CHAPTER 5 DEVELOPMENT STRATEGY AND CONCEPT

5.1 Development Goals and Strategy

5.1.1 Development Goals

Taking into consideration of the national and regional development as well as the development potential, the following future goal and strategies are proposed in terms of regional economic development with due consideration on environment and poverty reduction in order to formulate the road development master plan study.

Goal 1: Development of Sulawesi as the Leading Island in East Indonesia as the Gateway to the Other Islands of Indonesia and Asian Countries

Goal 2: Development of Environmentally Friendly Sulawesi with Poverty Reduction

5.1.2 Development Strategies

To attain the development goals, the following regional development strategies are proposed by the Study team:

Strategy 1: Economic growth through industrial development

To boost the economic growth of Sulawesi, industrial development, especially processing industries utilizing agricultural, forest, fishery, and mining resources is necessary.

Strategy 2: Economic growth in activity centers

Sulawesi economic will be promoted by the social and economic development in the national and regional activity centers (cities). The national activity centers will be networked to form a cluster over Sulawesi by utilization of the existing inter and intra island linkage.

Strategy 3: Alleviation of Social and Economic Disparities by Strengthening Public Administration Service

Social and economic disparities should be alleviated by strengthening of public administration services and integration with regional economy throughout the island, particularly in the isolated communities of rural areas.

Strategy 4: Development of Sulawesi with due Consideration on Environment, and Safety for Disaster

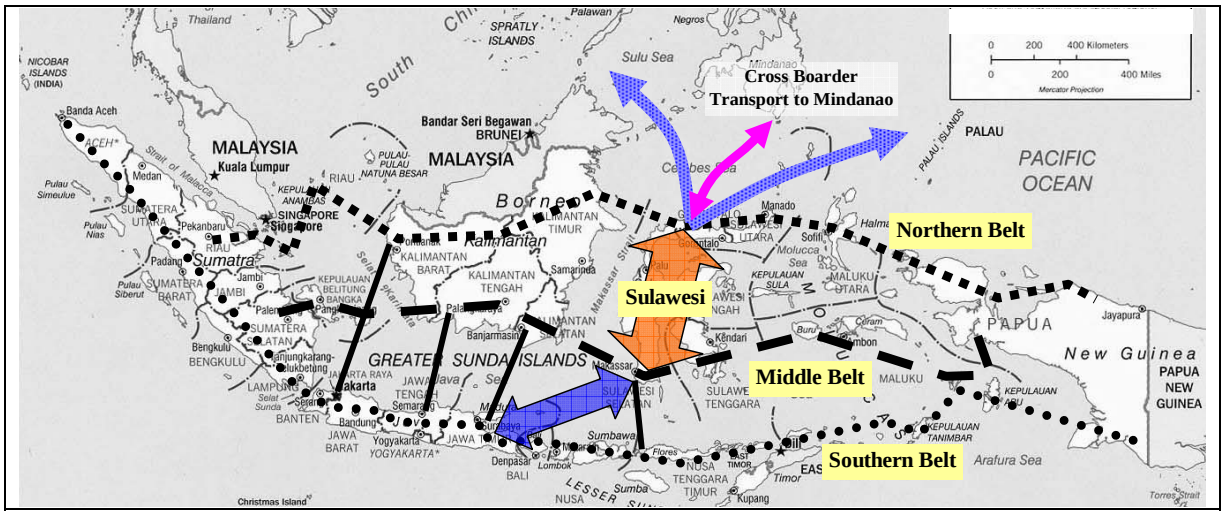
Sulawesi should be developed with due attention on the environment preservation, reduction of environmental load, safety for disaster and capacity development of human resources.

5.2 Sulawesi Island Development Concept

5.2.1 Development Plan by Strengthening Inter-regional Linkages in Sulawesi as well as with other Islands of Indonesia including other Asian Countries

(1) Inter-regional Linkage with other Island of Indonesia and other Asian Countries

The national spatial plan defines three development belts in Indonesia, i.e. the Northern Belt, Middle Belt, and the Southern Belt, as shown in Figure 5.2.1. Sulawesi seems to be in a strategic location that links the three development belts as well as the neighboring Southeast Asian countries and the Northeastern Asian countries through Sulawesi's northern tip in Manado. Surabaya the industrialized city in East Java can enjoy this form of linkages through Sulawesi for international trade.

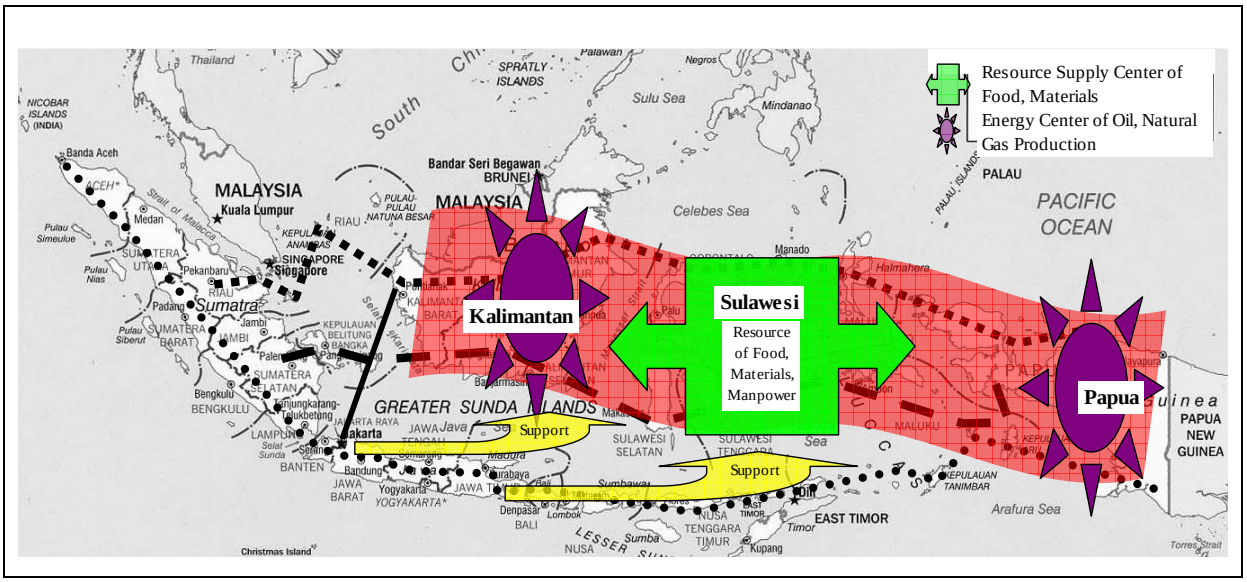


Source: JICA Study Team

Figure 5.2.1 Proposal on the Linkage of Indonesia's Development Belts Through Sulawesi

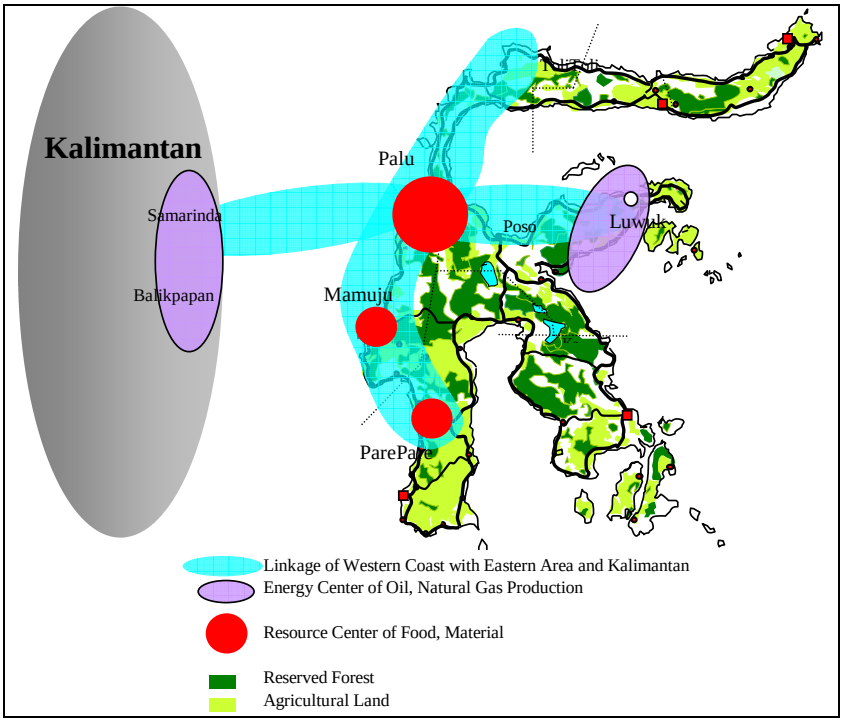
The other important role of Sulawesi in national development is that it is in an advantageous location allowing it to contribute to the energy resource development in Kalimantan and Papua. Figure 5.2.2 shows Sulawesi can act as a supply center for necessary resources such as food, construction materials, and various commodities. Thus, the development of such industries in Sulawesi is considered critical to the energy development in Indonesia, which is the key industry for nationwide future prosperity.

The west coast of Sulawesi Island will play a significant role to support the Kalimantan energy exploiting industry through the provision of agricultural products, construction materials, and other commodities as shown in Figure 5.2.3. The three cities of Palu, Mamuju, and Parepare will be the trading and distribution centers for linkages with Kalimantan. Considering that the Luwuk energy development area is also prospective and significant, resource supply mechanisms developed in the west coast of Sulawesi should be utilized to support the Luwuk area, as well.



Source: JICA Study Team

Figure 5.2.2 Energy Resource Development Belt in Eastern Indonesia and Role of Sulawesi



Source: JICA Study Team

Figure 5.2.3 Sulawesi West Coast Development for Energy Exploitation in Kalimantan and Luwuk

(2) Inter-regional Linkage in Sulawesi

Existing economic linkage between six provinces of Sulawesi should be sufficiently utilized for the effective economic growth of Sulawesi. Economic linkage between priority service centers will be enhanced and linkage between ndustrial/trade core areas and poor rural areas promoted.

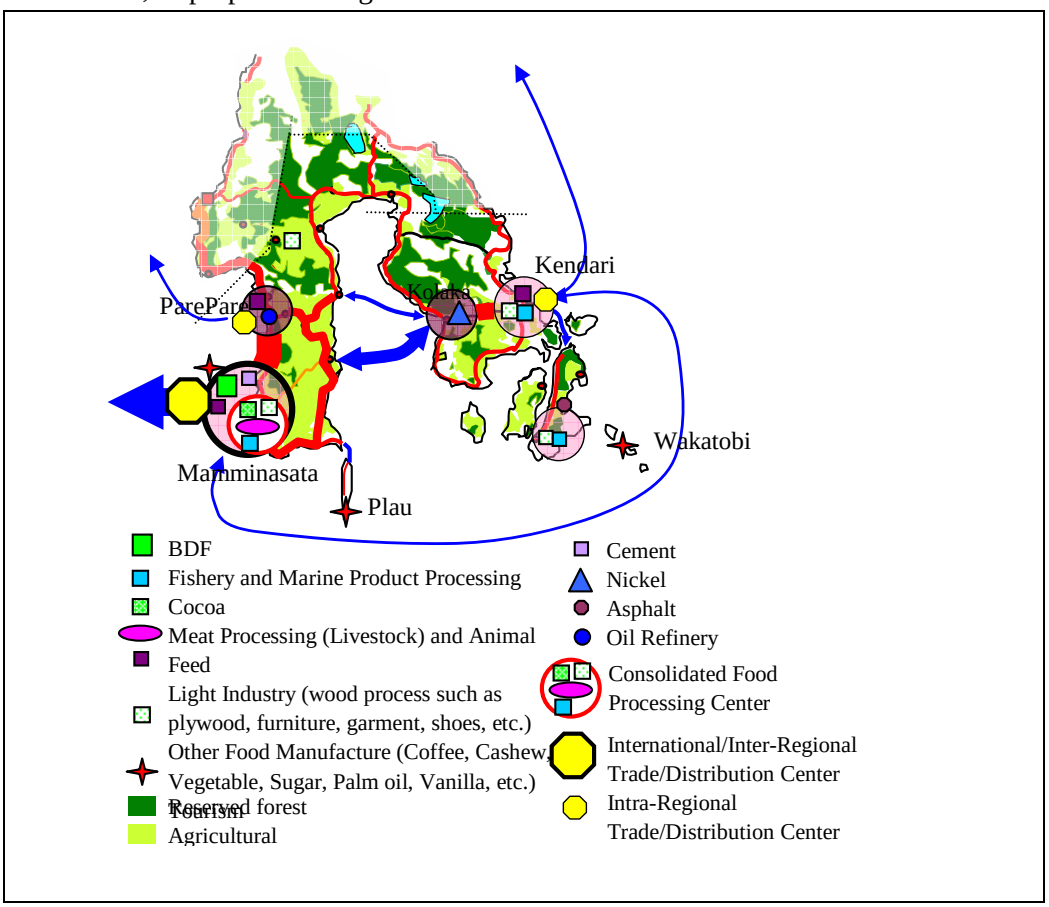
To develop the Regional Development Strategy 1, following development plans are proposed.

1) Development Plan on the basis of Economic Linkage between South Provinces and Southeast Province

The development on the basis of economic linkage between Makassar-Kendari is most important in connection with the utilization of the concentrated population and the further promotion of industries. The success of this development will contribute to the total economic growth of the island.

* Makassar will continuously act as the gateway of inter island linkages. Both the neighboring Kalimantan energy base and Java Island will tightly link with the Makassar and Pare-pare priority areas and the distribution and transportation of commodities and passengers will be done through this gateway.

* In the Maminassata priority area, together with the Pare-pare priority area, further promotion of food manufacturing (cocoa, fishery, seaweeds, sugar, meat), light industries (wood product, garments, shoes) and cement manufacturing are prospective. The development of the bio-diesel fuel industry is also recommended, utilizing the widely grown coconuts in the hinterland. Consolidated food processing centers can be conceivable, as proposed in Figure 5.2.4.



Source: JICA Study Team

Figure 5.2.4 Development Plan on the basis of Economic Linkage between Makassar-Kendari

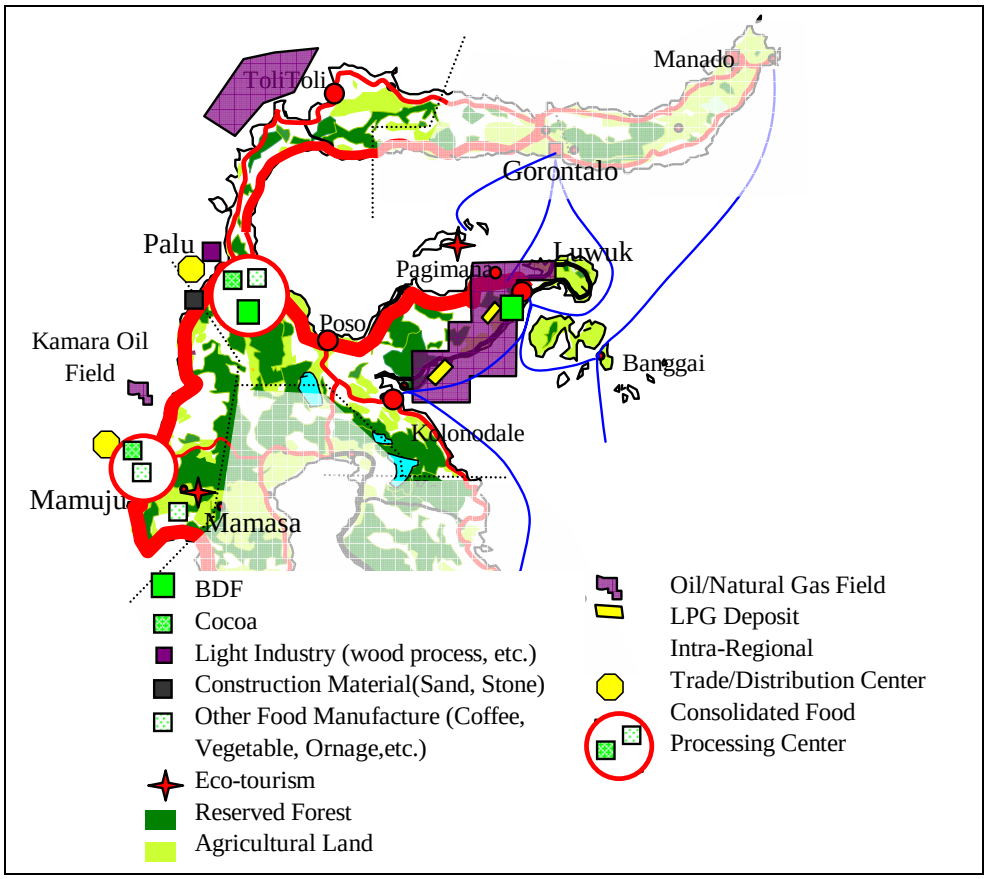
* The Pare-pare area will become an intra-island trading center for fuel and food after the construction of the oil refinery. Rice trade is already concentrated in Pare-pare with the vast rice field spread in the eastern plain of Pare-pare.

* The island destinations in Makassar and Plau Salayar have a strong tourism potential.

* Kendari/Kolaka priority area will be further developed as the industrial center for nickel and asphalt. Agricultural (cashew nut, palm oil) and fishery, as well as wood processing, industries also have great potentials in Baubau, Raha and Unaaha. Eco-tourism activity can be promoted in the remote island, Wakatobi.

2) Development Plan on the basis of Economic Linkage between Central Provinces and West Province

Palu-Mamuju-Luwuk is rich in agricultural/forest resources and produces construction materials. The Palu and Mamuju priority areas will be the trade center for these products which will be shipped to the energy development areas in the eastern coast of Kalimantan Island. Processing industries for cacao, wood, and other food products such as vegetables and livestock have great promise in the priority area. Coconut-based bio-diesel fuel is also proposed for establishment in the Palu area. In Mamasa area which is isolated due to the lack of arterial road access has rich potential of agricultural product and tourism destination like Tana Traja.



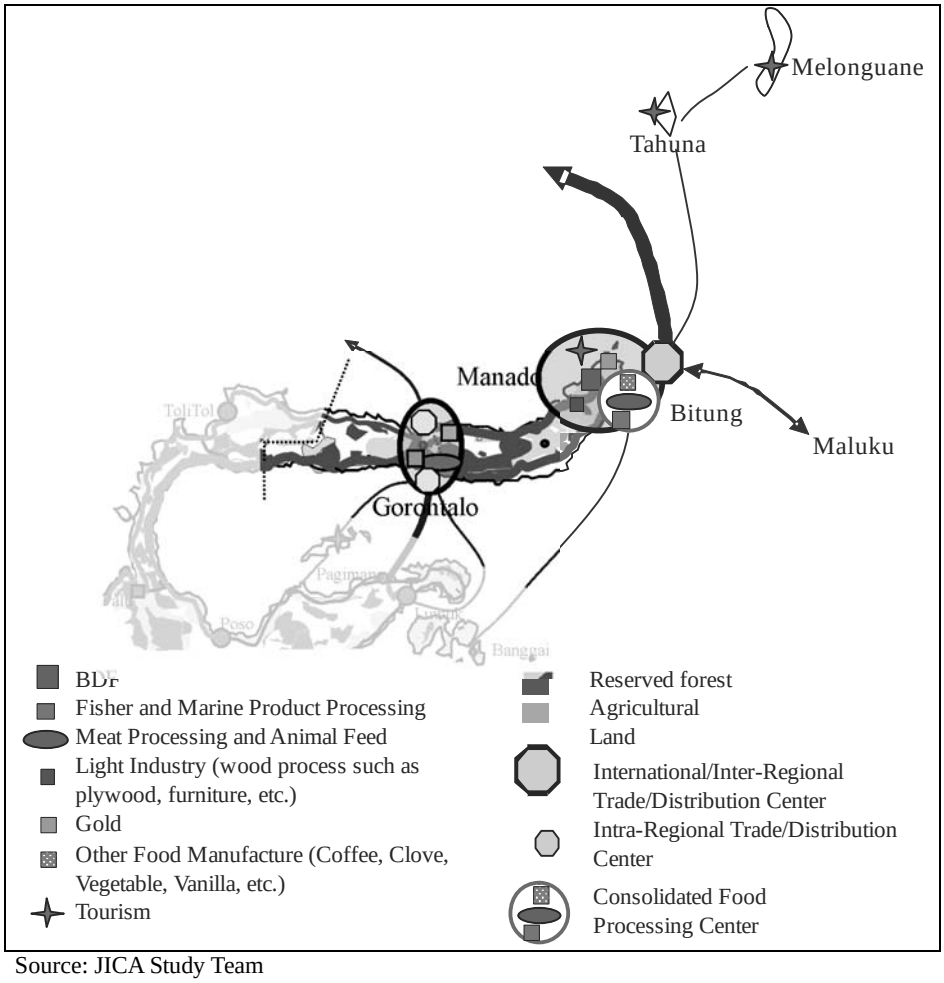
Source: JICA Study Team

Figure 5.2.5 Development Plan on the basis of Economic Linkage between Palu-Mamuju-Luwuk

The Luwuk priority area will produce oil and natural gas, which is one of the strategic energy-producing bases of Indonesia. Luwuk energy production area will be supported by Palu and the other areas in terms of food, materials, and labor supply. Figure 5.2.5 shows the development plan on the basis of economic linkage between Palu-Mamuju-Luwuk.

