

Chapter 5. Objectives and Strategy by Sector

5.1. Economic Development

5.1.1. Objectives for economic development

The economic sector provides the driving force for the attainment of the Angonia regional development objectives presented in sub-section 3.1.2. Objectives for economic development are defined in such a way as to support the regional development objectives in economic, social and environmental aspects. First, the following two basic objectives are defined, that should be attained in the medium term:

- (1) To alleviate widespread poverty and to realize self-reliant and sustainable economic performance; and
- (2) To attain self-sufficiency in basic foodstuffs and to improve nutrition of local people.

Three additional objectives are defined with varying emphasis on economic, social and environmental aspects, just like the regional development objectives. This dual structure of overall and sector objectives mutually supporting one another would ensure more balanced attainment of economic, social and environmental development. These objectives are specifically expressed as follows:

- (3) To generate sufficient number of high earning employment opportunities through diversifying economic activities and promoting linkages among them;
- (4) To enhance asset value of environment through more productive use of indigenous resources and proper management of external resources; and
- (5) To contribute to national socio-economic integration and enhanced national status in the international society through outward-oriented production and services with inter-regional and international linkages.

Objective (3) represents social concerns of generating employment opportunities and raising income levels as well as economic concerns for high growth. Linkages between various agricultural, industrial and service activities should be promoted to diversify economic activities for robust economic structure. Through this process, objectives (1) and (2) should be attained.

Objective (4) represents mainly environmental concerns in relation to economic activities. For instance, sound agricultural practice with high productivity should help to protect the rural environment by enhancing economic value of environment. This objective also pursues proper management of external resources such as foreign capital and technology in balance with use of indigenous resources including human resources to ensure the quality of environment will be protected.

Objective (5) expresses an ultimate goal of the Angonia regional development to realize an open society, self-reliant but not self-contained, linked to the outside world with viable economic activities. This objective also pursues free exchange of information and ideas among peoples of different backgrounds to promote various socio-cultural value for a dynamic society.

5.1.2. Strategy for agricultural development

(1) Characteristics of agriculture in the Study Area.

It may be useful to distinguish two broad areas for the agricultural planning purpose. One area coincides largely with the districts of Angonia and Tsangano, and parts of Macanga and Moatize districts. The area has most favorable conditions for agriculture centering around the Angonia plateau with relatively high rainfalls and perennial flow of rivers, generally good soil conditions, and moderate temperate climate. It has been affected by the market economy earlier, which allows the procurement of agricultural input on a commercial basis and marketing of surplus agricultural produce. Main markets are across the border in Malawi for maize, wheat and vegetables, and Tete city and other urban areas for potatoes, some fruits and other high value crops.

The other broad area coincides largely with the districts of Chifunde and Chiuta, occupying the lowland along the Zambezi river and its main tributary, the Luia. The area has lower rainfalls, although the soil conditions are generally favorable for agriculture. The area is characterized by subsistence agriculture, dominated by the slash and burn practice. Access to markets and access to production technology and commercial capital are limited.

Common constraints to agricultural development in both areas include soil erosion caused mainly by deforestation in the Angonia highland area and the slash and burn practice in the Zambezi lowland area, and the presence of mines. In the Angonia highland area, the population pressure and resultant land conflicts are becoming a constraint, while in the Zambezi lowland area, low population density itself poses a constraint to agricultural land development.

The main issue for agricultural development in the Zambezi lowland area is how to transform subsistence agriculture into market-oriented agriculture. Another main issue common to both areas is how to transform resource-exploitative agriculture into environmentally sound and sustainable agriculture. Market development and the establishment of price-competitive production system hold keys for agricultural development in the Study Area as a whole.

(2) Basic strategy for agricultural development

Under the economic development objectives, agricultural development in the Study Area

should pursue higher productivity, more diversified activities, and environmentally sound and sustainable practice. Important components are: 1) introduction of irrigated agriculture, 2) improvement of rain-fed agriculture, 3) expansion of agricultural land, 4) establishment of new cash crops, and 5) livestock development. Given the present subsistence-oriented agriculture and enclave-type rural communities, most important would be to organize farmers and motivate them for new types of agricultural activities.

This would hold a key for marketing new agro-products and procuring input to improve agricultural practices. The basic strategy for agricultural development in the Study Area is established, centering on farmer's organizing for marketing and input procurement in combination with the technical options. More specific strategies for the Angonia highland and the Zambezi lowland are presented subsequently.

1) Farmers' organizing

A prerequisite to transforming the agriculture in the Study Area from subsistence to market-oriented one is to organize farmers. This would allow farmers to produce strategically selected crops in a scale large enough for marketing outside their communities, districts or even beyond. This would allow prices of their products to reflect market conditions rather than dictated by middlemen. Organized farmers can procure various input to enhance agricultural productively also at competitive prices.

Farmers do not usually organize themselves voluntarily without interventions from outside, while they are highly conscious of the necessity and effectiveness of farmers associations. Therefore, some interventions would be necessary and effective to encourage their formation. Farmers will make a certain level of contribution to start a farmers association with initial technical and financial supports by MARD channeled through its district officers, NGO's or other facilitators. Once an association is set up, it will be operated with financial autonomy by member farmers' contribution and repayment. A farmers' association may be equipped with a vehicle for transporting farm produce, input and daily commodities and also for other non-farm purposes. It may have retail functions as well.

Various types of farmers' associations should be established as operational vehicles to implement the technical options listed above. These technical options are further clarified.

2) Irrigated agriculture

Irrigated agriculture is almost non-existent in the Study Area. Farmers do not have any strong motivation to increase their production when they see limited marketing opportunities, limited access to agricultural credit, and thus high risks involved in investing into irrigation facilities. Except in parts of the Angonia highland area, where farmers gained experiences in irrigated agriculture earlier under the Afro-Industrial complex of

Angonia, experiences are quite limited in cultivation, management and marketing of crops under irrigation.

Farmers should be convinced of effectiveness of irrigation in increasing production and yields, and gain experiences in various irrigation technologies. Also production increase under irrigation should be attained along with market development. Therefore, step-wise introduction of irrigated agriculture may be recommended.

In the first step, small scale irrigation schemes may be introduced in areas along small tributaries by constructing simple weirs and contour canals for gravity irrigation. One promising possibility is to utilize gabions to be produced with gravels and stones by skillful local people. Steel wire may be procured from outside the Study Area, or farmers can use bamboo widely available locally for low cost technology. Alternatively, other materials may be used such as sand bags for weirs. It is desirable to utilize self-help efforts of local farmers so that they will develop a sense of ownership and thus maintain the irrigation schemes properly. Farmers' Associations should be promoted with technical support of MARD.

In the second step, larger scale irrigation schemes may be developed, where sufficient managing organizations have developed and experiences gained. Price competitiveness of crops cultivated under irrigation can be assessed more realistically based on attained production performance such as yields, crop budget and on-farm water management as well as initial marketing performance.

Areas suitable for the first step development may be found along small tributaries, and the second step development may be undertaken in the extensive lowland areas along the Luia the Mavuzi and the Zambezi rivers in Chifunde and Chiuta, where soil conditions are favorable for intensive agriculture and market access is expected to improve, linked with Tete city. Promising crops under irrigation may include rice as a cash crop, vegetables and possibly fodder crops. Production of potatoes and possibly wheat may also be expanded under supplemental irrigation in the Angonia highland area.

3) Rain-fed agriculture

Rain-fed agriculture will continue to be the dominant agricultural practice in the Study Area, and its productivity increase needs to be pursued especially for maize. At present, maize production in the Study Area is characterized by low input-low yield. This results in low cost production and price competitiveness of maize export to Zambia and Malawi. To increase maize production, introduction of high input-high yield option may be inevitable, but this may undermine the price competitiveness.

Another potentially important crop under rain-fed conditions is wheat, currently produced in Tsangano district for export to Malawi. Wheat can find a growing domestic market

within the Study Area, if the production increases and the physical access to/from production areas is improved. Combining maize and wheat, the Angonia region may have a potential to become a granary for the entire Central Mozambique.

4) Agricultural land development

Extensive area in the Zambezi lowland area is not much used for productive agriculture, except the slash and burn practice and extensive grazing. Horizontal expansion of agricultural land in this broad area is another issue. At present, grasses and leaves in bush land and vines and undergrowth in woodland provide important roughages for cattle and goat. The horizontal expansion for crop cultivation, therefore, should be balanced with the livestock development to ensure sufficient supply of roughages in the dry season.

Another serious constraint to horizontal expansion of agriculture is lack of sufficient population in the Zambezi lowland area. The population density of Chifunde, Chiuta and even Macanga districts is smaller than 10 per km². To utilize the limited farming population and extensive land, high potential areas should be identified carefully, and a comprehensive package of measures should be taken to improve various socio-economic infrastructure by an integrated rural/agricultural development approach. Such areas should naturally be priority areas for demining activities as well.

5) Establishment of new cash crops

The Study Area produces only a few cash crops at present, represented by surplus maize, potatoes and vegetables. Most crops, including various fruits, have not been commercialized. Tobacco, produced mainly in Angonia and Macanga districts under the contract farming, is practically the only real commercial crop in the Study Area. Paprika has been introduced recently in Macanga and Angonia with initial success for marketing.

Since the Study Area produces already a variety of crops, a few crops may be selectively strengthened to establish new cash crops. Promising crops include wheat, groundnuts, sunflower, soybean, garlic and other vegetables, peach and bamboo. Other crops that may be newly introduced as cash crops include rice, sesame, chilies, kapok and rattan. Expansion of cashew may deserve serious consideration for its opportunities to combine with livestock raising and/or natural silkworms for integrated farming as well as processing of nuts, nutshell, apple and bark. Mulberry production is still another possibility for sericulture.

6) Livestock development

Livestock activities have been well established in the Study Area, although livestock population decreased drastically during the civil war and is recovering only slowly. A productive mixed local breed of cattle (Angoni breed) is available in the Angonia plateau area. The Study Area is known also for large goat population of good quality especially in

Moatize and Tete city.

More intensive cattle production should be pursued in the Angonia plateau area in view of increasing land shortages. Breeding capacity of the Angoni breed needs to be expanded, and veterinary services improved. Semi-intensive livestock/poultry in the backyard by small farmers may be combined with crop cultivation for various forms of integrated farming.

In the Zambezi lowland area, control of animal diseases caused by tsetse flies is a prerequisite for further livestock development. Also, a balanced development with crop cultivation to ensure sufficient supply of roughages is another issue as mentioned above. In some areas with better access, more intensive cattle raising may be practiced, combining managed pasture and artificial feed. Improved breeding and veterinary services are pre-conditions for this.

For smaller livestock, more intensive raising in sheds/pens should be increasingly undertaken. To support this practice, the feed base needs to be expanded. As it will rely increasingly on artificial feed, breed needs to be improved to ensure the economies of operation. Supply of improved breed and extension for fattening with proper feeding are among the needs.

(3) Strategy for Angonia highland area

The main theme for agricultural development in the Angonia highland area is how to enhance productivity. Important strategic components are irrigation for high value crops, integrated farming by small farmers, commercial plantations of fruits, agro-forestry on slope land, and high input-high yield production of maize. Research and extension services, agricultural credit, and other supports to be provided for these strategies are summarized in Table 5.1. Main points are highlighted below.

Crops to be cultivated under irrigation are mainly vegetables, including some less conventional ones such as paprika, chilies, garlic and asparagus. Yields may increase also for wheat and potatoes under supplemental irrigation. Integrated farming combines crop cultivation by small farmers with livestock in their backyards. In addition to the Angoni breed, dairy breed may be introduced. Fruit production should be commercialized focusing on more marketable fruits such as peach, apple, plum, and pear.

Agro-forestry should be promoted on slope land to reduce soil erosion, while ensuring adequate profitability for sustained agricultural practice. Grapes, cashew and other trees may be combined with field crops for contour farming. Maize production should be expanded by introducing high input-high yield option. Grain storage capacity needs to be much expanded to provide stable supply and prices to other regions as well.

**Table 5.1. Strategy for Enhancing Agricultural Productivity
in Angonia Highland Area**

Strategic component	Research and extension services	Agricultural credit	Other supports
Irrigation for high value crops (vegetables, wheat, potatoes, etc)	<ul style="list-style-type: none"> • Crop selection and cycles • Land preparation • On-farm water management 	<ul style="list-style-type: none"> • Irrigation facilities 	<ul style="list-style-type: none"> • Provision of seed • Support in marketing (export to Malawi and urban markets) • Support for farmer organizing
Integrated farming by small farmers (grains and pulses in combination with cattle including milk cow)	<ul style="list-style-type: none"> • Integrated farming models • Veterinary services and breeding • Silage production • Small on-farm dairy production 	<ul style="list-style-type: none"> • Livestock sheds by small farmers • Purchase of stock and calves • Dairy facilities 	<ul style="list-style-type: none"> • Breed improvement for milk cattle • Establishment of milk collection system or guidance for linkages with processors • Slaughterhouses
Commercial plantations of fruits (peach, apple, plum, pear, etc.)	<ul style="list-style-type: none"> • Selection of fruits and other tree crops depending on land suitability • Disease control 	<ul style="list-style-type: none"> • Land development for orchards • Purchase of seedlings 	<ul style="list-style-type: none"> • Provision of seedlings • Support in marketing or guidance for linkages with processors • Mediation of contract arrangements with farmers
Agro-forestry on slope land (grapes, cashew, etc.)	<ul style="list-style-type: none"> • Selection of fruits and other tree crops depending on land suitability • Disease control • Sloping agricultural land technology • Products development 	<ul style="list-style-type: none"> • Purchase of equipment and device for land stabilization • Purchase of seedlings 	<ul style="list-style-type: none"> • Provision of seedlings • Support in marketing or guidance for linkages with processors • Support for farmer organizing
High input-high yield production (maize)	<ul style="list-style-type: none"> • Input use • Selection of second crops 	<ul style="list-style-type: none"> • Purchase of agricultural input • Grain storage facilities 	<ul style="list-style-type: none"> • Provision of improved seed • Grain storage facilities

Strategic crops to be strengthened under these schemes are summarized as follows:

- Maize with high input-high yield option,
- Wheat and potatoes with higher yields under supplemental irrigation,
- Vegetables including some exotic ones, and
- Fruits such as peach, apple, plum, pear, grapes (on slopes), and cashew (to a limited extent, on slopes).

Other strategic activities are milk industry and silage production. Development of various integrated farming models would be particularly important for agricultural development in

the Angonia highland area. In principle, stock raising should be combined with cultivation of grains and pulses to ensure subsistence of small farmers at the very least. This is an important consideration when small farmers are to embark on new livestock activities like dairy cattle. Other models, however, should also be developed, combining other crops and small livestock. One innovative model would be a combination of swine raising, biogas production, and organic agriculture for vegetables. Another model may be expansion of maize combined with silage production to support livestock. Expansion of cashew may provide opportunities for different kind of integrated farming combined with goat or swine raising and/or natural silkworms.

(4) Strategy for Zambezi lowland area

The main theme for agricultural development in the Zambezi lowland area is how to transform subsistence agriculture into market-oriented agriculture. Important strategic components are integrated rural development, establishment of new cash crops, small scale irrigation by self-help efforts, livestock improvement, and small livestock development. Research and extension services, agricultural credit, and other supports to be provided for these strategies are summarized in Table 5.2. Main points are highlighted below.

