, female 3, 60 off-springs/year***
		Beekeeping	Quantity of honey product	-	-
		Aqcuaculture and fish processing	Number of cultivated fish	-	-
(3)Improvement of living environment	⑥Improvement of natural environment	Replantation	Number of replanted places	0 place	***1 place***
	⑦Improvement of living environment	Cooking stoves	Number of cooking stoves	0 place	***13 places***
		Literacy education	Number of participants		
		Handicrafts	Number of participants		
		Maintenance of drinking water facilities	Drinking water facilities（wells）	0 place	***2 places***
			Morbidity rate		
(4)improvement of public facilities	⑧Improvement of public facilities	Improvement of health environment	Number of health promoters	0 person	***2 people***
			Number of nurses（Zone）		
		Improvement of educational facilities	Number of teachers（Zone）		

Input

Human resource：DVDA Songololo, Technical staff of rice cultivation of INERA

Money

Operating cost

Cattle ploughing：1,700$（1 set : 1,700 $ (1 set already introduced）

Introduction of new varieties：280 $（half of all households : 14 households × 20 $, cost of seeds, already introduced for 20 households by PP）

Promotion of rice cultivation : 3,360 $

Animal husbandry：886 $（1 place : 886 $, 1 male and 3 female pigs）

Replantation：100 $（Seedlings 50 × 2 $, seedlings already introduced by PP）

Drinking water facilities：7,000 $（Construction cost for 1 well : 7,000 $）

Health promoters：100 $（1 place・1 person 100 $, picturecard show, malaria test kit）

Cooking stoves improvement：use of local utilizable materials

Literacy education：100 $（1 place 100 $, textbooks and blackboard）

Handicrafts：100 $（Knitting needles, etc）

Leisure activities：20 $（Transportation 8$, refreshment 12$, already practiced by PP）

・Maintenance cost

Health facilities：70 $（210 $ / 1 facility shared by 3 villages, paint etc.）

School facilities：70 $（210 $ / 1 facility shared by 3villages, paint etc.）

Cost of community road maintenance

Table 7.3 Village development plan（Kilueka route 8/10）

Community development plan for Mbanza Ndamba

Target period	2010～2014
Target group	Residents of Mbanza Ndamba（494 people, 91 households：at Sep, 2008）
Village's character	There are a lot of school children.
Zone's character	Students go to primary school in Mbanza Ndamba (up to grade 4), and Kilueka Site. Villagers go to Kilueka for health center.

Development objectives

Area	Program	Project	Index		
			Items	Current situation	***Dev. goal***
(1)Essential	①Rehabilitation of community roads	Rehabilitation of community roads	Time required to Kimpese by a car	180 min	***50 min***
	②Supports and reinforcement of resds' org.	Supports and reinforcement of residents' org.	Number of villagers' organizations		
(2)Improvement of livelihood	③Improvement of agricultural productivity	Cattle ploughing	Average cultivation area per capita	Rainy season：0.34ha Dry season：0.29ha	***Rainy season :0.74ha Dry season :0.29ha***
		Vegetable cultivation	Vegetable cultivation（shipment in off season）	0 households	***46 households***
		Promotion of rice cultivation	Cultivation area	-	-
	④Improvement of value addition to farm products	（ Treatment and processing for postharvest）	Number of practitioners	-	-
		（ Transportation of farm products）	Number of practitioners	-	-
		Collective collection and shipment	Quantity of shipped farm products	-	-
	⑤Diversification of income sources	Animal husbandry	Number of heads of pigs	Non	***1 place: Male 1, female 3, 60 off-springs/year***
		Beekeeping	Quantity of honey product	0 l	***1 place 150l/year***
		Aqcuaculture and fish processing	Number of cultivated fish	-	-
(3)Improvement of living environment	⑥Improvement of natural environment	Replantation	Number of replanted places	0 place	***4 places***
	⑦Improvement of living environment	Cooking stoves	Number of cooking stoves	2 places	***46 places***
		Literacy education	Number of participants		
		Handicrafts	Number of participants		
		Maintenance of drinking water facilities	Drinking water facilities（wells）	1 place	***1 place***
			Morbidity rate		
(4)improvement of public facilities	⑧Improvement of public facilities	Improvement of health environment	Number of health promoters	0 person	***2 people***
			Number of nurses（Zone）		
		Improvement of educational facilities	Number of teachers（Zone）		

Input

Human resource：DVDA Songololo

Money

Operating cost

Cattle ploughing：3,400$（2 sets : 3,400 $ (1 set already introduced）

Introduction of new varieties：920 $（half of all households : 46 households × 20 $, cost of seeds, already introduced for 24 households by PP）

Animal husbandry：886 $（1 place : 886 $, 1 male and 3 female pigs）

Beekeeping ：810 $（1 place: 810 $, boxes for gathering bees and honey, etc.）

Aquaculture ：50 $（1 place: 50 $, fry）

Replantation：100 $（Seedlings 50 × 2 $, seedlings already introduced by PP）

Drinking water facilities：28,000 $（Construction cost for 4 wells : 28,000 $）

Health promoters：200 $（1 place･2 people 200 $, picturecard show, malaria test kit）

Cooking stoves improvement：use of local utilizable materials

Literacy education：100 $（1 place 100 $, textbooks and blackboard）

Handicrafts：100 $（Knitting needles, etc）

Leisure activities：20 $（Transportation 8$, refreshment 12$, already practiced by PP）

･Maintenance cost

Health facilities：70 $（210 $ / 1 facility shared by 3 villages, paint etc.）

School facilities：70 $（210 $ / 1 facility shared by 3villages, paint etc.）

Cost of community road maintenance

Table 7.3 Village development plan（Kilueka route 9/10）

Community development plan for Kilueka

Target period	2010～2014
Target group	Residents Kilueka（455 people, 91 households：at Sep, 2008）
Village's character	The terminal of the Kilueka route. There is a way behind the village to Mt. Bangu.
Zone's character	Students go to primary school in Mbanza Ndamba or Kilueka site. There is a health center within the village.

Development objectives

Area	Program	Project	Index		
			Items	Current situation	***Dev. goal***
(1)Essential	①Rehabilitation of community roads	Rehabilitation of community roads	Time required to Kimpese by a car	180 min	***50 min***
	②Supports and reinforcement of resds' org.	Supports and reinforcement of residents' org.	Number of villagers' organizations		
(2)Improvement of livelihood	③Improvement of agricultural productivity	Cattle ploughing	Average cultivation area per capita	Rainy season：0.58ha Dry season：0.27ha	***Rainy season :0.95ha Dry season :0.27ha***
		Vegetable cultivation	Vegetable cultivation（shipment in off season）	0 households	***46 households***
		Promotion of rice cultivation	Cultivation area	-	-
	④Improvement of value addition to farm products	（ Treatment and processing for postharvest）	Number of practitioners	-	-
		（ Transportation of farm products）	Number of practitioners	-	-
		Collective collection and shipment	Quantity of shipped farm products	-	-
	⑤Diversification of income sources	Animal husbandry	Number of heads of pigs	Non	***1 place: Male 1, female 3, 60 off-springs/year***
		Beekeeping	Quantity of honey product	0 l	***1 place 150l/year***
		Aqcuaculture and fish processing	Number of cultivated fish	-	-
(3)Improvement of living environment	⑥Improvement of natural environment	Replantation	Number of replanted places	0 place	***1 place***
	⑦Improvement of living environment	Cooking stoves	Number of cooking stoves	0 place	***46 places***
		Literacy education	Number of participants		
		Handicrafts	Number of participants		
		Maintenance of drinking water facilities	Drinking water facilities（wells）	0 place	***1 place***
			Morbidity rate		
(4)improvement of public facilities	⑧Improvement of public facilities	Improvement of health environment	Number of health promoters	0 person	***2 people***
			Number of nurses（Zone）		
		Improvement of educational facilities	Number of teachers（Zone）		

Input

Human resource：DVDA Songololo

Money

Operating cost

Cattle ploughing：3,400$（2 sets : 3,400 $ (1 set already introduced）

Introduction of new varieties：920 $（half of all households : 46 households × 20 $, cost of seeds, already introduced for 24 households by PP）

Animal husbandry：886 $（1 place : 886 $, 1 male and 3 female pigs）

Replantation：100 $（Seedlings 50 × 2 $, seedlings already introduced by PP）

Drinking water facilities：28,000 $（Construction cost for 4 wells : 28,000 $）

Health promoters：200 $（1 place・2 people 200 $, picturecard show, malaria test kit）

Cooking stoves improvement：use of local utilizable materials

Literacy education：100 $（1 place 100 $, textbooks and blackboard）

Handicrafts：100 $（Knitting needles, etc）

Leisure activities：20 $（Transportation 8$, refreshment 12$, already practiced by PP）

・Maintenance cost

Health facilities：70 $（210 $ / 1 facility shared by 3 villages, paint etc.）

School facilities：70 $（210 $ / 1 facility shared by 3villages, paint etc.）

Cost of community road maintenance

Table 7.3 Village development plan（Kilueka route 10/10）

Community development plan for Kilueka Site

Target period	2010～2014
Target group	Residents of Kilueka Site（1,385 people, 230 households：at Sep, 2008）
Village's character	This site is an ex-Angolan refugee camp.
Zone's character	There is a primary school within the site. Residents go to Kilueka for health center.

Development objectives

Area	Program	Project	Index		
			Items	Current situation	***Dev. goal***
(1)Essential	①Rehabilitation of community roads	Rehabilitation of community roads	Time required to Kimpese by a car	200 min	***60 min***
	②Supports and reinforcement of resds' org.	Supports and reinforcement of residents' org.	Number of villagers' organizations		
(2)Improvement of livelihood	③Improvement of agricultural productivity	Cattle ploughing	Average cultivation area per capita	Rainy season：0.20ha Dry season：0.13ha	***Rainy season :0.20ha Dry season :0.13ha***
		Vegetable cultivation	Vegetable cultivation（shipment in off season）	0 households	***58 households***
		Promotion of rice cultivation	Cultivation area	-	-
	④Improvement of value addition to farm products	（ Treatment and processing for postharvest）	Number of practitioners	-	-
		（ Transportation of farm products）	Number of practitioners	-	-
		Collective collection and shipment	Quantity of shipped farm products	-	-
	⑤Diversification of income sources	Animal husbandry	Number of heads of pigs	Non	***1 place: Male 1, female 3, 60 off-springs/year***
		Beekeeping	Quantity of honey product	-	-
		Aqcuaculture and fish processing	Number of cultivated fish	-	-
(3)Improvement of living environment	⑥Improvement of natural environment	Replantation	Number of replanted places	0 place	***1 place***
	⑦Improvement of living environment	Cooking stoves	Number of cooking stoves	0 place	***115 places***
		Literacy education	Number of participants		
		Handicrafts	Number of participants		
		Maintenance of drinking water facilities	Drinking water facilities（wells）	16 places	***16 places***
			Morbidity rate		
(4)improvement of public facilities	⑧Improvement of public facilities	Improvement of health environment	Number of health promoters	0 person	***2 people***
			Number of nurses（Zone）		
		Improvement of educational facilities	Number of teachers（Zone）		

Input

Human resource：DVDA Songololo

Money

Operating cost

Introduction of new varieties：1,160 $ (assuming that one half of the households will return to Angola, 1/4 of present the all households: 58 households×20US$, cost of seeds, already introduced for 20 households by PP）

Animal husbandry：886 $（1 place : 886 $, 1 male and 3 female pigs）

Replantation：100 $（Seedlings 50 × 2 $, seedlings already introduced by PP）

Drinking water facilities：7,000 $（Construction cost for 1 well : 7,000 $）

Health promoters：100 $（1 place・1 person 100 $, picturecard show, malaria test kit）

Cooking stoves improvement：use of local utilizable materials

Literacy education：100 $（1 place 100 $, textbooks and blackboard）

Handicrafts：100 $（Knitting needles, etc）

Leisured activities：20 $（Transportation 8$, refreshment 12$, already practiced by PP）

・Maintenance cost

Health facilities：70 $（210 $ / 1 facility shared by 3 villages, paint etc.）

School facilities：70 $（210 $ / 1 facility shared by 3villages, paint etc.）

Cost of community road maintenance

7.3.5 Action Plan

This development plan is set for 5 years, which is consisted of first 3 years as short term to make foundation of residents led community development plan, and second 2 years as medium term after the first 3 years to spreading period for other areas, as shown in figure 7.10.