3) Development Plan on the basis of Economic Linkage between North Province and Gorontalo Province

In the hinterland in the Provinces of Norht and Gorontalo, various kinds of agricultural, fishery and wood products will be produced for trading through the Manado/Bitung gateway to northern Asian countries and other parts of the Pacific region. Food manufacturing (e.g. fish canning, coconuts, coffee, vegetable oil, clove, animal feeds) and light industries (e.g wood processing) will be developed and expanded in the Manado-Bitung priority area. Development of the coconut bio-diesel fuel industry is also recommended in this area. To promote these industries, the introduction of designating the Manado-Bitung-Likpa economic development zone and the promotion of FDIs will be most effective.



Source: JICA Study Team

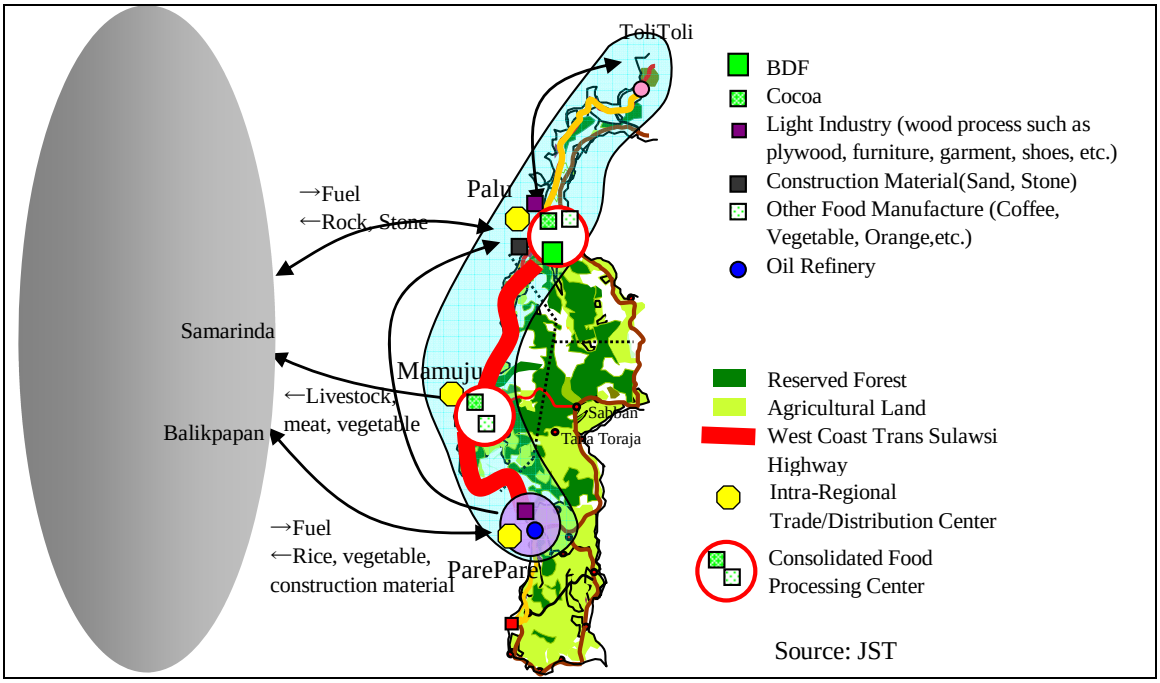
Figure 5.2.6 Development Plan on the basis of Economic Linkage between Manado-Gorontalo

Taking advantage of its reputation as a marine tourism destination, it is recommended that Manado should promote marine eco-tourism in consideration of the tourism demand explosion and improving incomes in Asian countries such as China. For this purpose, its marine environment should be preserved through a wholistic coordination between tourism and industrial development.

In Gorontalo, maize manufacturing, animal feeds, fish and livestock processing have potentialities. Figure 5.2.6 shows the development plan on the basis of economic linkage between for the Manado-Gorontalo.

4) Development Plan for Western Coastal Area

The western coastal area of Sulawesi covers three provinces, namely South Sulawesi, West Sulawesi, and Central Sulawesi covering the cities of Parepare, Mamuju, Palu, and Tolitoli. This coastal area occupies a most strategic location that can support the island of Kalimantan. Since food, construction materials, and commodities are insufficient in the oil-and-natural-gas-rich area of Kalimantan and the transportation network is undeveloped in the island, Sulawesi's west coast area is in an advantageous position to support its neighboring island through its rich agricultural, construction, and human resources from the hinterlands of Central and South Sulawesi. As shown in Figure 5.2.7, food, construction materials, and commodities will be transported to Kalimantan, while fuel is imported into Sulawesi. The Parepare priority area will act as the shipping center for rice, other materials, and commodities.



Source: JICA Study Team

Figure 5.2.7 Development Plan on the basis of Economic Linkage between Pare-Pare-Mamuju-Palu and Kalimantan

5.2.2 Industrial Development Concept

(1) Industrial Development through Utilization of Resources

The National Spatial Plan indicated that Sulawesi will be developed as the national granary, area for horticulture, livestock raising, natural-resources-based industries especially fishery, tourism, agricultural plantations, maritime industry, oil and gas industry, mining, tourism, and processing industries.

The global shortage and price escalation of resources due to increasing demand from the Chinese and Indian economies provide Sulawesi an opportunity to fill the gap.

In this context, the development of natural-resources-based industries offers the most prospective measure for Sulawesi, as is proposed in Regional Development Strategy 1.

However, Sulawesi's resources are not infinite. Moreover, the resources in undeveloped poor areas in the hilly rural regions, especially in Gorontalo and in Central Sulawesi cannot be utilized readily For instance, cocoa and coconut trees are ageing and productivity is deteriorating, which present a development disadvantage.

Under these preconditions, JICA Study Team proposes an industrial development concept as shown in Figure 5.2.8.

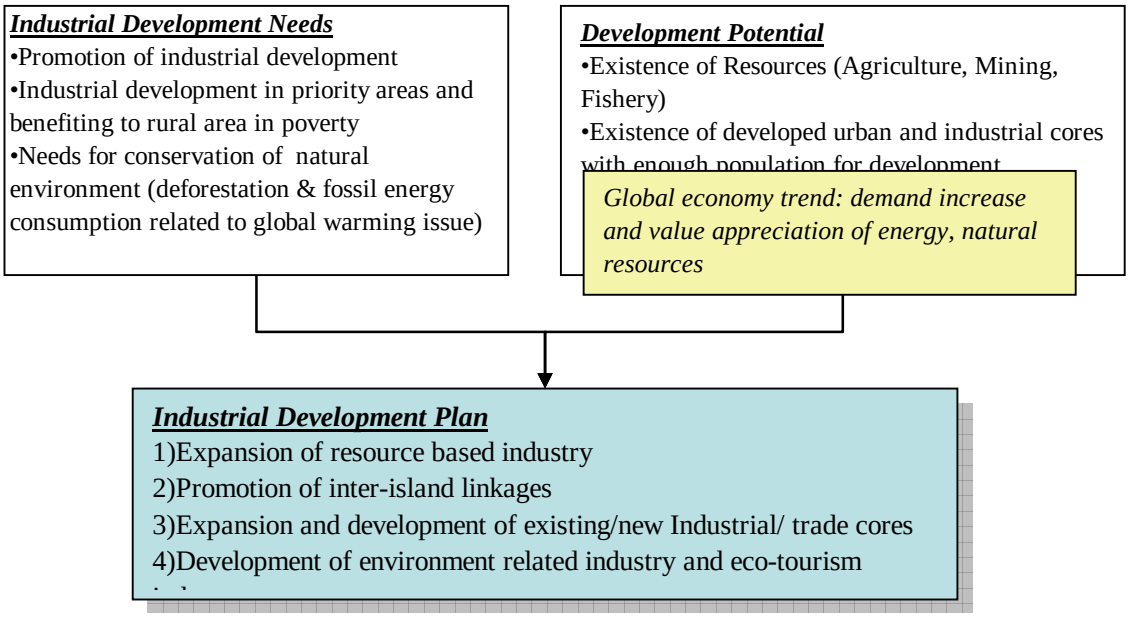


Figure 5.2.8 Industrial Development Plan for Sulawesi

(2) Prospective Resource-based Industries in Sulawesi

The prospective industries for Sulawesi are tabulated in Table 5.2.1 on the basis of the discussion in Chapter 4 on the category-wise analysis of global market trends, global and domestic competitiveness of Sulawesi products, and the production capacity of Sulawesi.

Table 5.2.1 Prospective Industrialization in Sulawesi

Category of Industry	Prospective Product/Market	Prospective Source Area	Development Phase	
			Short Term	Med/Long Term
1) Agricultural Processing	Biodiesel fuel for domestic fuel consumption in Sulawesi.	Coconut production areas such as Manado, Makassar, Palu.	○	
	Food processing of cacao, copra, coffee, vanilla, clave, vegetable, cashew nuts, etc. for foreign markets, especially China.	• Processing and trading centers of agricultural and fishery products such as Manado, Makassar, Palu, and other provincial capitals. • Consolidated food processing centers (CFPC) are recommended. • Residual processing in CFPCs for animal feeds/ organic fertilizers, etc. for domestic livestock industries	○	○
2) Livestock/Meat Processing/Animal Feed Processing	(Halal) meat for the Middle East market/Kalimantan, etc. Animal feeds from copra, maize, cassava, soybean, and fish residuals for domestic livestock breeders.		○	○
3) Fishery and Marine Product Industry	New products such as Milkfish for the export/domestic market Promotion of processing of Tuna, Sea weeds, etc. for export		○	○
4) Mining Industry	Development of oil and natural gas for export and domestic market. Enhancement of Nickel, Asphalt, Gold, etc. for export and domestic market	On-site production and primary processing in Southeast .Sulawesi, etc.	○	
5) Construction Materials Industry	Gravel, stone, cement export to development areas in Kalimantan and Luwuk.	Central and South Sulawesi.	○	
6) Light Industry	Labor-intensive manufacturing such as wood materials, plywood, furniture, garment, shoes, etc. for export.	Processing and trading centers such as Manado, Makassar, Palu, and Kendari.	○	○
7)Tourism Industry	Marine eco-tourism.	Manado and the remote islands of Wakatobi in Southeast Sulawesi and Bantaeng in South Sulawesi.	○	○

Source: JICA Study Team

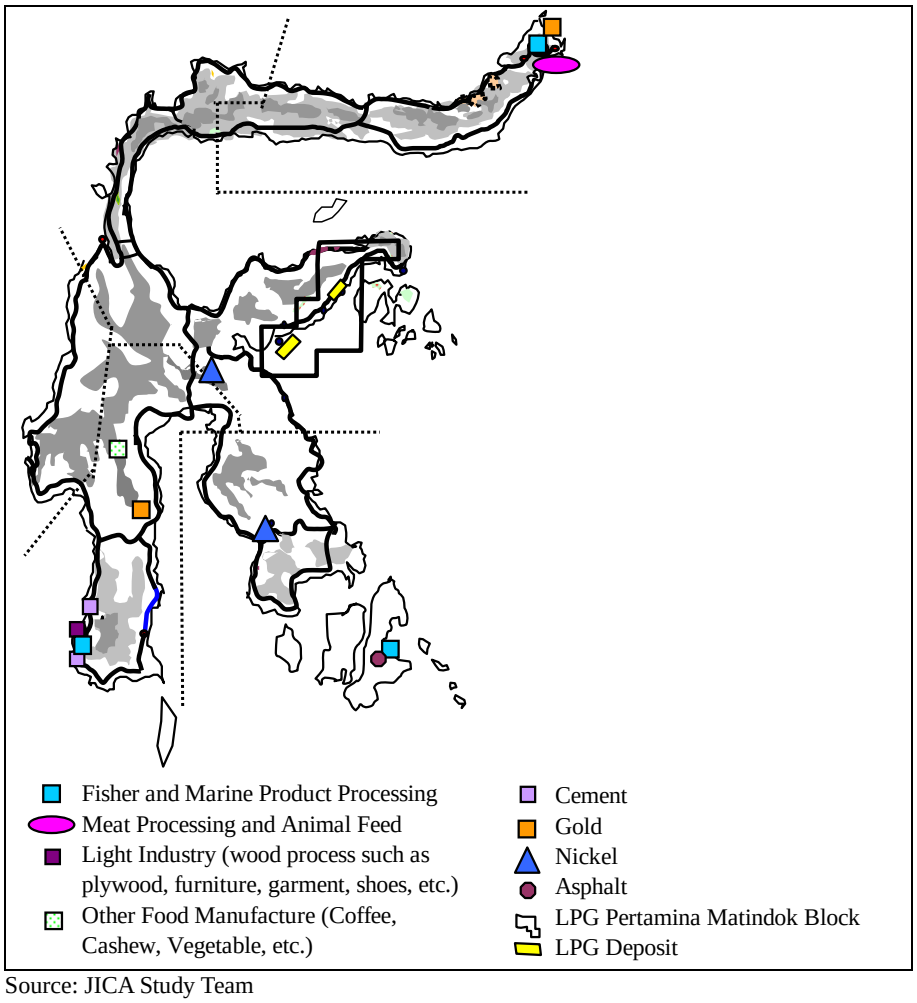
Marketing channels for international commodities are quasi-established and are quite labor intensive to get Sulawesi's products into existing channels. For instance, world marketing channels for cacao products are already established, making it difficult to change the importing sources and channels of raw materials. Exporters of cacao beans, butter, and powder, therefore, will have to maintain the existing export channels and find new markets.

New markets of the Sulawesi products can be found in China and in the BRIC countries where the demand for imported products is increasing and marketing channels are less established. To open up markets in China some measures should be strategically taken under the framework of the ASEAN-China Free Trade Agreement (FTA). For instance, the export of cacao butter and

powder processed in Sulawesi would find new markets if the imposition of VAT on locally processed cacao is lifted. Other tropical products could also find markets in China. Therefore, further detailed studies on trade linkages with China in both the medium and long terms are important.

(3) Development of Industrialized Core Center

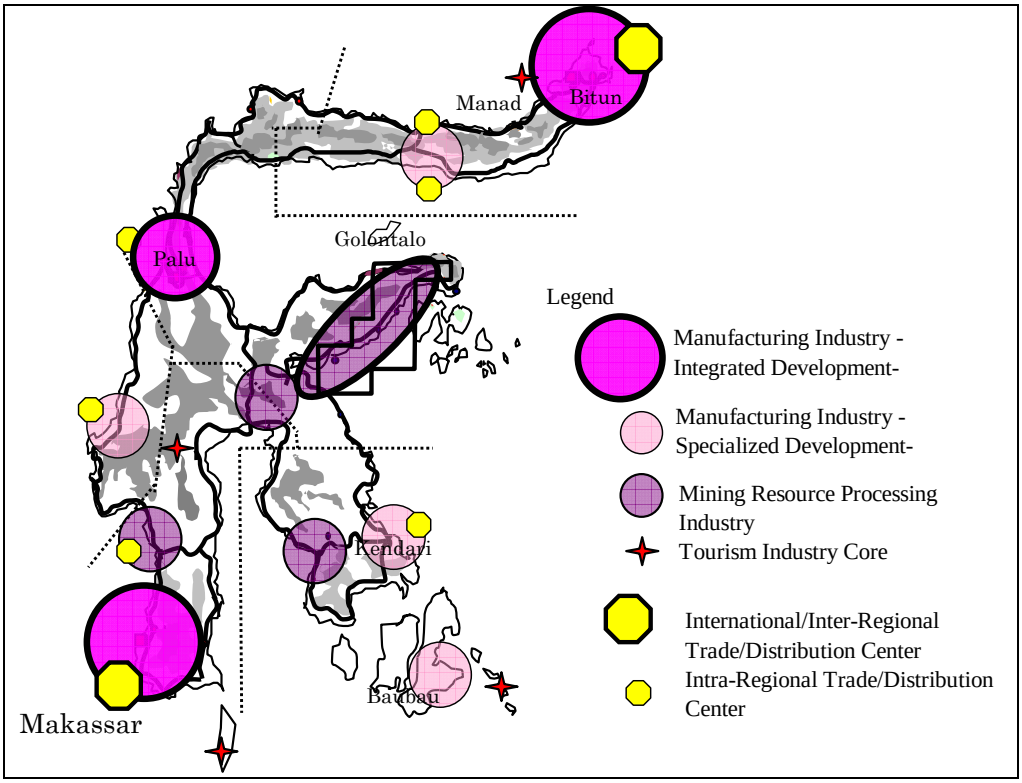
The manufacturing industry in Sulawesi has been underdeveloped due to the overspread of agricultural, mineral, marine resources, and labor despite a large population and average education. Few manufacturing and mining industries operate in the island, as shown in Figure 5.2.9. The development of tourism is also insufficient compared with the other destinations in Indonesia and neighboring countries. Resources collected from and products made in the territory are exported to advanced regions in Indonesia without local processing.



Source: JICA Study Team

Figure 5.2.9 Current Manufacturing Industries in Sulawesi

To promote industrial development, the establishment of industrial centers will improve the investment environment for FDIs and domestic direct investments (DDIs). Considering the availability and the distribution of resources and the established industries, the concept of industrial centers is proposed, as shown in Figure 5.2.10.



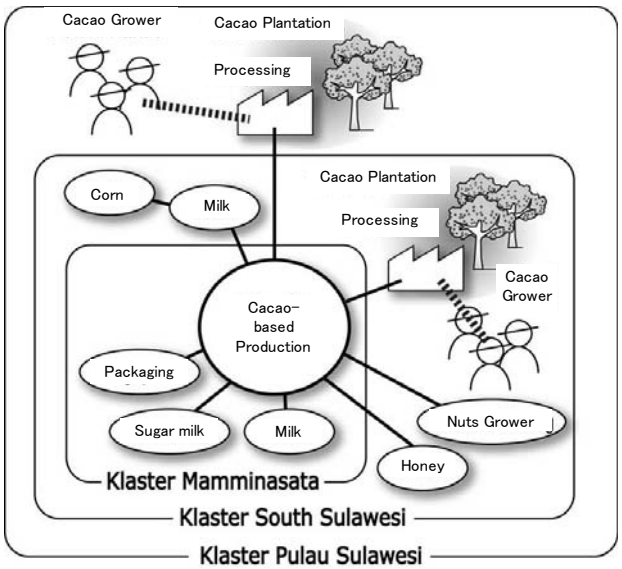
Source: JICA Study Team

Figure 5.2.10 Concept of Industrial/Trade Centers

(4) Development of Cluster-type Chain Industrial Chain

The development of clustered industrial chains should be promoted. Concurrently local primary processing activities including resource growers should be developed as primary processors through cluster chains. This form of primary processing will significantly benefit the local community.

To connect the above clusters, efficient logistical functions should be established to link production areas and processing zones as well as markets.



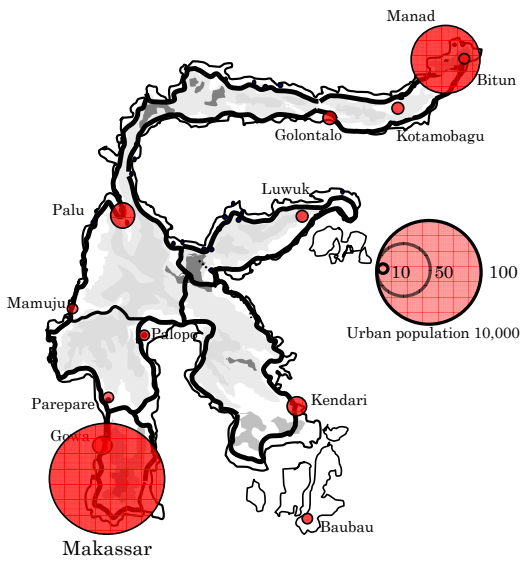
Source: JICA Study Team

Figure 5.2.11 Idea of Cacao Industry Cluster Chain

Cluster type industrial chains based on resource processing could be developed in the priority areas as well as in adjoining regions throughout the island. Different types of cluster chains can be established by category of resources. Figure 5.2.11 shows a case for cacao production.

5.2.3 Alleviation of Social and Economic Disparities in Rural Area through Integration of Regional Centers and Cities

For the realization of Regional Development Strategy 3: "The social improvement and mitigation of regional gaps through an integrated development," which follows the linkage plan among priority areas, is conceived.

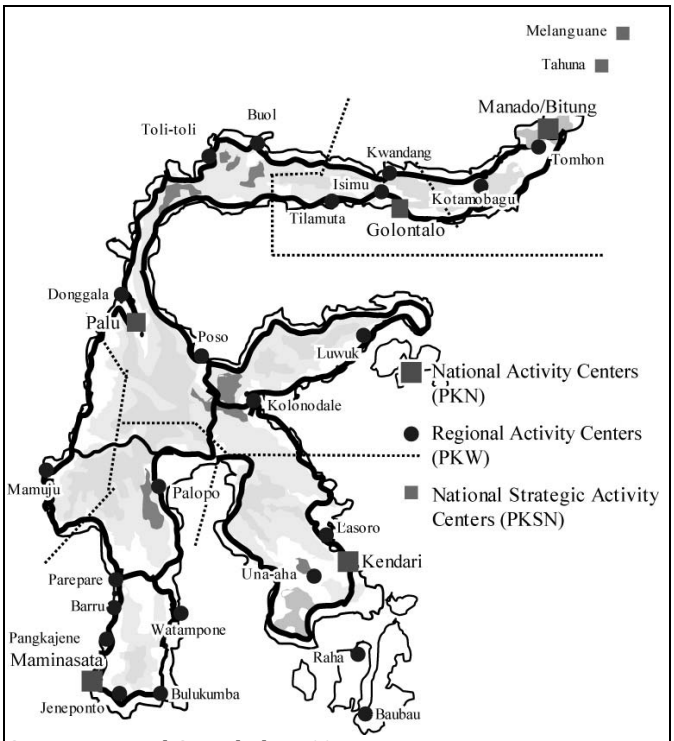


Source: JICA Study Team

Figure 5.2.12 Urbanized Two Core Areas in Sulawesi

In line with population increases, population concentration in the two developed cores of Makassar and Manado will be accelerated, as shown in Figure 5.2.12. Population increases of 320,000 and 210,000, or 30% and 40% of the present population, is estimated in Makassar and Manado/Bitung, respectively, in the next two decades. Thus the further development of the two cores should cope with the population increase. Urban environmental improvement, the development of new habitats, the development of industries to create jobs, the improvement of education and medical services, etc. are requisite developments in the two core areas.