Horizontal expansion of agricultural land should focus on high potential areas to be carefully identified along the Luia, the Mavuzi and the Zambezi rivers. A comprehensive package of measures should be taken by an integrated rural development approach to establish new rural communities supported by productive agriculture.

Farmers need to be motivated to produce beyond their subsistence levels. One effective way, as manifested by tobacco production in the Study Area, is to introduce cash crops with all the supports including purchase guarantee for products. Alternative models may be established through farmer organizing and a package of support measures. Small scale irrigation should be developed by self-help efforts of organized farmers with the full support of the provincial agricultural office from site selection to marketing of products as well as technical guidance on construction works.

Livestock improvement will establish more disease resistant yet drought tolerant breed of cattle and provide improved veterinary services to establish livestock as the major economic activity in the Study Area. Grazing will continue to be dominant, but more intensive cattle raising may be introduced in steps, combining managed pasture and artificial feed. Small livestock development by small farmers should be promoted, supported by MARD for breed improvement and improved veterinary services. Contract arrangement for fattening with artificial and natural feed should become a common form of practice.

Table 5.2. Strategy for Transforming Subsistence Agriculture into Market-Oriented Agriculture in the Zambezi Low Land Area

Strategic component	Research and extension services	Agricultural credit	Other supports
Establishment of new cash crops (sunflower, soybean, sesame, exotic vegetables, etc.)	<ul style="list-style-type: none"> • Crop selection on the basis of land suitability • Input use • Post harvest treatment 	<ul style="list-style-type: none"> • Purchase of seed and agricultural input 	<ul style="list-style-type: none"> • Provision of seed • Support in marketing or guidance for linkages with processors • Support for farmer organizing • Mediation of contract arrangements between farmers and trader/processor
Small scale irrigation by self-help efforts (rice, vegetables, fodder crops, etc.)	<ul style="list-style-type: none"> • Site selection and land preparation • Crop selection and cycles • Design and construction of weirs • On-farm water management 	<ul style="list-style-type: none"> • Purchase of materials for weirs 	<ul style="list-style-type: none"> • Provision of seed • Support for farmer organizing • Support in marketing
Livestock improvement	<ul style="list-style-type: none"> • Veterinary services and breeding • Disease control • Management of grazing land 	<ul style="list-style-type: none"> • Purchase of improved stock and calves 	<ul style="list-style-type: none"> • Breed improvement • Guidance for linkages with processors • Slaughterhouse • Dips
Small livestock development	<ul style="list-style-type: none"> • Veterinary services and breeding • Disease control • Extension for fattening with artificial feed 	<ul style="list-style-type: none"> • Livestock sheds by small farmers • Purchase of stock, piglets, etc. 	<ul style="list-style-type: none"> • Breed improvement • Mediation of contract arrangements
Integrated rural development	<ul style="list-style-type: none"> • Crop selection 	<ul style="list-style-type: none"> • Improvement of living environment • Post harvest facilities 	<ul style="list-style-type: none"> • Improved rural infrastructure • Assistance in settlement

Strategic crops to be strengthened under various schemes are summarized as follows:

- Oil crops: sunflower, groundnut (expansion) mainly for confectionary and condiments with extension to control aflatoxin, soybean as the second crop in maize field under supplemental irrigation, and sesame with extension,
- Vegetables under irrigation for urban markets,

- Fruits such as mango, citrus, avocado, guava, and banana, and
- Cashews (on slopes).

Related strategic activities are various kinds of complete cycle processing. Oil crops and cashew particularly fit this scheme. Oil crops are processed into edible oils and related products with oil cakes used in animal feed manufacturing to support livestock development. Cashew may be processed in multiple ways as well known: apple into wine, nut into processed nut, and nutshell and bark for industrial oils. Its leaves can feed small livestock. An innovative way is to utilize natural silkworms on cashew leaves for textiles.

Particularly important for agricultural development in the Zambezi lowland area is the identification of high potential areas and development of integrated rural development models to fit to local conditions. Government initiative is expected in planning for various rural infrastructure and agricultural land development. Farmers should be assisted for initial establishment of livelihood and agricultural practice.

5.1.3. Strategy for mining

Mining in general is a risky business, as it depends on sub-surface resources. Established markets for mineral products are almost always international, often dominated by a few large suppliers, and prices are sometimes vagarious. The Study Area is endowed with a variety of seemingly rich mineral resources, but most of them are still at an early stage of development. A sensible approach to mining for the Angonia regional development, therefore, is to identify and concentrate on a few most promising mineral resources in view of the quality assessed on the basis of sufficient data and marketing prospects.

Following this approach, strategy for mining in the Study Area is established with the three broad components: 1) stage-wise development of Moatize coal, 2) systematic exploration of a few most promising minerals, and 3) local processing of non-metallic minerals. Each component is described below. For any activity in this sector, the private sector initiative is expected supported by MMRE for information services and by GPZ for facilitation of licensing and other procedures.

(1) Stage-wise development of Moatize coal

The coal reserve in Moatize has the highest priority for development. It was once developed successfully with the peak production of 600,000 tons/year, it has a well established reserve of 2.4 billion tons, and the quality is very high. It is potentially price competitive with about US\$15/ton at the site, while the international norm is US\$18/ton. In view of major issues of transportation means and product mix with markets, the following stage-wise development strategy should be taken.

Short to medium term

Production of Moatize coal should increase steadily for export to neighboring countries as well as the domestic market over the next five years or so. During this period, minimal rehabilitation of the Sena railway is expected to be undertaken. Coal briquette manufacturing should be introduced in the nearest future and expanded along with the coal production, as coal briquettes have ready and growing regional/domestic markets. Other possibilities for diversifying value-added products may be examined during this period by mine operators supported by MMRE to improve the viability of coal production, including coal sorting and pre-treatment.

Medium to long term

Full scale development of Moatize coal should be undertaken during Phase 2, aiming at 6.0 million ton annual production to be transported mainly by the Sena railway for shipping from the Beira port. A good portion of this will be in the form of coking coal. To utilize low quality thermal coal to be left after coking coal manufacturing, a mine-mouth coal-fired thermal power plant may be constructed. A preliminary power supply-demand analysis of Mozambique seems to justify the construction of a thermal power plant with at least 1,000MW capacity by the year 2025, even if all the proposed major hydropower plants are implemented (sub-section 5.4.4).

(2) Systematic exploration of most promising minerals

Systematic exploration should be undertaken for a few most promising mineral resources: copper at Mt. Chidue in Chiuta district, the Mt. Muambe deposit, graphite in Angonia, and apatite at Monte Muande. According to an early work, Cu contents of samples from Mt. Chidue are high (10 weight % Cu or higher). Further works should be undertaken to determine the reserve and also to explore possible cobalt association. The Mt. Muambe deposit should be further explored, aiming at the product mix of fluorite and rare earth minerals such as beryllium, niobium and strontium.

Graphite deposits in Angonia have been partly developed in small scale, and estimate of reserves made for some deposits. A systematic exploration should start with compilation and analysis of the existing data for all the deposits while small scale extraction may be undertaken immediately. Interest in the Monte Muande deposit centered on magnetite in the past, but it hosts sizeable marble massif containing both magnetite and apatite concentrations of economic importance. Reserves have been calculated to a depth of 140m for Fe and P₂O₅. Further exploration beyond the depth and into neighboring deposits at Monte Fema should be undertaken.

(3) Local processing of non-metallic minerals.

The Study Area is rich in other non-metallic minerals such as limestone, dimension stones

and marble, and clay (bentonite) as well as gravels and stones. Some of them are locally utilized in small scale. For instance, production of bricks from clay is commonly practiced throughout the Study Area. The existing lime production unit at Boroma may expand as the demand for lime increases for road construction, agriculture and other purposes. As the construction demand increases, local cement manufacturing may be established in the Study Area. Dimension stones and marble have good prospects for export to neighboring countries as well. Quarrying for gravels and stone will expand to produce construction materials, including gabions to be used for weirs, river bank protection and other purposes. Local processing of these non-metallic mineral resources should be promoted as a matter of principle as it will localize value-added and facilitate better management by local communities.

5.1.4. Strategy for industrial development

(1) Overview of industrial development

Existing situations

The Study Area has been isolated from more advanced areas in the south due to its geographic location and poor inter-regional infrastructure. Thus, competitions among industries are not severe, while their markets are quite limited. There exist only a few medium scale enterprises to lead the regional economy, and majority of enterprises are of micro-scale such as brick makers, bakeries and carpenters, employing two or three workers. Under the globalizing market economy, enterprises would have to face severe competition. Existing conditions in the Study Area related to industrial development may be summarized as follows.

- 1) The Study Area has large surplus of agricultural products that are largely unutilized, and farmers do not have motivations to produce more despite the potentials due to limited marketing opportunities for processing.
- 2) Import from neighboring countries dominates the local market, and competitions are severe for limited export markets of some goods.
- 3) Capital accumulations in the Study Area are small for products development and market expansion.
- 4) Industrial infrastructure is generally insufficient including transportation, electricity and telecommunications as well as the trading system.
- 5) Complicated administrative procedures tend to increase production costs.

Prospects

The industrial sector in the Study Area has two promising characteristics. One is that it is located in the productive agricultural area. The other is that it is on the crossroads of

international and inter-regional trade and distribution. Two main directions for industrial development in the Study Area, therefore, are 1) to strengthen linkages between the agricultural and the industrial sectors, and 2) to establish a distribution system for logistics to support the trade and distribution sector. Coordinated and concerted efforts by the public and the private sectors will be vitally important.

1) Establishment of agro-business base

It is in line with the government policy to promote characteristic industries in regions of underdeveloped industry. The Study Area may establish a new agro-business base for the Country by mustering its business resources.

2) Establishment of trade and commerce base

Tete city has a potential to become a center of trade and commerce in the north-central part of the Country, capitalizing on international cargoes to/from neighboring countries. A logistic center may be established to provide both high grade hardware (infrastructure) and software (operation system) for handling of goods, storage, packaging, and distribution controlled by a computer system linked with other logistic center in neighboring countries. The center will be operated by the private sector, and the provincial government will provide an office for custom clearance and other necessary procedures. As the first step, the center should start from nucleus facilities to support agri-trade with a cold storage for collection and distribution control of local crops.

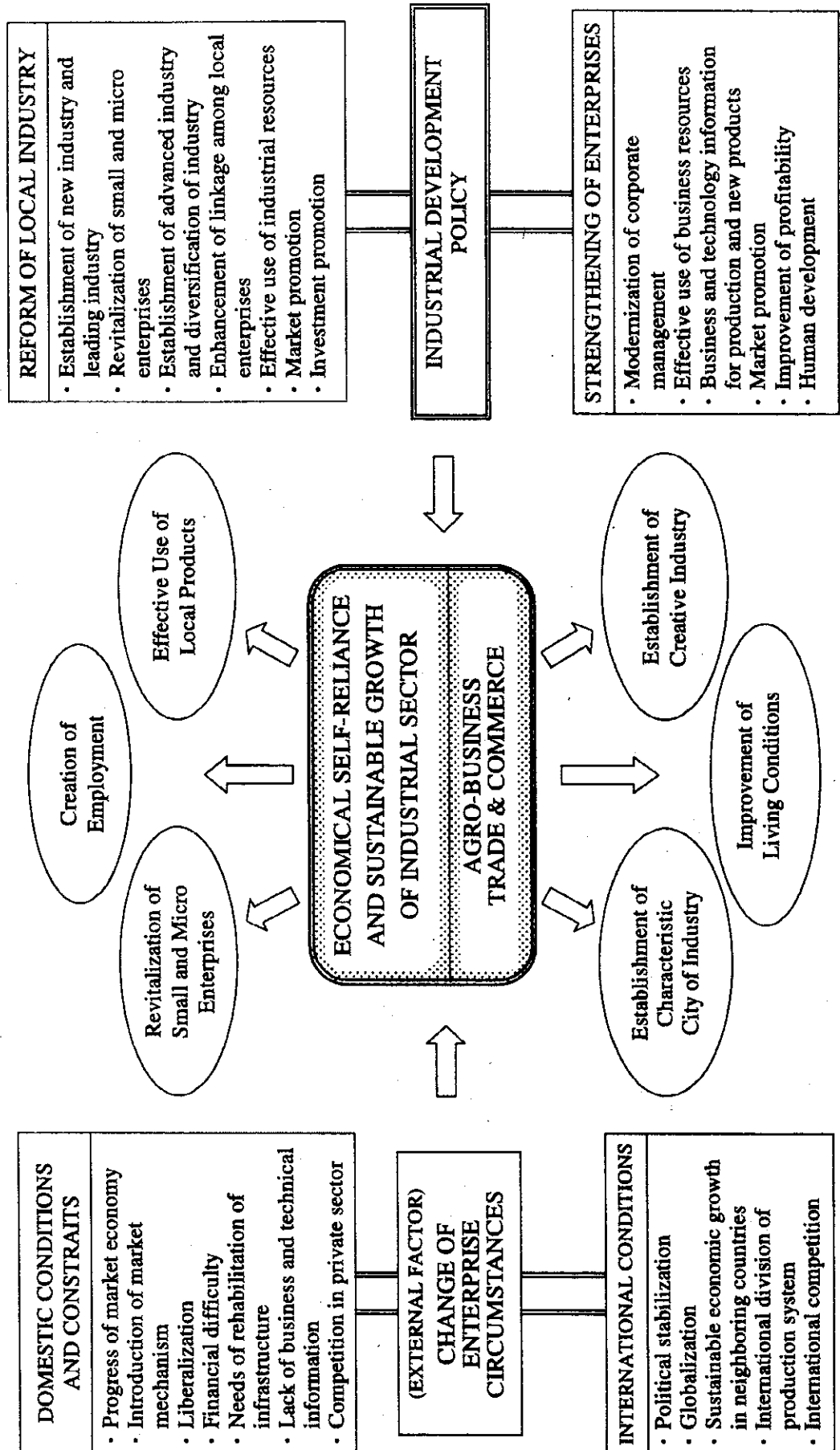
3) Public-private partnership

Industrial development can be achieved by joint efforts of the public and the private sectors. Roles of the public sector are to promote the reform of the local industrial structure from macro sector and country viewpoints, and to provide fundamentals for support of the private sector, such as infrastructure and policy measures. The role of the private sector is to improve company management with the support of the public sector. In the Angonia region, GPZ should play an important role in coordinating between the public and the private sectors for effective implementation of industrial programs.

(2) Basic strategy for industrial development

To attain the economic development objectives, the industrial sector can contribute particularly to generating high earning employment opportunities through diversifying economic activities and promoting linkages with agriculture, and trade and distribution, and pursuing national socio-economic integration and enhanced national status mainly through export processing. Basic strategy for industrial development in the Study Area is established with the four components as clarified below (Figure 5.1).

Figure 5.1. Prospects and Strategy for Industrial Sector in the Study Area



1) Structural reform of the sector

The industrial structure in the Study Area should be transformed over time. As the existing industries in the Study Area also exist in other areas, they have no competitive power in larger markets. An important direction of the structural reform is to create characteristic industries. Such industries should take advantage of rich agricultural products and mineral resources in the Study Area. Economic linkages should be reinforced, supported by improvement of transport and trade infrastructure and information services for business cooperation and marketing.

2) Enterprising reform

For the existing medium scale enterprises to lead the regional economies, they need to modernize their corporate management as a first step of the structural reform. Subsequently, external supports for industrial fundamentals should be provided to strengthen their financial and technical bases as described.