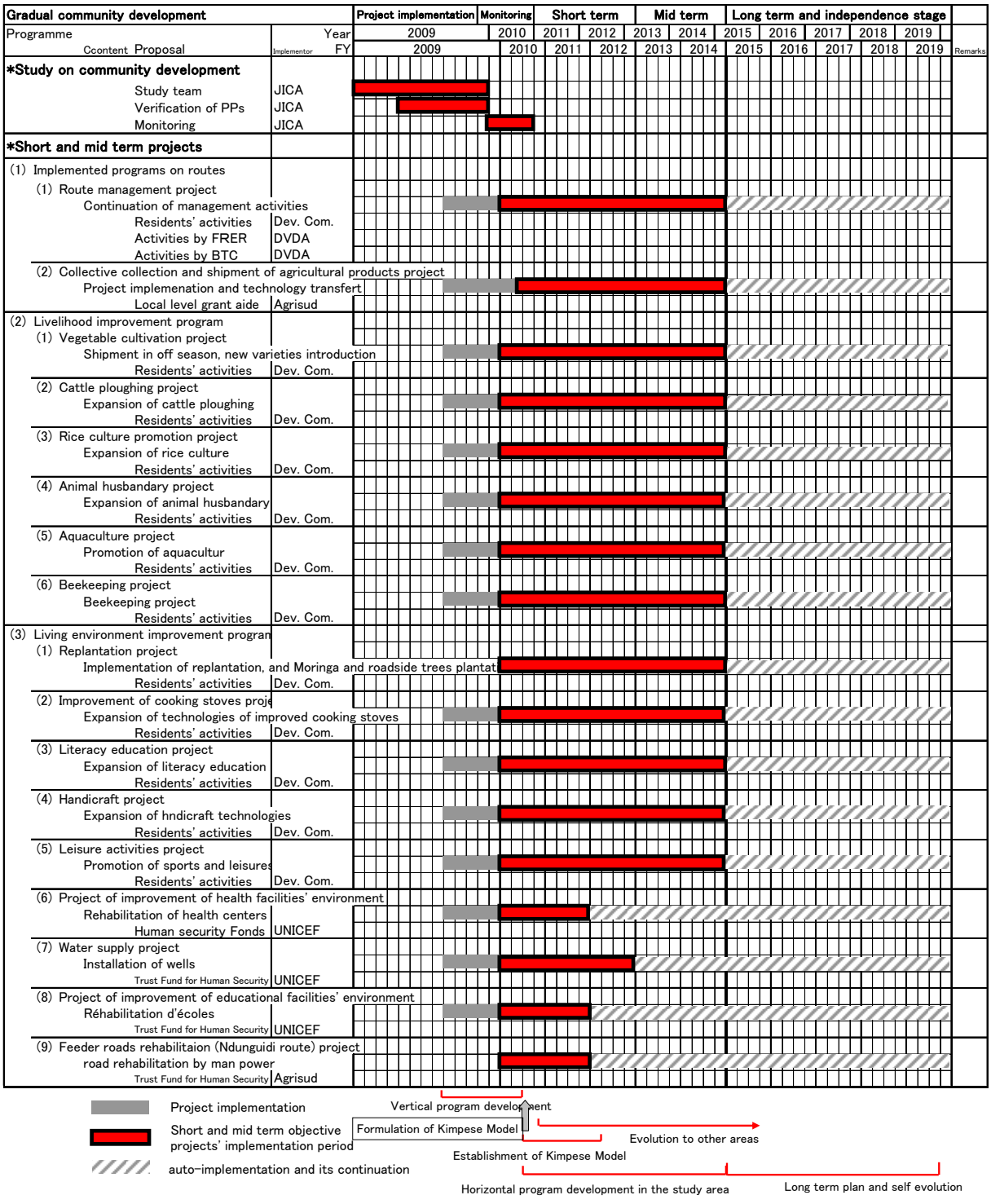


Figure 7.10 Community development plan（short and medium term plan）

7.3.6 Project Evaluation of Each Project

As evaluating projects of the Kilueka route development plan, the volume is decided as calculated in "7.3.3 Project Scale and Setting of Standards (3) Route development plan," and benefits regarding income increase are based on calculation of each PP as shown in the chapter 6. The benefits of each PP are shown in the table below.

Project evaluation of the Kilueka route development plan

Projects	Outline	Input (dollar)	Increased benefits/year (dollar)	Increased benefits/unit (dollar)
Projects regarding livelihood improvement				
Cattle ploughing:	・ Targeted at 7 villages, 469 households ・ 20% of increase in average cultivation areas per household from 0.5 ha in the rainy season by installing cattle ploughing. ・ In addition, cultivation areas by a pair of oxen is considered as 0.25 ha per day, and therefore, 21.6 ha are considered as annual cultivation areas based on 4 months of work duration in the rainy season.	17,000	19,500	1,950/head
Introduction of new varieties (Vegetable cultivation):	・ 327 households within the ten villages are targeted. ・ Calculated benefits are based on hastening of sale period (form 1 to 2 months) by introduced technology (high-floored nursery bed). ・ Seed costs as inputs are calculated in order to secure to cover seeds cost for early seedling. ・ Moreover, decrease in fertilizer purchase costs by compost and frequencies of irrigation by mulching can be realized by introduced technology. ・ In addition, an average cultivation area per household in the Study Area, 1,500 m^2, was applied.	7,660	270,398	706/1500m^2
Promotion of rice cultivation:	・ Rice cultivation particularly enables to apply unused lowlands in the rainy season. ・ Two villages are targeted. ・ It is possible to expand cultivation areas using seeds, which were already introduced by the PP. ・ Increased benefits are indicating those after the 2^{nd} year. The benefits of the first year are minus 671/s ha when personnel costs for developing rice fields, which are necessary, are calculated. However, there will be a little soil to be treated from the following year.	50	7.058	3,529/2ha

Projects	Outline	Input (dollar)	Increased benefits/year (dollar)	Increased benefits/unit (dollar)
Treatment and Processing for Postharvest:	・ Regarding treatment and processing for postharvest, it is difficult to produce items for sale if necessary costs (bottles, and labels etc.) to make them are culculated for processing agricultural products from the villages. ・ Therefore, it is important to select processing items from which villagers buy. According to the Study, tomato purees boiled in water can be listed as a processing item ・ Benefits are not calculated because those are domestically consumed.	-	-	-
Transportation of farm products:	・ Benefits from using oxen carts are calculated. ・ The villagers are not practicing the cattle ploughing, and therefore, they do not have oxen carts. The cattle ploughing is mainly applied for rainy season cultivation, and not for dry season cultivation when vegetables as the cash crops are cultivated. Therefore, it is counted on extending oxen carts together with extension of cattle ploughing.	400	71	71/ 1 set
Animal husbandry:	・ Basically, 1 male and 3 female pigs are introduces as the initial installation; however, it is desirable to start 1 male and 1 female when the installation of pigpens and purchase of forge. ・ In addition, the concrete is utilized for flooring to the pigpens in order to secure sufficient intensity while local materials for walls and roofs are utilized. ・ Inputs exceed benefits at the initial year; however, there will be benefits from the following year.	2,000	1,790	179
Aquaculture:	・ Benefits are not calculated because aquaculture for auto-consumption is intended. ・ The arrangement of ponds for aquaculture is mainly based on earthwork by manpower after selecting an appropriate place; therefore, there is no large inputs other than young fish.	150	-	-
Beekeeping:	・ The costs of bee hives and bee protection work suits are calculated; however, bees which can be available in the place are not calculated.. ・ The initial costs exceed benefits at the first year, but there will be benefits from the third year.	2,430	1,194	398
Cooperative shipping center (storeroom):	・ Products collected in the collective collection and shipping centers can produce benefits when they are	-	1,355/1500m^2	1,355/1500 m^2

Projects	Outline	Input (dollar)	Increased benefits/year (dollar)	Increased benefits/unit (dollar)
	temporally stored in them in order to be sold when the price is increased. ・ 2,000Fc per 1 sac for storage are calculated to recover administration costs.			
Projects regarding living environment improvement (Benefits are not calculated because those projects contribute to improve living environment)				
Leisure activities	・ This aims to promote exchanges among villages through spots events. ・ It is important to organize an event for all of the target area when a group of people is registered as an organization to province and territory where those events are difficult to organize.	200/1 time	-	-
Replantation	・ There are no short term benefits; however, improvement of residential environment by replantaion, conservation of existing trees, and sensitization for lighting are expected. ・ The production of young trees for replantation for conservation is made from seedlings, and plants for fruits trees are introduced. ・ However, the maximum replantation area is limited to 2,500 m^2 considering maintenance.	600	-	-
Improved cooking stoves	・ There are not inputs other than the instruction , because the improved cooking stoves introduces by PP were made with clay or blocks locally available. ・ It is possible to reduce the volume of fire wood by the improved cooking stove.	-	-	-
Literacy education	・ The needs for literacy education are significantly high, but it is necessary that both teachers and participants of this literacy education agree upon the operation of this for sustainable implementation. ・ In other words, it is indispensable to talk about a fee for teachers and schedule of classrooms.	800	-	-
Handicraft	・ Handbaskets and hats using plastic bags are made in the PP. ・ The handicraft is particularly effective for women who live in villages as a way to exchange information working in a group.	100	-	-
Projects regarding manage and maintenance of public facilities				
Water supply facilities	・ This aims to reduce the disease ratio of diarrhea as the main disease. ・ For this to occur, it is necessary to prefentially arrange water supply facilities to villages where people use	35,000	-	-

Projects	Outline	Input (dollar)	Increased benefits/year (dollar)	Increased benefits/unit (dollar)
	surface stream water such as river water. ・ Draw wells are desirable because hand pumps and its parts are difficult to purchase in the DRC. ・ In addition, the depth of wells is set for 7 m as well are draw wells, and an appropriate place has to be looked for. ・ The rules of utilization and water fees should be clearly defined before excavating a well because the maintenance is necessary even for draw wells.			
Health facilities	・ The health facilities can be in good conditions for a long period of time by maintenance among which the villagers themselves can implement such as painting and repair of roofs.	400	-	-
Educational facilities	・ Likewise the health facilities, the educational facilities can be in good conditions for a long period of time by maintenance among which the villagers themselves can implement such as painting and repair of roofs.	600	-	-
Manage and maintenance of community roads	・ The transportation of agricultural products such as main products can realize 1) shortening of transportation time and 2) preventing scuff during transportation by keeping in good conditions of the roads. ・ In addition, the time for 1) purchasing daily commodities and 2) transportation of the injured and the sick will be able to be reduced. ・ The drainage function of the road should be maintained by maintenance because it is mainly paved by clay.	5,040	-	-

Chapter 8 Implementation of a Quick Impact Project

8.1 Flow of Project Implementation

The flow of the quick impact project was as follows: In the first year, the Study was conducted and, in the second year, contractors were selected through the bidding based on the result of the Study in the first year, and rehabilitation of the work was implemented.

Table 8.1 Flow of project implementation

Year	[First year]					[Second year]										
	2008					2009										
Activity	Aug.	Sep.	Oct.	Nov.	Dec.	Jun.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Site survey																
Plan and Design																
Cost estimation/ Construction planning																
Preparation for bidding																
Bid/ Selection of contractor																
Negotiation and contract																
Preparation for the work																
Execution of the work																
Work shop of road maintenance																

[First-year study]

(1) Site survey and analysis

The Study Team conducted collection of documents of relevant organizations and existing projects, execution of topographic survey and soil survey, through local recommission to local contractor.

a. Site survey around Kilueka route and review of result of survey

b. Collection of basic data such as topographic maps and documents regarding hydrologic data, etc.

c. Investigation of actual situation on local contractors

d. Acquisition of road standards in DRC

(2) Plan and design of project

a. Determination of routes to make topographic survey

b. Planning of longitudinal profile and cross section based on topographic survey

c. Plan and design of roads

d. Plan of relevant facilities (such as drainage), rehabilitation of bridge, etc.

(3) Cost estimation and construction planning

a. Market research regarding materials and equipment for the civil work (availability and locations where they are obtained, means of its transportation, prices, etc.)
b. Acquisition of estimated unit prices of each construction woks
c. Cost estimation/ set of ceiling price for bid
d. Preparation of general construction planning and bid documents (draft)

[Second-year study]

(4) Preparation for bidding

a. Finalization of bid document
b. Distribution of letter of interest and selection of bidders
c. Distribution of bid documents

(5) Bidding and selection of contractors

a. Opening of bids and evaluation of proposals
b. Selection of first contractor in order of negotiation

(6) Contract negotiation and contract

a. Contract negotiation with the first contractor in order of negotiation
b. Confirmation of contract terms and signing of contract

(7) Preparation for the work

a. Submission of performance security and advance payment security, and payment of advance
b. Preparation of construction planning
c. Site preparation

(8) Execution of the Work

8.2 Creation of Tender Documents and Selection of Contractors

8.2.1 Outline of Construction Work

(1) Objective of construction work

* Rehabilitation of the community road (Kilueka route): adoption of the laterite pavement and concrete pavement partially
* The Client: JICA representative office in the Democratic Republic of the Congo
* Road administrator: Direction des Voies et Dessertes Agricoles Bas-Congo (DVDA Bas-Congo) du Ministere du Developpement Rural

(2) Target road extension

* Total length of 17,970m

Main road of 17,760m (Measurement points: No.0+280+No.18+39.7)

Branch road of 210m (Connected to No.16+950: Up to entrance of Kilueka site)

(3) Construction period

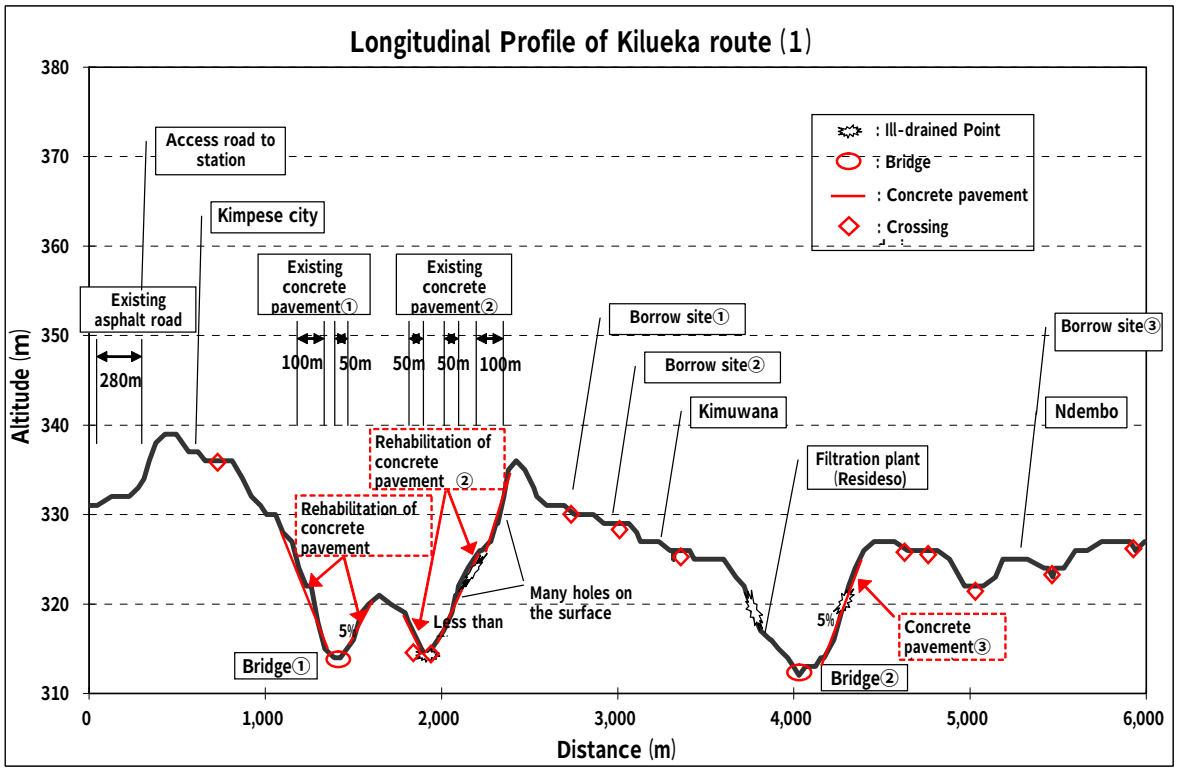
* Original contract: From April 10 to October 1, 2009 (175 days)