At the same time, each provincial capital will continue to be the center of their respective provinces. Population increases are also predicted in the provincial capitals mainly due to in-migration from rural areas. Population increases in Kota Kendari and Kota Palu, for instance, are estimated at 170,000 and 150,000 in the next two decades. In the Sulawesi Spatial Plan, the provincial capitals and primary cities, as shown in Figure 5.2.13, are the development targets for becoming regional service centers.



Source: National Spatial Plan 2007

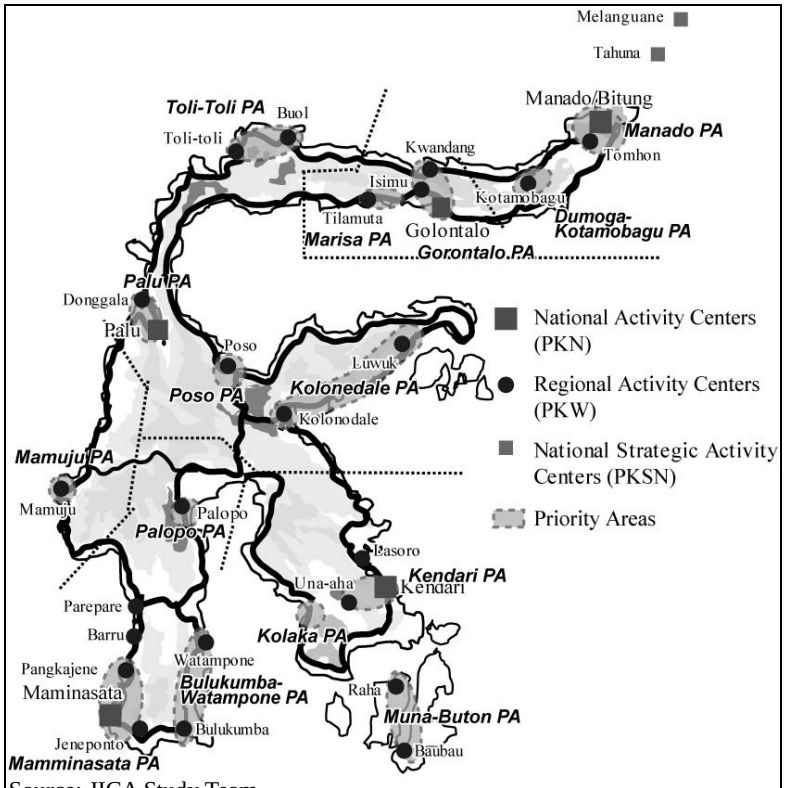
Figure 5.2.13 Activity Centers in Sulawesi

On the basis of the concept of urban service center development mentioned above, the following additional proposals are proposed:

1) Considering the importance of the Kota Palu and Luwuk energy base areas, the development of the Palu and the Luwuk priority areas will be accelerated and commenced in the second 5-year instead of the third 5-year plan as originally proposed in the spatial plan explained in Table 2.3.3 and Figure 2.3.1. Figure 5.2.14 shows the distribution and phased development of the priority area, as reviewed by the JICA Study Team. The transportation network concept of a phased strategy and the linked priority areas is illustrated in Figure 5.2.15.

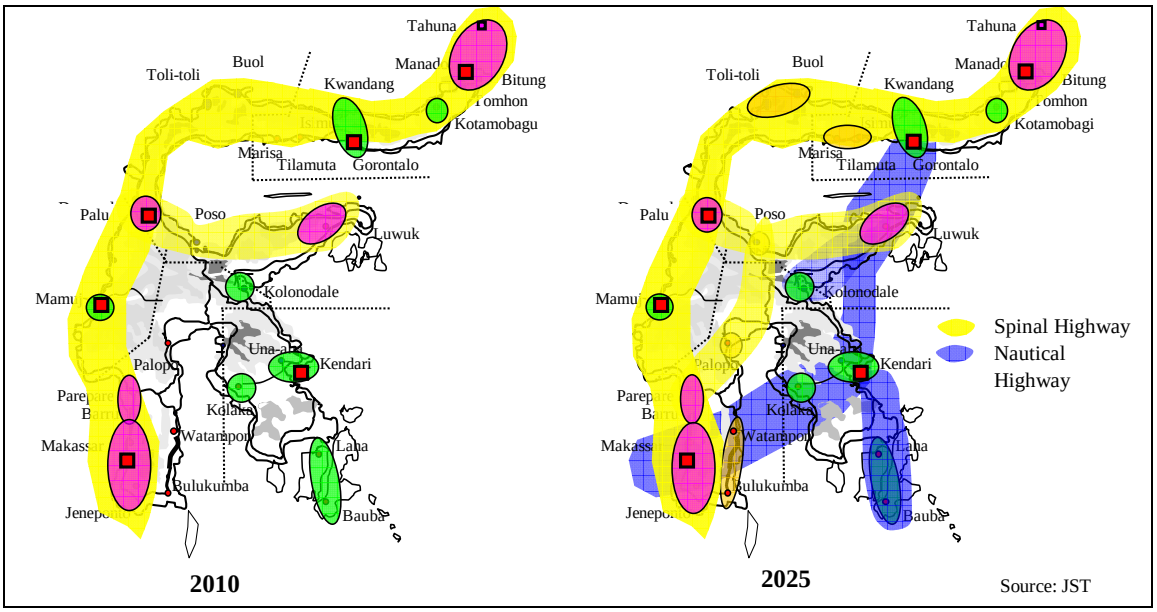
2) The isolated settlements, which are inaccessible via the national and provincial roads and suffer high poverty rates, are shown in Figure 5.2.16. Development support is necessary for these human settlements to attain government goals and reduce poverty rates in Indonesia. Road provision is another effective measure to improve the social and economic conditions of these areas.

3) The empowerment of local farmers through agricultural technology transfer and livelihood improvement is important to mitigate regional economic disparities. Agricultural technologies assisted by plantation investors and FDIs in the manufacturing industries, in addition to the public agricultural institute will help farmers in producing market-oriented products. Moreover, the interventions by the local government, non-governmental organizations, and donors will educate local families to improve their livelihoods.



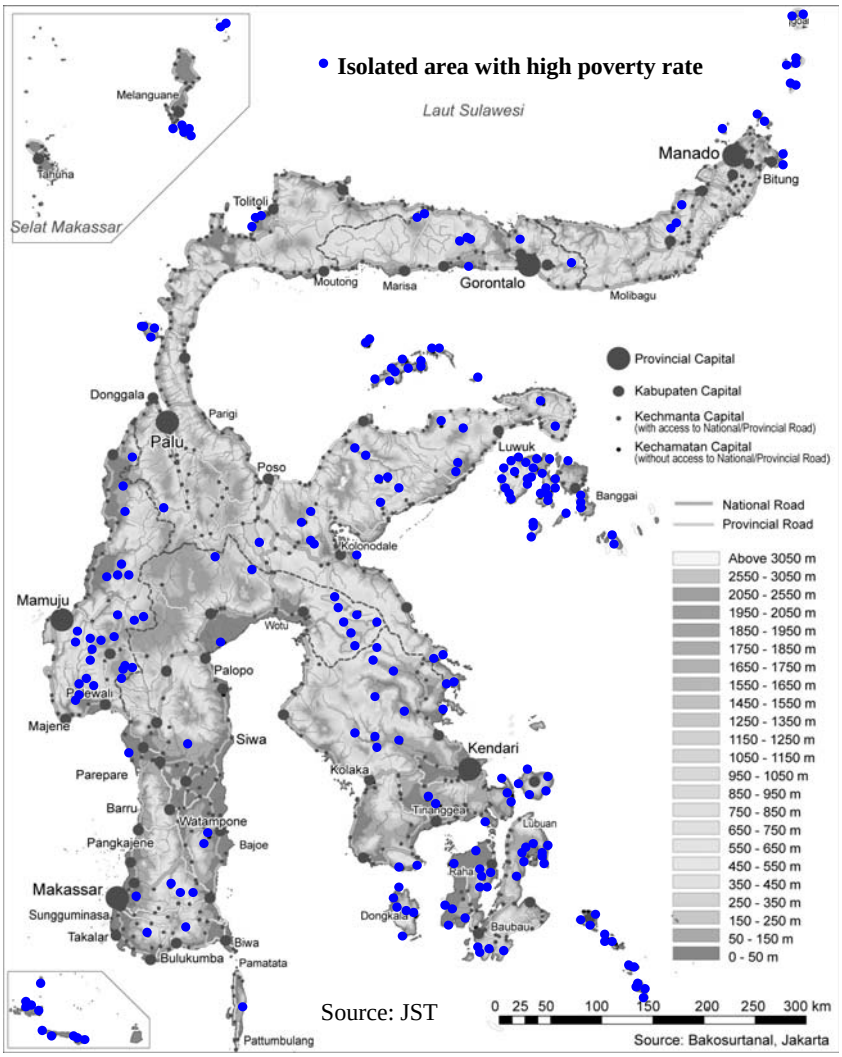
Source: JICA Study Team

Figure 5.2.14 Development of Priority Areas and Activity Centers based on the Spatial Plan



Source: JICA Study Team

Figure 5.2.15 Transportation Network Concept connecting Priority Areas



Source: JICA Study Team

Figure 5.2.16 Isolated Human Settlements with High Poverty Rates

5.2.4 Environment-friendly Development and Disaster Prevention

For the Regional Development Strategy 4 which calls for "development with full attention to environmental preservation and disaster prevention," three concepts are proposed hereunder:

(1) Vertical Development

Land in Sulawesi Island has been utilized to their full extent thus horizontal expansion for agricultural land use is now difficult. Also to address criticisms that Indonesia has the worst deforestation practice, forestation or at least the preservation of the remaining forest lands should be planned and carried out.

* Instead of deforestation, vertical land use by replacing overaged trees in existing croplands is recommended so as to help increase yields. Intercropping and multiple cropping , with high-yielding corn or other crops, such as soybean, are also proposed.
* Natural resource management is important. Through proper natural resource management, communities throughout the Sulawesi Island can improve their incomes and enhance their living standards in tandem with the conservation of their natural environment so as to preserve the rich biodiversity in Sulawesi.
* Vertical development increases agricultural yield without land expansion, and it is achieved by means of applying a more efficient management of crops, as explained below.

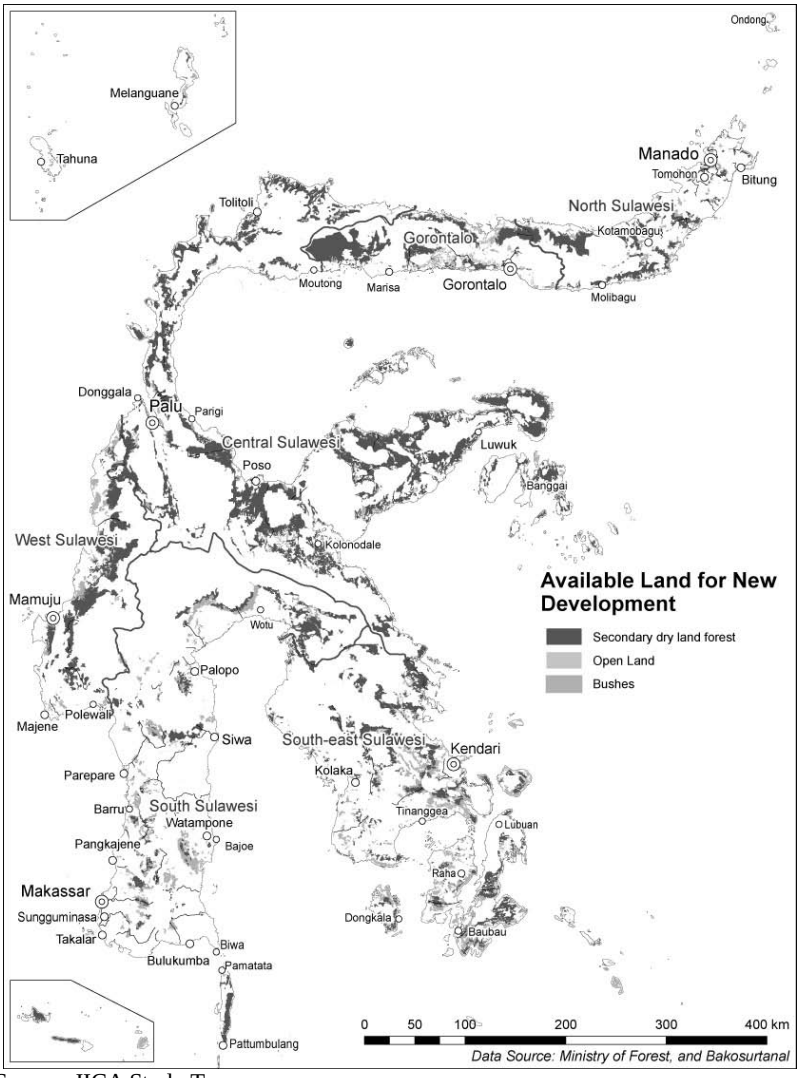
Coconut and Corn: For Sulawesi, the idea is to expand corn fields within coconut cultivation areas and thus pursue intercropping. Coconut trees will be replaced with more productive species at a grid of 10m x 10m. Then high-yielding corn, or other crops such as soybean, will be planted in between the trees. The coconut will be harvested every 45 days so as to provide raw materials for the production of bio-diesel and other by-products. This way, production volumes for coconut will double, while the corn outputs will significantly increase. The copra meal obtained from bio-diesel production will be used in the coconut cultivation field as organic fertilizer which will also increase the output of corn.

Cocoa: As for cocoa, the major export cash crop for Sulawesi, the cocoa yield per hectare can be increased through intensive cropping and the exercise of proper techniques for maximizing yields per hectare. Although these efforts have been done in the past, they failed because farmers were not properly motivated. Sale prices did not benefit such efforts, and concerned agencies lacked manpower and administrative capabilities. These were aggravated by the fact that the area covered by cocoa farming is quite large especially in South Sulawesi. The quality of cocoa beans is expected to improved when cocoa processing activities become more significant. This is due to the fact that since the investors in cocoa processing businesses will be concerned not only in the output and stable supply of cocoa beans but also in the specific qualities of the cocoa beans themselves.

Coffee: There are 2 types of coffee production in Sulawesi. One is coffee production through modern coffee estates and the other is through traditional backyard coffee cultivation common among small land holders who also usually plant other kinds of staple or cash crops. The yield and quality of coffee grown by small growers can be improved if large-scale coffee growers will make an effort to disseminate information and management techniques to small coffee growers. However, this can happen only when coffee processing is done in Sulawesi, since the coffee processing operators should undertake such necessary works to maintain international quality standards.

Land for Vertical Development

Table 5.2.2 and Figure 5.2.17 show the type of lands that are suitable for vertical development, especially those that occupy secondary dry forest lands and bushes approximating 1,080,000ha or an average of 6% of the total land. As seen in the previous discussion on BDF, 660,000 ha is the necessary areas for the BDF industries in order to satisfy BDF demands in Sulawesi Island. It can be said that this area is sufficiently available from the secondary dry forest lands.



Source: JICA Study Team

Figure 5.2.17 Potential Land for Vertical Development for Agriculture

Table 5.2.2 Potential Land for Vertical Development for Agriculture

(1,000ha)

Province	Total land	Gross Possible Land		Net Possible Farmland	
North Sulawesi	1,393	139	10%	70	5%
Gorontalo	1,217	200	16%	100	8%
Central Sulawesi	6,809	921	14%	460	7%
West Sulawesi	1,679	205	12%	102	6%
Southeast Sulawesi	3,676	407	11%	204	6%
South Sulawesi	4,612	286	6%	143	3%
Total	19,385	2,157	11%	1,079	6%

Note: /1 Natural forest, mangrove, Primary dry forest, swamp, unsuitable land for agriculture such as savanna, land above El.1,000m are excluded.
/2 Net farm land is estimated at 50% of gross possible land.
Source: JICA Study Team based on GIS land-use map

(2) Reduction of Environmental Load (Idea for new energy and cycle-oriented industries)

The development of new energy sources, such as BDF, along with the utilization of local agricultural resources and the introduction of cycle-oriented industries through the reuse of residuals, is proposed.

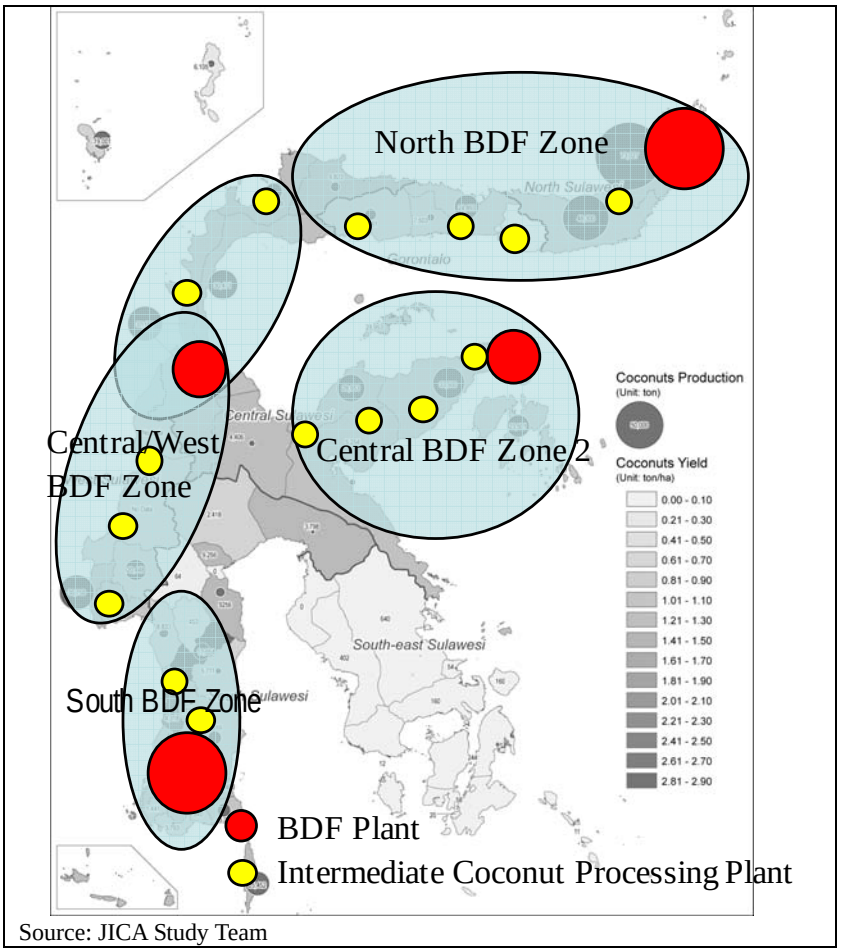
1) BDF Production

Several Asian countries have already taken measures to introduce bio-diesel fuel made from raw vegetable oils locally available. In Indonesia, experimental production and distribution of bio-diesel is currently being conducted but the raw material used is palm oil. Parallel with the development of the palm oil-based bio-diesel, the use of Jatropha has likewise progressed especially in areas where there is limited precipitation since Jatropha farming does not require much water.

Sulawesi has traditionally been known as a coconut island. It has around 700,000 hectares planted to coconuts, accounting for 20% of the total coconut cultivation area in Indonesia. The northern part of Sulawesi, such as Sulawesi Utara and Gorontalo, are the areas where intensive cultivation of coconut has been practiced for quite a long time.

Table 5.2.3 Distribution of Coconut Cultivated Areas in Sulawesi Island

	North	Central	South	Southeast	Gorontalo	West	Total
Area (ha)	250,923	172,581	119,498	50,375	53,967	67,013	**714,357**
Share	35%	24%	17%	7%	8%	9%	100%



Source: JICA Study Team

Figure 5.2.18 Coconut-based Bio-diesel Development Zones in Sulawesi

With coconut's predominance in the island, it is proposed that BDF development zones be established. The concept of the coconut-based BDF development zones is illustrated in Figure 5.2.18.

Each zone shown in the figure above is planned to have at least one unit of bio-diesel production plant with a capacity of 300 tons of BDF per day, or 110,000 KL per year. This plant requires around 165,000 hectares of coconut cultivated land exclusively for the supply of raw materials for producing bio-diesel. If four BDF plants will be put into operation, together with the newly developed coconut cultivation areas amounting to 660,000 hectares, the total BDF production volume will reach 440,000 KL per year.

The total diesel consumption of Sulawesi in 2006 was around 1.4 million KL which is expected to increase to 2.0 million KL in 10 years starting in 2007. Since the maximum blending ratio of bio-diesel and petroleum diesel is 20%, it is expected that BDF demands for Sulawesi will reach 400,000 KL, which correspond to the production output of the four BDF plants. Theoretically, if the pump price of diesel would remain as it is today at, say US$0.55 per liter, the annual sales from 400,000 KL of bio-diesel will be US$ 220 million for Sulawesi alone.