(a) Modernization and strengthening of corporate management

Local enterprises will have to introduce a modern management technology to conform to the competitive market economy. Small enterprises dominant in the Study Area should be organized by sector into associations, through which modernization measures should be introduced. For larger enterprises, entrepreneur training and company diagnosis should be provided. It is expected that the financial base of enterprises will be strengthened through the modernization of their management.

(b) Development of technology

There exist no research and development activities by existing institutions to support the industrial sector. It is difficult for existing enterprises to improve production technology and to develop new products due to the lack of technology information as well as fund. Therefore, a technology center is to be established by the public sector to facilitate technology development.

(c) Human development

The enterprise reform cannot be achieved only by entrepreneurs themselves. Their messages need to be understood by employees with special talents and skills and reflected in their actions on the job. Human development programs should be provided for both entrepreneurs and employees.

3) Market and investment promotion

(a) Market promotion

Medium scale enterprises as well as small and micro enterprises do not have capacities to collect market information necessary for their marketing decisions. An organization

for providing the market information needs to be established.

(b) Investment promotion

Introduction of foreign investments is an effective means to promote regional industrialization. To attract foreign investors to such inland and remote areas like Tete city, high points of the region, as compared to other regions, such as rich resources, abundant electricity and industrial water, and human resources of high technical and communication skills, need to be properly promulgated.

4) Revitalization of small and micro enterprises

The private sector holds a key for industrial development in the market economy. The private sector in the Study Area consists mainly of small and micro enterprises, which do not have capacity to improve their operation. Support measures, therefore, need to be carefully designed, covering a full spectrum of business factors from technology development to infrastructure improvement. An ultimate goal is to create and expand the market for these enterprises linked to the open world economy directly or indirectly. The industrial fundamentals necessary for development of industry cover a wide range of business activities such as capacity of technology, human development, access to credit, and infrastructure. Access to these fundamentals will provide incentives for informal sector activities to formalize themselves and become eligible.

The existence of the fundamental facilities is the most important factor to vitalize local enterprises not only in Mozambique but also in other countries. In Japan, for instance, many of the local governments have provided necessary facilities and measures in order to vitalize existing local industries, especially small and micro enterprises in their regions.

(3) Phasing strategy

The strategic measures proposed above should be taken in steps, changing emphasis in different phases. Phasing strategy is illustrated in Figure 5.2. Measures to revitalize small and micro enterprises should be taken throughout the planning period to make them viable economic units in the open economy. The reform of industrial structure should be undertaken in the short to medium term (Phase 1) to support the revitalization of local industry and to strengthen industrial linkages. Specific measures are provision of incentives, business center for market and investment promotion, agricultural associations, and establishment of an industrial technology and information research center (ITIRC).

The enterprise reform during the early part of Phase 1 should aim at modernization of corporate management, and be effected through training programs and enterprise diagnosis. It should support the introduction of new industries in the second half of Phase 1, including food processing, bio-briquette manufacturing, and import substitution industries.

Figure 5.2. Phasing Strategy for Industrial Development in the Angonia Region

Year	Structural reform of industrial sector	Strengthening of enterprise management
2002 Phase1	Objective: To support revitalization of enterprises; and To strengthen linkage Start year: 2002	Objective: To modernize corporate management Start year: 2002
	Program: Provision of governmental support Business center for market and investment promotion Agricultural associations Establishment of ITIRC	Program: Training program Corporate management Sales promotion Enterprise diagnosis
2005 Phase2	Renovation of infrastructure Roads and bridges Telecommunication	Objective: To introduce new industries Start year: 2005
		Program: Promotion of food processing Coal briquette Import substitution industries
2010	Market and investment promotion	
Phase3	Objective: To establish leading industry Start year: 2010	↓
	Program: Investment promotion zone for agro-business Distribution center and cargo terminal Iron and steel factory	⇒ Investment Promotion
	Renovation of Infrastructure Railway Electricity supply	↓
		Establishment of agro-business base and trade and commerce base

The promotion of market and investment will be most actively undertaken during Phase 2 after 2010. It should aim at establishing leading industry complex through investment promotion zone for agro-business, distribution center and cargo terminal, and iron and steel industry.

5.1.5. Strategy for services

Development of the service sector is especially essential in the Study Area. At present Tete city functions as the main node of commercial activities in the Study Area but lacks a commercial network covering the hinterland. The link between Tete city and other areas in the Study Area is weak, especially with border districts. As a result, many goods are imported from Malawi only to border district consumers. Their transactions are made in the Malawian currency, Kwacha. A weak commercial network results in undeveloped markets for farm produce and limited access to farm inputs and daily commodities for farmers. Penetration of the Malawian economy into the border districts is in a sense beneficial for the consumers because purchasing goods from Malawi is the only way available. An important policy direction would be to create an environment in the Study Area, in which purchasing goods reaching from Tete city becomes more attractive for those consumers. The resultant competition from Malawian suppliers would benefit consumers who now can select from who to buy goods. Measures needed to seek this policy direction would include improvement of physical infrastructures and streamlining of administrative procedures concerning investments.

5.2. Objectives and Strategy for Social Development

5.2.1. Objectives for social development

Overview of social conditions

Despite the restoration efforts after the civil war, the Study Area still faces acute shortages of education and health facilities. Teachers and health personnel are insufficient, and their geographic distribution is grossly unbalanced. Most rural people are deprived of access to existing education and health facilities, because of poor conditions of rural roads and socio-economic reasons.

These problems are more or less common to other regions as well, but higher incidence of poverty and lower literacy rates make these problems more serious in the Study Area. For instance, predominant diseases in Tete province are typical poverty-related diseases associated with poor hygiene and nutrition, limited water supply, and low education and economic levels. One problem specific to the Study Area is increase in HIV/AIDS cases because of its geographic location, and another is high mortality and fertility level. Also the Study Area has a large number of returned refugees and higher ratios of single parent families, and gender disparities are larger in the Study Area (subsection 2.1.1).

To pursue the regional development of the Angonia region, a prerequisite is to satisfy basic human needs. Given the limited human and financial resources, a community-based approach should be taken, whereby people would serve themselves for self-reliant

communities. Community organizing and people empowerment hold a key.

Objectives for social development

Social development is to develop such social conditions that are conducive to human development for various socio-economic activities. The local environment and indigenous resources would be best protected by establishing ownership among the local people and communities. Objectives for social development of the Angonia region are defined, reflecting these social, economic, and environmental concerns, and in line with the regional development objectives presented in subsection 3.1.2. The dual structure of overall and sector objectives mutually supporting one another would ensure a better balance between the economic, social and environmental development.

Social objectives for the Angonia regional development are expressed as follows:

- (1) To ensure universal access to primary education and primary health care as essential part of basic human needs, rectifying particularly the existing gender biases and rural-urban disparities;
- (2) To provide sufficient opportunities for higher education, skill training, and advanced health care to ensure high quality human resources will be maintained to support diversified economic activities; and
- (3) To organize and empower people to ensure the local people and communities will become accountable for environmental management.

5.2.2. Basic strategy for social development

Basic strategy for social development is double-pronged: focusing on the community initiative and government supports. Two components are as follows:

- (1) Enhancing local capacities, particularly recognizing the roles of women, to deal with disease prevention, sanitation, self-learning, self-help construction, environmental management, demining and other social issues for self-reliant society through education, training and awareness programs; and
- (2) Providing structured support for improving social infrastructure through:
 - a) establishing an effective health referral system,
 - b) developing demand responsive education and training systems, and
 - c) combining the area approach and the focused group approach for solving specific social problems.

Short to medium term

In the short to medium term, the emphasis should be placed on the following:

- (3) Improving existing primary education and health facilities in association with the improvement of various rural infrastructure in selected areas to increase the service

coverage effectively, particularly rectifying the existing gender biases and rural-urban disparities; and

- (4) Promoting community organizing and farmers/business associations for effective socio-economic activities and community/voluntary works, including rural women and their organizations.

Medium to long term

In the medium to long term, social service capacities should be much expanded with new facilities and improved infrastructure under the following strategy:

- (5) Expanding capacities of social facilities and personnel, including teacher training school, specialized training institutes, and training hospital as well as more primary and secondary schools and health posts; and
- (6) Enhancing mobility and communications capacities among various social organizations, and between different areas and sectors to ensure a wider coverage by given social facilities, respectively.

5.2.3. Strategy for education and training

In line with the basic strategy for social development, more specific strategies are derived for education and training. They are (1) improving primary school facilities, (2) promoting non-formal education and skill training, (3) developing the human resources base, and (4) supporting specialized training institutes.

(1) Improving primary school facilities

Initially, existing primary schools should be further improved with associated facilities such as adequate classrooms, toilets, and school furniture and supplies. Priority for the school improvement should be consistent with the improvement of rural infrastructure. The integrated rural development approach is quite relevant to improve the overall living conditions in selected rural areas to facilitate the deployment of teachers.

In the medium to long term, primary school facilities should be much expanded in steps to realize the universal coverage within the planning period. Capacity of the teacher training school in Angonia should be expanded to generate more qualified teachers.

(2) Promoting non-formal education and skill training

Non-formal education should be much emphasized to enhance human capacity in rural areas in general and to cope with the gender disparity in education and training attainment in particular. Teaching methods should be carefully developed to increase the effectiveness of the education and training. Using drama, case study, and puppet show has been proved effective in other parts of Africa. Topics and subjects in education and training include

health awareness, sustainable agriculture and resources management.

Community skill training should be undertaken to enhance the chance for rural people, especially women, to obtain part time employment during the off-farming season. It may cover basic community skills such as masonry, carpentry, cooking, baking, knitting and crocheting. These activities may also support small business development in communities. Local artisans should participate in teaching rural communities, and farmer-extension workers should provide training for trainers to teach and evaluate their skills and knowledge.

(3) Developing the human resources base

To meet the large, increasing and diversifying needs for education and training, the human resources base needs to be widened. This may be realized through broad-based participation of people to teach themselves. Use of local artisans and former-extension workers mentioned above are examples. Parents may be mobilized to teach certain subjects for their children at school. Moreover, many communities are willing to share the cost of construction of schools and health posts by contributing labor and some construction materials. Government supports for such activities would be a cost-effective way to improve school and health facilities. Provisions of appropriate numbers of teachers and health personnel should be guaranteed upon the completion of facilities in return for community contributions.

Formal training for social services personnel should also be strengthened in steps. The teacher training school in Angonia and the provincial hospital in Tete city should be supported to expand their training capacities.

(4) Supporting specialized training institutes

The Angonia regional development is expected to be supported by much diversified economic activities, including new crops, dairy livestock, a wide range of agro-processing, mining and mineral resources processing. To generate sufficient manpower responding to needs of new industries, professional/technical schools should be much strengthened. In particular, the agricultural training school in Angonia and the Institute of Mine and Geology in Moatize should be supported.

Moreover, more specialized training institutes and advanced education facilities may be established in the Study Area. Subjects to be covered by these new facilities may include soil management, agronomy, veterinary science, metallurgy and metal working in the short to medium term, and other engineering expertise, hydrology, water quality analysis and other water-related expertise in the medium to long term. Remote sensing, GIS and GPS may also be included.

5.2.4. Strategy for health development

Under the basic strategy for social development, health development in the Study Area aims at universal access to health care as essential part of basic human needs through a community-based approach. As available health resources are quite limited in the Study Area, focusing on preventive health care by empowering local people would be the most efficient and effective way to improve the overall health status. Strategy for health development in the Study Area is established with four broad components.

(1) Strengthening health promotion program

A lack of adequate knowledge on hygiene and sanitation due to low educational level is critical. Community nutrition education program, especially for women, will improve food habits which is essential for decreasing both infant mortality and maternal mortality. Although provincial health offices and donors have already implemented several health education programs such as 20 minutes weekly radio broadcasting in three different languages via radio together with dissemination of written health information materials, the effectiveness seem insufficient.

Diseases such as diarrhea and malnutrition, two major causes of childhood death, could be prevented by increasing health awareness. For example, people do not boil dirty water to make safe drinking water, and mothers do not understand importance of breastfeeding so that they start giving baby food to their new-born babies too early and babies easily get malnutrition. Health promotion should be carried out through community participation so that they can solve health problems by themselves. Since the lack of education is a most serious development issue in the region, strengthening of health education program should be pursued by collaboration with other sectors.

(2) Strengthening reproductive and child health interventions

Infant mortality and fertility in the Study Area is much higher than the national average. There seems to be a low awareness of spacing methods, low exposure to contraceptive information and disapproval of family planning by husbands. The reproductive and child health (RCH) interventions are anticipated to achieve multiple objectives, including improved health status of women of childbearing age and of their children, reduced level of fertility and population growth, and prevention of STI (sexually transmitted infections) including HIV/AIDS.

In countries or regions with such a high mortality and fertility level, health intervention for women is most efficient to improve total health status. This RCH approach is expected to reduce unwanted fertility and maternal and childhood deaths, thus enabling poor women to participate in economic activities and build a base of healthy human capital essential for economic growth. For successful intervention, other factors such as female education and

employment are expected to improve.

(3) Improving access to health services

Although the number of health facilities and health manpower has been increasing little by little, the provision of health services in the Study Area is absolutely insufficient. Primary issues in the Study Area are severe shortage of trained health personnel and maldistribution of health resources. An incentive program should be developed to attract health staff including medical doctors to work in currently under-served areas.

Training is important not only for increasing manpower but also improving quality of services. Improvement of training program and an increase in the number of students in training centers would be desirable. The training program for teachers in centers should be upgraded. Moreover, technical training for health assistants in health facilities and for health administrative staff is recommended.

(4) Strengthening management capacity in the health sector

Effective implementation of health programs depends on both technical and administrative management capacities. Since the health sector suffers from budget shortages and mobilizing more resources from the private sector is difficult in the Study Area, effective use of limited resources is important. Activities such as minimizing wastes as much as possible to reduce expenditure, providing education on self-care to decrease the number of patients with minor diseases will increase the efficiency of health programs.

Upgrading health information system is important for better needs assessment, planning, monitoring and evaluation of health services.