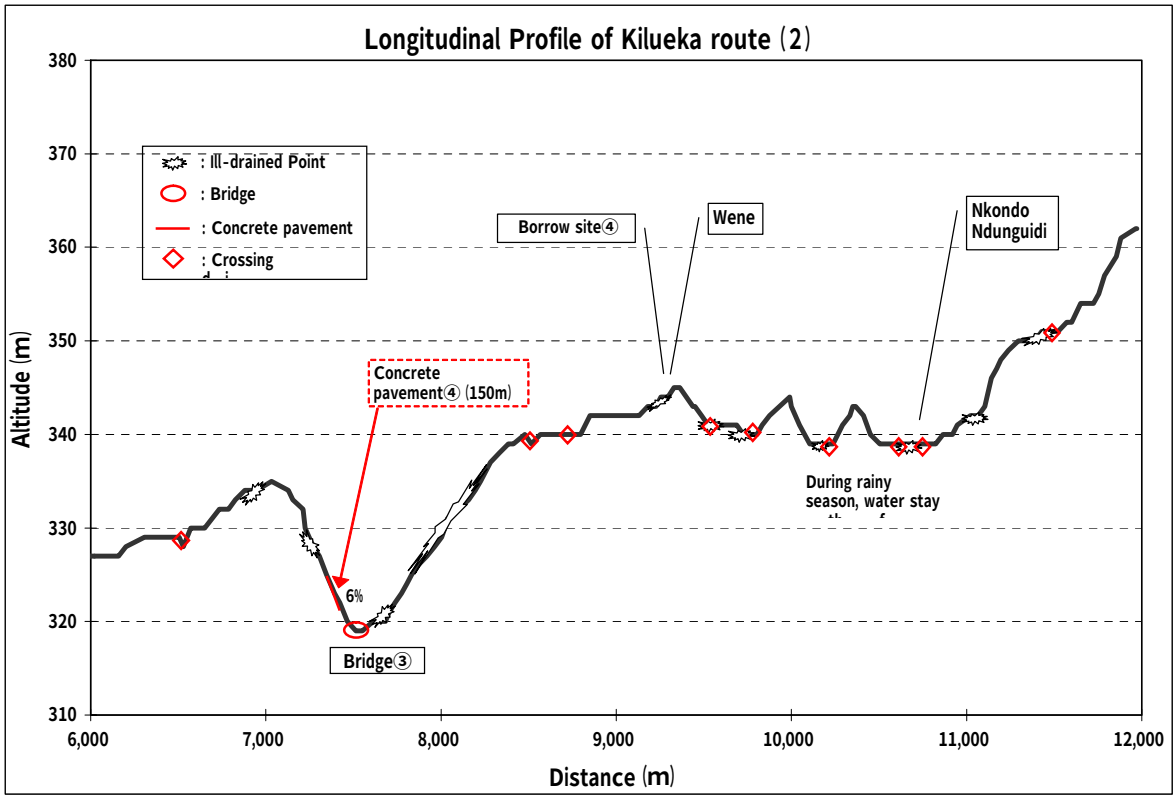
* Amendment contract: From April 10 to November 15, 2009 (220 days)

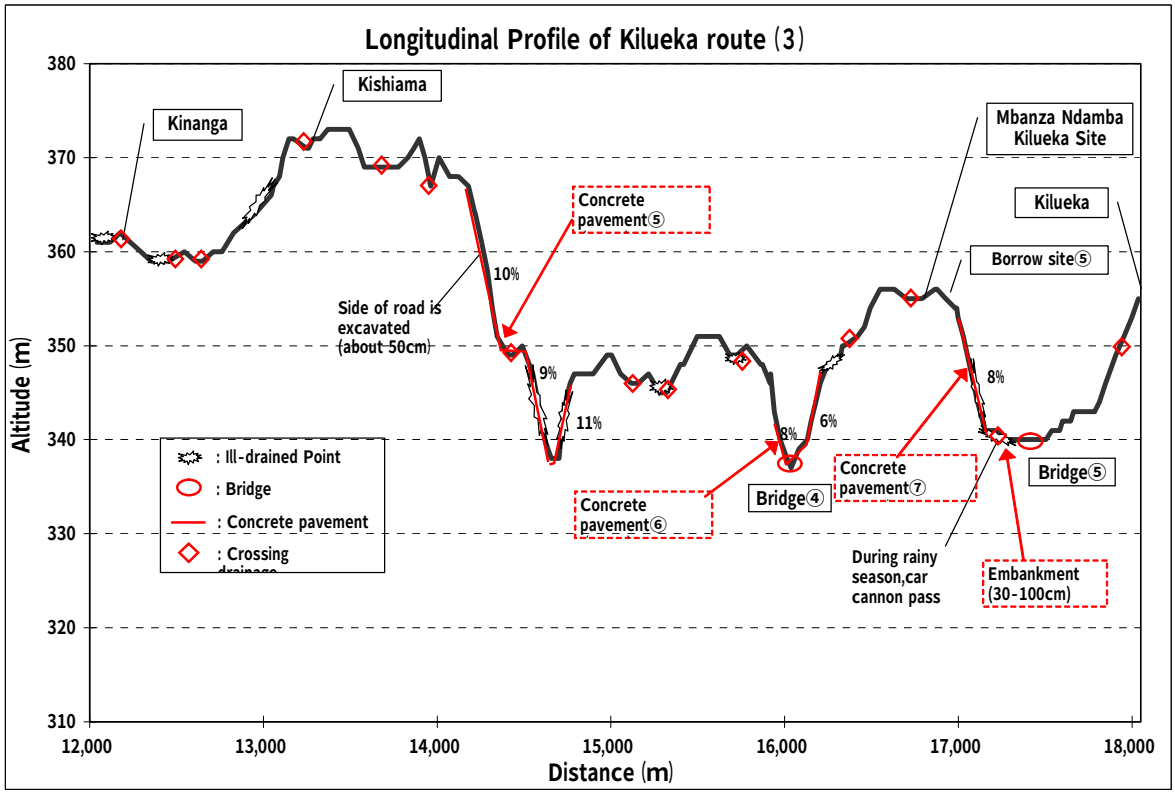
(4) Condition on the Current state and post-rehabilitation of the road

Item	Current state	Post-rehabilitation
Surface of road	* Width of road : about 2.5～3.0m * Surface of road was quite unevenness. * Road side of steep slope sections was eroded deeply by rain water.	* Width of road 4.0m+ shoulder 1.0m * Laterite pavement: 15.3km * Concrete pavement: 2.7km (in the steep slope parts more than 5%)
Longitudinal slope	* Longitudinal slope followed the shape of land. * There were not much excavation and embankment, but were many sharp slope in the road.	* Longitudinal slope follows the shape of land in order to avoid the big excavation and embankment. * 0.5-1.0m height of embankment is set between Mbanza Ndamba and No.5 Bridge.
Bridge : 5 place	* Concrete beam bridge: 1 place and Concrete and steel beam bridge : 4 places * Main beams were in good condition but concrete of base plates were damaged and steel bars used with base plates were corroded. * Abatements were made of stone masonry, which did not subside and were not cracked.	* No. 5 bridge does not need repair. * Beams of No.2-4 bridges are painted and concrete for base plate are re-cast. Abatements do not need repair. * Foot walks are added to No.1 bridge.
Drainage	* Drainage was not placed along the almost part of the road. * All crossing drainages (26 units) did not function, because of sediment expecting 1 unit.	* Drainage whose width of 30-50cm is set all along the road. * L type drainage is placed in the road at Kimpese city (about 800m). * 37 crossing drainage are set.
Maintenance	* Villagers carried out cutting glasses and small reparation of the road around each village as the task of Salongo.	* System of maintenance for road is established. * 3 people in charge of maintenance of the road in the each village are selected respectively. * 2 Workshops for maintenance of road are held.

The following shows the longitudinal profiles of existing and after-rehabilitation of road condition.


Longitudinal Profile of Kilueka route (1)
Altitude (m)
Distance (m)
380
370
360
350
340
330
320
310
0
1,000
2,000
3,000
4,000
5,000
6,000
: Ill-drained Point
: Bridge
: Concrete pavement
: Crossing
Access road to station
Kimpese city
Existing asphalt road
280m
Existing concrete pavement①
100m
50m
Existing concrete pavement②
50m
50m
100m
Rehabilitation of concrete pavement ②
Rehabilitation of concrete pavement
5%
Bridge①
Less than
Many holes on the surface
Borrow site①
Borrow site②
Kimuwana
Filtration plant (Resideso)
5%
Concrete pavement③
Bridge②
Borrow site③
Ndembo


Longitudinal Profile of Kilueka route (2)
Altitude (m)
Distance (m)
380
370
360
350
340
330
320
310
6,000
7,000
8,000
9,000
10,000
11,000
12,000
: Ill-drained Point
: Bridge
: Concrete pavement
: Crossing
Borrow site④
Wene
Nkondo Ndunguidi
Concrete pavement④ (150m)
During rainy season, water stay
6%
Bridge③



8.2.2 Selection of Contractors

Bids submitted by bidders were opened in the presence of the Chef de DVDA Bas-Congo on March 25. M.W.AFRITEC which offered the lowest bid price was selected as the first candidate to be negotiated, and negotiation of the contract was made. There were three bidders.

In the contract negotiation, the Study Team confirmed (1) construction planning, plan for heavy machine, and plan for quality control and (2) bank account, issue of securities, and payment method, and decided that it was generally free of problems. Consequently, a contract was awarded to M.W.AFRITEC on April 8 for amount of contract of US$2,390,307.89 with period of contract due date of October 1.

On October 1, amendment contract was signed due to a raise in the unit price of concrete and the extension of due date of contract. Accordingly, the contract amount was changed to US$2,545,400.61 and the due date of contract to November 15.

8.2.3 Steps from Contract Negotiation to End of Construction

(1) Steps regarding contract

Date	Item	Content	Actor	Receptor
6, April	Letter of Acceptance	Issuing Letter of Acceptance after final decision of JICA	JICA in DRC	Contractor
8, April	Acceptance of content of contract	Issuing Letter of Acceptance of Order after receiving Letter of Acceptance,	Contractor	JICA in DRC

Date	Item	Content	Actor	Receptor
8, April	Sign of contract	Signing contract in three days after issuing Letter of Acceptance of Order	Both the sides	
9, April	Notice of Proceed	Issuing Notice of Proceed after signing contract. One day after signing shall be the commencement day.	JICA in DRC	Contractor
10, April	Letter of Intent for Notice of Proceed	Issuing Letter of Intent for Notice of Proceed after receiving Notice of Proceed	Contractor	JICA in DRC
14, April	Submission of Performance Security	Submitting Performance Security in 14 days after receiving Acceptance of Order	Contractor	JICA in DRC
14, April	Submission of Advance Payment Security	Submitting Advance payment Security in 14 days after receiving Acceptance of Order	Contractor	JICA in DRC
14, April	Procedure of Advance Payment	Proceeding Advance Payment after receiving Performance and Advance Payment Security	JICA	Contractor
14, April	Notice of result of bidding	Noticing result of bidding to each bidders after receiving Performance Security	JICA in DRC	Bidders
5, May	Submission of Construction Planning	Submitting Construction Planning in 25 days after signing contract.	Contractor	Supervisor (NTCI)
1, October	Amendment of Contract	Modifying amount of contract and contract period.	Both side	
13, October	Final Inspection	Executing final inspection after 206 days passed from the commencement day.	Both side	
22, November	Certification of the Work	Issuing Certification of the Work after completion of the work	Supervisor	JICA／Contractor
02, December	Procedure of Final Payment	Proceeding Final Payment after completion of the work	JICA	Contractor
XX, December	Return of Advance Payment Security	Returning Advance Payment Security after receiving certification of the work	JICA in DRC	Contractor
XX, December	Submission of Default Security	Submitting Default Security after receiving certification of the work	Contractor	JICA in DRC
XX, December	Payment of 5% of retention money	Proceeding retention money after receiving default security	JICA in DRC	Contractor
XX, December	Return of Performance Security	Returning Performance Security after receiving Default Security	JICA in DRC	Contractor

(2) Events on the construction site

(a) April 10: Ceremony giving some gift to the land owners who own lands used as borrow site on the sites

(b) April 18: Ground-breaking ceremony before the start of construction on the site

(c) May 25: Commencement ceremony

(d) December 7: Completion ceremony

8.3 Details of the Work

8.3.1 Road Design

The road was designed according to the flow shown below.