Table 5.2.4 SWOT Analysis of BDF

Area	Profile	Internal Factor	
		Strength	Weakness
Production	Total coconut cultivation area of Sulawesi is around 710,000 ha. It accounts for around 22% of the total coconut cultivation area of Indonesia which is almost 3.2 million hectares.	Sulawesi has traditionally grown coconuts and the population is familiar with it.	Most coconut trees are old and their productivity has declined substantially.
	The production of coconut in Sulawesi is around 600,000 tons per year in terms of copra weight and it is processed into CNO at around 290,000 tons per year or 35% of the total CNO production of Indonesia.	Sulawesi has been a leading exporter of CNO, so it is famous in the international market.	
	Indonesia is ranked second after the Philippines in terms of CNO export volume and ranked first in coconut cultivation area.	Sulawesi has a number of fairly large operative CNO production plants. However, since the market demand for CNO has declined despite a considerable increase in palm oil demand in the world, CNO plants are operating below capacity.	
	Shifting of market from coconut oil to palm oil.	The market for vegetable oil has been shifting from coconut oil to palm oil, causing a continuous decline of market demand for coconut oil.	
Area	Profile	External Factors	
		Opportunities	Threats
Market	The potential of introducing bio-diesel production and distribution is quite high in Sulawesi because of the intensive cultivation of coconut trees in the area.	Bio-diesel production using coconut oil may be realized. If it is realized, farmers will be assured of steady incomes, thereby enhancing rural economies.	Unless copra can be purchased by bio-diesel producers at fixed prices, the bio-diesel business will not be feasible. Thus coconut farmers will not have an access to this new income source.
	All parts of the coconut can be utilized for commercial purposes so it is called tree of life.	If by-products are fully exploited through the bio-diesel production, farmers' incomes will increase.	Unless a steady purchase of copra is realized by bio-diesel producers, this will not happen.

Source: JICA Study Team

Due to the lack of virgin land for coconut plantation, several measures that will help in attaining high productivity should be taken. This includes the replantation of existing coconut plantations with more productive species and the use of effective harvesting cycles of around 45 days. The SWOT analysis below will show that BDF has a huge potential for Sulawesi.

The development plan for the production of a coconut-based bio-diesel has been preliminary prepared as shown in the **Appendix 1** attached to this report.

2) Recycling of Residuals in CFPC: The maximization of resources through the utilization of residuals from agricultural processing

The recycling of residuals can only be realized through the introduction of a recycling system for

agricultural wastes (residual or offal) in agricultural farms in the most economical of methods and through maximum efficiency. Theoretically, the recycling of agriculture wastes back to farms, can be exercised individually by farmers. However, they can do this at a limited scale with limited effects only. It is possible to recycle waste on a fairly large scale using optimum methods and for commercial purposes.

However, in Sulawesi, this type of industrial development may require proper government intervention and the organization of private interests together with the organization of farmers to disseminate proper information and techniques and aims of the proposed activities.

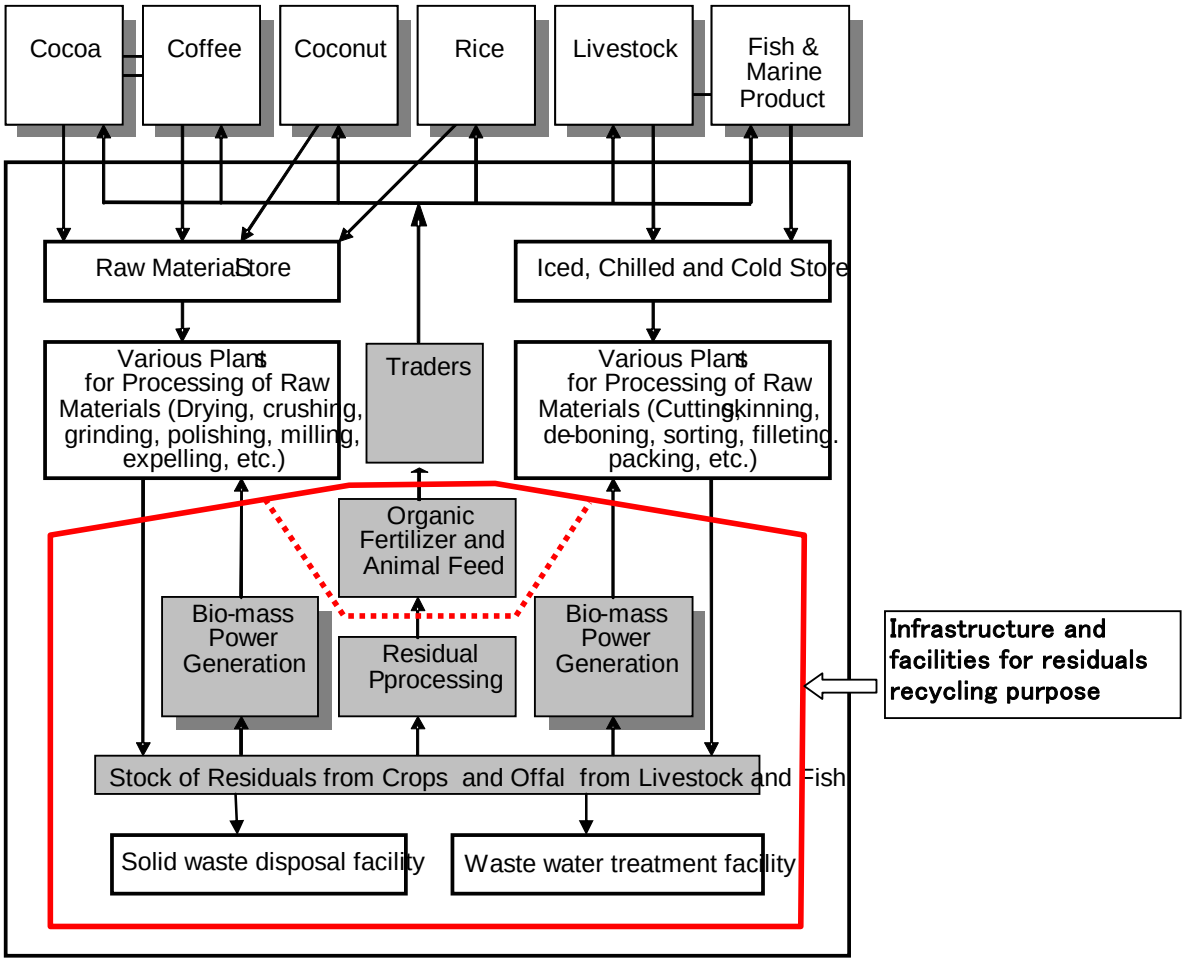
Figure 5.2.19 illustrates an example of such a facility which will enable such a system to operate. This proposed facility will be developed in the proposed consolidated food processing center (CFPC) in the Mamminasata and Manado areas which is proposed as a food processing industrial complex.

The proposed CFPC will be composed of the following facilities for residual recycling purposes:

* Residual processing plant.
* Bio-mass generation plant.
* Organic fertilizer and animal feed maker.
* Common distribution facilities such as warehouses.
* Power supply system, water supply system, liquid waste treatment plant, solid waste treatment system.

The significant function of CFPC is that it does not limit its function to food processing but to the production of by-products from residues that came out of the first process and recycling these by-products back to the farm as organic fertilizers or animal feeds. Solid wastes which can be burned, i.e. rice hull, coconut husk, corn cob, etc., will be utilized as bio-mass energy sources either to generate electricity or run boilers which are needed for the food processing operation.

This way, power consumption from the power grid, which is originally based on the combustion of fossil fuel and petroleum fuel, can be reduced, thereby contributing to lesser loads on the environment. In fact, if the expected reduction of fossil fuels can reach more than 100,000 tons of carbon dioxide per year, the bio-mass power generating portion of the proposed facility will be entitled to a Certified Emission Reduction (CER) under the Clean Development Mechanism (CDM).



Source: JICA Study Team

Figure 5.2.19 Facilities for Residuals Recycling in Consolidated Food Processing Center

(3) Management of a Disaster-resistant Island

In order for Sulawesi to cope with various natural disasters, regional disaster prevention capacities should be enhanced. Once a disaster happens, the relief, recovery, rehabilitation, and reconstruction of the area where the disaster hit will be urgently needed.

Although Sulawesi has not suffered relatively from catastrophes such as volcanic eruptions, tsunamis, etc., or disasters, such as floods and land slides, these are events that could happen throughout the island. To prepare for disaster mitigation, damage rehabilitation, and prompt recovery, the following preparations are necessary:

* Disaster information system: Potential disasters should be disclosed to the public for their understanding and preparation. Regular community evacuation training will enhance capacities to prevent, mitigate, or prepare for disasters.

* Alert system: Although a perfect alert system is impossible, even basic alert systems will be practical in cases of disasters.

* Accessibility to damaged areas: Securing access to damaged areas in cases of disasters

is very important. Rescue and recovery at the initial stage after a disaster has struck are critical for victims. Therefore, the security of access roads is crucial. A two-route access system to damaged areas is recommended.

* Recovery and rehabilitation are urgently necessary for victims after disasters. The provision of a systematic and speedy support for victims should be done through scientific methods, and preparedness will be established through training.

* Livelihood recovery is the target of disaster prevention. Reconstruction will be made through the collaboration of the affected communities and nongovernmental organizations.

5.3 Land Use Plan

5.3.1 Principles for Land Uses

Land is the most basic element where people can conduct various forms of economic activities. To determine effective and efficient long-term land uses, the Study would designate several types of centers and zones in Sulawesi Island. Since land for development is quite limited in Sulawesi, future economic growth will require more intensive uses of built-up or developed areas. At the same time, in order not to bring about negative environmental impacts, there is a need to pay attention to environmental sustainability.

A center is defined as a node which accommodates (or will accommodate) a dense number of people as well as intensive economic activities. Existing nodes, i.e. cities, towns, and major villages, can be categorized as centers. The Study classifies the potential nodes into interregional/international center and intraregional centers in consideration of their population and scale of economic activities.

A zone is defined as a spatial extent where valuable natural resources for supporting people's lives and economic activities (in a center) are available. In the Study, classifications of zones are: (1) agriculture zone, (2) regional forest zone, (3) nature park, and (4) nature/wildlife reserve.

The table below shows a general idea of the land-use classification.

Table 5.3.1 Land-use Classifications

1st Classification	2nd Classification	Remark
Center	Interregional/International Center	National Activity Center (*PKN: Pusat Kegiatan Nasional*) would be a candidate.
	Intraregional Center	Regional Activity Center (*PKW: Pusat Kegiatan Wilayah*) would be a candidate.
Zone	Agriculture Zone	Existing agriculture area and its surroundings.
	Regional Forest Zone	Forest areas (including protection forests) and surroundings.
	Nature Park	Designated nature parks.
	Nature/Wildlife Reserve	Designated reserves.

Source: JICA Study Team

It is hoped that the stakeholders concerned, including provincial governments, would take into consideration the proposed land-use classification in addition to their own plans/programs, so as to attain good coordination and integrated development of the whole island.

5.3.2 Land-use Frameworks by Province

(1) Land-use Principles

Based on the land-use classifications, the Study has proposed a preliminary land-use framework for Sulawesi Island up to 2024, as illustrated in Figure 5.3.1.

Three interregional/international centers (shown in red circles) and five intraregional centers (shown in yellow circles) are to be created in the whole island. Economic linkages among the centers are expected to be enhanced by means of improved or upgraded arterial road networks and sea lanes. At the same time, agricultural zones should be enhanced through improved production and quality of priority crops, while green hinterlands should be appropriately managed in compliance with proper laws and regulations.

(2) Land Use Framework by Province

North Sulawesi Province

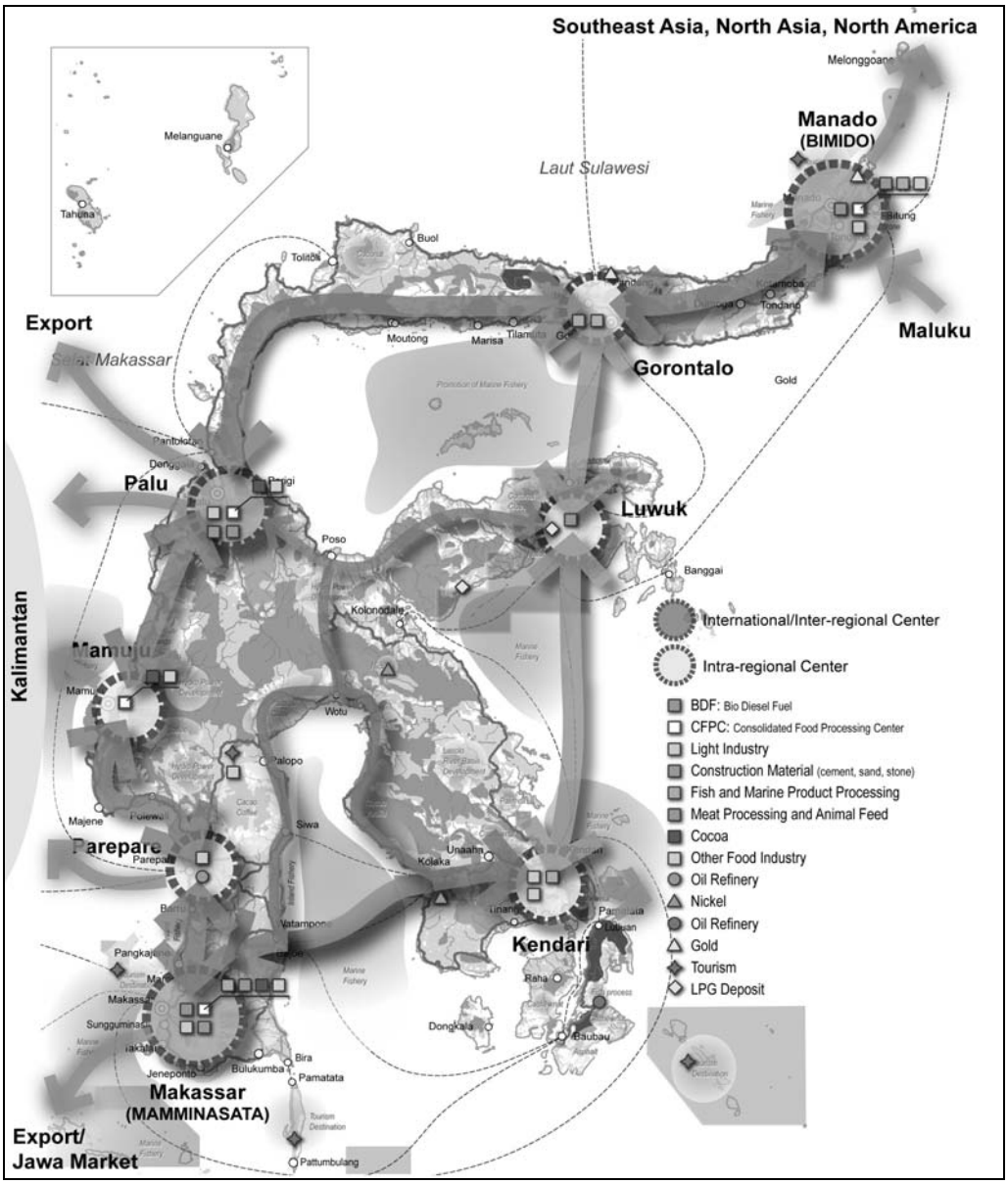
North Sulawesi Province would play a leading role in Northern Economy Linkage. Particularly, Manado and its surroundings, called BIMIDO (Bitung-Minahasa-Manado), designated as the interregional/international center is expected to grow for an international trading core toward the future. BIMIDO has a potential for an integrated industrial development supported by key infrastructures such as an international sea port (Bitung) and an international airport (Manado), with the rich natural resources from their seas taken into account. Marine tourism is also a prospective potential industry that could be combined with green tourism areas (national parks) to further promote the attractiveness in the tourism sector.

It is proposed in the Study, to strengthen the linkage to the west, that the northern coastal road to Gorontalo should be urgently upgraded as a Trans-Sulawesi section, while the southern coastal road would be a long-term priority in consideration of the cost-effectiveness because of its indented coastal line. In addition, a crossing road (North-South Corridor) between the northern coastal road and the southern coastal road is proposed while paying enough attention to the protected green area.

Gorontalo Province

Gorontalo is now applying as a KAPET aimed mainly at promoting food-industries. A corn-related industry is one of the potential or strategic industries according to their regional economic plan. There are several areas that can be declared as natural reserves in and around Gorontalo. Enough attention should be paid to them even as corn, coconut, and other crops production is promoted.

City of Gorontalo is in a key location in transportation, from which national road and national sea lane extend for Central Economic Linkage. Meanwhile, there is a need for improving inland crossing transportation between the northern coastal line and the southern coastal line in order to enhance the accessibility in the isolated areas.



Source: JICA Study Team

Figure 5.3.1 Land-use Framework for Sulawesi Island up to 2024

Central Sulawesi Province

Palu, the Capital of Central Sulawesi Province, is designated as the interregional/international center, while Luwuk is the intraregional center. Palu has a strategic location that connects it with Sulawesi and Kalimantan (as stated in Section 5.2.2). It has a potential for an integrated industrial development with emphasis on hinterland agriculture which can be supported by the sea port (Pantoloan) and the airport (Palu). Luwuk holds a huge potential for natural oil/gas which can be exploited in the near future. It is expected to boost energy-related industries, while its green area should be appropriately conserved or protected. Even though it has already been designated as a KAPET, this area is not yet developed due to its geographic characteristics.

To open this area to the Sulawesi economy, sea lane transportation from and to Luwuk (and Pagimana) is proposed to be enhanced in order to strengthen its linkages with the other peninsulas

(to Gorontalo and to Kendari), while improving its inland transport to Palu via Poso.

West Sulawesi Province

Mamuju, the Capital of West Province, is in a strategic location with the potential hinterland agriculture zones, which is expected to contribute to plural economic linkages, i.e. Central Economy Linkage, Western Economy Linkage and Southern Economy Linkage. Currently, the road network between Mamuju and Palu is under poor condition. Therefore, this road, as a Trans-Sulawesi section between Palu, Mamuju and Parepare, should be improved so as to attain the smooth movement of people and goods. In addition, inland road network to the isolated areas should be improved so that agricultural products can be smoothly transported.

South Sulawesi Province

Makassar, the Capital of South Province, and its surroundings called MAMMINASATA (Makassar-Gowa-Maros-Takalar) are designated as the interregional/international center, while Parepare is the intraregional center. Makassar, with its relatively good infrastructures, is the largest city in Sulawesi Island in terms of population and economic activities. To further create a more intensive industrial development, the Mamminasata Integrated Spatial Plan was recently drafted through coordination with a provincial development coordination body (BKSPMM), which proposed several new industrial areas for development after KIMA. Parepare is located 150km north of Makassar. Although it is already designated as a KAPET supported by a sea port, it has yet to see substantial progress in development. A plan for an oil refinery plant has already been drafted to lead the regional economy there.

To further enhance the South Sulawesi economy, the national road section between Makassar and Parepare is highly prioritized, following the national development policy.

Southeast Sulawesi Province

Kendari, the Capital of Southeast Province has been designated as a KAPET, and has been in a top position in per-capita GRDP in Sulawesi because of the mining production of nickel. While, the Study would propose to have more strong linkage among Kendari, Makassar and other cities, for the purpose to have more efficient/effective business and trade that could result in higher value-added.

To integrate this area more with the overall Sulawesi economy, an enhanced sea lane transport is ideal measures as nautical highway to South Sulawesi and to Central Sulawesi. At the same time, since the province has many islands without efficient accessibility, local transportation system in such remote areas should be taken into consideration.

Buton regency is one of the lowest per-capita GRDP regencies in Sulawesi. However, full utilization of natural asphalt (Asbuton) as studied in Appendix 9 and the oil and gas exploitation started in 2007 could contribute to regional development of these southern island areas in the future.

5.4 Industrial Promotion

5.4.1 Principles for Industrial Promotion in Sulawesi

After reviewing the current status of Sulawesi Island from a variety of angles, i.e. natural condition, demographic trends, industry characteristics, basic principles for industrial promotion toward the future could be distilled into three things. They are:

① To improve productivity and quality in agriculture, so that the stability of employment would be secured.

② To promote agro-industry through introduction of necessary techniques and skills, thereby employment opportunity would further be created and value-added would be raised.

③ To promote the selected prospective industries/products by providing necessary supports/incentives from the public sector in the public-private partnership. By doing so, employment opportunity and income level would further be improved.

Most developable plain areas in the island have been developed, that would limit new development in the viewpoint of land use, coupled with environmental conservation. Given this situation, the only thing the agricultural sector in Sulawesi could challenge is to improve productivity and quality of the selected crops which could be processed/industrialized to be competitive in the market.

For ① and ② above, the stakeholders concerned (both public and private sector) should try to make a total commitment so as to let the agriculture and agro-industry in Sulawesi be competitive in the long and medium terms. At the same time, ③ must be strategically prioritized in order to make the Sulawesi economy grow on a short-term basis. The Study team recognizes and proposes bio-diesel fuel production (see Appendix 1) and food processing to be important as priority industries. These could contribute not only to the economic development of the island but also to promotion of new energy and cycle-oriented economy.

In the following section, more practical approaches under the three basic principles above will be discussed to promote industries.

5.4.2 Assessment of Prospective Industries

The Study has selected prospective products/industries of Sulawesi Island. To efficiently and effectively promote them for the acceleration of the future economic growth, it is necessary to look into the prerequisite for the industrialization, thereby to identify advantage/disadvantage of each product/industry at this point.