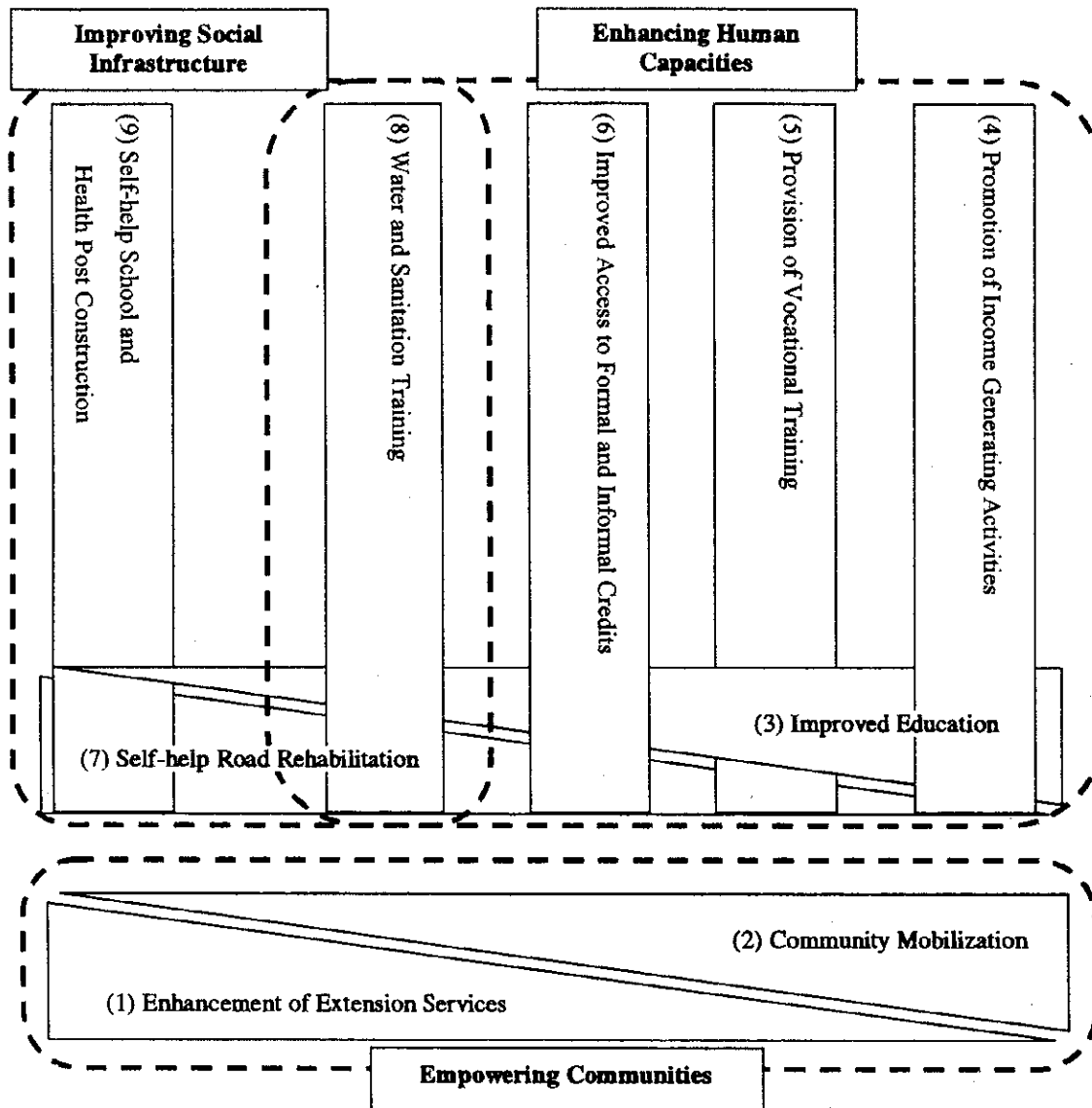
5.2.5. Strategy for community development

As part of the Study, community workshops were conducted to find out existing conditions and development needs as perceived by communities and to formulate projects corresponding to the identified needs. Two communities were chosen in each of six districts in consultation with respective district administrations. Through a series of consultations, workshops and discussions among the team of facilitators, strategy for community development has been established and projects formulated. The strategy is presented under the three broad components: (1) empowering communities, (2) improving human capacities, and (3) improving social infrastructure (Figure 5.3).

(1) Empowering communities

To build a strong foundation for human development of the Study Area, sense of self-governance and self-determination should be strengthened among communities. Empowered communities would support various projects and programs proposed in

Figure 5.3. Relationships between Community Development Strategies



different sectors. The following are more specific measures.

1) Enhancement of extension services

Local farmers should be mobilized as extension workers for two roles: (a) to provide appropriate technical information needed by community members, and (b) to initiate changes as catalysts. Fellow farmers should be encouraged to adopt new ways of doing things. More importantly, they would change their perception of human environment from negative to positive ones.

2) Community mobilization

Existing social organizations in communities should be utilized and re-vitalized to serve effectively their respective membership population. These organizations

include women's committee, water committee and justice committee as well as others under the traditional tribe structure. Some of these would function as autonomous entities to consult with and implement projects based on communities' needs. In implementing the Angonia regional development master plan, these organizations are expected to serve as vehicles for delivering various services.

In order to strengthen the roles of these social organizations, their missions should be reviewed thoroughly. Respective committee members should be responsible for the reviewing process. Their missions should be evaluated to see if they serve for the clients, and if respective activities are all along with the spirits of the missions. Through such a process, the community-based organizations are revitalized. If necessary, a new organization should be established. The result of the process will bring communities an increased confidence and awareness on governing their communities. Training should be provided to various levels of the community members. Leadership should be restored and strengthened through various community events and leadership training.

(2) Improving human capacities

Capacities of community members should be enhanced to cope with anticipated changes occurring in their physical and human environment as a result of implementing proposed projects/programs. They should become "pro-active" participants in projects implementation. Four strategic measures are proposed.

1) Improvement of formal and non-formal education

Informal education should be much emphasized to cope with the gender disparity in education/training attainment in the Study Area. Teaching methods should be carefully developed to fit the target population. Topics and subjects for education/training include health awareness, sustainable agriculture and resources management. Other issues may also be covered such as civil rights and land ownership. Region-wide radio broadcasting may be utilized for tree planting and anti-"slash and burn" campaigns.

2) Promotion of income generating activities

Income generating opportunities should be expanded and diversified while promoting environmentally sound and more productive agriculture. Among specific activities are small animal husbandry, horticulture, and fruit tree planting.

3) Provision of vocational training

Community skill training should be undertaken with dual purposes. One is to meet community needs, and the other is to provide rural people, especially women, income-generating opportunities during the off-farm season. The training may cover masonry, carpentry, cooking, baking, knitting, crocheting and others.

4) Improvement of access to formal and informal credit

Improved access to the capital along with business training assisted by extension services and work of civil organizations would promote entrepreneurship in rural communities. Improved access to the market would reinforce the establishment of small businesses that link between communities and the market.

Both formal and informal lending schemes should be employed in the implementation. Informal lending schemes need to be much emphasized, because of conventional lending institutions' inability to reach out to distant communities. The quality of services provided by formal lending institutions should be much improved. Priority should be given to those who trade basic goods and services to the communities. By providing such loans, communities are able to sell their surplus produce.

(3) Improving social infrastructure

Basic infrastructure in rural areas is grossly inadequate in the Study Area. To utilize limited financial and manpower resources, the governments and communities should collaborate for effectively improving service levels. Community consultations have revealed that all the communities surveyed are willing to bear some costs by contributing labor and materials locally available. The following are more specific strategies.

1) Self-help road rehabilitation

Self-help efforts of villagers should be mobilized to improve rural roads to improve communications between villages and to improve access to markets and social services. Local governments should support such efforts with technical guidance and provision of equipment and other materials.

2) Water and sanitation training

To maintain existing rural water supply systems, communities should become their owners. For a new water system, establishment of a self-governing "water committee" should be a prerequisite for installing facilities. Training should be provided to community members to be selected by the committee for basic maintenance of wells and pumps, and for organizational leadership and basic bookkeeping. Training should be provided also for dug-well construction and sanitation practices.

3) Schools and health posts construction

Construction of primary school facilities and rural health posts through collaborative efforts between communities and local governments should be promoted. Appropriate numbers of teachers and health personnel should be provided after the completion of the facilities.

5.3. Objectives and Strategy for Environmental Development

5.3.1. Objectives for environmental development

Overview of existing environmental conditions

Environment and natural resources in the Study Area have been extensively utilized without proper management. While the population density is still quite low, the extensive use has brought some areas close to the threshold of environmental capacity. Forest resources have been degraded, particularly in highland areas, and slash and burn practice has been widely undertaken in lowland areas. Moreover, soil fertility has declined significantly in most productive areas of the Angonia plateau.

These problems have reduced the production and water retention capacities of land in rural areas. They, in turn, affect the life in urban areas through reducing the availability of good quality groundwater and increasing flood risks, while the population pressure increases by rural-to-urban migration.

To pursue further the regional development of the Study Area, the environmental capacity needs to be restored and even enhanced. The problems that are already evident in rural areas need to be resolved properly such as deforestation, extensive slash and burn, and soil fertility reduction. At the same time, other problems that have just started to appear especially related to urbanization need to be addressed, including water quality of river water and groundwater, solid waste disposal, industrial pollution, and urban traffic. Properly addressing to the latter problems would be essential in realizing highly efficient urban-based production system. Thus the main environmental issue for the Angonia regional development is how to establish highly productive yet environmentally sound and sustainable production systems in rural and urban areas on the balance between economic, social and environmental development.

Objectives for environmental development

Environmental quality of the Angonia region should be improved to support productive economic activities, to provide comfortable living environment, and to protect the value of environment itself. These concerns over economic, social and environmental aspects of development should be reflected in the definition of objectives for the Angonia environmental development.

Objectives for environmental development of the Angonia region are defined as follows in line with the regional development objectives presented in sub-section 3.1.2. The dual structure of overall and sector objectives mutually supporting one another would ensure a better balance between the economic, social and environmental concerns. The objectives are expressed as follows:

- (1) To improve living environment in rural and urban areas with proper sanitation and

management of indigenous resources;

- (2) To restore and enhance the environmental capacity to support highly productive yet environmentally sound production systems in rural and urban areas, and
- (3) To maintain the present bio-diversity by protecting existing forest areas and restoring degraded forest areas.

Strategy to pursue these objectives is presented below for rural environment, urban environment, and environmental administration. Phasing strategy is also indicated.

5.3.2. Strategy for rural environment

As outlined above, some problems in rural areas are already evident such as deforestation, extensive slash and burn, and soil fertility reduction. These problems should be resolved or at least alleviated urgently. Soil fertility reduction may be alleviated by establishing proper agro-forestry practice formulated in the agricultural sector (Table 5.1). Rural environment may be subject to drastic changes as the Angonia regional development is implemented. To provide reference data for monitoring such changes and avoiding adverse effects, a resource inventory should be taken. These strategic measures are further described. An additional measure for medium to long term consideration is also discussed.

(1) Restoration of forest resources

On-going afforestation efforts should be much expanded especially in the Angonia highland areas. Guidelines related to selection of tree species should be established urgently. Afforestation with mixed species is considered preferable, combining fast growing trees with other indigenous trees. Selection should be based not only on land suitability but also on use of wood, prevention of diseases, soil degradation and other possible environmental problems.

In addition to massive reforestation projects, other options should also be taken for more broad-based restoration of productive capacity. On-farm tree planting for firewood as well as soil protection is an important option. Bamboo reforestation on riverbanks is another. These and other efforts combined should make effective watershed management through coordinated efforts by proper management organizations. As a prerequisite for effective watershed management, land tenure should be clearly established especially in forest areas and along rivers. Conventional rights granted by traditional authorities may be amenable to community-based management, but they need to be formally documented with legal support.

(2) Control of slash and burn

Slash and burn practice has been extensively undertaken in the Study Area, clearly beyond the need for shifting cultivation. Sometimes an extensive area is burned without even a

trace of any agricultural activity. Reasons for the practice may be multiple, including hunting, land ownership claims, and socio-cultural reasons.

For effective control, community involvement is indispensable to clarify specific reasons and to formulate and implement practical measures. Environmental education and awareness campaign may be undertaken to discourage unnecessary slash and burn. Alternative production systems need to be established to divert farmers from shifting cultivation with slash and burn.

(3) Resource inventory

Despite deforestation, slash and burn, and illegal hunting threatening various flora and fauna, the Study Area still holds a wide variety of species. Exact situations of flora and fauna, however, are not known as no comprehensive survey has been conducted in the Study Area. Since the Study Area is expected to undergo significant changes as the Angonia regional development is implemented, it will be useful to take a resource inventory as a reference for monitoring. Such an inventory may also provide convincing justification for the proposal to establish a wildlife reserve in the Chiuta and Chifunde districts.

(4) Landscaping with major infrastructure projects

This is a strategic measure to be considered in medium to long term. The Study Area contains some attractive landscapes and objects in rural areas, but none of them is outstanding except the Zambezi river itself. Value of the rural landscapes may be enhanced by carefully designed infrastructure for eco-tourism and rural tourism. Landscaping should be associated with major infrastructure projects such as dams, highways, railways and bridges.

5.3.3. Strategy for urban environment

Urban environmental problems are just emerging in Tete city such as water pollution, solid waste dumping and littering, some industrial pollution, and urban traffic. The city is developing rapidly, especially beyond the Zambezi river, where there is not even a proper road plan. These problems would aggravate as the urbanization is accelerated as expected by the Master Plan. Various urban infrastructure facilities should be improved in steps as the urbanization proceeds. Especially, urban water supply needs to be improved as a priority. Solid waste management and sewage treatment should follow, starting in Tete city. In the medium to long term, various urban amenity facilities should be introduced especially in Tete city, to attract more visitors and investors. These measures are further described.

(1) Planning for accelerated urbanization

While production capacity of land is restored and enhanced in rural areas, non-land based economic activities should be promoted to reduce the population pressure on limited land and to attain much higher level of economic performance. Accelerated urbanization is desirable for the Study Area to support diversifying socio-economic activities. This, however, would apply further stress on existing urban infrastructure and urban environment. Improvement of various urban infrastructure facilities should be planned in anticipation of accelerated urbanization. This applies particularly to Tete city and its vicinities, where inadequacies of some infrastructure have been felt already, including water supply, sanitation and urban roads.

To cope with the accelerated urbanization, planning and urban management capacities need to be much enhanced at the local level. The planning should be undertaken within a broader framework of regional development rather than just physical planning for urban facilities.

(2) Selective and step-wise improvement of urban infrastructure

Under the accelerated urbanization strategy, urban population will concentrate largely on Tete city and its vicinities. This would ease the population pressure on other secondary towns, where urban infrastructure should be selectively improved to support designated urban functions in accordance with the urban hierarchical system. At the same time, improvement of urban infrastructure in Tete city needs to be undertaken more vigorously. Urban water supply for Tete city needs to be expanded further, and urban roads should be improved including newly developing areas on a priority basis.

(3) Creation of urban amenity

Tete city is expected to serve as a functional capital of the central Mozambique. Tete city may be equipped with some center functions within the context of the Zambia-Malawi-Mozambique Growth Triangle (ZMM-GT) initiative. To serve these functions, Tete city needs to attract a large number of visitors and investors as well as immigrants. Urban amenity should improve in steps to attract more people to Tete city. In the medium to long term, Tete city should provide some high grade facilities such as a research institute and an advanced hospital and various amenity facilities such as cultural and sporting facilities and shopping arcades. The Zambezi river waterfront should be effectively utilized for some amenity facilities.

5.3.4. Strategy for environmental administration

As mentioned above, extensive use of environment and natural resources without proper management has brought some areas close to the threshold of environmental capacity. To

deal with drastic changes in rural and urban environment as foreseen, high level of environmental management is required. Given the limited administrative and financial capacities of local administrations, a broad-based approach is necessary to expand the capacity for environmental administration. Three strategic measures are recommended.

(1) **Community participation in watershed management**

Watershed management is essential for restoring and maintaining the productive capacity of land in rural areas, and involvement of local communities is a prerequisite as indicated above. To take a community-wide approach, all the leadership should be involved including traditional authorities, religious leaders and local politicians as well as all the stakeholders. To motivate community members for better watershed management, some incentives should be provided, by which they would receive material benefits from the use and management of forest resources. Some innovative scheme, Tchuma Tchatu in Cahora Bassa for example, may be introduced.

(2) **Enhancement of planning and urban management capacities**

Enhancement of planning and urban management capacities should be undertaken not only for physical planning of Tete city but more importantly for urban planning within the regional development context of the Study Area as a whole. GPZ may be in the best position for the purpose. The planning and urban management functions may be expanded at GPZ to work with physical planners of local administrations as well as Tete city and to prepare an urban development and management plan for the entire Study Area. Regulatory functions and financial management should be performed by respective local administrations and Tete city in line with the plan.