(a) Grasping existing situation on traffic and type of cars passing	
Item	Actual condition
[Actual condition] (1) Type of cars passing	[Information from CLER/Sector] *Truck for agricultural products, daily commodity etc.
(2) Traffic	*Rainy season: 0-5 cars per day, Dry season: 5 cars per day

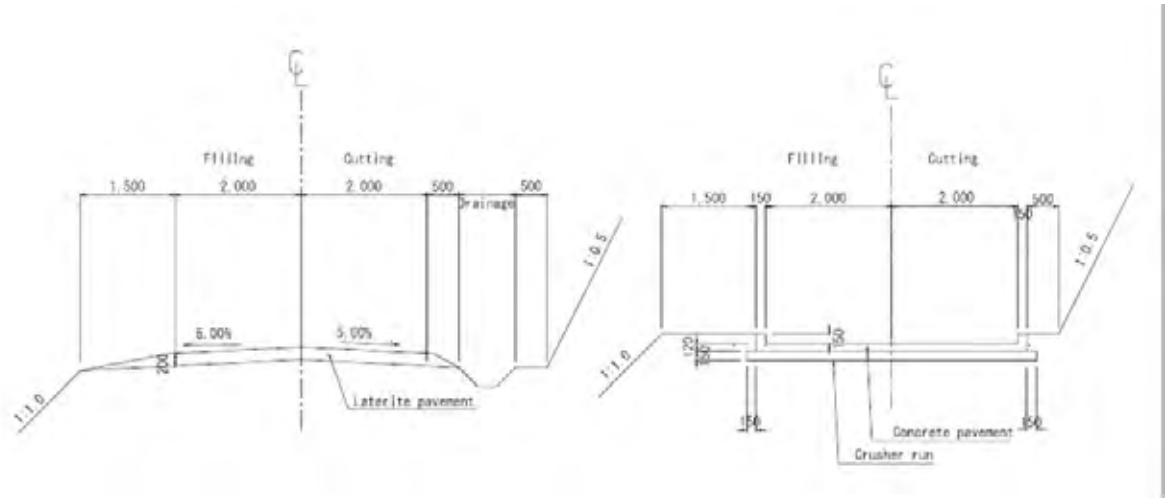
↓

(b) Estimation of traffic and type of cars after rehabilitation of road	
Item	Conclusion
[Traffic prediction] (1) Type of cars	[Information from CLER/Sector] *Public transportation (bus, taxi etc.), Truck for agricultural products, daily commodity .etc.
(2) Traffic	*Rainy season: 5 cars per day, dry season: 10 cars per day *Pedestrian and bicycle pass the route frequently because of community road
→Traffic of public transportation and truck for agricultural products and daily commodity are estimated to be double (10 cars per day). Pedestrian and bicycle shall be considered.	

↓

(c) Setting standard of road	
Item	Conclusion
(1) Design speed	Standard of DRC: (1) Normal part: 60km/h, (2) Around village: 30km/h
(2) Width	* Width of road is decided for big track to be able to pass easily and for normal cars to be able to go by each other considering design traffic and type of car. * Lay-bys are installed for big tracks to go by each other every 300-500m. ->Width 4.0m+shoulder 1.0m in total 5.0m At embankment section, both side of the road are extended to 1.0m against erosion.
(3) Standard of pavement	* Traffic, type of car passing, cost of construction etc are applied to standard of DRC ->Laterite pavement is adopted, which is common type of pavement at community road in DRC. During rain, traffic shall be interrupted in order not to damage road. Concrete pavement is adopted more than 5% of slope section to avoid erosion by rain.
(4) Cross section	* 5 % of slope of cross section is adopted to drain rain from the surface of road.
(5) Drainage	* Side ditches (earth canal type) are planned all along the road to drain rain. Width of side ditches are 30 -50 cm based on calculation of amount of flow. * Crossing drainages (pipe culvert and U type canal) are planned to evacuate rain water. Diameter of pipes is 80cm in order to clean up inside with manpower.
(6) Bridge	* Bridge is designed for 14 ton-track to pass according to estimation of type of cars passing.

The typical cross-sections designed based on the above are shown on the next page.



8.3.2 Construction Plan

The work types of this construction are as follows:

No	Item	Contents
100	Site preparation and clearing fee (installation of an office, running costs, etc.)	Installation of site office, transportation of materials, machine and staffs, set up of temporal site, Procurement of materials needed/ground rent, installation of water/electricity facilities, maintain of office, clearing of site
200	Cutting and reclamation and demolition of existing facilities	
210	Cutting and reclamation	Cutting glasses and reclamation at 2.0m on both the sides along the road using Manpower
220	Demolition of existing concrete pavement	Demolishing existing concrete pavement at the entrance of the route with Bulldozer 15t
230	Demolition of existing drainage	Demolition of existing RC pipe, outlet and inlet by Manpower
300	Road earthwork	
310	Excavation	Leveling road, excavation of clay soil, laterite and rock with Backhoe 0.6m^3, manpower
320	Transportation	Transporting of excavated soil and laterite, dumped soil with Dump track 10t
330	Embankment	Making embankment with Manpower and Bull dozer 15t
340	Slope protection	Seed spraying by Manpower
400	Pavement	
410	Laterite pavement	Leveling the road, spreading laterite and compacting with Motor grader, Bulldozer 15 ton and Vibration roller etc.
420	Concrete pavement	Setting base course (with crasher run), leveling the road, casting concrete including frame work, curing, joint and steel bar against crack by Manpower, Motor grader, Bulldozer 15 ton and Vibration roller etc.
500	Drainage	
510	Earth canal	Digging soil with Manpower, Backhoe 0.6m^3
520	Crossing drainage	Casting concrete, setting reinforced concrete, steel bar, masonry, RC pipe φ800 and U type canal cast in place with ridges with Manpower, Backhoe 0.6m^3
530	L-type drainage	Casting concrete and setting base (crusher run) with Manpower including materials
600	Safety facilities	
610	Signalization	Placing road sign indicating limit of speed, slope section and width of road, etc.
700	Bridge	Demolishing of concrete, casting reinforced concrete, steel bar, masonry, balustrade(including painting): manpower and backhoe 0.6m^3
800	Temporary works	
810	Temporary road (at bridges)	Setting RC pipe of φ800 with backhoe 0.6m^3

8.3.3 Construction Planning

(1) Construction procedure

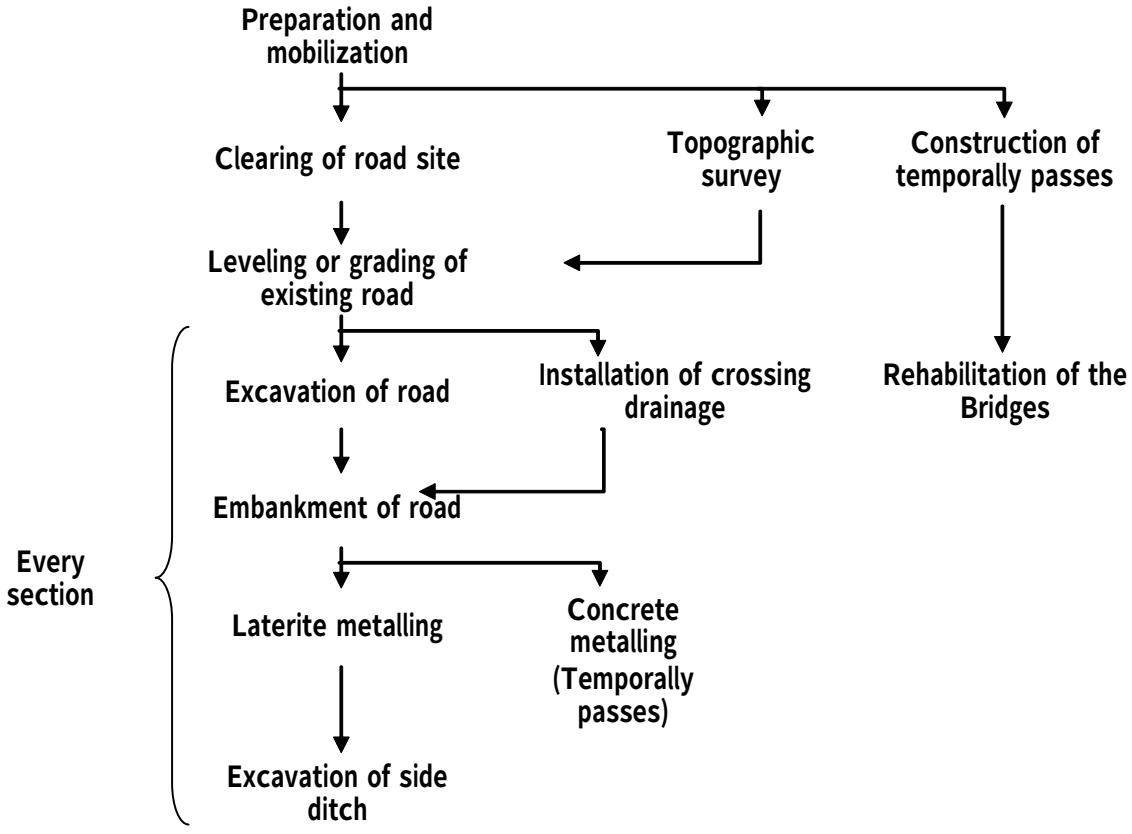
(a) The work started from the section between the No.1 bridge and No.2 bridge (No.1+40 – No.4+50), where longitudinal and cross leveling survey were completed.

(b) As soon as a temporary road at No.2 bridge was set up, another team was added to the section after No.2 bridge to proceed with the work simultaneously. The work in each section started from the part closer to the ending point if possible to ensure that the passage of heavy machine did not disturb the surface of the road completed. In each section, the topographic survey for construction of all the routes was executed at first.

(c) One team for the bridge work and another team for casting of concrete in the concrete pavement section were introduced.

(d) Side ditches were installed in the sections where work of laterite pavement had been completed.

(2) Construction procedure chart



8.3.4 Details of Construction

(1) Progress

The progress of work was as shown on the next page.

Table 8.2 Progress of works

Item	4/10-18 1st week	4/19-25 2nd week	4/26-5/2 3rd week	5/3-9 4th week	5/10-16 5th week	5/17-23 6th week	5/24-5/30 7th week	5/31-6/6 8th week	6/7-14 9th week
(1)Installation of site office		***	******	******	******	******	******	******	******
(2)Topographic survey		***	******	******	******	******	******	******	******
(3)Cutting and reclamation			******	******	******	***			
(4)Temporary works				No.2 bridge	No.3 bridge	No.3 bridge	No.4 bridge	No.1 bridge	******
(5)Demolition of existing facilities							******	******	
(6)Leveling					******	****	**		
(7)Earth work							**	******	******
(8)Laterite pavement								**	******
(9)Concrete pavement									******
(10)Drainage									
(11)Others	Preparation		Construction planning			Preparation of commencement ceremony	Commencement ceremony (5/25)	Compaction test	

	6/15-21 10th week	6/22-6/28 11th week	6/29-7/4 12th week	7 /5-7/11 13th week	7/12-7/18 14th week	7/19-7/25 15th week	7/26-8/1 16th week	8 /2-8/8 17th week	8/9-8/15 18th week
(1)Installation of site office									
(2)Topographic survey	******	******	* ****	******	******	******	******	******	******
(3)Cutting and reclamation									
(4)Temporary works	No.2	No.3		******	******	******			
(5)Demolition of existing facilities		******	* ****	**					
(6)Leveling		***	* ****	******	****	***	******		
(7)Earth work	******	******	* ****	******	******	******	******	******	******
(8)Laterite pavement	******	******	* ****	******	******	******	******	******	******
(9)Concrete pavement	******	******	* * *					******	******
(10)Drainage	******	******	* ****	******	******	******	******	******	******
(11)Bridge			**	******	******	******	******	******	No.1

	8/16-8/22 19th week	8/23-8/29 20th week	8/30-9/5 21st week	9 /6-9/12 22nd week	9/13-9/19 23rd week	9/20-9/26 24th week	9/27-10/3 25th week	10 /4-10/10 26th week	10/11-10/17 27th week
(1)Installation of site office									
(2)Topographic survey	******	******	******	******	******	******	******	******	******
(3)Cutting and reclamation									
(4)Temporary works									
(5)Demolition of existing facilities			***						
(6)Leveling									
(7)Earth work	******	******	******	******	******	******	******	******	******
(8)Laterite pavement	******	******	******	******	******	******	******	******	******
(9)Concrete pavement	******	******	**	******	******	*****	*****	******	****
(10)Drainage	******	******	******	******	******	******	******	******	******
(11)Bridge	******	******	******	******	No.2	******	No.3	******	No.4

	10/18-10/24 28th week	10/25-10/31 29th week	11 /1-11/7 30th week	11/8-11/14 31st week	11/15-11/21 32nd week	11/22-11/30 33rd week	12/1-12/5 34th week	12/7
(1)Installation of site office					******	******	******	
(2)Topographic survey	******	******	******	******				
(3)Cutting and reclamation								
(4)Temporary works								
(5)Demolition of existing facilities								
(6)Leveling								
(7)Earth work	******		******					
(8)Laterite pavement	******	******	******	******	Revision of surface	Revision of surface		
(9)Concrete pavement	*** *	*****	******	******	******			
(10)Drainage	******	******	******	******	******	Revision of surface		
(11)Bridge	Balustrade, finishing surface	Balustrade, finishing surface	******	******	******	Finishing surface		
Others				Final inspection			Completion	Inauguration

(2) Conditions by work type

Details of construction by work type are as shown below (See the photographs attached in front page for how the work was conducted at the site).

1) Site preparation

* Setting up of site office: Setting up of 1 set of temporary office, 2 containers as storage and a generator
* Concrete plant setup
* Transportation of heavy machine: 2 backhoes, 2 bulldozers, 3 road loaders, 3 vibrating rollers, 2 vibrating compactors (hand guide), 5 dump trucks, 2 motor graders, 3 mixer trucks, 2 sprinkler trucks, 1 small mixer, and 2 vibrators

2) Topographic survey

* Preparation of shop drawings: Longitudinal and cross leveling (every 25 meters) were executed to prepare shop drawings. This process started from the beginning point and ended by the end of July.
* Execution of engineering survey: Center lines were marked and piles were planted to indicate the limit of road in traverse direction.
* Two sets of transits and levels were used.
* The center lines were changed in parts of the sections where the land for road occupied house gardens or roadside trees.