(1) Cluster Analysis Approach

With reference to the analytical framework of *Industrial Cluster*, that was put forward by *Michael Porter*, four elements, i.e. i) *Factor Conditions*, ii) *Demand Conditions*, iii) *Firm Strategy,*

Structure and Rivalry, and iv) *Related and Supporting Industries*, will be analyzed by the prospective product/industry. These elements would configure competitive advantage through mutually affect dynamism among them.

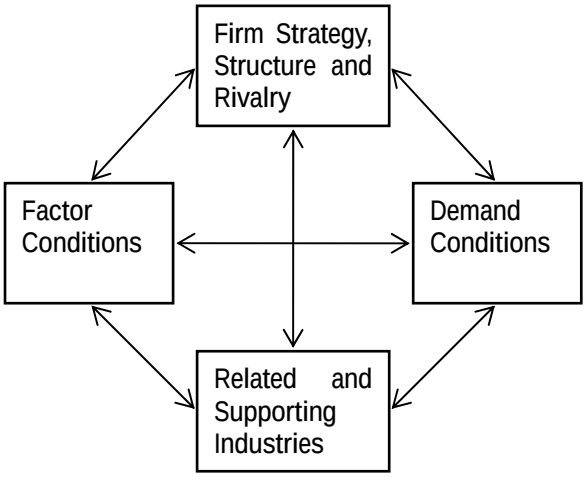


Figure 5.4.1 A Diagram of Competitive Advantage Elements

Factor Conditions is composed of quality/cost of inputs and specialty/originality of product/industry. Natural resources, human resources, capital, and infrastructure (physical, information and technology) are the component units to be assessed in the aspects of quality and procurement cost. If there are any particular regional characteristics reflected in the product/industry, there is a possibility to have a competitive advantage in general.

Demand Conditions is outlined based on the quantitative/qualitative level of the target markets/customers and their spirits of innovation in needs/requirement. If the required level is higher or the spirit of innovation is clearer, the conditions would be more favorable to the producers/enterprises, so that they would be motivated to improve their production/business.

Firm Strategy, Structure and Rivalry is represented by the appropriateness of investment and the continuity of quality improvement efforts by the producers/enterprises, and the competition degree among them. It can be understood the more they compete, the more likely competitive advantages increase.

Related and Supporting Industries can be assessed competitive advantage if there is a number of competent supplier and/or any existing cluster accumulations. It directly concerns the cluster through interactions with the other three elements, resulting in the overall competitive advantage of the producers/enterprises.

In order to promote/strengthen industrial clusters, theoretically, it is said to be necessary i) to assess each element of the production/industry in objective terms, ii) to improve each element as much as possible, and iii) to promote interactive effects among the elements.

(2) Assessment by Proposed Industry

Following the framework of *Industrial Cluster*, the nine selected promising products/industries of Sulawesi Island (①~⑨ below) have been assessed, from the four viewpoints of competitive advantage element, thereby to respectively identify the current advantages/disadvantages.

① AGRICULTURAL RESOURCE PROCESSING_1:
Bio-diesel fuel based on coconut and jatropha to substitute domestic fuel in Sulawesi.

② AGRICULTURAL RESOURCE PROCESSING_2:
Food processing including cacao, coffee, vanilla, vegetable, cashew nuts, etc. for foreign market, especially China.

③ LIVESTOCK/MEAT PROCESSING/ANIMAL FEED PROCESSING:
Halal meat for the Middle East / Kalimantan. Animal feeds from copra, maize, cassava, soybean, and fish residuals for domestic livestock breeders.

④ FISHERY AND MARINE PRODUCTS:
New products such as milkfish for the export / domestic markets. Promotion of processing tuna, seaweed, etc. for export.

⑤ MINING RESOURCE PROCESSING_1:
Development of oil and natural gas for export and domestic markets.

⑥ MINING RESOURCE PROCESSING_2:
Enhancement of nickel, asphalt, gold, etc. for export and domestic markets.

⑦ CONSTRUCTION MATERIALS:
Gravel, stone, cement to be exported to energy development areas in Kalimantan and Luwuk.

⑧ LIGHT INDUSTRY:
Labor intensive manufacturing, such as wood materials, plywood, furniture, garments, shoes, etc. for export.

⑨ TOURISM INDUSTRY:
Marine eco-tourism.

Details of assessment are shown in Table 5.4.3 (1/9)-(9/9) in the latter part, while the overall assessment on Sulawesi products/industries can be summarized as follows, according to the four elements.

- *Factor Conditions*: Sufficient for basic requirement both in quantity and quality, while further improvement is needed.
- *Demand Conditions*: Potential markets/customers are anticipated, however their need should be appropriately and continuously monitored to survive in the competition.
- *Firm Strategy, Structure and Rivalry*: Still a large room to improve. One of the keys is to proactively promote FDI/DDI, that could help the producers/enterprises to cope with the inherent *Factor Conditions* and *Demand Conditions* at the same time.

- *Related and Supporting Industries*: Close relation with the *Factor Conditions*, with the understanding of "The more human resources are competent, the more competent suppliers grow". Thus, it is evidently urgent to develop competent human resources as a fundamental condition for competitive advantage.

In the meantime, the JST made an attempt to give a priority order to the selected products/industries, by rating them on a scale of "++ (*following wind*)", "+ (*calm wind*)" and "- (*headwind*)" for each element of competitive advantage, based on the assessment shown in Table 5.4.3 ahead. Table 5.4.1 summarizes the priority order with total scores by the rating. If total score comes to five "+" or more, it could be prioritized as "A" which would be promoted immediately receiving the current following wind. Likewise if total score is three "+" but less than five, it could be prioritized as "B" which needs some preparation/improvement of one or two elements of competitive advantage for the promotion. And if total score is less than three "+", it would be ranked "C" which still need more efforts until being promoted.

Table 5.4.1 Priority of Product/Industry

Elements of competitive advantage / Proposed industry	Factor Conditions	Demand Conditions	Firm Strategy, Structure and Rivalry	Related and Supporting Industries	Total Score
AGRICULTURAL RESOURCE PROCESSING_1 (bio-diesel fuel)	+	++	-	+	+++ B
AGRICULTURAL RESOURCE PROCESSING_2 (food processing)	Cacao +	++	-	+	++++
	Coffee +	++	-	-	+
					Ave. ++ B
LIVESTOCK/MEAT PROCESSING/ANIMAL FEED PROCESSING	Livestock, Meat Processing +	++	-	+	+++
	Animal Feed ++	+	-	+	+++
					Ave. ++ B
FISHERY AND MARINE PRODUCTS	+	++	-	-	+ C
MINING RESOURCE PROCESSING_1 (oil and natural gas)	++	++	+	+	+++ A
MINING RESOURCE PROCESSING_2 (nickel, asphalt, gold, etc.)	++	++	+	+	+++ A
CONSTRUCTION MATERIALS	++	+	+	+	+++ A
LIGHT INDUSTRY	+	++	-	-	+ C
TOURISM INDUSTRY	+	+	-	-	+ C

++: following wild, +: calm wind, -: head wind

From this priority order, even an attempt, mining industries are considered most priority (rank A) to immediately promote while needing to pay enough attention to bringing about spillover effects to the region. Agro-industries and livestock related industries are in the second priority (rank B) which requires appropriate management to breakthrough into big businesses. Once these industries are on growth paths, sustainability of the regional economy could be highly anticipated coupled with the production potentiality. On the other hand, fishery and marine industry, light industry and tourism industry are rather lower prioritized (rank C) due to lack of supporting industries and management bodies. It seems these industries would take longer time than the others though they are assessed positive in *factor conditions* and *demand conditions*. From a different angle, these industries are to be strategically prioritized with a strong government policy.

5.4.3 Policies and Measures for Industrial Cluster Promotion

It is proposed in common, to improve/strengthen competitive advantage of industrial clusters, that the following policies and measures are necessary to be taken into account.

Table 5.4.2 Policy for supporting/promoting competitive advantage of industrial clusters

Competitive Advantage Element	Supporting/Promoting Policies and Measures
Factor Conditions	*Further quality improvement, more efficient procurement* ① Technical cooperation/guidance for qualitative/quantitative improvement of agricultural and marine products. ② Education and training for human resources development. ③ Financial cooperation or introduction of credit scheme. ④ Development/improvement of physical infrastructures (road, water, power, drainage, waste management). ⑤ Development/improvement of information and technology infrastructures to support production and distribution.
Demand Conditions	*Appropriate and continuous determination of market needs* ⑥ Education and training for human resources development. ⑦ Development/improvement of information and technology infrastructures to support production and distribution.
Firm Strategy, Structure and Rivalry	*Promotion/attraction of FDI/DDI* ⑧ Technical training of primary products processing. ⑨ Financial cooperation or introduction of credit scheme. ⑩ Improvement of investment regimes and taxation system. ⑪ Development/improvement of information and technology infrastructures to support production and distribution.
Related and Supporting Industries	*Urgent development of human resources* ⑫ Technical cooperation/guidance for qualitative/quantitative improvement of agricultural and marine products. ⑬ Leadership training and capacity building for community. ⑭ Development/improvement of physical infrastructures (road, water, power, drainage, waste management).

Based on the policies and measures above, several specific programs are proposed hereinafter to support and accelerate the Sulawesi economy toward the future, by physical infrastructure program and institutional/capacity building program.

(1) Infrastructure Development/Improvement

✧ Transportation Infrastructure Development Program (addressing ④)

Purpose	Development/improvement of transportation infrastructures such as roads, sea lanes and seaports for the purpose of supporting economic growth in Sulawesi Island.
Key inputs	i) Arterial road improvement (national and provincial roads) ii) Collector/Local road improvement (regency roads) iii) Sea lane enhancement (Ro-Ro ferry) iv) Key facilities/infrastructures development (e.g. seaport)
Period	Long term: 2009~2024 (3 stages)
Main Actors	- Central Governments (Ministry of Public Works (DG of Bina Marga), Ministry of Transport)
Relevant Stakeholders	- Local Governments (Province, Kabupaten) - Private Sector

✧ Information Infrastructure Development Program (addressing ⑤,⑦,⑪,⑭)

Purpose	Development of information/communication system which will support production, distribution and marketing activities of producers/enterprises.
Key inputs	i) Installation of broadband (high speed) information system ii) Capacity building and training to governmental agencies and producers.
Period	Mid term: 2014~2024 (2 stages)
Main Actors	- Central Governments (Ministry of Communication, Ministry of Industry)
Relevant Stakeholders	- Local Governments (Province, Kabupaten) - Private Sector

(2) Institutional Arrangement and Capacity Building

✧ Local Products Development/Promotion Program (addressing ①,②,③,⑥,⑧,⑫,⑬)

Purpose	Capacity building for agricultural and marine producers for the purpose to increase added-value which would contribute to GRDP of Sulawesi Island.
Key inputs	i) Technology transfer to the producers for processing commodities (cacao, coffee, etc.) and marketing skills ii) Implementation of the pilot projects for the selected commodities (e.g. 3 exportable commodities for each Kabupaten)
Period	Short term: 2009~2013
Main Actors	- Local Governments (Province, Kabupaten) - Producers of Agricultural and Marine Products
Relevant Stakeholders	- Central Government (Ministry of Agriculture, Ministry of Industry) - Private Sector

✧ **Export Promotion Program** (addressing ⑥,⑩,⑫)

Purpose	Improvement of export regimes in order to smoothly handle the goods produced for the export purpose, thereby to be competent for international trade.
Key inputs	i) Institutional rearrangement of export regimes ii) Capacity building and training in accordance with the institutional rearrangement
Period	Short term: 2009~2013
Main Actors	- Central Government

✧ **FDI/DDI Promotion Program** (addressing ⑨,⑩)

Purpose	Improvement of the investment procedure and establishment of "one-stop service" so as to motivate investors (after EPA: Economic Partnership Agreement).
Key inputs	i) Improvement of investment procedure ii) Capacity building and training in accordance with the institutional rearrangement
Period	Short term: 2009~2013
Main Actors	- Central Government (BKPM, Ministry of Industry)

✧ **Resource Conservation, Recycle and Reuse Program** (addressing ①,⑥,⑧,⑫,⑬)

Purpose	Planning and implementation of strategic actions for the purpose of resource conservation, recycle and reuse, including alternative energy development.
Key inputs	i) Action planning and Implementation of pilot projects ii) Feasibility study of alternative energy development (e.g. bio-diesel fuel)
Period	Short term: 2009~2013
Main Actors	- Central Government (Ministry of Environment, Ministry of Energy & Mining)
Relevant Stakeholders	- Local Governments (Province, Kabupaten) - Private Sector

5.4.4 Implementation of Industrial Promotion Programs

As has been mentioned in 5.4.1, it is required that the stakeholders concerned (public and private) should make a comprehensive commitment for the industrial promotion in order to reach the target economic growth from the current starting point of agriculture-based economy.

There is no royal road for economic development or industrial promotion. However, again, at least two directions could be set to follow; i) Improvement of productivity and quality in agriculture based on inherent local resources of the island, and ii) Challenging a new industrial field (e.g. Bio-fuel industry) supported by an intensive commitment of the stakeholders. The former would require farmers' steady efforts and the government's patient supports as well for medium to long terms, while the latter would need the government to appropriately guide, lead

and support the private sector so as to bring up the industry to a sustainable level.

Figure 5.4.2 shows a schematic implementation schedule for the industrial promotion in Sulawesi, in which the proposed programs area indicated in time frames of short, medium and long term. Infrastructure programs and institutional/capacity related programs should be implemented concurrently, mutually supporting like two wheels, to get a quick start so that the Sulawesi economy could take advantage of the continued growth toward the future. As illustrated in the figure, the next five-years would be "*A precious five-years for Sulawesi to break through the door to the sustainable economic growth*". It is expected that these programs would be launched as proposed by putting all the necessary inputs and investing time and energy of the stakeholders concerned.

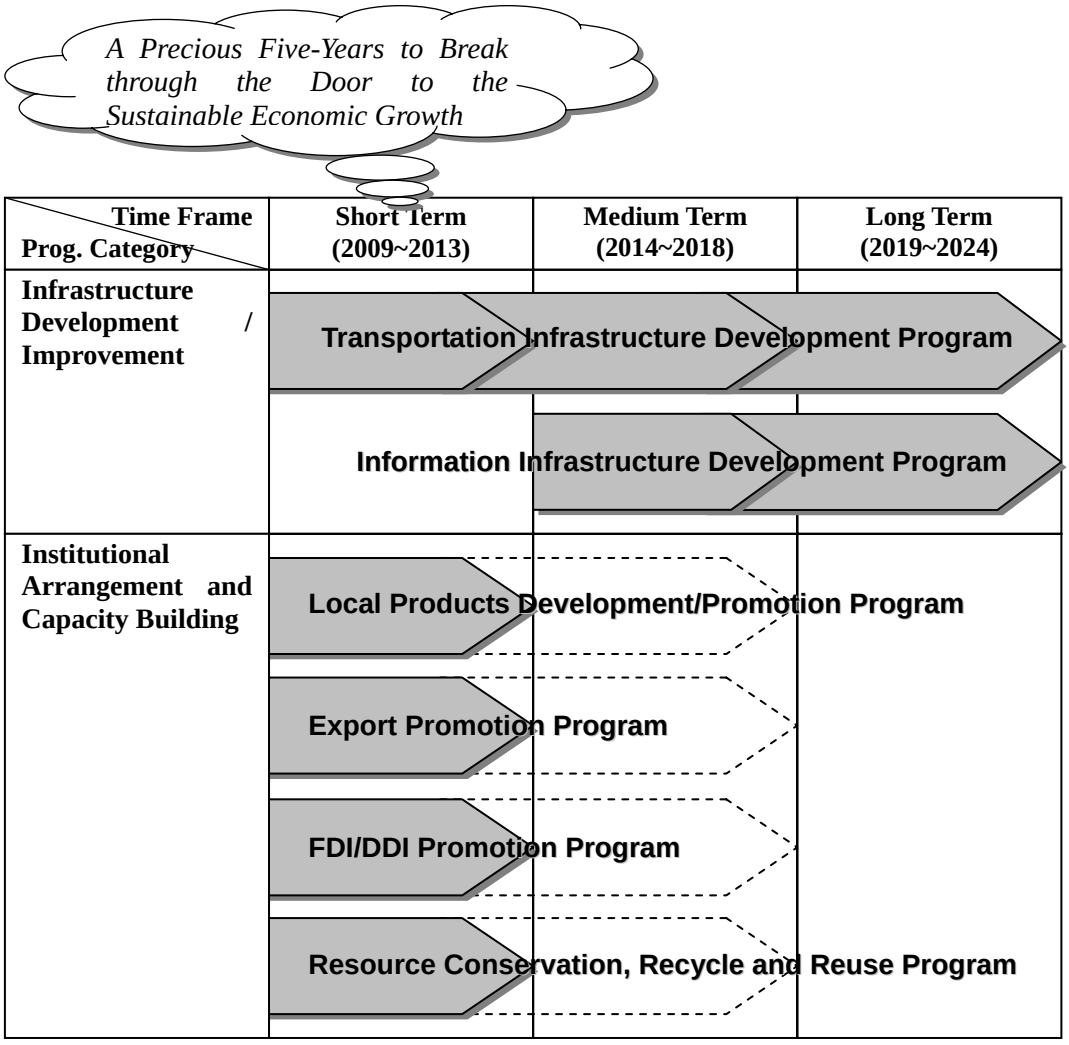


Figure 5.4.2 Implementation Schedule of Industrial Promotion in Sulawesi

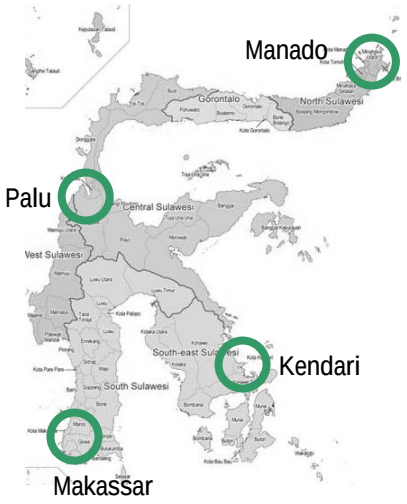
Table 5.4.3 Assessment by Proposed Industrialization (1/9)

Category of Industry / Prospective Product and Market

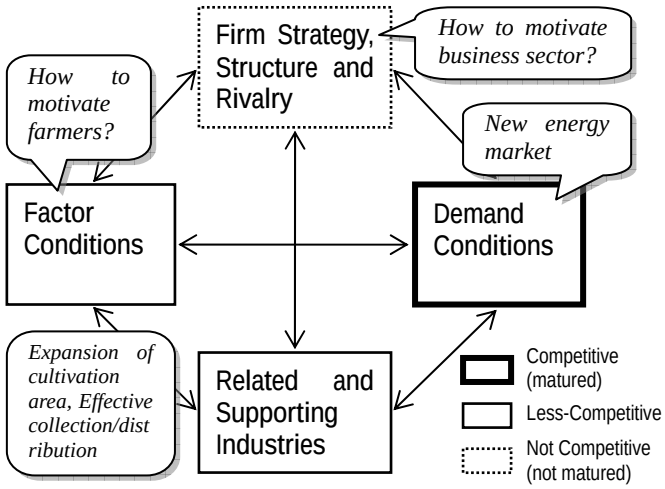
Agricultural Resource Processing_1

Bio-diesel fuel based on coconut and jatropha to substitute domestic fuel in Sulawesi.

Prospective Production Center



Summary of Competitive Advantage Assessment



Detailed Assessment

	Criteria	Assessment
Factor Conditions	Quality and cost of inputs (production as raw material, human resources, capital, infrastructure, others)	Sulawesi has grown coconut trees for long years. Currently total cultivation area is around 710,000 ha or 22% of 3.2 million ha in whole Indonesia. While, most of coconut trees are aged and causing low productivity.
	Specialty of inputs	Sulawesi is a leading island of the world in CNO export for long years.
Demand Conditions	Level of needs in quality and quantity	Demand of CNO has been declining because vegetable oil has been shifting from coconut oil to palm oil. The operating ratio of CNO plant is less than the designed capacity.
	Change of market needs	Price of CNO is dominated by the international market. Bio-diesel fuel production using coconut oil may be feasible to develop new energy source, if copra can be purchased by the producer at fixed price.
Firm Strategy, Structure and Rivalry	Capability for appropriate investment and self-reliant effort for quality improvement.	A number of large scale CNO production plans are in operation, while, they seem not really capable enough to invest in Bio-diesel production by themselves considering the current CNO market and business.
	Rivalry among the firms (communities)	---
Related & Supporting Industries	Spatial proximity of upstream / down stream industries. Existing industrial cluster / accumulation	Sulawesi population is familiar with growing coconut. A number of large scale CNO production plants are in operation.

Issues to Consider

Since the bio-diesel production business is new to business players, necessary supports by the governmental agencies concerned should be extended to the players so as to hedge the business risk, while high priority must be put under a national policy of new energy source development.