(3) **Enforcement of EIA**

Environmental impact assessment (EIA) is legally well established in Mozambique. It is administered by a directorate of MICOA. Conduct of EIA may prove to be instrumental in bringing all the stakeholders for any development project. Participation of officials, experts and potential investors as well as local communities in the EIA procedure would enlarge the expert capacity and resources. More importantly, relevant data and information would be shared by all the stakeholders, and discussions and decision making would be made open. This would better ensure protection or enhancement of environmental quality in the region against possible negative intervention from outside.

5.4. Objectives and Strategy for Spatial/Infrastructure Development

5.4.1. Objectives for spatial/infrastructure development

Objectives for spatial/infrastructure development of the Angonia region are established in

line with the regional development objectives presented in sub-section 3.1.2. Three objectives are defined to represent social, economic and environmental concerns, just like the overall objectives. This dual structure of overall and sector objectives mutually supporting one another would ensure a better balance between these three broad concerns. The spatial/infrastructure development objectives for the Angonia regional development are expressed as follows:

- (1) To facilitate the delivery of basic social services to rural people;
- (2) To support the outward-oriented production and marketing at local, regional and cross-regional levels for high economic growth; and
- (3) To reinforce community-based resources and environmental management.

For the first social objective, all the sub-sectors will contribute directly. Transport infrastructure should improve the access by rural people to social services available in community centers or other urban centers. Telecommunications should support, among others, better health services with a referral system and more effective education combining conventional and distance education. Water and power supply constitutes essential part of basic needs for all.

The second economic objective will be pursued at different levels with step-wise improvement of various infrastructures. These infrastructure facilities range from rural access roads to international arteries, from basic telephone services to multimedia network, from rural energy to power export, and from rural water supply to major dam development.

For the third environmental objectives, various infrastructure may contribute in different and sometimes subtle ways. Well maintained rural roads may be essential for monitoring and management of watershed and other resources by local communities. Telecommunications infrastructure will support information exchanges among stakeholders and well-informed decision making. Energy and water resources related infrastructures will more directly support this objective through empowering people.

Strategy to pursue these objectives is developed below by sector. Phasing strategy for short, medium and long term development is also discussed.

5.4.2. Strategy for transportation development

- (1) Basic strategy

Transport development for the Angonia region should be pursued under the following basic strategy with four components: 1) establishing a multi-modal transport system, 2) encouraging private sector participation, 3) enhancing community involvement, and 4) developing technical capability. Each component is described.

- 1) Establishing a multi-modal transport system

The existing transport system in the Angonia region is exclusively road-based. A fundamental issue for the long-term development of the transport system is modal composition: whether the Study Area should follow the motorization trend emerging in Mozambique or other modes should play comparatively more important roles. As a matter of principle, all the modes should be strengthened in a mutually complementary manner. Moreover, the development of the transport system in the Study Area should be complementary to the development of the inter-territorial corridor in order for the region to take advantage of its strategic location and to contribute to the national spatial and socio-economic integration.

A multi-modal transport system should be established for the region, linking airports, ports, railways and roads especially for cargoes. Components of such a system include international artery roads, the Sena railway, river transport for local and regional traffic including tourism, airport and local air services network, and some terminal facilities such as a bus terminal and inland container depot.

2) Encouraging private sector participation

Increasing private sector participation needs to be pursued in expanding resources for transport development. The private sector has already been involved not only in the construction but also in operation and management of some transport facilities in Mozambique. A regulatory framework for privatization of public transport operations may be made more effective. The Government should give incentives to private operators in the forms of tax exemption, concessionary loans, and appropriate fare structures. Concessionary loans may be applied also to purchase of vehicles.

3) Enhancing community involvement

Another way to expand resources for transport development is to enhance community involvement. This may be effected at the district and the local levels. District administrations are responsible for non-classified roads, but at present they do not have sufficient financial and administrative capacities even for routine maintenance. Capacities to manage non-classified roads at the district and the local levels should be expanded by community participation, while resource allocation to district administrations should increase, reflecting their increasing roles in coming decades.

4) Developing technical capability

Technical capability in the transport sector needs to be developed at the national and the regional levels. At the national level, design standards for roads should be established, hierarchical systems for ports and airports developed to serve local, regional and national needs, and user charges introduced for public transport operations. These may be reflected at the regional level in implementation and operation of some transport infrastructure.

Also technical capability of the ANE Tete office needs to be further developed not only to plan and implement classified roads but also to provide technical guidance to district administrations for improvement of non-classified roads with community involvement.

(2) Phasing strategy

The basic strategy is to be effected by changing emphasis on different strategic components and their application to different areas in short, medium and long terms. Strategy in the short to medium term and in the medium to long term is presented.

Short to medium term

A two pronged strategy may be taken for the transport development in the Study Area in the short to medium term with the following emphasis:

- 1) Improving non-classified roads to promote outward-oriented production at the local level; and
- 2) Upgrading international artery roads and transport infrastructure for Tete city and its vicinities to support limited outward orientation at the regional and the cross-regional levels.

Medium to long term

The following should be undertaken side by side to promote both the regional integration and the export drive in the medium to long term:

- 1) Establishing the hierarchical structure of transport infrastructure in line with the urban hierarchical system, inter-linking areas and activities of different levels for regional integration; and
- 2) Strengthening international terminal facilities to support the export drive.

5.4.3. Strategy for telecommunications

(1) Basic strategy

Telecommunications in the Study Area are least developed. Establishing reasonable telecommunication links within the Study Area as well as with major cities and towns outside is a pre-requisite to pursuing the regional development. While the basic telephone services should cover all the districts as a matter of urgency, high quality services should be introduced in steps for limited areas. Therefore, the basic strategy for telecommunications in the Study Area is established with the three components:

- 1) Accelerating telephone lines expansion;
- 2) Increasing public card phones in rural areas; and
- 3) Improving Tete city's telecommunication linkages with the outside world.

(2) Phasing strategy

Specific measures under the basic strategy will be taken in short, medium and long terms. The strategy by broad phase is present below.

Short to medium term

- 1) Providing basic telephone services to districts; and
- 2) Restoring and enhancing Tete city's linkages with the outside world through a repeater station at Carroeira.

Medium to long term

- 1) Expanding telecommunications network into rural areas from Tete city and district capitals; and
- 2) Linking Tete city with Beira through fiber optic cables.

5.4.4. Strategy for energy development

(1) Basic strategy

The basic strategy for energy development in the Angonia region is established with two components. One is to develop the full potentials of the region rich in various energy resources, and the other is to safeguard the environmental quality from exploiting use of energy resources. Each component is described.

1) Making the Angonia region a power export center

This is the strategy to devote the Study Area to the power supply system for the entire Country. The Study Area can contribute to this in two ways: development of large power plants, and creation of large demand centers. Three large hydropower plants are under various stages of development in or near the Study Area. Capacities of these plants are assessed as follows.

Project	Installed capacity (MW)	Annual energy generation (GWh)
Cahora Bassa north bank	1,960	9,201
Mepanda Uncua	1,230	5,774
Boroma	360	1,683
Sub-total	3,550	16,657

Power demand in Mozambique for domestic use and export has been projected at this time, referring to existing demand projections and introducing plausible assumptions. The total power demand is projected to reach 31,900GWh by the year 2025. Even if all the major hydropower plants are implemented, the total supply capacity will be 21,700GWh in 2025. The balance, some 10,200GWh may be met by a coal-fired thermal plant at the mouth of the Moatize coal mine as proposed.

Expansion of power supply in the Study Area should constitute an important part of the future integration of the Southern Africa Power Pool (SAPP). Creation of larger demand centers will facilitate the integration: one centering around Tete city and the other in Angonia highland areas.

While the power supply network is extended from the overall system's point of view, alternative sources of energy should be developed for areas away from the network. The latter may be either diesel generators for district or sub-district capitals or small systems based on alternative sources such as mini-hydro, solar and wind to serve rural settlements and activities. Combination of the power supply network extension and alternative energy would allow cost-effective expansion of service coverage by power supply and effective contribution to the integration of the SAPP.

2) Promoting environmentally sound and renewable energy use

Development of the full potentials of the region as a power export center as described above, should be combined with careful use of other indigenous energy resources. In remote rural areas, small independent power supply systems may be developed based on mini-hydro, solar and wind as mentioned already. Coal briquettes should be introduced to replace charcoal and firewood, and energy saving cooking stoves promoted. A communal solar energy project may be launched to allow farmers to get their batteries charged at a local solar center with a reasonable fee.

To promote these and other alternative energy uses, a renewable energy center may be established. The center may serve also as a venue for environmental education and campaigns to promote environmentally sound and renewable energy use.

(2) Phasing strategy

Under the basic strategy, more specific strategies may be taken in short, medium and long terms. These are presented below.

Short to medium term

The following should be undertaken:

- 1) District electrification with diesel generation, power supply network extension or alternative energy sources;
- 2) Development of local energy resources, including coal briquettes and pilot communal solar energy project;
- 3) Improvement of power supply in the Tete corridor and the Angonia highland areas; and
- 4) Preparation for hydropower development.

Medium to long term

The early efforts presented above will be expanded into the following:

- 1) Integration of the regional power supply network;
- 2) Implementation of dam projects on both the main stream and the tributaries; and
- 3) Establishment of a renewable energy center.

Eventually, with the completion of all the major dam projects, the regional power supply network will be fully integrated into the SAPP. Also the renewable energy center may serve as an information center for neighboring countries, serving their research, development and promotion needs as well.

5.4.5. Strategy for water resources development and management

Strategy for water resources development and management in the Angonia region is established with the following five components. Each is described below. Phasing strategy is also indicated.

(1) Multi-purpose water resources development and management

The practice of water resources development and management is still at a very early stage in Mozambique. The Study Area should pioneer in the application of modern water resources technologies as it has high potentials for water resources development largely unutilized and management needs are high due to unique climatic, hydro-geometric and soil conditions. In particular, multi-purpose dam projects should be formulated on the tributaries of the Zambezi river for irrigation, hydropower, flood control and urban water supply.

The concept of multi-purpose water resources development and management should be recognized through a feasibility study on a multi-purpose dam project in the short term. EIA covering both natural and social environment is important part of the feasibility study as well as consultation with local communities and other stakeholders. Technical capability for modern water resources development and management should develop in the medium to long term through continual implementation and operation of multi-purpose dam projects.

(2) Step-wise introduction of irrigated agriculture

The first step to substantive introduction of irrigated agriculture in the Study Area may be to implement small scale irrigation schemes to allow small farmers to gain experiences and to convince them of the utility of the irrigation. Simple weirs may be constructed across small tributaries and streams to raise the level of water, which would be introduced into contour canals and gravity irrigation. One possibility is to utilize gabions that can be produced by utilizing gravels and stones widely available in the Study Area and the local

people's skill. Bamboo may be used instead of steel wire, if necessary to reduce costs. Alternatively, sand bags and/or logs may be used as already attempted in the Study Area. Local communities should better be involved in the identification of sites for weirs and suitable agricultural areas as well as construction works.

Small farmers should be supported not only for the construction works but also for operation and management of irrigation schemes. Short training courses may be effective on crop cycles, on-farm water management for irrigation scheduling and drainage, and soil and slope protection as well as weir design, canal alignment and land preparation.

Large scale, possibly commercialized irrigation development may follow the implementation of many small irrigation schemes. With the experiences to be gained through the small irrigation schemes, small farmers should be able to participate in the large scale development as active stakeholders rather than subordinate contract farmers. Simple weirs would not obstruct in any way the construction of large irrigation facilities.

(3) Community participation in watershed management and rural water supply

Slash and burn practice is widespread in the Study Area. Especially toward the end of the dry season, extensive areas undergo this practice, well beyond the level necessary for shifting cultivation. This practice needs to be controlled. Also upper catchment areas of main tributaries have been degraded by deforestation. Watershed management is essential to restore and maintain production and water retention capacities of the entire river basins. Given the magnitude of the existing problem and the need for a broad-based approach, community-wide involvement is necessary under the leadership of traditional authorities, religious leaders and politicians.

Population coverage of rural water supply is still quite low, more or less one third of the rural population. What is more disturbing is that many hand pumps installed on wells and boreholes are not working. A key for improving not only the service coverage by new installations but also operation and management of wells and boreholes may be to encourage community involvement in the identification of needs and sites for wells and boreholes as well as their installation. Training should be provided to community members for regular maintenance and minor repair of pumps.

(4) Accelerated expansion of urban water supply

Rapid urbanization is envisioned in the Study Area in the coming decades. Urban water supply capacity needs to be expanded rapidly to meet the growing demand. Especially for Tete city and its surroundings, urgent measures need to be taken to alleviate the existing stress. At the same time, existing projects and plans should be reviewed, and medium and long term measures formulated in accordance with the Angonia regional development master plan.

In the short to medium term, existing water supply systems for district capitals should be improved with rehabilitation, restoration and expansion of service areas. These systems will be continually expanded as the urbanization proceeds.

(5) Enhancing planning and coordinating capacities.

Water resources development and management naturally involve various sectors such as agriculture, industry, energy, environment and social services. These sectors are usually under jurisdictions of different sector agencies, as is the case in Mozambique as well, to make coordinated actions difficult to take for effective development and management. Planning and coordinating functions for water resources development and management need to be much strengthened especially at the local level. GPZ may be in the best position to strengthen these functions in cooperation with local governments.

Effective development and management of water resources should be supported by proper information and accurate data. Among the most important data are hydro-meteorological data, data on existing water use facilities (e.g., location, dimension and capacity of wells and boreholes), and data on groundwater resources. For proper information on development needs and operational conditions of existing facilities, involvement of local communities would be essential. Local communities should also be involved in monitoring and evaluation activities related to natural environment including watershed management, and social environment such as change in social values and habits due to improved access to safe drinking water, irrigated agriculture, and dam projects.

Chapter 6. Development Projects and Programs

The Angonia regional development to the year 2025 will be supported by a set of development projects and related institutional measures constituting the Angonia regional development master plan (the Master Plan). Institutional arrangements for the implementation of the Master Plan are recommended in Section 4.3. Sector specific institutional measures are suggested in Chapter 5 under the strategy by sector. Some measures are combined with specific project proposals to define programs. This chapter presents projects and programs.

Most projects and programs have been newly formulated through the master planning. Some have been taken from existing plans and programs of sector agencies, and modified or expanded through discussions with relevant agencies and experts.

6.1. Structure of Angonia Regional Development Master Plan

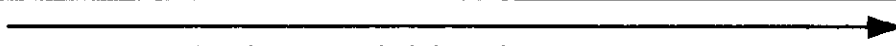
6.1.1. Idea of basic strategy

The basic strategy for the Angonia regional development has been established with three components: (1) strengthening spatial structure, (2) promoting outward-oriented production, and (3) enhancing development administration at regional/local levels. Promotion of outward-oriented production and services, and linkages at different levels are the crux of the strategy. This has three aspects. First, development efforts should be focused on Tete city and its vicinities to lead the development of the entire Angonia region. Second, at the same time, socio-economic activities in dominant rural areas should be enhanced so that they will not be left behind and hopefully catch up with more advanced areas. Third, economic linkages should be promoted between communities, between rural and urban areas, and between the Angonia region and outside world. To support these activities, the spatial structure should be strengthened, and the development administration enhanced particularly at the regional and the local levels.