3) Cutting and reclamation

* The work was conducted in two steps, cutting and root removal. Villagers were hired for this work.
* The contractor contacted the Duki of each village and proposed the scope of the works (distance and width), daily workload (150 m2 per day per person), and wage (1,700 FC per day). The villagers worked proactively.
* The contractor confirmed the workloads completed with the Duki twice every month (date of 1st and 15th), calculated the wages based on this information, and paid them to workers directly.

4) Setup of temporary roads in the bridge section

* Temporary roads were installed at the second and third bridges from early May.
* When sandbags were piled in the river, the level of water in the river increased by rain. Therefore, the work was interrupted for about two weeks.
* From early June when the water level lowered, the installation of concrete pipes was started.

5) Material test

* Laterite (5 locations) and sand (river sand) were collected and subjected to quality test at the laboratory. The unit weight, dense graded and degree of compaction were checked.

6) Demolition of existing concrete structures

* The existing concrete pavement between the No.1 and No.2 bridges started to be demolished by bulldozers.
* The existing crossing culvert was demolished by manpower.
* The wreck of concrete was given to villagers living around as construction materials.

7) Land leveling and earthwork

* The current road, after being leveled with a motor grader, was widened with bulldozers, and the road height was adjusted to the planned height.
* The leveling up to the ending point was completed in July.
* Trees that became obstacles when widening the road were removed.

8) Laterite pavement

* Laterite was transported from five borrow sites using five dump trucks at the maximum.
* The procedure was as follows: (1) Laterite was transported using dump trucks and placed in such a way as not to form piles. (2) Motor graders were used to spread and level off laterite in a 30-centimeter layer. Workers were assigned to several locations to remove large stones. (3) The road was formed with motor graders to maintain a 5% of crossfall. Depressions were backfilled with laterite. (4) The road was compacted with vibrating compactors. The road shoulders were compacted with compactors (hand guide).
* Using standard-size template, the shape of road, such as the crossfall of 5% was checked at the section of every 25 meters.

9) Concrete pavement

* From early July when the concrete plant was set up, the execution of concrete pavement started from the steep slope after No.1 bridge, which was closer to the starting point. The construction progressed gradually towards the ending point.
* For better workability, temporal roads along the section of concrete pavement were constructed in to allow for passage of heavy machine, vehicle for the work and villagers.
* The procedure included (1) base course installation and compaction degree test, (2) installation of mold forms and reinforcing bars for crack prevention, (3) cast of concrete, and (4) cure.
* The work was performed for every six meters as one block. The reinforcing bars for crack prevention were made by rebar workers at the site office.
* About six to eight blocks were covered per day. For sections of 10 kilometers or more far from the concrete plant, the number of mixer trucks was increased to handle the work.
* Night work was performed for about eight days to accelerate the progress of work. However, the safety and quality control of work were uncertain because only one illumination was available. Therefore, an instruction was given to contractor to avoid night work as much as possible.

10) Bridge construction

* In August, the work started with No.1 bridge. In October, concrete casting was completed up to No.4 bridge.
* The procedure included (1) demolition of existing concrete, (2) anti-rust coating for existing bridge girders, (3) assembly of mold forms and reinforcing bars, (4) casting and curing of concrete, and (5) installation of hand rails.
* After curing, the road connecting bridges and road were set before and after the bridges.

11) Side ditches and road crossing work

* Side ditches were dug by manpower. The work started from the sections where laterite pavement was completed.
* L-type ditches were made using a combination of ready-made products and cast-in-situ concrete. They were used in the section with road-side houses in the city of Kimpese.
* Road crossing drainage was dug with man power. Later, crossing pipes and inlet/outlet works were installed.

(3) Problems in construction

1) Status of construction by contractor

Many heavy machines owned by the contractor were superannuated and failed in such a frequency that affected the progress of the work. Without exception, one of them failed every day. Although there were three mixer trucks and three compacting machines available, it turned out that only one of them was operative affecting the progress in September. Countermeasures such as supplement of spare parts and increase of mechanics were taken, but the progress was not improved significantly.

The supply of materials was not smooth. In particular, lack of cement, base course materials, and reinforcing bars sometimes influenced the progress of concrete pavement. Although there were two cement factories near the site, cement ran short in the entire country of DRC so that, sometimes, no cement could be bought for three or four days.

Work sites were dispersed in 18-kilometer of the road, but the engineers and supervisors were inappropriately stationed to such a place, which influenced the work progress and quality.

2) Employment of villagers

The road rehabilitated in this project is going to be maintained and managed by the villagers after the completion of the work. In view of cultivation of the ownership of villagers to Kilueka route, the contractor was requested and agreed to hire the beneficiary in the work as much as possible. The work types for which the villagers were employed were as follows:

(1) Cutting and reclamation, (2) digging of side ditches, (3) demolition of existing culverts, (4)

assistance of skilled workers, etc.

The track of workloads of the employees were maintained and coordinated by the Duki. At the beginning of the work, however, the following problems occurred:

(a) Problem: In late April in Kimwana, the workers boycotted the work, claiming that 1,700 FC per day was not sufficient.
Solution: A meeting was held with the contractor in the presence of the chief of sector. Although he proposed 2,500 FC, the contractor objected, saying that it would bring in better-motivated workers from Kimpese city or other villages. Finally, the meeting settled on 1700 FC per day.

(b) Problem: On May 8 in Mbanza Ndamba, the workers stopped working at noon, claiming the wage was not sufficient.
Solution: Negotiation was held with the contractor, and an agreement was reached to decrease the workload per day.

(c) Problem: On May 9 in the Kimwana, workers were brought in from Kimpese city. According to the contractor, "Kimwana refused to work because the last payment had not been made (which was to be made every 15 days)." When the fact was checked with the Kimwana secretary, it was learned that they "boycotted because Kimpese residents had been brought in last time.
Solution: The two parties were advised to talk with each other, reaching an agreement that the local workers were to be hired from May 11.

At the beginning of the work, conflicts between the villagers and their employers occurred due to insufficient explanation. Later, fewer problems occurred because both the parties deepened understanding on each other after making a list of persons who could be hired and as more meetings were held.

8.4 Environmental and Social Considerations

"The Study on the environmental and social considerations" was done so that social and environmental impacts, which might be and/or was provoked by this study, were analyzed before the work starts, and expected and evaluated avoidance or mitigation measure were considered.

As a result of preliminary study and a discussion made between the Study Team and stakeholder etc, rehabilitation of the Kilueka route was presumed the only project with the potential to cause some adverse effects on the environment. After preliminary scoping exercise, which was executed only for rehabilitation of the road, IEE study, evaluation of countermeasures against impacts and monitoring during construction were conducted.

Summary of the Study on the environmental and social consideration is shown below.

8.4.1 Laws, Regulations and Organization Related to Environmental and Social Issues

(1) Constitutional requirement of environmental protection in DRC

The constitution, also known as the Constitution of the Third Republic was adopted by the

Government on 18 February 2006. Article 53 stipulates that:

- ✓ Everyone has the right on healthy environment that encourages its full development.
- ✓ The environment must be protected.
- ✓ The State must deal with the protection of the environment and human health.

Furthermore, Article 123 of the Constitution provides for the adoption of future laws, in particular, environmental protection and tourism. Article 203 allows for cooperation between the central government and provincial governments for environmental protection, natural sites and landscapes, and conservation of these sites.

(2) National legal framework for managing the environment

In DRC, studies of environmental and social impacts are not always systematically integrated into the planning of projects. There is however an embryonic legal framework for such studies with the Decree No. 043/CAB/MIN/ECN-EF/2006 of 08/12/2006 concerning liability for environmental and social assessment of projects in the country.

There is still neither any policy for environmental management at the national level, nor any procedures for environmental and social impact assessment, nor any environmental guidelines. However, there are codes, decrees, and other legislations often developed for key areas such as mining, land degradation, forests, and water resources. Despite a number of regulations which include the Decree No. 043/CAB/MIN/ECN-EF/2006 above, virtually everything is to be urgently built in terms of environmental policies, procedures and guidelines nationwide.

There is still the existence of decrees establishing the implementation and operation of the Environmental Evaluation Group in Congo (GEEC) to support the Ministry of Environment in the environmental assessment process and programs, but such a group remains to be functional.

(3) Legal system in DRC concerning environmental management

Despite the establishment of the Ministry of Environment in 1975 and the establishment of inter-ministerial committees for environment, the protection of the environment was not considered a priority for governments. The multiple creations of institutes, national networks, national centers and departments, provincial and local committees have been made in response to emergency situations or to pressure from international environmental lobbies.

Recently, frameworks for the management of environmental and social impacts of projects have been defined, which concern respectively the Project of Emergency Support to the Improvement of Living Conditions (PUAACV), the Multi-sector Program for the Emergency Rehabilitation and Reconstruction (PMURR), and the Emergency Program for Urban and Social Rehabilitation (Purus). These three programs were funded by the World Bank between 2006 and 2008. Environmental assessments that were made under these programs have followed the criteria of the bank.

8.4.2 Methodology of the Study on the Environmental and Social Considerations

The DRC has not yet formulated the policies, procedures and guidelines for national environmental assessments; hence, JICA procedures will be applied to the environmental and social considerations related to this community development project.

(1) Guidelines for JICA environmental and social considerations

For projects reviewed by JICA for its approval, guidelines for environmental and social considerations are given by JICA. Procedures of the Study given by the guidelines are as follows;

(a) Projects are classified into three categories depending on the extent of social and environmental impacts (Decision on execution of IEE or EIA)

(b) Preliminary scoping

(c) Temporary terms of reference for the EIA or IEE study (Based on Scoping preliminary)

(d) Execution of IEE or EIA

(e) Monitoring during construction

(f) Evaluation or monitoring after the work

(2) Categorization

According to these guidelines, projects are classified into three categories depending on the extent of social and environmental impacts. The classification takes into consideration the characteristics of the project, location, the degree of sensitivity of the environment in which it was established, the extent and nature of impacts and changes in the natural environment and human expectations. This classification should be done early in the planning process and lead to one of these three categories;

Category A:

Projects that are likely to cause significant adverse impacts on the environment and society. Those are projects which are supposed side effects, complex, or unprecedented, and therefore difficult to predict, or multiple or irreversible. The broad range of impacts on the environment and society fell into this category.

Projects requiring a study of environmental impact assessment, according to the legal framework and socio-economic and environmental conditions of the countries are also beneficiaries of Category A. Category A also includes projects in principle in sensitive sectors (i.e., with characteristics that are likely to cause adverse effects on the environment as mining, for example) and projects located in or near some fragile environments.

Category B:

Projects under this category are likely to cause less adverse effects on the environment and human populations that projects of Category A and are generally specific to the site. Most of these impacts are not irreversible and, in general, normal mitigation measures are adequate.

Category C:

These projects are likely to have minimal or little adverse impact on the environment and society. After the environmental screening, no further action environmental assessment is needed for projects to Category C.

For projects Category A, JICA conducts studies on environmental and social EIA, including a monitoring plan, an institutional arrangement, and mitigation measures to avoid or minimize adverse impacts in accordance with the terms of reference (TOR) and in collaboration with recipient governments.

For projects of Category B in accordance with the TOR, JICA conducts studies on environmental and social IEE in which the alternatives are analyzed, including a situation of "no project".

The guidelines require that JICA projects considered by them must comply with laws, ordinances and standards relating to environmental and social considerations established by governments that have jurisdiction over the project site.

(3) Preliminary scoping and development of TOR for EIA or IEE

The categorization of projects to start the scoping phase whose preliminary findings are used to prepare a draft terms of reference for the Study on the environmental and social considerations. Also preliminary scoping is executed to delimit the extent of impact caused by activities and projects and specify big affection. Based on the result of scoping, needs of execution of IEE or EIA is decided in order to confirm the result of categorization.

For Category A studies, surveys and/or consultations on the ground particularly among local stakeholders are conducted in collaboration with the recipient governments. The purpose of these consultations is to assess the needs of project activities and to consider alternatives.

For Category B studies, consultation with stakeholders occurs above if necessary. The terms of reference should understand the needs identified on the project, to assess the impacts, analysis of alternatives, methodology and timetable for more study.

Under the terms of reference, and in collaboration with the recipient governments, JICA conducts studies on environmental and social considerations is the level IEE, including consideration of alternatives, including the "without project" or the level EIA studies for Class A which are more thorough, and require the use of a team of consultants for implementation. JICA conducts studies at IEE level through the member of the Study Team dispatched to examine the environmental and social considerations on the ground.

8.4.3 Results of the Study on the Environmental and Social Considerations

(1) Categorization and its reasons

Upon consideration of environmental and social considerations based on the recognition of land on the project sites, workshops held with stakeholders, including villagers in collaboration with the concerned government staff, and analysis of existing documents, the activities to be carried out under the community development plan and pilot projects considered for implementation can be classified as **Category B**. The main reasons for this classification are:

- The Study aims to strengthen the community on the basis of reconciliation and coexistence of refugees with local populations, increasing incomes and improving living standards by improving agricultural productivity and reducing difficulties aggravated by the influx of refugees. With the participation of populations, the Study will identify ways to develop and promote the implementation of a community development plan, with particular emphasis on agriculture, living conditions and services Community. Under the project scheduled for quick impact (rehabilitation of a road), it is referred to improve access, encourage exchanges between communities and improve the flow of products.
- Activities to be carried out under the community development plan and pilot projects considered for implementation should not have significant adverse impacts and irreversible effect on the environment and society.
- Although planned for the rehabilitation of the road Kilueka under the Quick Impact Project has many positive effects on the community, some of the negative impacts are expected on the natural environment, including the removal of a number of trees, and health risks during construction and after it with dust and fumes among others. With the appropriate measures, these impacts can be reduced and controlled.