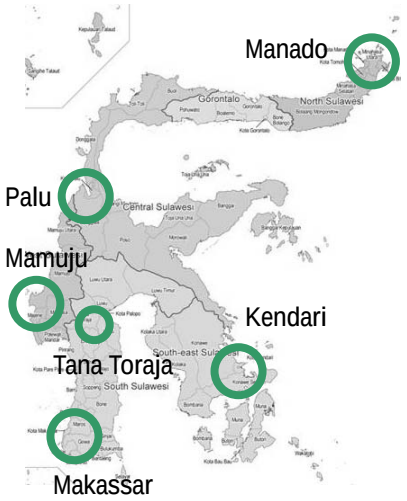
Table 5.4.3 Assessment by Proposed Industrialization (2/9)

Category of Industry / Prospective Product and Market

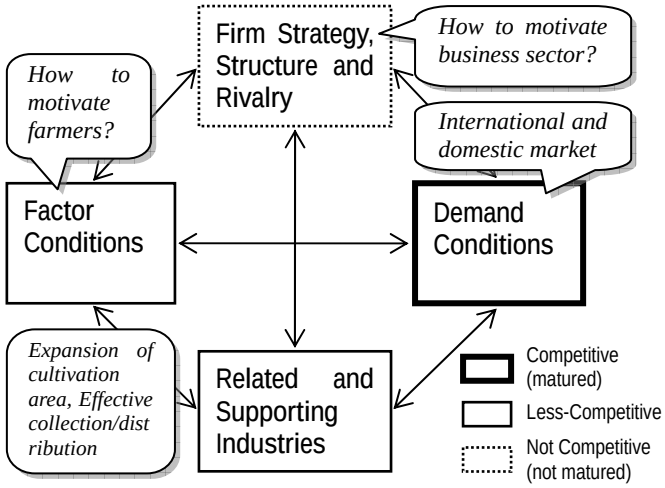
Agricultural Resource Processing_2

Food processing including cacao, coffee, vanilla, clove, vegetable, cashew nuts, etc. for foreign markets, especially China.

Prospective Production Center



Summary of Competitive Advantage Assessment



Detailed Assessment_Cacao

	Criteria	Assessment
Factor Conditions	Quality and cost of inputs (production as raw material, human resources, capital, infrastructure, others)	Sulawesi has 600,000 ha of coconut cultivation area with 450,000 of cacao growers. 570,000 tons of cacao beans are produced of which 350,000 tons of dried beans are exported. While, productivity is low and fluctuated. Distance between production area and final collection area is far thus transportation cost is high. Farmers sell their product to local middlemen with low bargaining position as price dominantly set by traders.
	Specialty of inputs	Large amount of production and export.
Demand Conditions	Level of needs in quality and quantity	The quality of cacao is evaluated at low in the market, while they are appreciated as base material in volume for chocolate producers.
	Change of market needs	No significant change.
Firm Strategy, Structure and Rivalry	Capability for appropriate investment and self-reliant effort for quality improvement.	Organization of cacao growers is difficult and in-effective to disseminate knowledge and skill to produce good quality of cacao with high productivity. No investor appears to challenge to improve the cacao industry of Sulawesi.
	Rivalry among the firms (communities)	Processing activity will be enhanced in Sulawesi to increase output and value by means of value-added activities. However, farmer may loose interest to continue growing cacao because of additional cost associated, if not increased income realized.
Related & Supporting Industries	Spatial proximity of upstream / down stream industries. Existing industrial cluster / accumulation	Widely produced in South Sulawesi, while Central Sulawesi and West Sulawesi are possible to expand cacao cultivation area to meet with growing demand in volume.

Issues to Consider_Cacao

A rapid expansion of cacao cultivation area may threat degradation of environment due to deforestation, so that necessary attention should be paid for increasing cacao production.

Detailed Assessment_**Coffee**		
	Criteria	Assessment
Factor Conditions	Quality and cost of inputs (production as raw material, human resources, capital, infrastructure, others)	Production quantity is around 3,000 tons in 2005, contributing to the national production at about 10%. Sulawesi is ranked in 4th position after E-Java, N-Sumatra and Aceh. Inconstant and small production volume complicates continuous supply to the existing coffee bean processing industries. Transportation cost from production area to end market is quite high.
	Specialty of inputs	Sulawesi coffee is known as Toraja Coffee with a reputation of quality together with a sort of myth.
Demand Conditions	Level of needs in quality and quantity	Arabica coffee produced in Toraja has a typical aroma that attracts high world market demand.
	Change of market needs	Fluctuation of Arabica coffee price is acute as it depends on the quantity of supply.
Firm Strategy, Structure and Rivalry	Capability for appropriate investment and self-reliant effort for quality improvement.	Toraja coffee marketable at high price is produced under the management of foreign direct investor (*Key Coffee*). The quality in general is below the standard since the post-harvest handling method is improper and inconsistent among farmers. Difficulties in provision of finance for on-farm production development.
	Rivalry among the firms (communities)	Farmers still regard Arabica coffee cultivation as a side job, not a main job.
Related & Supporting Industries	Spatial proximity of upstream / down stream industries. Existing industrial cluster / accumulation	Land suitable for Arabica coffee is actually limited in Sulawesi for medium to large scale plantation. Distribution line is quite complicated for farmers. They individually sell their product to middlemen at low bargaining position.
Issues to Consider_**Coffee**		
A further expansion of coffee (Arabica) cultivation area seems difficult, thus necessary measure should be taken for farmers to increase productivity.		

Table 5.4.3 Assessment by Proposed Industrialization (3/9)

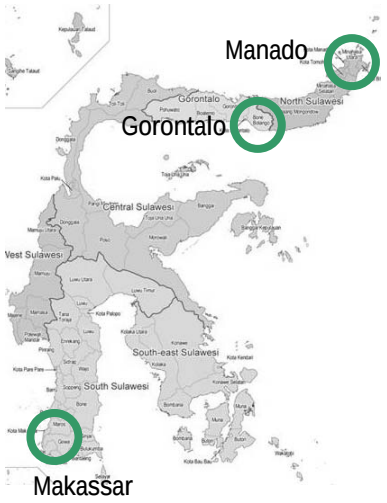
Category of Industry / Prospective Product and Market

Livestock/Meat Processing/Animal Feed Processing

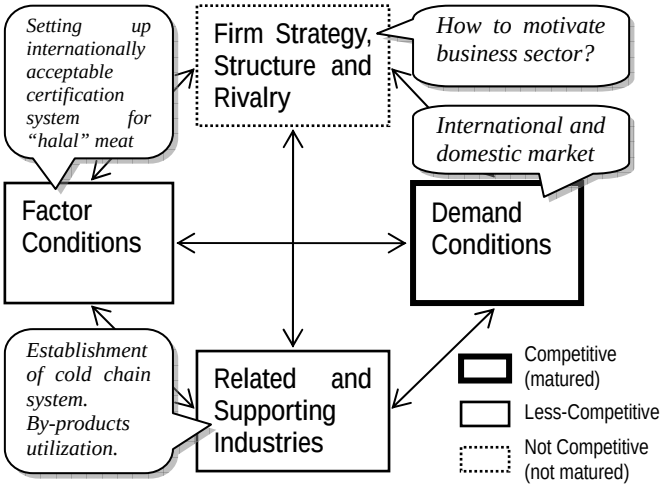
"Halal" meat for the Middle East/Kalimantan.

Animal feeds from copra, maize, cassava, soybean, and fish residuals for domestic livestock breeders.

Prospective Production Center



Summary of Competitive Advantage Assessment



Detailed Assessment_Livestock, Meat Processing

	Criteria	Assessment
Factor Conditions	Quality and cost of inputs (production as raw material, human resources, capital, infrastructure, others)	Sulawesi produces around 230,000 tons of livestock products which is enough to cover yearly consumption of the island, while there is no large scale livestock processing industry.
	Specialty of inputs	Major portion of livestock is processed in the way of "halal".
Demand Conditions	Level of needs in quality and quantity	The market of other member countries of ASEAN and the Middle East that consumes halal meat has been expanding. This must be a considerable opportunity for Sulawesi's livestock and meat processing industry.
	Change of market needs	Demand for halal meat in the overseas is expanding.
Firm Strategy, Structure and Rivalry	Capability for appropriate investment and self-reliant effort for quality improvement.	Sulawesi has not developed a large-scaled cold chain system for the transportation and distribution of frozen or chilled products.
	Rivalry among the firms (communities)	---
Related & Supporting Industries	Spatial proximity of upstream / down stream industries. Existing industrial cluster / accumulation	Sulawesi has no adequate processing system and transportation system for halal meat designated for export.

Issues to Consider_Livestock, Meat Processing

Regionally and internationally acceptable certification system on halal meat aimed at their exportation has not been established yet. This will require a considerable time for setting up regulation and inspection system. Enough attention should be paid to the by-product utilization.

Detailed Assessment_**Animal Feed**		
	Criteria	Assessment
Factor Conditions	Quality and cost of inputs (production as raw material, human resources, capital, infrastructure, others)	Sulawesi produces maize and coconut in a big volume, while the island still holds a vast land area for coconut cultivation.
	Specialty of inputs	---
Demand Conditions	Level of needs in quality and quantity	Animal feed produced from copra has an overseas market, while local market can be developed further in promotion of organic farming of high value.
	Change of market needs	Diversification of material to produce more different kind of animal feed is necessary. Livestock processed as halal meat has a big market potentiality especially in the Middle East countries. Such livestock in a good quality needs to be fed by good animal fodder.
Firm Strategy, Structure and Rivalry	Capability for appropriate investment and self-reliant effort for quality improvement.	No modern and appropriate processing plant is in operation in Sulawesi.
	Rivalry among the firms (communities)	---
Related & Supporting Industries	Spatial proximity of upstream / down stream industries. Existing industrial cluster / accumulation	---
Issues to Consider_**Animal Feed**		
Enough attention should be paid to the by-product utilization.		

Table 5.4.3 Assessment by Proposed Industrialization (4/9)

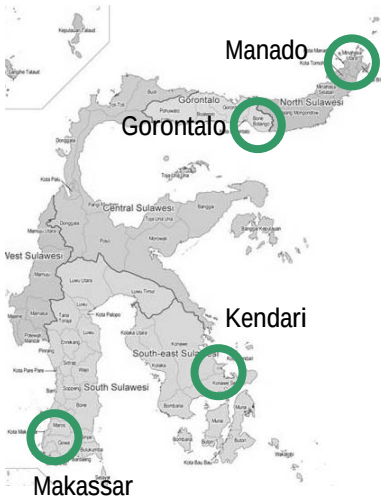
Category of Industry / Prospective Product and Market

Fishery and Marine Products

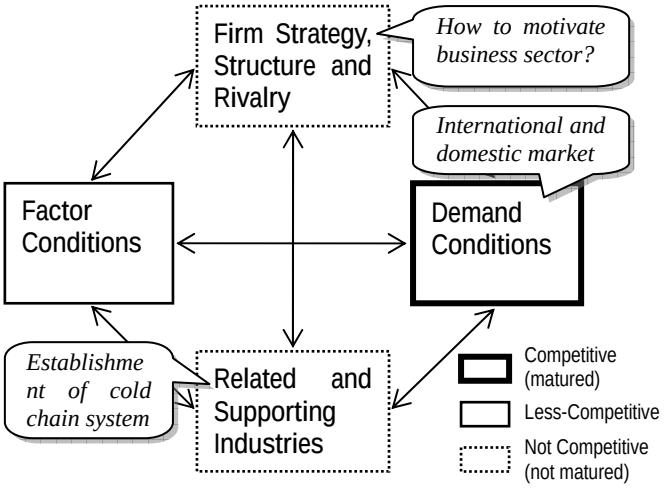
New products such as milkfish for the export/domestic markets.

Promotion of processing tuna, seaweed, etc. for export

Prospective Production Center



Summary of Competitive Advantage Assessment



Detailed Assessment

	Criteria	Assessment
Factor Conditions	Quality and cost of inputs (production as raw material, human resources, capital, infrastructure, others)	The volume of fish landed is 400,000 tons per year in Sulawesi, which is more than enough to cover the annual consumption in the island. Fishery in Sulawesi depends totally on small-scale coastal fishing thus not suitable for a large-scaled industrial processing.
	Specialty of inputs	---
Demand Conditions	Level of needs in quality and quantity	There exists a huge possibility to develop a local market for preserved fish such as de-boned, dried, marinated fish. Such processed products can be exported to other countries in Asia.
	Change of market needs	The taste of final products should meet with the requirement of those target market countries.
Firm Strategy, Structure and Rivalry	Capability for appropriate investment and self-reliant effort for quality improvement.	As most of the fisher forks do not possess capital for investment in the establishment of processing plant, so no added value activity can be realized.
	Rivalry among the firms (communities)	---
Related & Supporting Industries	Spatial proximity of upstream / down stream industries. Existing industrial cluster / accumulation	No cold chain system has been established in Sulawesi.

Issues to Consider

Table 5.4.3 Assessment by Proposed Industrialization (5/9)

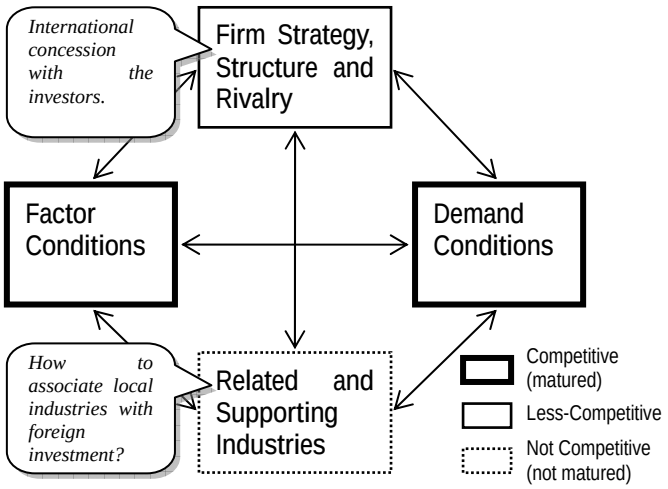
Category of Industry / Prospective Product and Market

Mining Resource Processing_1

Development of oil and natural gas for export and domestic markets.

Prospective Production Center

Summary of Competitive Advantage Assessment



Detailed Assessment

	Criteria	Assessment
Factor Conditions	Quality and cost of inputs (production as raw material, human resources, capital, infrastructure, others)	New energy resources of natural oil/gas (offshore site in Karama in West Sulawesi and a huge potential area in Luwuk in Central Sulawesi) will be exploited allegedly by foreign investors.
	Specialty of inputs	---
Demand Conditions	Level of needs in quality and quantity	Meeting with international oil/gas market.
	Change of market needs	Global trend of shifting from fossil fuel to recyclable energy
Firm Strategy, Structure and Rivalry	Capability for appropriate investment and self-reliant effort for quality improvement.	Candidate foreign investors.
	Rivalry among the firms (communities)	---
Related & Supporting Industries	Spatial proximity of upstream / down stream industries. Existing industrial cluster / accumulation	No related industries have been established.

Issues to Consider

How to associate local industries with the foreign investment will be a key in order to bring about benefit to the local economy. At the same time, enough attention should be paid to the environmental aspect so as not to bring about negative/undesirable impact.

Table 5.4.3 Assessment by Proposed Industrialization (6/9)

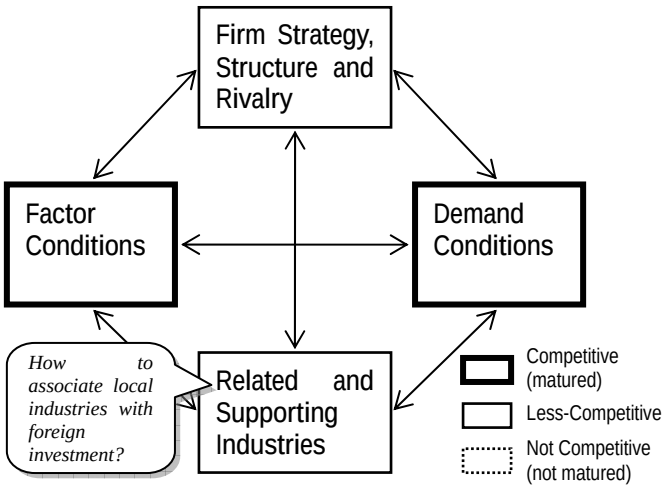
Category of Industry / Prospective Product and Market

Mining Resource Processing_2

Enhancement of nickel, natural asphalt, gold, etc. for export and domestic markets.

Prospective Production Center

Summary of Competitive Advantage Assessment



Detailed Assessment_Nickel

	Criteria	Assessment
Factor Conditions	Quality and cost of inputs (production as raw material, human resources, capital, infrastructure, others)	Deposit of nickel in Southeast Sulawesi in ranked 4th in the world accounting for around 13 million tons.
	Specialty of inputs	The geographical location of nickel mining and Sulawesi itself is quite ideal to the change of international market as the ballooning market locates very close to Sulawesi.
Demand Conditions	Level of needs in quality and quantity	Demand of nickel has been quite strong in the international market due to and expansion of nickel consumption in China for production of stainless steel there.
	Change of market needs	The nickel market has been in the character of seller's market. Thus, the price has risen quickly however it all depends on the market condition of one country (China). The change of economic situation influences the mining operation quite substantially so as its risk.
Firm Strategy, Structure and Rivalry	Capability for appropriate investment and self-reliant effort for quality improvement.	PT. Inco is planning to develop new nickel deposits in South Sulawesi, with targeting the market in China.
	Rivalry among the firms (communities)	---
Related & Supporting Industries	Spatial proximity of upstream / down stream industries. Existing industrial cluster / accumulation	No local industrialization has been developed.

Issues to Consider_Nickel

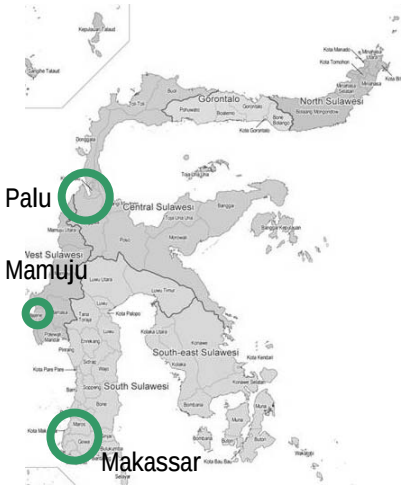
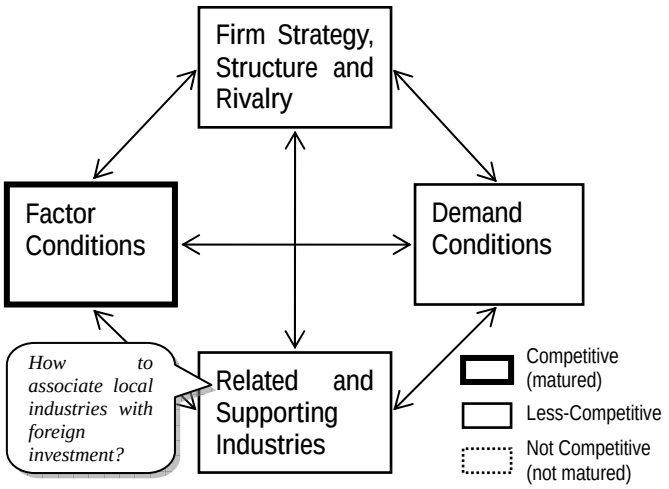
Note: * The natural Asbuton deposits have been found in four (4) locations in Buton Island. The estimated deposit is 600 million tons. Though current production is small, MPW has ordered to fully utilize Asbuton resource to substitute the current high price bitumen (refer to Appendix 9).

Table 5.4.3 Assessment by Proposed Industrialization (7/9)

Category of Industry / Prospective Product and Market

Construction Materials

Gravel, stone, cement to be exported to energy development areas in Kalimantan and Luwuk.

Prospective Production Center	Summary of Competitive Advantage Assessment
	

Detailed Assessment

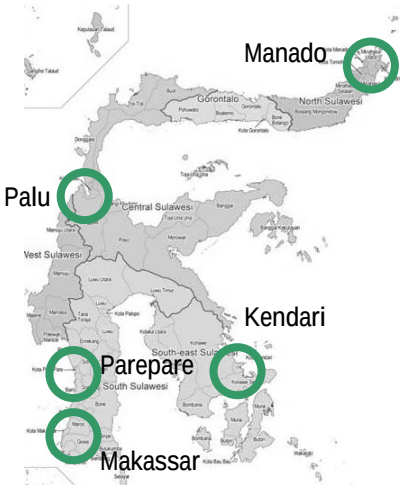
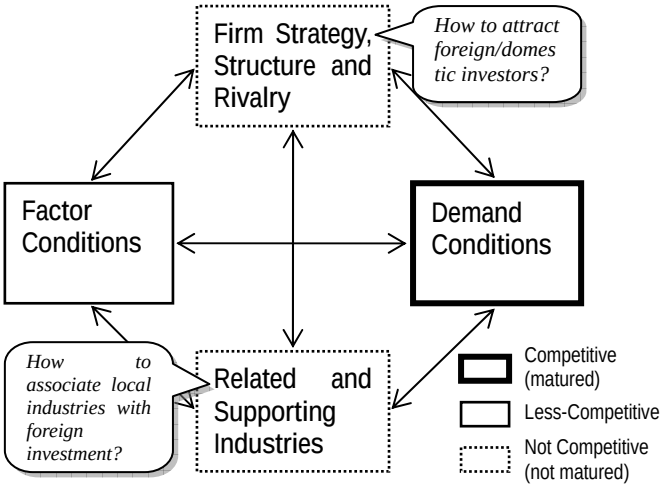
	Criteria	Assessment
Factor Conditions	Quality and cost of inputs (production as raw material, human resources, capital, infrastructure, others)	Sulawesi's cement production has been expanding and the volume of production has reached to 1.9 million tons in 2005. Sulawesi endows a huge deposit or cray mountain close to seashore especially along the coastal area of South Sulawesi.
	Specialty of inputs	Because of the location of potential area for cement mining, transportation cost for other region can be minimized.
Demand Conditions	Level of needs in quality and quantity	As the economy of Indonesia rebound and regain the vitality, the demand of cement will increase. While, the demand of cement is closely related with the economic performance of the country, thus the market situation has been still vulnerable.
	Change of market needs	---
Firm Strategy, Structure and Rivalry	Capability for appropriate investment and self-reliant effort for quality improvement.	A local enterprise (PT. Bosowa) and a national corporation have long been engaging the cement business in South Sulawesi.
	Rivalry among the firms (communities)	---
Related & Supporting Industries	Spatial proximity of upstream / down stream industries. Existing industrial cluster / accumulation	No upstream / down stream industrialization has been developed.