Spatial structure strengthening encompasses improvement of rural or intra-regional infrastructure, inter-regional infrastructure, and international infrastructure. These improvements should be undertaken in a mutually complementary manner, aiming at establishing a multi-modal transportation network linked with neighboring countries, supported also by improved urban system, telecommunications and other infrastructure. Outward-oriented production and services in various forms should be undertaken at different levels in different phases in different areas along with the improvements of spatial infrastructure. Development administration should be enhanced in steps throughout these improvements and developments. Relationships between the three components of the basic strategy are illustrated in Figure 6.1.

Figure 6.1. Relationships between Three Components of Basic Strategy

Spatial structure strengthening	Outward-oriented production		
	Phase 1	Phase 2	Phase 3
Intra-regional	Throughout rural areas	Throughout the Study Area	-
Inter-regional	Tete city	Secondary towns Tete city and vicinities	Throughout the Study Area
International	Border-trade (dominantly informal)	Border trade (formalized) Tete city	Tete-Moatize corridor A few secondary towns



Development administration enhancement

6.1.2. Strategic project packaging

Reflecting the idea of the basic strategy described above, all the proposed projects and programs are packaged into four broad programs:

- (1) Urban Development Initiative,
- (2) Rural Socio-economy Enhancement,
- (3) Spatial Structure Strengthening, and
- (4) Local Accountability Enhancement.

Urban Development Initiative pursues the outward orientation in urban areas. Focus will be placed first on strengthening Tete city and its vicinities to lead the Angonia regional development at a high level, and also on creating another urban area to serve the Angonia highland. Rural Socio-economy Enhancement pursues outward orientation in rural areas to diversify activities and raise productivity so that rural people can link up with more advanced areas.

Spatial Structure Strengthening pursues the spatial structure strengthening strategy at different levels to facilitate the integration of rural and urban activities, and between the Angonia region and neighboring regions and countries. Local Accountability Enhancement pursues the development administration enhancement strategy on a much more expanded basis to ensure that human, social and environmental capacities in the region will increase to support all the activities indicated above.

6.2. Development Projects and Programs

A total of 48 projects and programs have been formulated in different sectors. They are packaged into the four broad programs as described above. Additional projects have been formulated through community workshops. These projects constitute a special program for participatory development. All the proposed projects and programs are listed by broad

program in Tables 6.2 through 6.6 with title, location, implementing agencies, and objectives. Profiles of most projects and programs are contained in Appendix.

6.3. Indicative Investment Schedule

6.3.1. Framework for invest planning

To attain the economic growth levels specified by the socio-economic framework, large amounts of investments would be required by the public and the private sectors in the proposed projects and programs in the next 25 years. Additional investments would be induced in the private sector. Including development expenditures on regular programs of central ministries, the total amount of investment required for the Angonia regional development is estimated and fund availability from different sources is examined.

To estimate the public investment that may be mobilized at the national level in different periods, the following assumption are made for macro economic performance:

- (1) The GDP growth will be at the annual rate of 6% to be sustained through 2025;
- (2) The public investment as a percentage of the GDP will be 10% up to 2010 and increase to 12% thereafter; and
- (3) The total investment to the GDP will increase from a 20% level at present to 25% by 2015; consequently the private investment to the GDP will increase from 10% at present to 13% by 2025.

These assumptions are based on the macro economic performance of Mozambique in recent years (Table 6.7) and considered appropriate for a long-term planning purpose. For instance, the Mozambican GDP increased at the average annual rate of 6.3% in 1990-1999. The public investment as a percentage of the GDP was 12.5% in 1996 and 1997, and has a tendency to decrease as foreign aids decline. As the Mozambican economy gains momentum, the 10% level should be maintained and slight increase should be attained in the medium to long term future. The total investment to the GDP should steadily increase as the private investment increases.

Efficiency of investment is measured by the incremental capital-to-output ratio (ICOR). The cumulative investment during 1996-99 is US\$3,544 million. The incremental GDP attained over the same period is US\$1,232 million. Thus, the ICOR during this period is calculated to be 2.88. This is an indicative number as there exist time lags between investment and economic growth, but nevertheless this level of efficiency is respectable. ICOR in the Study Area must be larger than this, meaning less efficient investments in the foreseeable future and assumed at 3.5 up to 2010, improving to 3.0 thereafter as a result of effect at planned investments.

Table 6.1. Urban Development Initiative with 13 Projects/Programs

No.	Project Title	Location	Implementing Agencies	Objectives
1.1	Tete-Moatize Core Urban Development	Tete city, Moatize town and vicinities	Inter-agency, private firms GPZ (coordination)	(1) To create an urban core with high grade urban infrastructure to attract investments; and (2) To provide high grade urban services for the central Mozambique and some center functions for the ZMM-GT
1.2	Tete City Water Supply Expansion	Tete city	MPWH, Agua de Tete	(1) To relieve urgently stress on existing water supply system in Tete city due to rapid population increase; and (2) To improve quality of city water supply continuously to meet increasing demand.
1.3	Urban Roads Improvement	Tete city, Moatize town	ANE, Tete city, Moatize town	(1) To improve urban roads in Tete city and Moatize town to support urban-based economic activities; and (2) To improve living environment of local residents.
1.4	Tete Corridor Power Supply Expansion	Tete city and corridor	EDM	(1) To improve the power supply in Tete city; and (2) To expand the power supply along the corridor up to Zobue.
1.5	Tete City Telecommunications	Tete city	TDM	To strengthen linkages between Tete city and countries and major cities in neighboring regions.
1.6	Agro-Industrial Zone Establishment	Moatize	MPWH, GPZ, private firms	(1) To introduce simplified procedures concerning business activities including special incentives for the Zambezi Valley; and (2) To provide high grade infrastructure for investment promotion.
1.7	Business Center Establishment	Tete city	MPWH, Ministry of Interior, private firms.	(1) To create institutional framework and establish a center to allow private business initiatives to be smoothly processed and authorized; (2) To provide all kinds of market information; and (3) To support these functions with advanced IT and audio equipment.

(No.)	(Project Title)	(Location)	(Implementing Agencies)	(Objectives)
1.8	Industrial Technology and Information Research Center	Tete city	Ministry of Industry and Commerce	To provide production technology and information necessary for business management.
1.9	Moatize Coal Development	Moatize	Private firms	(1) To expand production of Moatize coals; and (2) To diversify coal products through sorting and pre-treatment as well as cokes and bio-briquettes manufacturing.
1.10	Institute of Mines and Geology Support Program	Tete city	MINED	(1) To improve facilities at the Institute of Mines and Geology; and (2) To expand subjects and curricula at the Institute.
1.11	Moatize Coal-fired Thermal Power Plant	Moatize	Private firm	(1) To utilize effectively large amount of thermal coal to be generated by coking coal production; and (2) To contribute to making the Angonia region a power export center in the Southern Africa
1.12	Small-scale Iron and Steel Manufacturing	Moatize	Private firm	(1) To supply high quality steel products, utilizing local resources; and (2) To introduce a leading industry for vitalization and strengthening of local economic linkages.
1.13	Angonia Highland Integrated Urban Development	Ulongue and vicinities	Inter-agency, GPZ (coordination)	(1) To pursue highly productive development through integrated development of agriculture, agro-industry and related services; and (2) To create a high density area for effective provision of social services.

Source: JICA Study Team.

Table 6.2. Rural Socio-economy Enhancement with 11 Projects/Programs

No.	Project Title	Location	Implementing Agencies	Objectives
2.1	Integrated Rural Development Program	Zambezi lowland areas	Inter-agencies, GPZ (coordination)	(1) To expand settlements in sparsely populated Zambezi lowland areas by improving rural infrastructures; and (2) To create productive rural environment based on more intensive agriculture.
2.2	Small Irrigation Schemes Development	Along small tributaries of six districts	MARD, the private sector	(1) To convince farmers of effectiveness of irrigation in increasing production and yields; and (2) To develop and accumulate experiences in irrigated agriculture and marketing of diversified crops.
2.3	Integrated Farming Systems Development Program	Angonia highland areas	MARD	(1) To establish various integrated farming systems by small farmers; and (2) To increase production of both crops and livestock and surpluses for processing.
2.4	Revuboe Multipurpose Dam	Revuboe river	MPWH, MARD, GPZ (coordination)	(1) To pioneer multipurpose development and management of water resources in Mozambique; and (2) To contribute to enhanced agricultural productivity, stable power supply, flood control, and water supply expansion for Moatize.
2.5	New Cash Crops Establishment Program	Zambezi lowland areas and slope land	MARD	(1) To establish/expand oil crops such as sunflower, soybean, groundnuts and sesame; and (2) To promote cashew production on slope land.
2.6	Livestock Development Program	Region-wide	MARD	(1) To promote small and large animal husbandry by providing disease control and improved veterinary services; and (2) To introduce improved breed to increase productivity, including milking cattle.
2.7	Farmers' Associations Promotion Program	Region-wide	MARD	To assist farmers organize associations that would provide technical assistance and functions as channel for procuring farm input and daily commodities as well as marketing farm produce.

(No.)	(Project Title)	(Location)	(Implementing Agencies)	(Objectives)
2.8	Grain Storage Development	Tete city, Ulongue	Agricultural cooperatives, grain millers' associations	(1) To expand grain storage capacity in the Angonia region to stabilize grain supply and prices; and (2) To support the region to become a granary in the central Mozambique
2.9	District Water Supply	District capitals of six districts	MPWH, Agua Rural	To improve water supply to six district capitals through rehabilitation of existing systems and expansion of service areas.
2.10	Rural Electrification	Region-wide	Ministry of Mineral Resources and Energy, EDM	(1) To electrify all the district capitals; (2) To develop independent supply systems for remote areas; and (3) To promote the use of local energy resources.
2.11	Mineral Resources Exploration Program	Mt. Chidue, Mt. Muambe, Angonia, Monte Muande	Ministry of Mineral Resources and Energy Ministry of Mineral Resources and Energy	To explore systematically more promising mineral resources such as copper at Mt. Chidue, the Mt. Muambe deposit for fluorite and rare earth minerals, graphite in Angonia, and apatite at Monte Muande.

Source: JICA Study Team.

Table 6.3. Spatial Structure Strengthening with 11 Projects/Programs

No.	Project Title	Location	Implementing Agencies	Objectives
3.1	Rural Roads Self-help Improvement Program	Region-wide	District administrations, ANE Tete	To maintain and repair rural roads by supporting self-help efforts of people in rural areas
3.2	Secondary Roads Improvement	Region-wide	ANE	(1) To rehabilitate sections of secondary roads to make them passable under any conditions in the short run; (2) To improve some secondary roads in steps to ensure access to all the district capitals; and (3) To resolve network deficiencies to establish efficient secondary roads system in the long run.
3.3	International Highways Upgrading	Tete city, Moatize, Chiuta, Chifunde	ANE	(1) To upgrade two regional artery roads to international standards; (2) To improve locational conditions of Tete-Moatize corridor for investments; and (3) To improve access to other areas of the region
3.4	Sena Railway	Sofala province, Manica province, Moatize, Tete city, Malawi	CFM-Central, private firm	(1) To provide driving force for Zambezi Valley and Angonia regional development; (2) To facilitate export of Moatize coal and other local products; and (3) To contribute to establishment of a multi-modal transport system linked with neighboring countries.
3.5	Zambezi River Transport Development	Zambezi river	Tete city, private firm	(1) To utilize the Zambezi river as inexpensive means to transport local goods; and (2) To introduce river cruising for tourism.
3.6	Bus Services Improvement	Region-wide	ANE, private firms	(1) To improve bus services by encouraging competition among private bus operators; and (2) To establish a bus terminal in Tete city to facilitate long distance services.

(No.)	(Project Title)	(Location)	(Implementing Agencies)	(Objectives)
3.7	Inland Freight Terminal	Tete city	MPWH, private firms	(1) To establish a freight terminal in Tete city to facilitate long haulage freight transport; and (2) To contribute to establishment of a multi-modal transport system linked with neighboring countries.
3.8	New Zambezi River Bridge	Tete city	ANE, private firms	(1) To meet future traffic demand on international artery across the river; (2) To establish a symbol of regional and national integration in the new era; and (3) To contribute to high image of the region and Tete city.
3.9	Tete International Airport Upgrading	Tete city	Dept. of Civil Aviation, private firm	(1) To upgrade facilities and services of the Tete airport; and (2) To establish a local air services network linked with neighboring countries.
3.10	Rural Telecommunications	District capitals	TDM	(1) To establish telephone links to all the district capitals; and (2) To provide basic telephone services to most larger settlements.
3.11	Border Facilities Improvement	Zobue, Calomue, Biri-biri, Cuchamano, Cassacatize, Misasale.	Immigration and Customs, district administrations	(1) To improve immigration and customs facilities at border points; and (2) To improve market facilities for border trade.

Source: JICA Study Team.

Table 6.4. Local Accountability Enhancement with 13 Projects/Programs

No.	Project Title	Location	Implementing Agencies	Objectives
4.1	GPZ Strengthening	Tete city	GPZ	(1) To strengthen GPZ functions for planning and coordination and coordination between the public and private sectors for industrial development; and (2) To expand GPZ capacities for fields to establish GPZ ownership.
4.2	Local Planning and Management Capacity Enhancement	Region-wide	GPZ, Tete city, district administrations	To enhance local planning and management capacity to support accelerated urbanization within context of the Angonia regional development.
4.3	Zambezi River Basin Database Development	Tete city	GPZ	(1) To establish comprehensive database for the Zambezi river basin covering both natural and socio-economic data; and (2) To contribute to promotion of multi-national cooperation on the entire Zambezi river basin.
4.4	Corporate Management Modernization	Tete city, Angonia, Moatize	Public vocational schools	To modernize corporate management of existing enterprises to enhance the private sector and increase competitiveness of enterprises.
4.5	Tete Provincial Hospital Upgrading	Tete city	MOH	(1) To improve health services of the Tete provincial hospital through upgrading medical equipment; and (2) To establish a provincial center for AIDS related activities.
4.6	Health Referral System Establishment	Region-wide	MOH, district administrations	(1) To establish referral system between hospitals at different tiers for effective health care coverage with limited resources; and (2) To introduce telecommunications systems to improve the operation of the referral system.
4.7	Health Awareness Enhancement Program	Region-wide	MOH	To enhance awareness for preventive health and sanitation among local people through information and education campaigns.

(No.)	(Project Title)	(Location)	(Implementing Agencies)	(Objectives)
4.8	Distance Education Program	Region-wide	MINED	(1) To attain complete coverage for primary education; and (2) To improve quality of education at all levels by establishing an open education system linked to qualified individuals and institutes outside.
4.9	Primary Schools Improvement	Region-wide	MINED	(1) To improve existing primary school facilities in short to medium term; and (2) To expand capacities of primary education in steps in medium to long term.
4.10	Watershed Management Program	Upper and middle catchment areas of three tributaries	Local administrations, communities, MICOA	(1) To restore and enhance environmental capacity of tributary basins; and (2) To establish community-based management organizations for watershed management and sustainable use of water and land resources.
4.11	Environmental Inventory	Chiuta, Chifunde	MARD, MICOA, Tete province, GPZ	(1) To conduct an environmental inventory to create a database on social and natural resources; and (2) To prepare comprehensive data on bio-diversity to justify the establishment of a wildlife reserve.
4.12	Urban Environment Improvement Program	Tete city	MPWH, district administration	(1) To realize clean and sanitary urban environment through proper management of solid wastes and wastewater; and (2) To create urban amenity for local residents and visitors.
4.13	Renewable Energy Center	Tete city	GPZ, Ministry of Mineral Resources and Energy.	(1) To establish an information center with a database on renewable energy resources and uses; and (2) To provide technical assistance to people in rural areas for renewable energy application.