(2) Definition of the preliminary field of impact assessment or scoping and consideration of alternative

1) Provisional Scoping using the JICA format

The scoping exercise is conducted to determine the extent of impacts that may be caused by the activity or project and identifying significant impacts. The scoping procedure undertaken here is based on the following facts:

- Several consultations with the affected villagers were held through 5 workshops organized to discuss their successes, failures, opportunities and obstacles related to agriculture, living conditions and social services to identify with them more priority actions needed in community development and their obligations to ensure the sustainability of these actions.
- The analysis of results of the workshops has enabled us to understand the projects considered for the plan and pilot projects.
- Discussions with the government staff have focused on environmental and social issues relating to ownership of land and related to the construction or rehabilitation of roads, the presence of

protected forests and / or important cultural relics in this race the road etc.

The following results were obtained from the above studies.

- Concerning the Pilot project:

* Most of the priority actions identified in agriculture are non-structural measures which are mainly related to capacity building of villagers

* Most of the priority actions related to living conditions and social services are mainly structural measures related to the rehabilitation or construction, namely health posts, schools, drinking water and rural roads.

- Concerning the Quick Impact Project

* To rehabilitate the Kilueka route seemed to be the only project with the potential to cause some adverse effects on the environment.

* The following provisional scoping for rehabilitation of the Kilueka route was done in order to determine the negative impact caused by construction work, which was used to consider alternative measures.

Table 8.3 Scoping impacts rising from the Quick Impact Project (road rehabilitation)

Composantes Environnementales			Evaluation	Reasons
Social Environnement	1	Involuntary displacement	C	The rehabilitation of the road will not lead to displacement since the road already exists and crosses the housing Kimpese and several villages, but some houses too close could be displaced in case of major extension of the road
	2	Economic activities, livelihood	D	The project will generate many jobs during the construction period, and cause development of economic activities.
	3	Land use and local resources	B	Those using the road allowances for corps have been advised not to sow long cycle corps such as cassava this year as work will begin around April next year, when maturity is not reached. They will then transfer 5 meters on both sides of the road, an area that corresponds to a property estate, which will affect agriculture and resources from
	4	Social institutions such as social infrastructure and local decision-making	D	The rehabilitation will not influence social infrastructure and local decision-making.
	5	Existing social infrastructure and services	D	The facilitation of movement of persons and goods is expected
	6	the people poor, minority and ethnic groups octhotone	D	The improvement of the lives of the people of the area is expected
	7	Inequitable distribution of benefits and damage	D	Improving the drainage water is provided
	8	Relic and cultural heritage,	D	No relic and cultural heritage is reported on the course and sites of borrowing,
	9	Local conflict of interest	C	The brewing staff with local populations can lead to contradictions and problems of jealousy.
	10	Right to water and admission,	C	Construction work can result in disqualification of coastal access and disrupt the current way of life,
	11	Health and sanitation	B	By fields Flooding runoff capsized by the drainage system in place is possible. Dust and fumes at work can cause health problems,
	12	Risks of disasters and infectious diseases such as HIV/AIDS	C	Brewing staff with local people will certainly induce amorous adventures that will lead to the spread of STD and AIDS

Composantes Environnementales			Evaluation	Reasons
Natural Environnement	13	Topography and geology	D	No activities that may affect the topography and geology since the road already exists;
	14	Subterranean waters	C	At wash areas and emptying the oil spill on the ground could lead not only the stain of soil but also that of groundwater
	15	Ground erosion	C	The design of the drainage system concentrates the runoff in times of rain, thereby increasing the speed of runoff therefore erosion. Also some sections of road are the most often-profile excavated embankment, exposing the embankment fill erosion
	16	Hydrological situation	C	The particles torn during the runoff will capsize in rivers preventing their use, especially during the period of construction, which could also cause long rehabilitation beds of rivers and their possible extinction if nothing is made.
	17	Costal area	D	No activities that may affect the coastal area
	18	Diversity of animals and plants	C	The release of-way during the construction work will entail the loss of vegetation and some wildlife
	19	Meteorology	D	No activities that can affect meteorology
	20	Landscape	C	The search for materials (lateritic sites borrowings and career) can distort the landscape, although several sites already exist along the road
	21	Global warming	D	No activities that cause global warming
Environmental Pollution	22	Air Pollution	B	During the work, dust and gas fumes will pollute the air
	23	Water Pollution	C	Is from leaching of land contaminated by oil or by building materials left behind, either by particles torn by runoff and deposited in rivers
	24	Ground Pollution	C	In terms of areas of maintenance of vehicles and engines and their fuel supply, pollution may be due to accidental oil payment
	25	Waste	C	Is from the materials or purging and cleaning materials are deposited on construction sites
	26	Noises and vibrations	C	They are due to transportation of materials and movement of equipment at work
	27	Subsidence	D	There is no activity on large-scale extraction of groundwater or deep drilling
	28	Offensive smell	D	There is no activity related to the generation of offensive smells
	29	Substratum	D	There was no activity related to the substratum
	30	Risks of accidents	B	The risks of accidents are also many during the rehabilitation phase as the operation of the road.

Category of evaluation: **A:** Serious impacts are expected, **B:** Some impacts are expected, **C:** Minor negative Impacts/ possible negative impacts later in the planning, **D:** Is not subjected to IEE and / or EIA, since no or some negative impacts are expected

2) Consideration on alternative measure and mitigation measure

As a result of provisional scoping, alternative measure including avoidance or mitigation measure were studied for items whose evaluations were B or C. 2 Alternative measures to avoid natural and social environmental impact are selected, which is shown below.

(a) To narrow the width of road, (b) To take alternate route to skirt the impacts

Impacts against 2 alternatives are shown in the following table;

Component		Considerable negative impact	Evaluation to alternative	
			(a)	(b)
Social Environnement	Involuntary displacement	The rehabilitation of the road will not lead to displacement since the road already exists and crosses the housing Kimpese and several villages, but some houses too close could be displaced in case of major extension of the road	D	C

Component		Considerable negative impact	Evaluation to alternative	
			(a)	(b)
	Land use and local resources	Farmland and possible farmland along the road might disappear due to being used for the road.	D	B: Affect to alternate road
	Local conflict of interest	The brewing staff with local populations can lead to contradictions and problems of jealousy.	D	B: Affect to alternate road
	Right to water and admission,	Construction work can result in disqualification of coastal access and disrupt the current way of life.	D	D
	Health and sanitation	Dust and fumes at work can cause health problems.	B	B
	Risks of disasters and infectious diseases such as HIV/AIDS	Brewing staff with local people will certainly induce amorous adventures that will lead to the spread of STD and AIDS	C	C
Natural environment	Subterranean waters	At wash areas and emptying the oil spill on the ground could lead not only the stain of soil but also that of groundwater	D	D
	Ground erosion	The design of the drainage system concentrates the runoff in times of rain, thereby increasing the speed of runoff therefore erosion. Also some sections of road are the most often-profile excavated embankment, exposing the embankment fill erosion	C	C
	Hydrological situation	The particles torn during the runoff will capsize in rivers preventing their use, especially during the period of construction, which could also cause long rehabilitation beds of rivers and their possible extinction if nothing is made.	C	C
	Diversity of animals and plants	The release of-way during the construction work will entail the loss of vegetation and some wildlife. Trees at some section are cut down.	D	B: Affect to alternate road
	Landscape	The search for materials (lateritic sites borrowings and career) can distort the landscape, although several sites already exist along the road	C	C
Environmental pollution	Air Pollution	During the work, dust and gas fumes will pollute the air.	D	D
	Water Pollution	It is from leaching of land contaminated by oil or by building materials left behind, either by particles torn by runoff and deposited in rivers.	B	B
	Ground Pollution	In terms of areas of maintenance of vehicles and engines and their fuel supply, pollution may be due to accidental oil payment.	C	C
	Waste	They are from the materials or purging and cleaning materials deposited on construction sites.	C	C
	Noises and vibrations	They are due to transportation of materials and movement of equipment at work.	C	C
	Risks of accidents	The risks of accidents are also many during the rehabilitation phase as the operation of the road.	C	C

Category of evaluation: **A:** Serious impacts are expected, **B:** Some impacts are expected, **C:** Minor negative Impacts/ possible negative impacts later in the planning, **D:** Is not subjected to IEE and / or EIA, since no or some negative impacts are expected

[Social and economic impact against alternative measure]

(a) To narrow the width of road: Because width of road are designed according to the estimated and assumed traffic and type of cars passing in future, the narrower road might disturb the economic development of villagers along Kilueka route; however, a partial diminution of width is supposed not to affect the transportation so much.

(b) To take the alternate route to skirt the impacts: Because the current plan is rehabilitation of the

existing road, alternation on making new other road shall create other big negative environmental social impact and cause increasing construction cost.

In this regard, adoption of the above option or alternative was regarded to be irrational and unrealistic, and mitigation measures shown below are applied to avoid natural and social environmental impacts.

Table 8.4 Mitigation measures

Environmental components		Possible negative Impacts	Mitigation measures Envisaged
Social Environment	Involuntary displacement	The ability to move people is much lower because there is enough space for the road already, but some houses too close could be affected if imposed extension occurs, which is not anticipated	- Avoid re-installations by selecting the location of structures with minimal impact - Prepare action plans considering the procedure for re-installation and support to displaced - Educate people in the way of no-occupation of the road fringes
	Use of land and local resources	Potential losses of crops and arable land through borrow sites, dump sites or clearing of road fringes	- Inform the population in advance to avoid the destruction of crops - Educate people not to occupy the road fringes
	Local conflict of interest	Destruction of valuable trees, forests sacred or cemeteries. Degradation of customs and traditions due to the installation of the staff of the company in an area.	- Take necessary measures with the competent authorities (traditional leaders, populations and the mission of control before any action - Educate engine drivers to respect the heritage and staffs to respect customs and traditions through meetings, integrating it in the rules and bylaws to be displayed at the headquarters
	Right of water and Admission	Construction works can lead to the destruction of current riparian access	- Restore access to all avenues leading to the roads
	Health and sanitation	Problems related to sanitation and drainage can cause vectors born diseases.	- Installation of culverts and other drainage facilities where necessary
	Risks of disasters and infectious diseases such as HIV / AIDS	Brewing staff with local people will certainly induce amorous adventures that will lead to the spread of STD and AIDS	- Inform and educate personnel on protection against STD / AIDS - Conduct a public awareness campaign to push the peoples and workers
Natural Environment	Groundwater	At wash areas and emptying the oil spill on the ground can cause contamination of groundwater	- Prohibit the discharge of vehicles and equipment on the bare ground - Concrete drainage areas, washing vehicles and machines and storage of toxic products - Handle bituminous products and paints with care to prevent soil and ground water
	Sol Erosion	The design of the drainage system concentrates the runoff in times of rain, thereby increasing the speed of runoff therefore erosion. Also some sections of road are the most often-profile excavated embankment, exposing the embankment fill erosion	- Cover the slopes of soil embankment at the end of the works before the rainy season and plant if necessary
	Hydrological situation	The particles torn during the runoff will capsize in rivers preventing their use, especially during the period of construction, which could also cause rising of river beds and their possible extinction if nothing has done.	- Protect the sewerage and drainage network through masonry or concrete lining at the critical slopes

Environmental components		Possible negative Impacts	Mitigation measures Envisaged
	Diversity of animals and plants	The cleaning up of road fringes during the construction work will entail the loss of vegetation and some wildlife	- Reduce to the maximum cleaning up road fringes in protected areas. - Do not allow borrow sites, or implantation of people
	Landscape	Searching materials (lateritic and quarry borrow sites) can distort the landscape, although several sites already exist along the road	- Consideration on the type and design of structures - Consideration of vegetation cover on structures
Environmental Pollution	Air Pollution	The dust and gas fumes emanating from the work will pollute the air	- Water systematically all areas likely to produce dust (especially areas of work around dwellings, on average 3 times a day - Stop the motors of engines and vehicles when they are parked - Require the wearing of dust masks to workers who must be given by the company
	Water Pollution	The run-off is contaminated by oil or construction materials left behind, either by particles torn by runoff and deposited in rivers, polluting waters	- Prohibit the discharge of vehicles and equipment along the road or on the bare ground. - Handle bituminous products and paints with care to prevent stain of soil and ground water - The company must have the absorbent products to alleviate the event of spillage of toxic products - The water supply points should be neither upstream nor at the points of use of populations
	Soil Pollution	In the areas of maintenance of vehicles and engines and their fuel supply, pollution may be due to accidental oil spill	- Prohibit the discharge of vehicles and equipment along the road or on the bare ground - Handle bituminous products and paints with care to prevent stain of soil and ground water - The company must have the absorbent products to alleviate the event of spillage of toxic products - Put concrete floor on drainage and vehicles washing areas and on storage areas of toxic products when failing to use airtight containers for discharge
	Wastes	Come from the purging and cleaning materials and materials stored at construction sites	- Appropriate treatment of residual soil
	Noise and vibration	They are due to transportation of materials and movement of engines at work	- Appropriate management of construction sites - Use of low-pollution types engines
	Risk of accident	The risks of accidents are also many as well during the rehabilitation phase as the operation of the road.	- Prohibit night work, impose speed limit to neighborhoods of homes, protected areas and in view of animals. Prohibit the consumption of alcohol / drug at the site

Category of evaluation: A: Serious impacts are expected, B: Some impacts are expected, C: Minor negative Impacts/ possible negative impacts later in the planning, D: Is not subjected to IEE and / or EIA, since no or some negative impacts are expected

Based on the provisional scoping, impacts identified for the rehabilitation of the road of quick impact project showed several impacts of reversible nature, which could be controlled by the application of specific mitigation simple confirming the classification of Category B, which required only a study on the environmental and social level IEE.

Based on IEE Study which was done by the Study Team, mitigation measure was adapted during the construction period.

(3) IEE Study

Summary of the result of IEE study is shown below.