Issues to Consider

Enough attention should be paid to the environmental aspect so as not to bring about negative/undesirable impact.

Table 5.4.3 Assessment by Proposed Industrialization (8/9)

Category of Industry / Prospective Product and Market
Light Industry *Labor intensive manufacturing, such as wood materials, plywood, furniture, garments, shoes, etc. for export.*

Prospective Production Center	Summary of Competitive Advantage Assessment
	

Detailed Assessment

	Criteria	Assessment
Factor Conditions	Quality and cost of inputs (production as raw material, human resources, capital, infrastructure, others)	The labor forces for manufacturing activities are abundant especially in and around major cities of Sulawesi as Makassar in the south and Manado in the north. Both cities, Makassar and Manado have an international container terminal having capacity to handle more than 1 million TEU per year and international airports available to ply with major cities in Southeast Asia by direct flight. The road transport infrastructure connecting production points, seaport and airport is not adequately developed yet. The skills and performance of inter-modal logistic services connecting to handle the cargo transported by different transport mode should be attained or improved. The power shortage and relatively high power cost are the most significant problems to run the manufacturing factories at optimum productivity.
	Specialty of inputs	Sulawesi's geographical location is ideal for collection of raw material and processing them into manufactured goods for re-exporting to domestic market, regional market and international market as it can be regarded as the gateway to the Eastern Indonesia in general and to the North-eastern Indonesia in particular.
Demand Conditions	Level of needs in quality and quantity	The market of electronic industries and consumables would expand further in the international market due to the participation of huge populous countries represented by BRICs. Therefore, the opportunities for the export of manufactures products in Sulawesi are expanding in Asia in general and in China in particular. Because of the imposing of free trade principal further and further in the international trade by adoption of WTO conditions, the competitiveness would become a key factor of international and local manufacturers. Unless the regulation, taxation, etc. concerned to the foreign direct investment to Sulawesi is prepared to promote and attract such foreign manufactures Sulawesi will loose its competitive edge with other region not only in Indonesia but also in international sphere.

	Change of market needs	The comparative advantage of Sulawesi for promotion of foreign direct investment are basically lies on the preparedness of inter-modal transport infrastructure in major cities ideal for light industrial products manufacturing center in the Eastern Indonesia. Timely development of infrastructure and preparedness of human resources is the key for promotion of foreign direct investment but it depends on the availability of capital development fund which is scarce at present in Sulawesi.
Firm Strategy, Structure and Rivalry	Capability for appropriate investment and self-reliant effort for quality improvement.	---
	Rivalry among the firms (communities)	---
Related & Supporting Industries	Spatial proximity of upstream / down stream industries. Existing industrial cluster / accumulation	---
Issues to Consider		
Infrastructure development/improvement to attract FDI/DDI as a basic prerequisite, and business service provision for supporting business sector.		

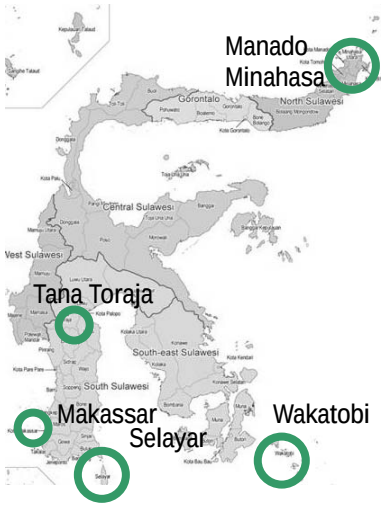
Table 5.4.3 Assessment by Proposed Industrialization (9/9)

Category of Industry / Prospective Product and Market

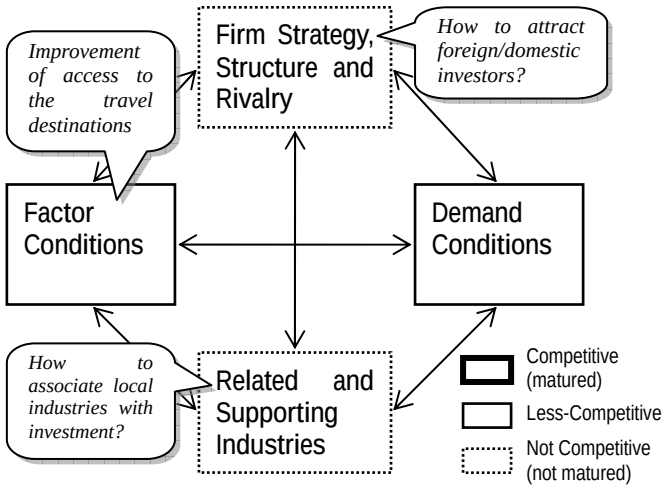
Tourism Industry

Marine eco-tourism.

Prospective Production Center



Summary of Competitive Advantage Assessment



Detailed Assessment

	Criteria	Assessment
Factor Conditions	Quality and cost of inputs (production as raw material, human resources, capital, infrastructure, others)	There exists several potential marine resort area having rich natural resources such as coral reef, white coral sand beach, fishing. However because of their locations and underdeveloped transportation network (inland and sea lane), it seems hard to attract foreign/domestic tourist to those destinations.
	Specialty of inputs	Natural coral reef and beautiful seashore, etc.
Demand Conditions	Level of needs in quality and quantity	A number of options for marine tourism in and out Indonesia, in an international wide.
	Change of market needs	Tourists are sensitive to management of cost and time (especially Japanese tourist).
Firm Strategy, Structure and Rivalry	Capability for appropriate investment and self-reliant effort for quality improvement.	Several investments have been made by domestic/international hotel operation companies.
	Rivalry among the firms (communities)	---
Related & Supporting Industries	Spatial proximity of upstream / down stream industries. Existing industrial cluster / accumulation	No strong association/alliance has been made among the tourism related enterprises, such as airline, sea lane, and hotel. Relationship between the investors and local economy seems not strong (not like the case of Bali island).

Issues to Consider

Resort development where the visitors can enjoy their stay in the natural environment on-schedule and with reasonable cost, while appropriate attention would be paid not to bring about negative/undesirable impact on the nature. Moreover, it is necessary to take into account how to further involve local economy in the tourism sector.

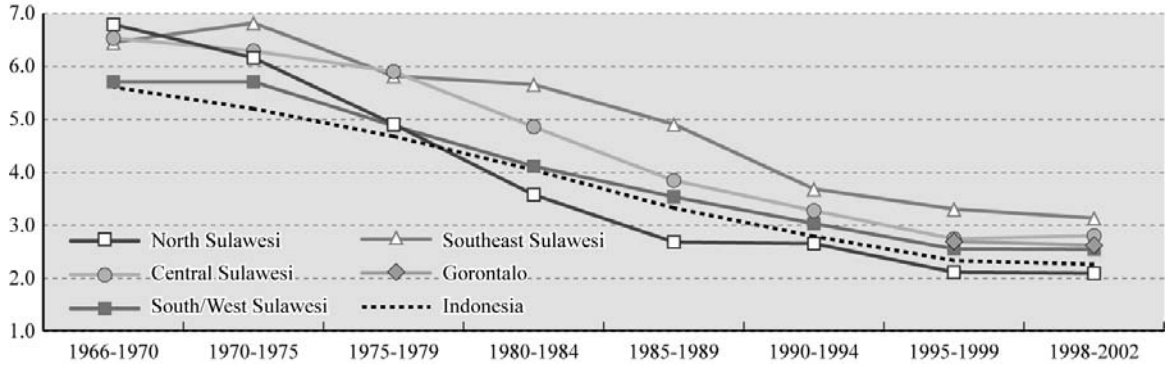
CHAPTER 6 SETTING OF SOCIO-ECONOMIC FRAMEWORK

6.1 Demographic Framework

6.1.1 Review of Population Growth Trends

(1) Fertility and Mortality

The total fertility rate (TFR) is a measure of fertility which is the average number of children that would be born to a woman over her lifetime. As can be seen in Figure 6.1.1, the TFR for the provinces in Sulawesi and Indonesia are on a decreasing trend over the past 40 years, ranging between 2.1 to 3.1 in 1998-2002. The TFR of North Sulawesi was 2.1 in 2005, the lowest in Sulawesi and lower than the Indonesian average of 2.27 for the same year. The TFR of the other provinces were higher than the national average especially for Southeast Sulawesi which shows the highest TFR since 1980-1984.



Source: BPS, Indonesia

Figure 6.1.1 Changes in the Total Fertility Rates in Sulawesi and Indonesia

Except for North Sulawesi, the infant mortality rate is considerably higher than the Indonesian average. In addition, the life expectancy at birth in all provinces in Sulawesi (61.0 ~ 70.3 year) was far below the national average of 74.0.

Table 6.1.1 Infant Mortality Rates and Life Expectancies at Birth, 2000

	Infant Mortality Rate: IMR (per 1,000)			Life Expectancy at Birth (year)		
	Male	Female	Total	Male	Female	Total
North Sulawesi	32.08	23.71	27.77	68.23	72.17	70.26
Central Sulawesi	72.87	58.78	65.62	59.14	62.81	61.03
South/West Sulawesi	63.33	50.34	56.65	61.13	64.9	63.07
Southeast Sulawesi	59.07	46.61	52.66	62.06	65.87	64.02
Gorontalo	63.33	50.34	56.65	61.13	64.9	63.07
Indonesia	-	-	36.0	70.78	71.97	74.05

Source: Census 2000

Except for North Sulawesi, fertility and infant mortality rates are higher, and life expectancies at birth are lower than in other provinces. These indicators mean that Sulawesi shows a typical pattern for less economically developed areas.

(2) Migration

Transmigration originally started under the Dutch colonial rule during the early 20th century, and it has continued under the Indonesian government after independence. Transmigration had three main goals, namely (1) to move millions of Indonesians from the densely populated inner islands (Java, Bali, Madura) to the outer, less densely populated islands and thus attain a balanced demographic development, (2) to alleviate poverty by providing land and new opportunities to generate income for poor, landless settlers, and (3) to effectively exploit the potentials of the outer islands.

Internal migration trends in Sulawesi were reviewed using 1971, 1980, 1990, and 2000 census (refer to Table 6.1.2). The table includes data not only on government-initiated transmigration but also on voluntary migratory movements. Central and Southeast Sulawesi experienced a net migratory inflow. Since these provinces are less developed compared with North and South Sulawesi, these migration inflows can be deemed as a result of the government-initiated transmigration from other areas (mainly Java Island). Net inflows to these provinces have shown an increasing trend. On the other hand, South Sulawesi and Gorontalo have faced substantial amounts of net migratory outflows.

Table 6.1.2 Changes in the Net Lifetime Migration in Sulawesi

	Net Lifetime Migration				Net Lifetime Migration/ Population			
	1971	1980	1990	2000	1971	1980	1990	2000
North Sulawesi	-12,169	-32,965	-65,751	-4,235	-0.71%	-1.56%	-2.65%	-0.21%
Central Sulawesi	16,663	150,614	237,782	295,171	1.82%	11.68%	13.89%	13.56%
South/West Sulawesi	-174,742	-403,687	-422,295	-600,463	-3.37%	-6.66%	-6.05%	-8.39%
Southeast Sulawesi	-4,865	14,836	129,175	271,628	-0.68%	1.57%	9.57%	14.92%
Gorontalo	-	-	-	-86,162	-	-	-	-10.34%
Sulawesi Total	-175,113	-271,202	-121,089	-124,061				

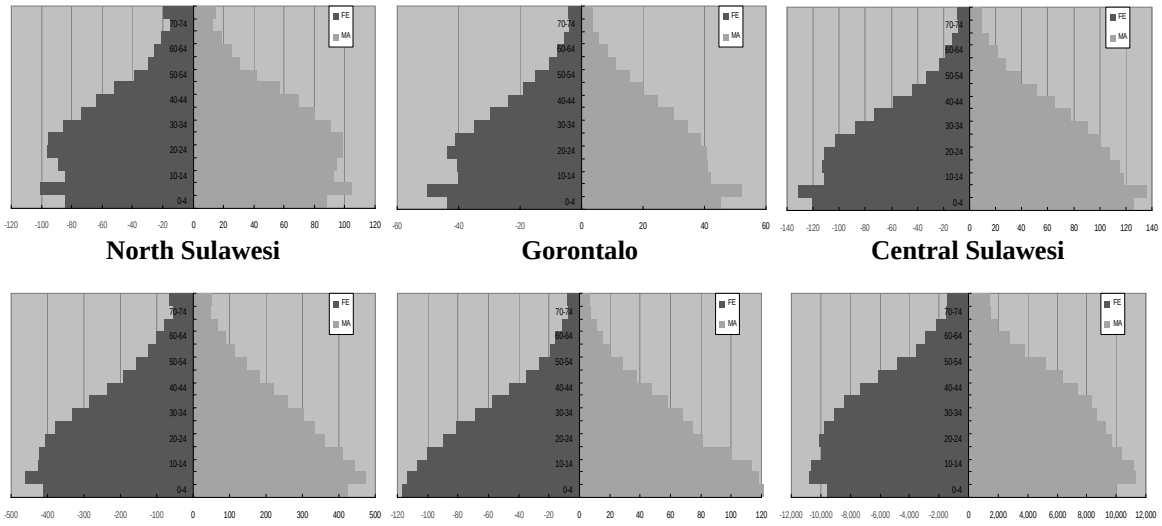
Source: Census 1971, 1980, 1990 and 2000; BPS

(3) Population Pyramid

The following figures show the population pyramid of five Sulawesi provinces and of Indonesia. The above-mentioned fertility, mortality, and migration patterns are also reflected in these figures.

Southeast Sulawesi's wide pyramid base or "expansive pyramid" indicates a large number of children, and the steady upward narrowing shows that more people die at each higher age band. The pyramid indicates a population in which there is a higher birth rate, a higher death rate, and a shorter life expectancy.

On the other hand, the population pyramids of North Sulawesi and Gorontalo show lower numbers or percentages of younger people. Judging only from the population pyramids, while North Sulawesi and Gorontalo have lower potential of population growths, Southeast Sulawesi has a higher potential for population growth in the future.

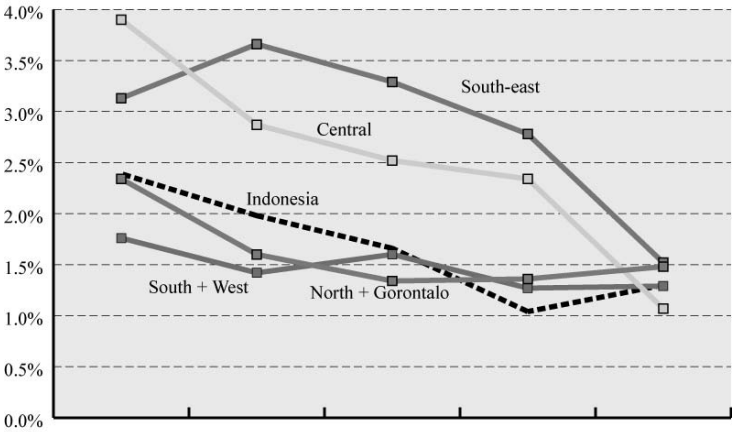


Source: Intercensus 2005, BPS

Figure 6.1.2 Population Pyramids of Sulawesi and Indonesia

(4) Population Growth Trends

Population growth rates of Sulawesi are basically on a declining trend similar to the national trend. Especially, the growth rates of Central and Southeast Sulawesi have been decreasing faster than other provinces even though the population growth rates of these provinces were still around 2% per annum, which were still higher than the national average of 1.3% per annum in the period 2000-2005.



Source: Population Census, 1971, 1980, 1990, 1995, 2000, and 2005, BPS

Figure 6.1.3 Changes in the Population Growth Rates

On the other hand, the growth rates of North Sulawesi (1.25% per annum during 2000-2005) and South Sulawesi (1.05%) were lower than the national average.

6.1.2 Review of the BAPPENAS's Population Forecast

Official population forecast was made by the BAPPENAS and BPS in 2005 with technical assistance from the United Nations Technical Fund. The forecast was made based on the 2000 census and covers the period up to year 2025.

These forecast provides a reading of the population size as well as age and sex structures of the

population of each province[1] from 2000 to the year 2025. The forecast resulted from the application of a component/cohort-survival population model to assumptions dealing with fertility, mortality, and transmigration.

The component/cohort-survival method requires separate forecasts for each of the components of population change, namely fertility, mortality, and migration. With this information and with a base year age-specific estimate of the population, a forecast for any subsequent year was made by promoting each age group in the preceding year to the next higher age group, while at the same time taking into account the effects of net migration, deaths, and births.

Net migration was assumed by sex and by age groups based on migration between 1995 and 2000. BAPPENAS forecasted the net inflow for North Sulawesi, Central Sulawesi, and Southeast Sulawesi, and the net outflow for South/West Sulawesi and Gorontalo.

Table 6.1.3 BAPPENAS's Forecast of Total Population and Urbanization Rates

		2005	2010	2015	2020	2025
Total Population (000)	North	2,141.9	2,277.2	2,402.8	2,517.2	2,615.5
	Gorontalo	872.2	906.9	937.5	962.4	979.4
	Central	2,404.0	2,640.5	2,884.2	3,131.2	3,372.2
	South/West	8,493.7	8,926.6	9,339.9	9,715.1	10,023.6
	Southeast	2,085.9	2,363.9	2,653.0	2,949.6	3,246.5
Urbanization Rate (%)	North	43.4	49.8	55.7	61.1	65.7
	Gorontalo	31.3	37.0	42.8	48.2	53.2
	Central	21.0	22.9	24.9	27.3	29.9
	South/West	32.2	35.3	38.8	42.6	46.7
	Southeast	23.0	25.6	28.5	31.8	35.5
Total Fertility Rate (%)	North	1.9	1.9	1.9	1.8	1.8
	Gorontalo	2.3	2.2	2.1	2.1	2.1
	Central	2.3	2.2	2.1	2.1	2.1
	South/West	2.3	2.2	2.1	2.1	2.1
	Southeast	2.6	2.4	2.2	2.1	2.1
Net Migration (%)	North	1.5	1.5	1.5	1.5	1.5
	Gorontalo	-6.2	-6.2	-6.1	-6	-5.9
	Central	4.4	4.4	4.4	4.3	4.3
	South/West	-3.4	-3.4	-3.3	-3.3	-3.2
	Southeast	7.5	7.6	7.6	7.7	7.7

Source: Indonesia Population Projection 2000 - 2025, BAPPENAS 2005

Table 6.1.4 Population Growth Rates

	2000-05	2005-10	2010-15	2015-20	2020-25
North Sulawesi	1.37%	1.23%	1.08%	0.93%	0.77%
Gorontalo	0.91%	0.78%	0.67%	0.53%	0.35%
Central Sulawesi	2.01%	1.89%	1.78%	1.66%	1.49%
South/West Sulawesi	1.08%	1.00%	0.91%	0.79%	0.63%
Southeast Sulawesi	2.76%	2.53%	2.33%	2.14%	1.94%

Source: Indonesia Population Projection, 2000–2025; BAPPENAS 2005

[1] Since the forecast was made based on the 2000 census, South and West Sulawesi were considered as one, since the latter was established from parts of South Sulawesi only in 2004.

Table 6.1.4 shows the forecast on the annual average population growth rate by BAPPENAS. The forecast is that the population growth rate will reduce gradually. The population growth rates of the Central and Southeast Sulawesi will be higher (1.49%~2.76%), while that of Gorontalo will be quite low (0.35~0.91%) due to a signficant net migratory outflow (about 6,100 people per year).

6.1.3 JICA Study Team's Population Forecast Methodology

(1) Population Forecast Methodology

Figure 6.1.4 shows the methodology for the population forecast by regency. The forecast was made based on the 2005 Intercensus, and covers the period from 2006 to 2025. For the provincial level forecast, population growth rates and speeds of urbanization similar to those of BAPPENAS's forecasts were adopted. The JICA Study Team's forecast methodology can be broadly divided into three steps, namely: (1) estimate of closed population, (2) estimate of migratory movement within province, and (3) estimate of labor force.