Source: JICA Study Team.

Table 6.5. Special Program for Participatory Development with 10 Projects/Programs

No.	Project Title	Location	Implementing Agencies	Objectives
S.1	Enhancement of Extension Services	Six districts and Tete city	Provincial Agricultural Office, MARD, NGOs	(1) To enhance roles and capacities of rural extension services; and (2) To encourage positive perception and behaviors for changing human environment.
S.2	Community Mobilization	Six districts and Tete city	Provincial Agricultural Office, MARD, NGOs	To utilize and revitalize existing social organizations in communities to serve effectively their respective member population.
S.3	Adult Education on Land Ownership and Sustainable Agriculture	Dala, Mbinhe, Namadende, Aphande, Makanje.	Dept. of Agriculture, Dept. of Education, Provincial Government.	To acquire knowledge, skills and attitude on environmentally sustainable agricultural practices.
S.4	Small Animal Husbandry Program	Chimwala, Mkanta, Nsadzu, Chipiri, Ntowe, Namadende Banga.	Provincial Agricultural Office, MARD, NGOs	To increase income from sales of small animals in the local market.
S.5	Horticulture/Tree Planting Program	Chimwala	Dept. of Agriculture, Dept. of Education, Provincial Government.	To promote a variety of fruit bearing trees and vegetables specifically to women in rural communities.
S.6	Community Skills Center	Chipiri, Lumadzi, Ntowe	Dept. of Agriculture, Dept. of Education, Provincial Government.	To acquire knowledge and skills on community skills such as carpentry, masonry, furniture making, etc.
S.7	Small-scale Business Program	All 12 communities surveyed.	Dept. of Agriculture, Dept. of Education, Provincial Government, Chamber of Commerce	To diversify sources of income by encouraging starting any kind of small business through provision of small informal credit.
S.8	Self-help Road Rehabilitation	Dala, Mukantha, Nsadzu, Chipiri, Lumadzi, Mbinhe, Aphande, Banga, Makonje	Dept. of Roads, Provincial Government.	(1) To improve road network and communication between villages within communities; and (2) To improve access to market and social services.

(No.)	(Project Title)	(Location)	(Implementing Agencies)	(Objectives)
S.9	Water and Sanitation Technician Training	Dala, Mukantha, Nsadzu, Lumadzi, Mbinhe, Aphande, Banga, Makonje, Ntowe.	Agua Rural	(1) To improve and maintain existing water supply systems; and (2) To improve sanitary conditions of communities.
S.10	Schools and Health Posts Construction	All 12 communities surveyed.	Dept. of Education, Dept. of Health, Provincial government	To improve the quality of social services delivery through collaborative initiatives of communities and the government

Source: JICA Study Team.

Table 6.6. Macroeconomic Performance of Mozambique in Recent Years

	1996	1997	1998	1999
Gross domestic product (Mt.x10 ⁹)	32,719	40,554	46,427	50,827
Gross domestic product (US\$x10 ⁶)	2,937	3,555	3,917	4,169
GDP growth (% p.a.)		21.0	10.2	6.4
Total investment/GDP (%)	20.9	18.3	23.5	32.6
Public investment/GDP (%)	12.5	12.5	10.0	–
Private investment/GDP (%)	8.4	5.8	13.5	–
Total investment (US\$x10 ⁶)	614	651	920	1,359

Source: *Statistical Year Book 1999*.

Provincial allocation of the public investment reflects development policies of the Government. In the recent past, the public investment concentrated heavily on the southern part of the Country, centering on its capital. This is changing, reflecting the policy to reduce disparities among regions and provinces, and also the decentralization policy. For the long time planning purpose, it may be reasonable to assume that the public investment will be allocated to provinces and regions in proportion to the population in any year.

Based on these assumptions the public investment that may be allocated to the Angonia region is estimated as shown in Table 6.7. As shown, the cumulative public investment at the national level is calculated to be US\$5,171million for 2000-10, US\$2,262 million for 2010-20, and US\$6,313 million for 2020-25. Private investments will become comparatively larger than public investment in the second and the third phases. From the commutative total investment and the incremental GDP, ICOR value is calculated to be 2.91 in 2000-10, 3.20 in 2010-20, and 2.85 in 2020-25. The public investment allocation to the Study Area is calculated to be US\$231.9 million in 2000-10, US\$435.3 million in 2010-20, and US\$311.2 million in 2010-25 for a total of US\$978.4 million over the 25-year period.

Table 6.7. Estimation of Public Investment Allocation to the Study Area

	2000	2010	2020	2025
GDP (US\$x10 ⁶)	4,500	8,060	14,430	19,310
Incremental GDP (US\$x10 ⁶)		3,560	6,370	4,880
Cumulative public investment (US\$x10 ⁶)		5,171	9,262	6,313
Cumulative private investment (US\$x10 ⁶)		5,171	11,114	7,575
Cumulative total investment (US\$x10 ⁶)		10,342	20,376	13,888
National population (10 ³)	17,242	21,857	27,170	29,998
Population in the Study Area (10 ³)	761.6	994.1	1,316.6	1,504.2
Share (%)	4.42	4.55	4.85	5.01
Public investment in the Study Area (US\$x10 ⁶)		231.9	435.3	311.2

Source: JICA Study Team.

Estimated public investment allocation to the Study Area may or may not be sufficient to realize the Angonia regional development as envisioned. Therefore investments to attain the expected economic growth in the Study Area are estimated. The results are shown in Table 6.8.

Table 6.8. Investment Requirements in Angonia Regional Development

	2000	2010	2020	2025
GRDP	184.3	339.5	811.2	1,186.3
Incremental GRDP (US\$ $\times 10^6$)	155.2	471.7	375.1	
ICOR	3.5	3.0	3.0	
Investment requirements (US\$ $\times 10^6$)	543.2	1,415.1	1,125.3	
Public investment allocation (US\$ $\times 10^6$)	231.9	435.3	311.2	
Additional investment required (US\$ $\times 10^6$)	311.3	919.8	814.1	
Additional investment as percentage of GDP (%)	14.5	22.1	22.3	

Source: JICA Study Team.

As shown in Table 6.8, the amount of investments required to attain the expected economic growth is US\$543.2 million in 2000-10, US\$1,415.1 million in 2010-20, and US\$1,125.3 million in 2020-25, for a total of US\$3,084 million. Given the estimated public investment allocation to the Study Area, the additional investment required is US\$2,106 million over the 25-year period. Additional investment requirements correspond to 14.5% of the GRDP in 2000-10, 22.1% of the GRDP in 2010-20, and 22.3% of the GRDP in 2020-25. While these percentages are not prohibitively high, it is clear that a large amount of private investments will have to be introduced in the Study Area in order to attain the expected economic growth. Alternatively, proportionally larger public investment may be allocated to the Study Area, as some of the proposed projects/programs such as international artery roads and power development are actually national projects. In fact, the Angonia regional development itself may be taken as a national program, as it would contribute to the strengthening of relationships with the neighboring countries as well as to the national integration.

6.3.2. Indicative investment schedule

Within the framework of estimated public investment allocation to the Study Area, an indicative public investment schedule is prepared, including all the proposed projects and programs. Investment costs of all the projects and programs are roughly estimated, and the investment schedule is constructed as outlined below.

Since the estimated public investment in the Study Area is rather limited as seen above,

and the Angonia regional development is expected to be implemented by the public-private partnership, for those projects expected to be implemented by the private sector initiative, no public investment allocation is made. They are the Moatize Coal Development, Moatize Coal-fired Thermal Power Plant, Small-scale Iron and Steel Manufacturing, Mineral Resources Exploration, and the Sena Railway. For some other projects, where both the public and the private sectors are involved, only costs to be incurred in the public sector are included. For instance, the public sector costs for the Tete-Moatize Core Urban Development include infrastructure and land preparation costs, but not costs of housing and factory buildings. Only costs for training, extension, information services, credit and other support measures are included for some projects to enhance capacities of farmers, business people and other human resources. These projects include the Integrated Farming Systems Development, Livestock Development Program, Farmers' Associations Promotion, Local Planning and Management Capacity Enhancement, Corporate Management Modernization, and Health Awareness Enhancement Program.

Estimated public investment costs are allocated to three broad phases: Phase 1 for the period up to 2010, Phase 2 for 2010-20, and Phase 3 for 2020-25. Not only logical sequence of implementation of different projects/programs in line with the development scenario, but also stage-wise implementation of new types of activities starting with pilot schemes as well as the investment framework are taken into account.

The indicative investment schedule is given in Table 6.9. The total public investment costs are US\$203.7 million in Phase 1 or 87.8% of the expected investment allocation, US\$390.2 million in Phase 2 or 89.6% of the expected allocation, and US\$144.6 million in Phase 3 or 46.5% of the expected allocation. The total public investment cost of all the proposed projects and programs is US\$738.5 million, which corresponds to 75.5% of the estimated public investment allocation to the Study Area over the 25-year period.

Considering other regular development expenditures will have to be covered by the allocated public investments, crowding out of some projects/programs may occur during Phase 1 and Phase 2, unless additional public investment is allocated. Clearly more public investment projects would be required in Phase 3. In fact, as the Angonia regional development proceeds, additional projects and programs should be formulated and implemented to cope with changing needs and emerging opportunities.

6.3.3. Expected effects of proposed projects and programs

Effects of proposed projects and programs are examined to check if these projects/programs will indeed serve as the driving force in attaining the expected economic growth. Under the Urban Development Initiative program, public sector projects containing economic components are the Tete-Moatize Core Urban Development, Agro-

Table 6.9. Indicative Investment Schedule for Angonia Regional Development (1/2)(Unit: US\$ $\times 10^6$)

No.	Project title	Status	Implementing agencies	Public investment allocation			
				Phase 1	Phase 2	Phase 3	Total
I. Urban Development Initiative							
1.1	Tete-Moatize Core Urban Development	New	Inter-agency, private firms, GPZ (coordination)	48.7	79.8	80.5	209.0
1.2	Tete City Water Supply Expansion	Extended	MPWP, Agua deTete	2.3	*		2.3(15.9)
1.3	Urban Roads Improvement	Extended	ANE, Tete city, Moatize town	*	*	*	-(9.7)
1.4	Tete Corridor Power Supply Expansion	Extended	EDM	*	4.9		4.9(14.7)
1.5	Tete City Telecommunications	Extended	TDM	*	*		-(6.2)
1.6	Agro-Industrial Zone Establishment	New	MPWH, GPZ, private firms	*			-(11.5)
1.7	Business Center Establishment	New	MPWH, M. of Interior, private firms	*			-(0.2)
1.8	Industrial Technology & Information Research Center	New	M. of Industry and Commerce	*	*		-(2.0)
1.9	Moatize Coal Development	Ongoing	Private firms	na	na	na	na
1.10	Institute of Mines & Geology Support Program	New	MINED	0.5	1.0		1.5
1.11	Moatize Coal-fired Thermal Power Plant	New	Private firm	na	na	na	na
1.12	Small-Scale Iron and Steel Manufacturing	New	Private firm	na	na	na	na
1.13	Angonia Highland Integrated urban Development	New	Inter-agency, GPZ (coordination)	5.0	26.6	38.1	69.7
	Sub-Total			56.5	112.3	118.6	287.4
II. Rural Socio-economy Enhancement							
2.1	Integrated Rural Development	New	Inter-Agency GPZ (coordination)	20.0	30.0		50.0
2.2	Small Irrigation Schemes Development	New	MARD, private sector	35.0	17.5		52.5
2.3	Integrated Farming Systems Development	New	MARD	15.0	10.0		25.0
2.4	Revobue Multi-Purpose Dam	New	MPWH, MARD GPZ (coordination)	8.0	97.0		105.0
2.5	New Cash Crops Establishment	New	MARD	10.0	10.0		20.0
2.6	Livestock Development Program	Extended	MARD	15.0	20.0		35.0
2.7	Farmers' Associations Promotion	New	MARD	1.2	2.4	1.2	4.8
2.8	Grain Storage Development	New	Farmers' associations	0.2	0.2	0.2	0.6
2.9	District Water Supply	Ongoing	MPWH, Agua Rural	0.6	1.2		1.8
2.10	Rural Electrification	Ongoing	MMRE, EDM	2.2	2.2	1.2	5.6
2.11	Mineral Resources Exploration	New	MMRE, private sector	na	na	na	na
	Sub-Total			107.2	190.5	2.6	300.3

Table 6.9. Indicative Investment Schedule for Angonia Regional Development (2/2)

(Unit: US\$ $\times 10^6$)

No.	Project title	Status	Implementing agencies	Public investment allocation			
				Phase 1	Phase 2	Phase 3	Total
III. Spatial Structure Strengthening							
3.1	Rural Roads Self-help Improvement Program	Extended	District administrations, ANE Tete	2.6	4.9	5.1	12.6
3.2	Secondary Roads Improvement	Extended	ANE	5.7	6.0	3.0	14.7
3.3	International Highways Upgrading	Extended	ANE	6.0	12.0	6.0	24.0
3.4	Sena Railway	Ongoing	CFM-central, private firm	na	na	na	na
3.5	Zambezi River Transport Development	New	Tete city, private firm		2.0		2.0
3.6	Bus Services Improvement	New	ANE, private firm	1.0	1.0		2.0
3.7	Inland Freight Terminal	New	MWPH, private firms	1.0	2.0		3.0
3.8	New Zambezi River Bridge	New	ANE, private firms	4.0	20.0		24.0
3.9	Tete International Airport Upgrading	New	Dept. of Civil Aviation, private firm		20.0		20.0
3.10	Rural Telecommunications	Extended	TDM	4.1	6.2	2.1	12.4
3.11	Border Facilities Improvement	New	Immigration and Customs, district administrations	1.0	1.0		2.0
	Sub-Total			25.4	75.1	16.2	116.7
IV. Local Accountability Enhancement							
4.1	GPZ Strengthening	Ongoing	GPZ	1.6			1.6
4.2	Local Planning & Management Capacity Enhancement	New	GPZ, Tete city, district administrations	1.0			1.0
4.3	Zambezi River Basin Database Development	New	GPZ	4.0			4.0
4.4	Corporate Management Modernization	New	Public vocational schools	0.5			0.5
4.5	Tete Provincial Hospital Upgrading	New	MOPH	3.1			3.1
4.6	Health Referral System Establishment	New	MOPH, district administrations	0.5	1.5	1.0	3.0
4.7	Health Awareness Enhancement Program	Ongoing	MOPH	0.5			0.5
4.8	Distance Education Program	New	MINED	0.5	1.5	1.0	3.0
4.9	Primary Schools Improvement	Ongoing	MINED	0.9	1.8	1.2	3.9
4.10	Watershed Management Program	Extended	Local administrations, communities, MICOA	0.5	1.0		1.5
4.11	Environmental Inventory	New	MARD, MICOA, Tete province, GPZ	0.5	2.0		2.5
4.12	Urban Environment Improvement Program	New	Tete city, Angonia district administration, MPWH	1.0	3.0	3.0	7.0
4.13	Renewable Energy Center	New	GPZ, MMRE		1.5	1.00	2.5
	Sub-Total			14.6	12.3	7.2	34.1
Total				203.7	390.2	144.6	738.5
				(87.8%)	(89.6%)	(46.5%)	(75.5%)
Public Investment Allocation				231.9	435.3	311.2	978.4

*Costs included in Project No. 1.1. / Source: JICA Study Team.