1) Objective

- Enter the physical, natural and socio-economic situation on the axis of the project and its environs;
- Examine the natural environmental and social impacts possible that can be caused by the implementation of projects designed in the master plan and pilot projects, including quick impact project (rehabilitation of the road)
- Develop an outline of an environmental management plan, including mitigation and monitoring plan, to be integrated into the master plan and the pilots.

2) Contents

(a) Full title of the Project and relevant report: The Study on Community Development in Cataracts District, Bas-Congo Province, Democratic Republic of Congo

(b) Type of the Study: Development Study with Quick Impact Project for Road Construction

(c) Environmental category and reason for categorization

* Methodology of the Study on the environmental and social considerations
* Categorization

(d) Agency or institution responsible for the implementation of the project: Ministry of Rural Development

(e) Outline of the Project: Rehabilitation of the road (18 km from Kimpese to Kilueka site and Kilueka Village) and 5 bridges along the road

(f) Description of the project site

* Geography/ Topography/ Meteorology/ Hydrology/ Vegetation
* Socio-economic conditions/ Current issues

(g) Legal Framework of environmental and social considerations

* Laws, regulations and standards related to environmental and social issues
* Legal system
* Relative agencies and institutions

(h) Definition of the preliminary impact assessment or scoping

(i) Analysis of alternatives including ‘without project’ option

(j) Mitigation measures for major environmental /social impacts

(k) Result of the stakeholders meetings

(l) Monitoring plan for environmental and social impacts

(m) Other relevant information

* Using the road fringes for agricultural fields
* Symbolic contribution to landowners
* Maintenance of the road

(4) Monitoring plan

1) During construction

As the Quick Impact Project is the main source of negative impacts on environment and society, the monitoring of these impacts, which mainly occur during the construction period, was done by the supervisor of the Study Team that made sure that the contractor in charge of the construction applied the necessary mitigation measures to control the impacts. Mitigation measures and monitoring items were shown in the following table, which was made based on the result of provisional scoping.

(a) Social environmental impacts

Component	Mitigation measure	Monitoring method	Result of monitoring
- Respect of local customs and traditions - Preservation of heritage - Avoidance of risks of disasters and infectious diseases such as HIV/ AIDS	- Educate staffs to respect the heritage, local customs and traditions on meeting - Display rules by laws stipulating at the headquarters bulletin board - Inform and educate staffs on protection against HIV/ AIDS	Confirmation on - if the rules is on bulletin board - number of meeting and its contents - number of campaign of infectious diseases such as HIV/AIDS	- Meeting was held in every Monday. - Rules were put on the wall of site office. - A campaign of infectious diseases such as HIV/AIDS was held by local NGO (CRAFOD) – distribution of condom.
- Secure of access at the level of concessions, schools, markets, health centers, collection tracks	- Develop access at the level of concessions, schools, markets, health centers, collection tracks	- Confirmation on access road is installed if necessary	- In August, a part of side ditch broke the access road to farmland. Simple road to pass the side ditch was established in a week.
- Secure of security of staffs/workers	- Provide staff with appropriate safety equipment at their workstation. - In case that staff does not use appropriate equipment, work is recommended to stop	Confirmation on: - in the field the wearing safety equipment by staff - Confirmation on number of accidents recorded	- Safety equipment was used properly. - Accident did not occur.
- Avoiding occurrence of diseases related to sanitation and drainage	- Install temporary toilet facilities for construction workers. - Prepare guidance need to be done for construction workers to prevent infectious diseases. - Install culverts and other drainage facilities installed where necessary	Confirmation on - number of toilet set and way of use - number of a outlet culvert	- 2 Toilets were installed near the site office. Those were used properly. - An outlet was established at washing place for heavy machine. - Meeting was held in every Monday.
- Traffic accident	- Present rules prohibiting night works without permission of mission of control - Notice limiting speed, alcohol/drug use at the site - Set fixed clear signs noticing construction	Confirmation on - number of night work and advance permission - number of traffic accidents registered	- Night works were executed at 8 nights. Supervisor worked together and confirmed its security. - No accident was confirmed.

- Avoidance of traffic congestion	- Install information board at appropriate position - Install temporary road at bridge - Broadcast the information to limit traffic due to the Work as necessary. - Consult with relative agencies such as police station on construction works to avoid the accidents	Confirmation on - number of sigh board to inform the works - condition of temporary road - situation on congestion at the road	- No sign board was observed before or after some section of construction. Supervisor instructed to put them immediately to improve the situation. - Proper temporal road at sites of concrete pavement (7 places) and bridges (4 places) were established. - During construction, information on limitation of traffic through Kilueka route was broadcasted twice through radio.
- Acquisition of lands due to extend the width of road - Ban of agriculture activity in 5 meters on both sides of the road	- Disclosure information on construction in advance - Provide alternative farmland - Take alternate route	Confirmation on - number of distribution of the information on ban of agriculture along the route - number of complain - the way of construction	- A part of center line (about 100 m) was changed to channel off the farmland along the route. - No acquisition of farmland was confirmed. - During construction, information on ban of agriculture activity in 5 meters on both sides of the road was broadcasted once through radio - Complain on use of farmland for temporary site were drawn twice during construction. As a result of confirmation with sector, people who complained did not have right to use those farmland and complaint were withdrawn.
- Involuntary displacement	- Avoid re-installations by selecting the location of structures with minimal impact - Educate people in the way of no-occupation of the road fringes	Confirmation on - number of displaced house - number of displaced farmland - number and amount of compensation	- Involuntary displacement house was not confirmed. - Involuntary displacement farmland was not confirmed.

(b) Natural environmental impact

Component	Mitigation measure	Monitoring method	Result of monitoring
- Water Pollution	- Avoid water staying at low point - Not locate water supply points at neither upstream nor at the points of use of populations - Avoid materials, soil, deforestation trees flowing into river - Install the washing place for heavy machine	Confirm on - number of place water staying and countermeasure against it - number of temporary drainage and place of outlet - situation of outflow of soil into river - number of complaints on water pollution - situation of washing place and its way of use	- No water staying at low place was observed. - Drainage form tap at site office to side ditches was established, which did not create problem. - No outflow of soil into river was confirmed. - No complaint was received. - Washing place was set next to site office.

- Soil Erosion and Pollution	- Conduct countermeasure against soil erosion at slope - Evacuate excavated soil along the road - Prohibit the discharge of vehicles and equipment along the road or on the bare ground	Confirm on - executing countermeasures of soil erosion - situation on excavated soil - situation of the discharge of vehicles	- Plantation was executed at slope of embankment before rainy season. - Cut slope was stable, which did not require any measure against erosion. - Excavated soil which was placed along the road was evacuated.
- Air Pollution	- Water systematically especially areas of work around dwellings - Stop the motors of engines and vehicles when they are parked - Require the wearing of dust masks to workers who must be given by the company	Confirmation on - situation of watering - contents of instruction by contractor to drivers - condition of using dust masks	- Watering was conducted every morning near the villages. - Meeting was held every Monday to notice them. - Workers worn dust mask at concrete plant.
- Noise and vibration	- Limit night work - Use of low-pollution types engines	Confirmation on - number of night work and its condition - condition of use of heavy machine	- Night works were executed 8 times at the place of far from village and the supervisor heard it before. - Low-pollution type engines were not normal in DRC and work near village was carried out during day. As much as possible, manpower was adopted.

2) Monitoring after the work

The Quick Impact Project was the main source of negative impacts on environment and society and most of the potential impacts might have occurred mainly during the construction period. However, according to a meeting which was held between the Study Team and the chief of Sector, monitoring for 2 items shown below should be continued after construction by the village committees, assisted by the Sector.

(a) Risks of accidents: Social impacts

After rehabilitation of the road, number of traffic must increase with the more speed than before. Although traffic signs, which indicate speed limit of 30 km/h around village, number of accident are expected to increase. So monitoring should be continued to check the number of accidents occurred to promote awareness to drivers and villagers.

(b) Restoration of vegetation and landscape: Natural impacts

As construction caused the cut of a few trees along the road and borrow pits, one should make sure that actions are taken to restore the natural environment, planting back a few trees to replace the ones that were cut. Also, the villages are expected to improve the landscape specially around the borrow pits where digging for laterite were made, which may have spoiled the landscape. Although

tropical climate give faster restoration of vegetation, natural condition at borrow sites and along the road should be monitored, and when necessary, planting back trees, which is in line with one component of the PP should be accelerated.

Monitoring Items after construction

	Item to be monitored	Survey item	Frequency	Point to be monitored	Person in charge	Others
Social environment	Traffic accident	No. of accident	Once per month	Along the all road	Committee Sector	Clarify the cause of accident
Natural environment	Restoration of natural environment and/or landscape	No. of trees planted and/or vegetative cover	Once per month	Along the road and/or at borrow sites	Committee Sector	-

8.4.4 Land Issue During the Construction Period

(1) Using the way of the road to agricultural fields

The current road to be rehabilitated through several areas brought under cultivation, and some cultures were practiced on the side of the road within the zone established by law as an estate (5 meters either side of the road to agricultural services and 10 m for roads). People who engage in these crops domaniales areas were warned not to plant cassava because the crop cycle was longer still under development at the commencement of work the next year in April, the idea would be to allow rather to cultivate short-cycle crops they could harvest time before the work begins.

However, during the workshop held on November 29, 2008 with the village leaders on maintaining the road to rehabilitate, it was reported that some farmers, particularly in the village Ndembo cassava planted near the road in the grip despite advice given repeatedly. The chief of sector had again ordered the head of the Agriculture and Rural Development to continue raising awareness among recalcitrant and warn they would lose their crops if they persist in not following the watchword.

(2) Contribution symbolic landowners

The Land Law recognizes the existing traditional landowners as having a say on the use of land they have acquired through generations in rural areas. Since the work would go in sacred groves belonging to villages or use sites borrowing, it is advisable to request permission to land managers to whom a traditional small contribution should be paid (for the purchase of cola or wine according to tradition). The village leaders had pledged to inform the heads of land that nothing more should be asked to companies to be responsible for the rehabilitation of the road in addition to the traditional contribution, considering that the road will be for the benefit of villagers. On the other hand, they should not be alarmed and seek contributions impossible thinking that companies prospect for gold or precious metals in the sites of borrowing and careers while they seek only gravel and laterite for the construction of the road.

Chapter 9 Lessons Learned and Recommendations

9.1 Lessons from the Quick Impact Project

The community road rehabilitation work between Kimpese and Kilueka was implemented as a quick impact project through a contract concluded with a local contractor and under construction management of the Study Team. The rehabilitated road has the following specifications:

Length of 18 kilometers, width of 4.0 meters, road shoulder width of 0.5 meters, combination of laterite pavement (85% of the total length) and concrete pavement (15% of the same), five concrete bridges (of which four were rehabilitated), drainages installed along the entire route, and road crossing works 30 to 50 centimeters in width at 37 locations. The overview of construction is described in Chapter 8, and this section describes the lessons learned from such a large-scale civil engineering work implemented in other area than Kinshasa.

9.1.1 Approximate Costs

The following shows the approximate costs, which are intended to serve as useful information for future road rehabilitation projects to be implemented.

* Total construction cost US$ 2,545,400.61 226,541,000 yen
* Construction cost per kilometer US$ 141,400 per km 12,586,000 yen per km
* Construction cost by work type Rate of US$1 = 89.00 yen

	Total amount (US$)	Total amount (yen)	Unit cost per kilometer (yen)
Laterite pavement	1,213,000	107,972,000	7,057,000
Concrete pavement	1,087,000	96,775,000	35,842,000
Bridge	57,890	5,152,000	1,030,000

* The construction cost for pavement includes construction costs for road earthwork, main work, and construction of drainages.
* The total construction cost includes, in addition to the above, costs for field management, demolition of existing facility, signs, and temporary works.

9.1.2 Competence of Contractors

(1) Contractors in this Study

The contractor chosen as a result of bidding was AFRITEC who submitted the lowest bid. This contractor is rated as rank A in terms of construction experiences, sales, etc. among the builders in the DRC and has abundant experience in roadwork. Therefore, as far as the construction technology is concerned, this contractor should have a potential technical competence that allows it to carry out the level of improvement work required for this project without any problem. However, the progress of work was seriously affected due to the following reasons:

①It is strongly suspected that the owned construction machines were superannuated and that there

were an insufficient number of operative construction machines. These seemed to be the reason for the significant delay of work due to machine failures and, consequently, there were considerable difficulties in keeping the construction schedule.

②The process and quality control depend on the skills of engineers, particularly, the project manager. Through out the DRC too, there is a serious shortage of engineers. Contractors, instead of having many engineers on a permanent basis, employ engineers temporarily on a project basis. The process and quality level depend on the competence of engineers who happened to be employed at this time. In this project, the project manager was the only permanent engineer of the contractor and did not have sufficient knowledge about process control.

As the countermeasures, the following recommendations are offered:

①A construction schedule must be established in full consideration of the start and end timings of the rainy season which has a significant influence on the construction. Additionally, it is important to properly evaluate the competences of contractors at the time of bidding. It is essential to check with other donors about the reputations of contractors and evaluate the contractors' historical background, reputation of past work, owned heavy equipment, and operational status, etc. at the time of the evaluation.

②Since the cooperation with headquarters of contractor is important in making up for the defects found on site at the time of construction, it is important to confirm, at the time of contract conclusion, a prompt supply of heavy equipment, materials, etc. and its participation in handling of encountered problems. The progress should also be reported frequently by the construction supervisor to the headquarters. If there is any problem in the engineers on construction site, it is also necessary to promptly increase the number of engineers and, eventually, give instructions including the replacement of engineers.

To correct the delay in the construction schedule, the Study Team repeatedly warned the site manager of the contractor and also summoned the signer of the contractor to the site and Kinshasa and demanded the improvement of the work. However, delays due to similar reasons repeatedly occurred because the responses were slow and the improvement effect did not last.

(2) Contractors in the vicinity of Kinshasa

This Study found that, in the vicinity of Kinshasa and the Bas-Congo Province, the contractors capable of implementing middle-scale or larger roadwork such as the current case in which the site is divided and multiple teams carry out construction simultaneously are only three or four private contractors including AFRITEC and multinational companies and the Roads Directorate (O.R.) of the Ministry of Infrastructures and Public Works. These private contractors have several heavy machines and own plants that can supply concrete products and aggregates. They also hire multiple engineers on a permanent basis and have continuous education and experience about construction. However, all

these contractors except AFRITEC are headed by foreigners, and hence they ask for higher prices for the construction. At this bidding time, the largest contractor in the DRC offered a tender 1.8 times as high as the successful tender price. Other contractors would have difficulty in implementing construction with complex processes due to the number of owned heavy machines, the quality of engineers, etc.

Therefore, when a road rehabilitation project similar to this Study is implemented in the future, it is necessary to consider the processes and required quality of work in the Study period, estimate as a high price for the construction as the largest contractor can receive the order, and consider the experiences and skills of contractors at the time of bidding. Otherwise, it would be necessary to allow non-major contractors to perform construction properly by giving enough time for the construction schedule or dividing the construction area into multiple zones so that multiple contractors can work on them.

9.1.3 Employment of Villagers as Workers

In the DRC, human-powered rehabilitation of laterite pavement community roads is carried out in HIMO in which villagers are employed by the assistance of CTB. In this Study, rehabilitation by a contractor was chosen in pursuit of the quality of construction. However, the contractor was requested to employ villagers for the types of work that can be carried out by them in expectation of development of the villagers' ownership for the roads and in consideration of requests made by the villagers because maintenance by villagers will be required after the project completion.

However, there were such employment problems as ① villagers' dissatisfaction about wages, ② short working hours for villagers, and ③ deteriorated labor quality, with which the Dukis were requested to deal. Additionally, the necessary number of workers could not be obtained in the farming season, and some workers did not complete the work because of hard labor, demonstrating that the employment was far from being smooth.

In this kind of construction work carried out, it is difficult to employ villagers for all the work types. Moreover, it is normally required that workers acquire skills through long-term employment in order to quicken the work processes. If villagers are employed in a similar project in the future, they should be employed for limited work types in view of the circumstances. Additionally, it is essential to avoid unnecessary problems by discussing the employment types, number of persons to be employed, and employment method with the Dukis in advance.

9.2 Continuation of Monitoring on Pilot Projects

In the Studies of first and second year was performed to establish plans mainly regarding resident-led community development and road maintenance. At present, PPs implemented in relation to the community development plan have not demonstrated specific effects yet. Moreover, the community development plan established in this Study depends largely on farm products, which vary

through time, and villagers or villagers' organizations feed on them. Therefore, it is considered absolutely necessary to continue monitoring on the items checked through the PPs, in addition to monitoring in the rainy season performed in this Study period.

When monitoring is performed for 6 months after the completion of the second-year Study, there may be differences in the sustainability of projects between routes, villages, groups, etc. If so, comparison of targets for which sustainability can and cannot be expected and further complementing of community profiling will yield guidelines for formation and enhancement of villagers' organizations in the future.

During the above monitoring, it is necessary to pay attention to the relationship between beneficiaries and non-beneficiaries in the villages. As time passes and the benefits and receivers of them become apparent, there may be disputes between the villagers because of envy and jealousy due to imbalance of benefits received. When such problems are likely to occur, it is necessary to analyze the sources of the problems and attempt to minimize disputes in order to emphasize the effects of this project and provide assistance to a project in an area similar to the Study Area, particularly a post-conflict area.

As for road maintenance, the implementation of resident-led road maintenance activities was planned because of the weakness of the administrative organizations in the Study Area. For the Nkondo route, a road maintenance organization of CLER Kiasungua has been established before the project implementation. While, for the Kilueka route, no road maintenance organization had been established, and the community development committee established in this project is planned to serve as a maintenance organization. The comparison of these routes will yield guidelines for selecting and establishing an appropriate maintenance organization when a community road rehabilitation plan is formulated in the DRC in the future.

Furthermore, it is considered to be necessary to perform monitoring on the synergistic effect of the rehabilitation of the community road to be completed in the final phase of the second-year Study and other community development PPs. In other words, the implementation of the third-year monitoring is proposed for identifying the impact of the road rehabilitation on the transportation of farm products and the villagers' sales strategies, etc., and how beneficial the increased benefits due to road rehabilitation was for the road maintenance.

9.3 Proposal for Future Community Development

Community development focused on village organizations in post-conflict areas such as the Study Area, increases living standards and improves the living environment of residents. The overall development of the area through mutual cooperation is essential to strengthen resistance against the emergence of new conflicts.

9.3.1 Recommendations on Adjustments with International Organizations Using the Funds for Human Security

In the Study Area, the villagers' organization has been established through the activities of the Study, and the community development initiative of the villagers' organizations is progressing. In particular, the establishment of common facilities maintenance system by the community is being pursued. In a post-conflict area such as the Study Area where the administrative service is not functioning, the beneficiaries of the community road, drinking water facilities, educational facilities, and health facilities are not specific people but all the local residents. Therefore, it is advisable that the local residents perform maintenance through collaboration.

However, it is difficult to expect spontaneous efforts of the residents to cover initial investment on these common facilities for initial improvement, etc. For such initial investment and enhancement of capabilities required for maintenance, the implementation of projects are recommended, which listed in the following sections by using the Human Security Fund and through collaboration with the UN assistance agencies such as UNICEF and FAO to pursue the goals of the Commission on Human Security, i.e., "enhancement of the capabilities of all people through complete dissemination of basic education," "giving high priority to the complete dissemination of basic health services," and "pursuing the universal realization of the minimum living standard."

(1) Expected Outputs

The expected outputs of the implementation of these activities are as follows:

1) Improving access to isolated villages and boost production activities throughout the area.
2) To improve schools and increase enrollment of children.
3) Reduce the risk of prolonged illness through the opportunity to benefit from simple care.
4) Reduce the number of patients with diarrhea or malaria, which are water-borne diseases.
5) Improve the capacity of administrative staff and leaders of village organizations and enable sustainable local development.

(2) Proposed project items

1) Project of maintenance and management of drinking water facilities

Improvement of wells (including training on the maintenance system of well facilities)

2) Project of improvement of educational facilities

Rehabilitation of schools (roof repair, painting walls, etc...)

Replenishment of school materials and equipment (introduction of equipment for making desks and chairs)

Development of school gardens (compensation for teachers' salaries, dissemination of farming skills (seeds of new varieties) through children, etc.)

Implementation of literacy education for adults

3) Project of improvement of health facilities

Rehabilitation of health centers

Training on the maintenance system for health facilities

4) Project of human resources development

Training and technology transfer for administrative officers and villagers' organization leaders

9.3.2 Proposal for Future Cooperation of JICA

The Minister of Rural Development, which is the counterpart body of this Study strongly demand Japan to continue its cooperation through the official development assistance after the end of the Study. For this reason, on the basis of results obtained in this Study and in order to contribute to establishing peace in the DRC, we recommend ensuring technology transfer needed to promote the restoration and improvement of communities, and setting up a financial cooperation that will achieve the desired results effectively.

(1) Proposal for technical cooperation project

In the community development plan, a development plan regarding improvement of livelihood, which can enhance its effects by the road rehabilitation and living environment, was formulated to aiming communities' reconstruction through implementation of both community road rehabilitation and its maintenance afterwards.

In order to spread this out of the Study Area, it is necessary to develop capacities of counterparts, who received technology transfer on the OJT basis throughout the Study, and technical transfer must be done to engineers who are in charge of areas where the plan will be transferred. For this to occur, it is proposed to carry out technical cooperation projects.

In the technical cooperation project, the community development plan, established in the Study Area of the Study on Community Development Plan in Cataractes District, Bas-Congo Province, is regarded as the Kimpese Model and the Model will be spread in the DRC. In the first stage of technical extension, technical transfer will be carried out in the other areas of the Bas-Congo province, where the model has been established and there are counterparts who have had experiences with the Study to realize horizontal extension. After that, the technical transfer will be implemented in the rest of the province and other provinces (ex) North Kivu and Oriental) by applying the findings acquired through the technical transfer in the Bas-Congo province including the results from this Study.

At the implementation of activities, the technical transfer will be carried out for counterparts

from within and without of the province who will be invited to the Study Area of this Study as a place of demonstration or training. The objective and expected outputs of the project is shown below;

1) Super goal

Community roads maintenance and community development projects are appropriately implemented, and therefore, reconstruction of the community is promoted in the Democratic Republic of the Congo.

2) Project goal

The Kimpese model or similar community development plans are implemented in other provinces out of the Bas-Congo province.

3) Outputs

a) The organizational capacity development to the Direction of Community Development (DECO), the Direction of Feeder Roads (DVDA), and the Ministry of Agriculture, Rural Development, Fisheries, Animal Husbandry and Small and Medium Enterprise Promotion of Bas-Congo Province, all of which are the counterparts, is realized.

b) The capacity development of Local Road Maintenance Committees (CLER), agricultural and rural development personals of provincial, district, and sector level, all of those are as actors of implementing community development, is realized.

c) The Kimpese Model is spread in the Democratic Republic of the Congo.

(2) Proposal of financial cooperation projects

It is necessary to quickly develop in order to avoid returning in a situation of conflict in the post conflict countries such as the DRC. Therefore, it is important to implement the roads rehabilitation by the financial cooperation at the same time of implementation of technical cooperation. However, there might be budget limitation and priority to other projects in the grant aid for general projects, and the Japanese contractors may not be interested in participating a bid because the roads rehabilitation is implemented in the remote areas. Therefore, the grand aid for community empowerment will be proposed in order that the local contractors will be able to submit the bids. The targets are agricultural roads which directly link to the National No.1 in the Bas-Congo province, and they should not be traverse the border of the sector. In addition, the same maintenance standards will be applied.

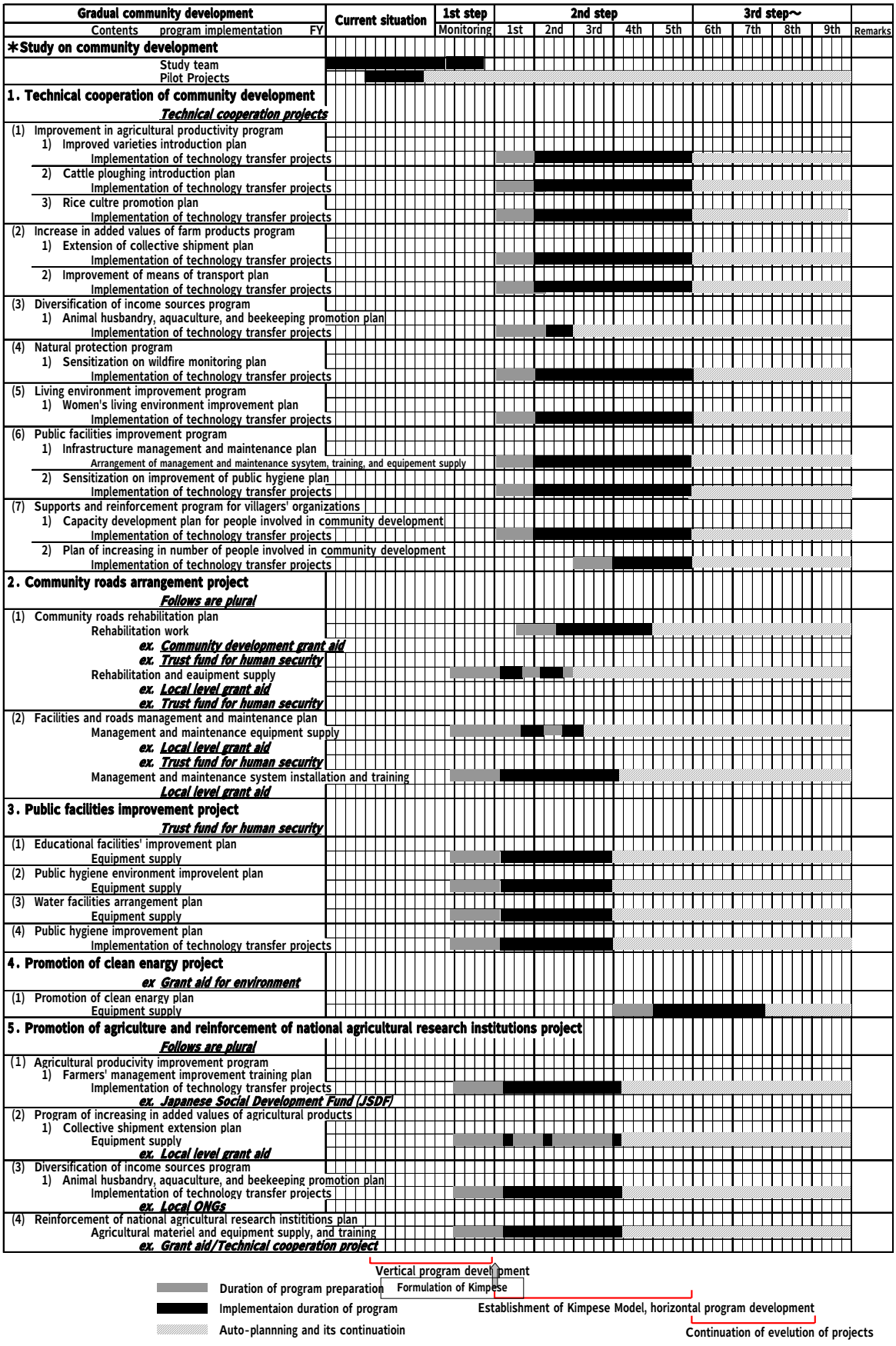


Figure 9.1 Example of Community Development Projects regarding Evolution in and out of Bas-Congo Province