Industrial Zone Establishment, and the Angonia Highland Integrated Urban Development. Others provide infrastructure supports to economic activities. Value-added contributions are roughly estimated for these three projects.

The Tete-Moatize Core Urban Development will create new towns with additional population of 118,000 by 2025, who are direct beneficiaries of the project. Per capita GRDP directly attributable to them is US\$789 in 2025 in line with the socio-economic framework. Without the project, the per capita GRDP may increase only to US\$507 by 2025 at the average annual rate of 3%. The incremental value-added is US\$282 per beneficiary or US\$33.3 million in total. Of some 44,000 employment opportunities to be generated in the core urban area, a half may be found in the Agro-Industrial Zones and mining, and the rest in services. The industrial employment may generate additional employment in the services sector, and this multiplier is assumed to be 2.5. Therefore, the total value-added attributed to the project is calculated to be US\$74.9 million.

The Angonia Highland Integrated Urban Development would generate the similar effects, except that comparatively more employment opportunities (say two-thirds of the total) may be generated in the services sector. The incremental value-added is US\$4.2 million directly, or US\$7.7 million including the multiplier effects. The total value-added of the program is US\$82.6 million.

Value-added due to the Rural Socio-economy Enhancement program is estimated for seven projects/programs having economic components. For each, the number of beneficiaries and unit value-added are estimated as summarized in Table 6.10.

Table 6.10. Estimate of Value-added Attributable to Rural Projects

Project	No. of beneficiaries	Unit value-added	Total value-added (US\$ $\times 10^6$)	Notes
Integrated Rural Development	50,000 farm households	US\$365	18.3	25 locations, average population 10,000
Small Irrigation Schemes Development	5,250 farm households	US\$963	5.1	105 schemes, 100ha each
Integrated Farming Systems Development	25,000 farm households	US\$963	24.1	\$1,000 per farmer for \$25 million total costs
Revobue Multi-purpose Dam		US\$1,000/ha	6.0	6,000 ha irrigation
New Cash Crops Establishment	20,000 farm households	US\$365	7.3	\$1,000 per farmer for \$20 million total cost
Livestock Development Program	35,000 farm households	US\$250	27.3	\$1,000 per farmer for \$35 million total cost
Farmers' Associations Promotion	9,600 farm households	US\$250	2.4	\$ 500 per farmer for \$ 4.8 million total cost
		Total	90.5	

Source: JICA Study Team.

The total value-added due directly to the seven projects is US\$90.5 million. Agricultural activities also induce service activities and this multiplier is assumed to be 1.2. Thus, the total value-added attributed to the program is US\$199.1 million.

To estimate value-added due to the Spatial Structure Strengthening program, a representative project is taken. According to the in-depth study of the secondary road improvement project, it will generate the direct benefit of US\$6.6 million at the cost of US\$19.3 million. The direct benefit may consist of US\$1.3 million for agriculture, US\$2.0 million for industry, and US\$3.3 million for services. By applying the same multiplier value for agriculture and industry, the total value-added due to the project is calculated to be US\$13.2 million. Other infrastructure projects should be equally cost effective. Therefore, the total investment cost of US\$116.7 million in the program would generate the total value-added of US\$79.8 million.

Value-added contributions of projects/programs under the Local Accountability Enhancement program are not taken into account here. Thus, all the proposed projects and programs with the total investment cost of US\$738.5 million would generate the total value-added of US\$361.5 million. Assuming equally cost-effective projects would be formulated and implemented within the framework of estimated public investment allocation, the total public investment cost of US\$978.4 million would generate the total value-added of US\$478.9 million.

Additional investments should be made in the public and the private sector at US\$2,106 million over the 25-year period as clarified in subsection 6.3.1. By assuming modest ICOR value of 3.5, these investments should generate the value-added of US\$601.7 million in total. Therefore, the total incremental value-added up to the year 2025 would sum to US\$1,080.6 million. This exceeds the incremental GRDP between 2000 and 2025 calculated to be US\$1,002 million according to the socio-economic framework. Therefore, the economic targets are attainable by effective implementation of the proposed projects and programs, and successful mobilization of additional investments in the public and private sectors.

Chapter 7. Operation Plan for Angonia Regional Development

7.1. Implementing Arrangements for Angonia Regional Development

7.1.1. Institutional framework with GPZ

The Angonia regional development will take place basically within the framework of existing development administration. As the Angonia region develops, however, administrative capacities for development planning, finance and management are expected to increase at the regional and the local levels. How and to what extent the capacities will increase depends, in turn, on institutional arrangements for the Angonia regional development.

The existing development administration for the Angonia region consists of the Tete provincial government, municipalities of Tete city and Moatize town, six district administrations, and GPZ. Along with the on-going decentralization process, some ministerial functions are slowly decentrated to the provincial government. In principle, the provincial government can combine the budget allocation from the Central Government and local revenue to implement its program without the approval of the center. GPZ is mainly a planning and coordinating agency as its statute dictates. GPZ can plan for any projects in any sectors within its territorial jurisdiction for approval by the Government. GPZ coordinates development activities of sector agencies and promote their implementation. GPZ guides the private sector and facilitates private investments.

In the existing administrative system with ongoing reforms, relationships between provincial governments and GPZ will be increasingly important. To perform the functions outlined above, GPZ should work closely with the provincial governments. In particular, the coordinating functions would be performed effectively through the respective provincial governments, where practically all the ministries are represented. Therefore, as the decentralization proceeds with slow but steady devolution of administrative power to provincial governments, effectiveness of the coordination should be enhanced.

Priority policy and commitment by the Government for the Zambezi Valley are embodied into the establishment of GPZ as a statutory agency. GPZ is expected to take the strong initiative for realization of the sustainable development of the Zambezi Valley. To realize this effectively, GPZ should better establish ownership for some substantive part of the Zambezi Valley development. In other words, GPZ should also be an executing agency for projects and programs in certain sectors.

By its nature as the river basin authority, a natural choice for the sector to establish GPZ ownership is the sector of water resources development and management. At present, the Ministry of Public Works and Housing (MPWH) is responsible for establishing policies and strategy for development and management of nation's water resources. MPWH

exercises its functions through the National Directorate of Water (DNA), which operates through the regional administration of water (ARA). Together with south, central and north ARA, the Zambezi Valley is under a separate ARA. As Mozambique enters a new era of water resources development and management applying such modern concepts as a river basin approach, watershed management and multi-purpose development, it would be quite relevant for GPZ to pioneer their application to the Zambezi Valley.

Other potential sectors for GPZ ownership include social/livelihood development, environmental management, and possibly joint venture activities with the private sector. The first two sectors may benefit from the field-based functions of GPZ. If transfer of major mandates to GPZ is found difficult, GPZ may establish its ownership initially as an executing agency for social/livelihood development and environmental management projects and programs with relatively small funds. Joint venture activities with the private sector are in line with the GPZ strategy to pursue strategic alliances with the private sector. It would be reasonable for GPZ to provide relatively small fund as pump priming for private investments.

7.1.2. Institutional arrangements for Angonia regional development

As outlined, some actions are expected to be taken at the national level to support the sustainable development of the Zambezi Valley. Specially, these are further decentralization, and expansion of GPZ mandate. At the regional and the local levels, the following conditions need to be satisfied for institutional arrangements for the Angonia regional development:

- (1) Planning and coordinating functions need to be strengthened at the local and the regional levels;
- (2) New funding mechanism should be devised to increase regional fund mobilization in a significant way;
- (3) Organization and participation of local people and communities should be promoted; and
- (4) The private sector should be encouraged to take active part in the Angonia regional development not only for a wider range of development activities but also for development management.

The planning and coordinating functions at the local level may be strengthened most effectively, given the limited manpower resources, by pooling expertises at a proper regional or provincial level to provide technical supports and guidance to all the district administrations. This is what the ANE Tete office is doing for the maintenance of non-classified roads, for instance. In the Zambezi Valley, GPZ is in the position to do this in general. To perform this function for multi-sector projects with several implementing

agencies involved, technical expertises of GPZ would have to be enhanced in steps. Among the expertises to be enhanced are those involved in integrated rural development, social/livelihood development, environmental management, and water resources development and management as well as other basic expertises such as local planning, data management and financial analysis.

The new funding mechanism may include a venture capital organization, regional banking institution, and specialized financing programs focussing on small and medium enterprises, organizational development, community self-help activities and others. A regional bank will utilize local deposits effectively for investment and social security purposes.

To expand the resource capacity at the local level, broad local participation should be effected by district administrations under the guidance of the Tete provincial government and GPZ, and facilitated by NGOs. It may take the form of cooperative community works to improve and manage various rural infrastructure. Another main area where more active local participation is expected is a conduct of environmental impact assessment, or more broadly environmental monitoring and management. Local participation would be effective also for resource inventory covering both natural and socio-cultural resources.

As a means to expand the roles of the private sector in realizing the sustainable development of the Zambezi Valley, a corporate type entity for development management should be experimented first in the Angonia region. It should take charge of some designated area as a development corporation. The envisioned Tete-Moatize core urban area is recommended for its jurisdiction.

7.1.3. Recommended organizational reform of GPZ

The ongoing organizational restructuring of GPZ is a welcome move as it will expand the staff capacity and introduce sub-regional units. Along with these, further strengthening of the organizational structure of GPZ is recommended.

The original setup of GPZ may be expanded along sector lines as the staff capacity is increased. The Department of Project Promotion may be expanded with separate sections in charge of agriculture, industry, small and medium business, and trade and services. The Department of Infrastructure may be expanded with subdivision by different kinds of infrastructure. A support department may be created for community and participatory development, information services, and other private investors support. These sector-wise developments will be complementary to the area-wise developments by sub-region.

Within this expanded organizational structure with increased staff capacity, a few specific departments and sections should be strengthened. First, the Department of Planning and Studies should be much strengthened to foster an integrated view of the Zambezi Valley for regional development and to ensure such a view to be reflected in sub-regional

development and development of different districts and cities. Technical support to district administrations and municipalities for socio-economic and land use planning are among the functions of this department.

Second, a section in charge of small and medium enterprises (SMEs) promotion should be created, and the Department of Community Development strengthened, since participatory development and private sector support should be the main thrusts of GPZ. The SME section should be instrumental in improving corporate management of the existing SMEs with introduction of new technologies and modernization of equipment, in developing markets and products ("Tete brand," for instance), and in promoting subcontracting among local industries. Also, a department of information and technology may be created to provide information services related to technology, markets and business opportunities to the private sector. The department will also provide information necessary for other departments.

Third, the sector-wise subdivisions of departments should be undertaken to establish the ownership of GPZ for some selected sectors and fields as suggested in previous sections. In addition to the strengthening of the Department of Community Development recommended above, the subdivision of the Department of Project Promotion may strengthen functions related to integrated rural development, and the subdivision of the Department of Infrastructure may support the functions of water resources development and management.

7.2. Action Plan

Activities to be undertaken subsequent to the completion of the Master Plan for the Angonia regional development are (1) adoption and promotion of the Master Plan, (2) strengthening of implementing arrangements with GPZ, and (3) further development and initial implementation of individual projects and programs. Specific activities are described.

7.2.1. Master Plan adoption and promotion

(1) Master Plan adoption

The bulk of development projects and programs proposed by the Master Plan can be implemented or further developed within the competence and policies of relevant sector agencies. However, the coordination of various development efforts by many agencies will have to be ensured as well as timely implementation of inter-related projects. For this purpose, Master Plan proposals will have to be discussed among related agencies first at the GPZ Technical Council to resolve sector concerns and conflicts. Results should be reported to the Ministerial Committee for GPZ, and the Master Plan should be formally

adopted there with addenda if necessary.

(2) Promotion and marketing

In parallel with these procedures, the Master Plan proposals should be disseminated widely to facilitate implementation through further cultivating the public acceptance and widening the support base. The following will be particularly effective:

- 1) conducting a series of workshops in the districts of the Angonia region to convey the Master Plan proposals widely to local people and to encourage their active participation in the implementation;
- 2) preparing publicity materials in addition to the general brochure already produced, addressing to different audiences such as politicians, local officials, NGOs, environmentalists, and researchers;
- 3) organizing investment promotion seminars to market specific projects for private investments; and
- 4) convening international donors' meetings to strengthen the support base for coordinated development aid.

7.2.2. Strengthening of implementing arrangements

The ongoing organizational restructuring of GPZ should be fully utilized to strengthen the implementing arrangements for the Angonia regional development. New subregional units should be instrumental in conducting community workshops proposed above, supported by the Department of Planning and Studies of GPZ. It would be the first step to implement a model regional development in the Zambezi river basin, followed by other subregional developments to be planned and implemented in the basin.

A key instrument to implement the Master Plan in rural areas is to establish farmers' associations for various purposes. The community workshops should offer opportunities for farmers to formulate proposals for specific farmers' associations by their initiative. The proposals should be further developed with the support of the Department of Community Development of GPZ, and implemented following the pilot projects proposed in the Master Plan.

A development corporation should be established for the Tete-Moatize core urban area development. The Government should provide seed fund, and private investors are invited to subscribe for shareholding to expand the fund. Board members should be elected through a democratic process from among the private shareholders, and the equal number of directors may be nominated initially from the public sector. A detailed development plan should be prepared for the core urban area within the framework of the Master Plan.

The initial implementation of the Master Plan will have to be supported extensively by

international aid organizations and NGOs. In particular, NGOs are expected to support farmers' associations, and international consultants should be mobilized to prepare the detailed plan for the Tete-Moatize core urban area development.

7.2.3. Project development and implementation

(1) Initial project development and implementation

It is expected that many projects and programs proposed by the Master Plan be initiated or further developed immediately by relevant sector agencies. Coordinated implementation of various projects by several agencies should be ensured by GPZ working in close collaboration with the Tete Provincial government.

For inter-agency projects, GPZ should take the initiative and coordinate with relevant district administrations as well as the Tete provincial government for further project development. A consultative workshop should be convened by GPZ to select projects for implementation in the nearest future. For each selected project, the roles of various actors should be clarified, including district administrations, NGOs, government agency local offices, GPZ, and the private sector. Projects to be supported by international aid organizations should also be selected, and lead agencies identified.

The special program for participatory development should be implemented in the nearest future. Cooperation of NGOs and other external support should be sought, facilitated by GPZ. While those pilot schemes are implemented, additional schemes should be formulated through the community workshops as already proposed.

(2) Special promotion package

While the stronger local initiative is expected for the Angonia regional development as a whole, continued priority policy and commitment by the Government for the Zambezi river basin will be essential, given the limited financial and administrative capacities of local governments. Such policy and commitment should be effected through GPZ and substantiated first for the Angonia regional development.

For this purpose, a special promotion package for the Angonia regional development should be implemented with the support of any donor agencies. Since GPZ is most instrumental in project development and implementation as clarified above, the program should support GPZ with dispatch of experts, provision of equipment and facilities, and counterpart training. Technical expertise required may include the following:

- 1) Development management, including project programming, budgeting and evaluation,
- 2) Rural development, including community organizing,
- 3) Environmental management, and
- 4) Marketing and promotion, including information management.

To develop its planning and coordinating capacities effectively, GPZ should continue to be involved in planning and development of multi-sector projects. To support the ongoing strengthening of GPZ staff capacity, technical assistance should also be sought for another multi-sector project such as integrated rural development or multipurpose dam project.



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