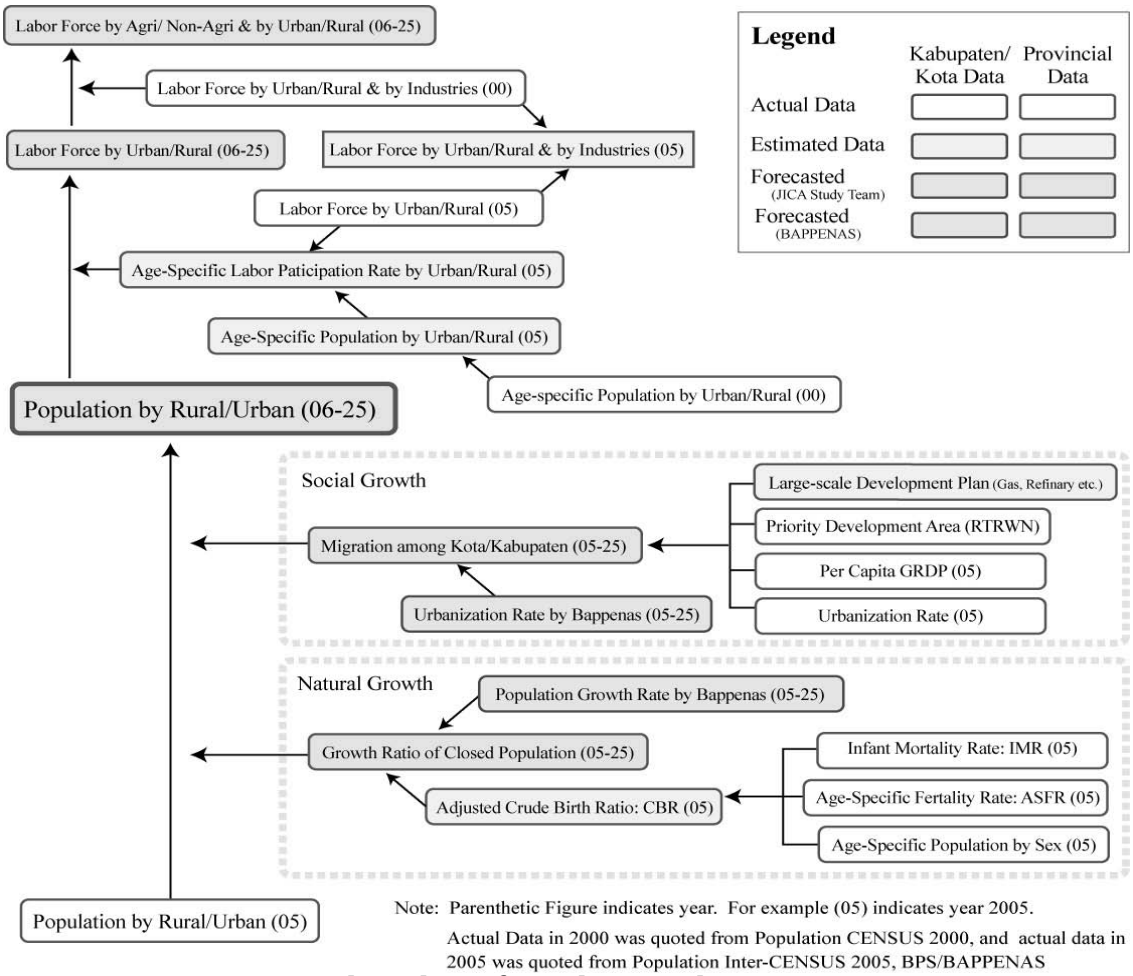


Figure 6.1.4 Flow Chart of Population and GRDP Forecast

Population forecasts not only include the total population of each regency but also urban/rural population, the urban/rural labor force, as well as by agricultural labor force (including forestry, fishery, and livestock) and the nonagricultural labor force.

(2) Estimate of Closed Population per Regency

Regency-wise, the closed population growth was forecasted based on net crude birth rate (NCBR). NCBR represents the rate of live infants per thousand population in a certain year. A bigger figure means higher natural growth potentials.

The NCBR of each regency was calculated based on the 2005 Intercensus. It used the following formula:

$$NCBR_{rl} = \sum_{x="15\text{-}19"}^{"45\text{-}49"} ASFR_{xi} \times FP_{xi} \times \{1\ (IMRM_i \times SR + IMRF_i) \div (1 + SR)\}$$

Where: $NCBR_i$= Net crude birth rate at regency "i"
$ASFR_{xi}$= Age-specific fertility rate of age group "x" at regency "i"
FP_{xi}= Female population of age group "x" at regency "i"
$IMRM_i$= Infant mortality rate for male infant at regency "i"
$IMRM_i$= Infant mortality rate for female infant at regency "i"
SR= Sex ratio at birth (1.05 constant)

Figure 6.1.5 shows the estimated NCBR of each regency. The darker green color indicates higher NCBRs. As shown in the map, the fertility of the regencies in Southeast and Central Sulawesi are higher than those in the other areas. Also, fertility is particularly higher in East Luwu (31.2) in South Sulawesi; Bombana (30.7), North Kolaka (30.3), and South Konawe (29.5) in Southeast Sulawesi; Buol (30.0) in Central Sulawesi; and Mamuju (29.6) in West Sulawesi.

The areas that had lower fertility rates were: Minahasa (15.2), North Minahasa (16.1), Manado (17.1), South Minahasa (17.1) in North Sulawesi, and Soppeng (15.9), Wajo (17.1) in South Sulawesi.

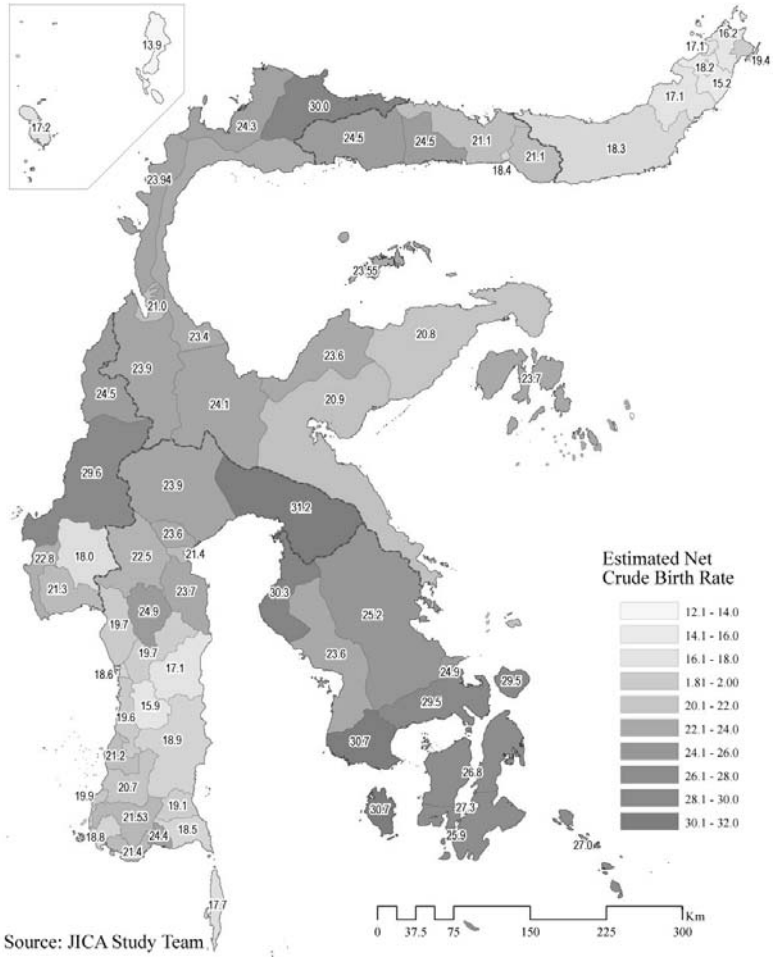


Figure 6.1.5 Estimated Net Crude Birth Rates

(3) Estimate of Intraprovincial Migratory Movements by Kabupaten/Kota

Intraprovincial migration is influenced by a wide variety of economic, demographic, social, and political factors. Many view intraprovincial migration as a combination of "push" factors that pressure a migrant to seek better opportunities, and "pull" factors that attract a migrant to a particular location. Consequently, movements between regencies under this hypothesis result from differences in economic and noneconomic conditions in the affected areas.

In this forecast, it was assumed that the differences in per-capita GRDP and urbanization rates among regencies likely play a role in influencing population movements.

For example, people will move from the regencies with lower per-capita GRDP to regencies with higher per-capita GRDP in order to seek better job opportunities and gain higher income levels. Also, people will move to urban areas to enjoy better administrative services, better entertainment, and attain nonagricultural job opportunities. The hypothesis and synthesis variables of the per-capita GRDP and urbanization rates were calculated for all regencies. Here, these synthesis variables are called “attractiveness coefficient.”

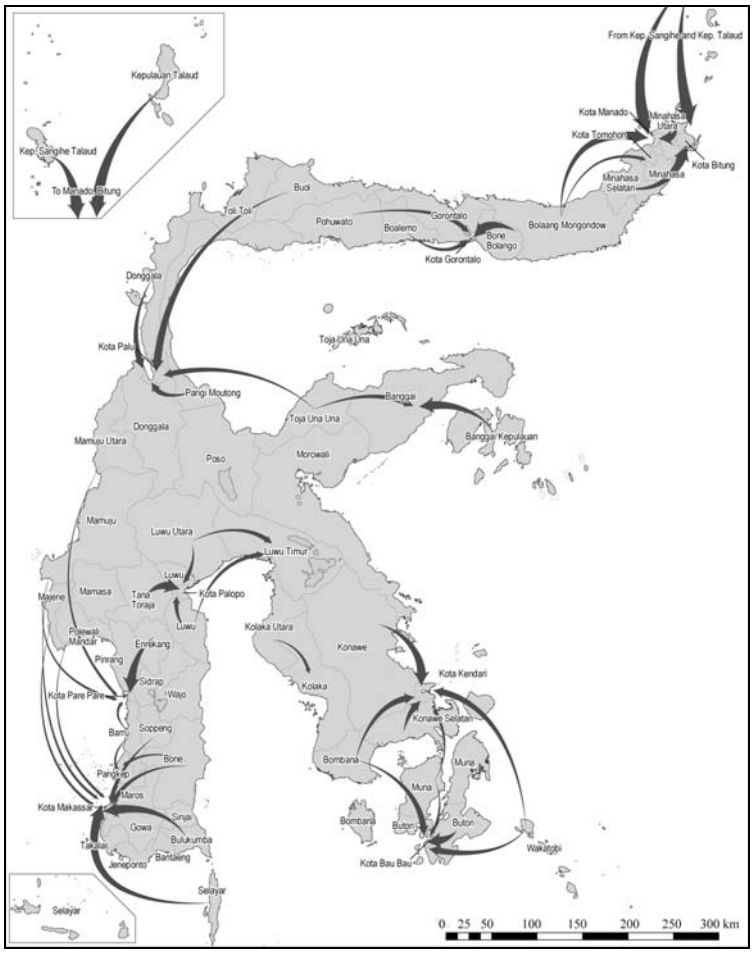


Figure 6.1.6 Estimated Migratory Movements in Sulawesi

$$NM_{rx} = NM_{pa} \times \left\{ \frac{PCG_{rx} \times \sqrt{UR_{rx}}}{\sum_{i=1}^{Pa} PCG_{ri} \div n} - \frac{\sum_{i=1}^{P} (PCG_{ri} \div PCG_{pa} \times \sqrt{UR_{ri}})}{n} \right\}$$

Where:
- NMrx: Net migration at regency “x”
- NMpa: Net migration at province “a”
- PCG_{ri}: Per-capita GRDP of the regency “i”
- PCG_{pa}: Average per-capita GRDP of the province “a”
- Pa: Total number of regencies in province “a”
- UR_{ri}: Urbanization rate of the regency “i” (minimum value= 10%)

During the period of special development (including priority development area by the National Spatial Plan and other large-scale development), the attractiveness coefficient was assumed to be doubled.

When the attractiveness coefficient of a regency is higher than that of its province, people will move to that regency. The higher the attractiveness coefficient of a regency, the bigger population inflows it will encounter. Also, it was assumed that out-migration will occur in the rural parts of regencies and flow in to the urban parts of the other regencies. The amount of annual migration was decided based on the forecast urbanization rate in each province by BAPPENAS. Figure 6.1.6 schematically illustrates the net migratory population movements during the forecast period.

(4) Estimate of Labor Force in Urban/Rural Areas and Agriculture/Non-agriculture Sectors

The number of labor force per regency was forecasted into urban and rural areas based on age-specific labor participation rates, which in turn were estimated based on a province-wise, age-specific labor force in urban/rural areas and age-specific total population in urban/rural areas. In this forecast, the labor participation rate was assumed to have increased by 0.5% point per annum both in urban and rural areas.

The number of agricultural and nonagricultural labor force per regency was estimated based on the number of labor force by major industry, in urban/rural areas, and on the forecast urban/rural populations by regency (refer to Table 6.1.6).

$$ALF_{riy} = \frac{ALF^{u}_{ri05} \times P^{u}_{riy} \times (LPR^{u}_{riy})}{NALF^{u}_{ri05} + ALF^{u}_{ri05}} + \frac{ALF^{r}_{ri05} \times P^{r}_{riy} \times (LPR^{r}_{riy})}{NALF^{r}_{ri05} + ALF^{r}_{ri05}}$$

$$NALF_{riy} = \frac{NALF^{u}_{ri05} \times P^{u}_{riy} \times (LPR^{u}_{riy})}{NALF^{u}_{ri05} + ALF^{u}_{ri05}} + \frac{NALF^{r}_{ri05} \times P^{r}_{riy} \times (LPR^{r}_{riy})}{NALF^{r}_{ri05} + ALF^{r}_{ri05}}$$

Where $ALF^{u(r)}_{riy}$: Agricultural labor force in urban (rural) area at regency "i" in year "y"
$NALF^{u(r)}_{riy}$: Non-agricultural labor force in urban (rural) at regency "i" in year "y"
$P^{u(r)}_{riy}$: Urban (rural) population at regency "i" in year "y"
$LPR^{u(r)}_{riy}$: Labor participation rate in urban (rural) at regency "i" in year "y"

6.1.4 JICA Study Team's Kabupaten Population Forecast Results

(1) Population Growth Rates

The annual average growth rate of Sulawesi during the gestation period of the master plan (2008-2024) was forecasted at 1.15%, which is lower than that for 2000-2005 (1.35%), and 1990-2000 (1.67%). Growth rates are higher in Southeast Sulawesi (2.20%) and lower in Gorontalo (0.56%). As a result, the total population in Sulawesi was estimated to increase from 16.4 million in the first year of master plan (2008) to 19.7 million in the end of the plan (2024). For details, refer to Table 6.1.5.

At the regency level, Bau-bau City (3.00%) Kendari City (2.80%), and Kolaka Utara (2.40%) in Southeast Sulawesi, Pare-pare City (2.40%) in South Sulawesi, Bitung City (2.05%) in North Sulawesi, and Palu City (1.94%) in Central Sulawesi, show higher growth rates (2005-2024)

Population growth rates in these regencies exceeded the growth rates of the two largest cities, namely Makassar City (1.25%), and Manado City (1.45%).

On the other hand, the population of Kepulauan Sangihe in North Sulawesi was forecasted to reduce by -0.52% per annum.

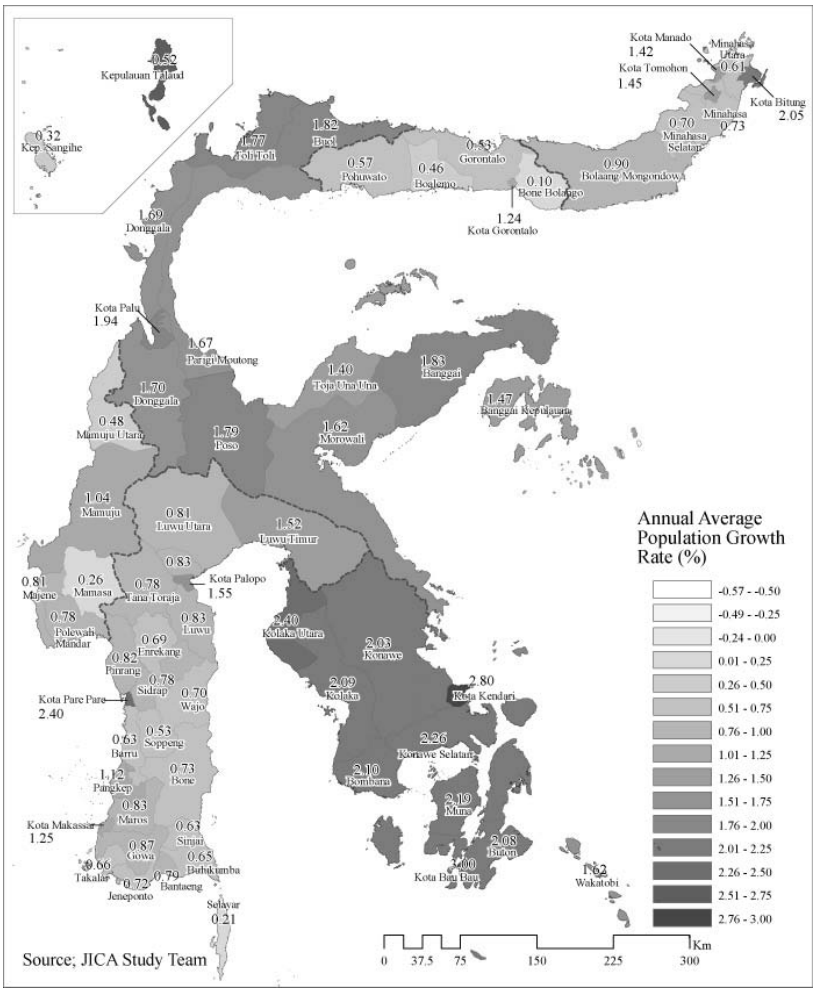


Figure 6.1.7 Population Growth Rate (2005-24)

(2) Changes in the Urban/Rural Populations

Population growth in urban areas has a higher forecast (2.52%), while rural areas had a lower forecast (0.58%). As a result, urbanization rates for Sulawesi will increase from 28.0% in 2005 to 35.8% in 2024, which is still lower than the Indonesia average of 42.1% in 2005.

Similar to the BAPPENAS forecast, the progress of urbanization was forecast to become rapid in North Sulawesi (37.3% -> 52.3%) and Gorontalo (31.3% -> 53.2%). Rural populations are expected to decrease in these provinces. On the other hand, total net population increases in the rur4l areas from 2005-2024 in Central and Southeast Sulawesi had a forecast exceeding 500,000. Substantial parts of these rural population increases will occur as a result of transmigration.

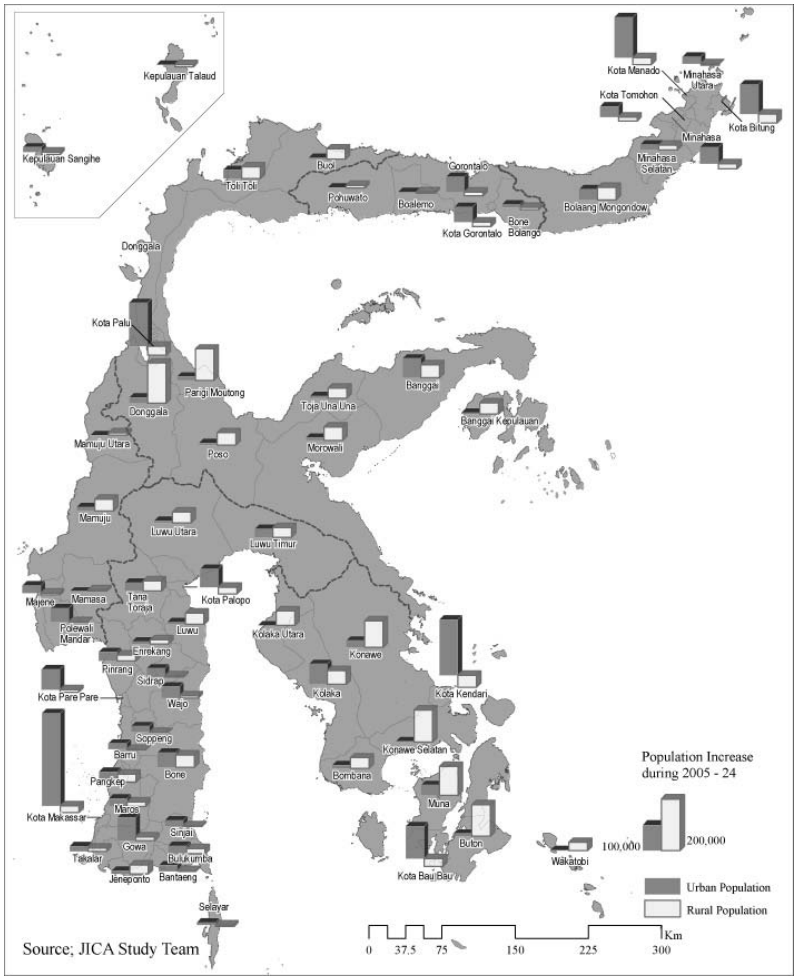


Figure 6.1.8 Urban and Rural Population Increases

Table 6.1.5 Urbanization and Net Population Increase

	Urbanization Rate		Net Population Increase (2005 - 24)		
	2005	2024	Urban	Rural	Total
North Sulawesi	37.3%	52.3%	540,016	-117,997	422,019
Central Sulawesi	19.5%	25.6%	364,352	513,630	877,982
South Sulawesi	31.2%	38.6%	1,092,940	299,423	1,392,363
Southeast Sulawesi	21.7%	30.2%	480,732	555,122	1,035,854
Gorontalo	31.3%	53.2%	259,788	-150,192	109,596
West Sulawesi	17.4%	23.9%	99,601	52,119	151,720
Sulawesi Total	28.0%	35.8%	2,660,762	1,328,774	3,989,536

Source: JICA Study Team

(3) Population Densities

Population density of Sulawesi will increase from 80.0/km^2 in 2005 to 100.3 per km^2 by 2024 (refer to Figure 6.1.9). Forecasted increases in population densities of major cities are as follows: Makassar (6,796→8,610), Manado (2,555→3,336), Gorontalo (2,362→2,986), Parepare (1,134→1,781), Kendari (799→1,348), Palu (734→1,065), Palopo (571→764), Bitung (485→713), and Bau-bau (389→683).

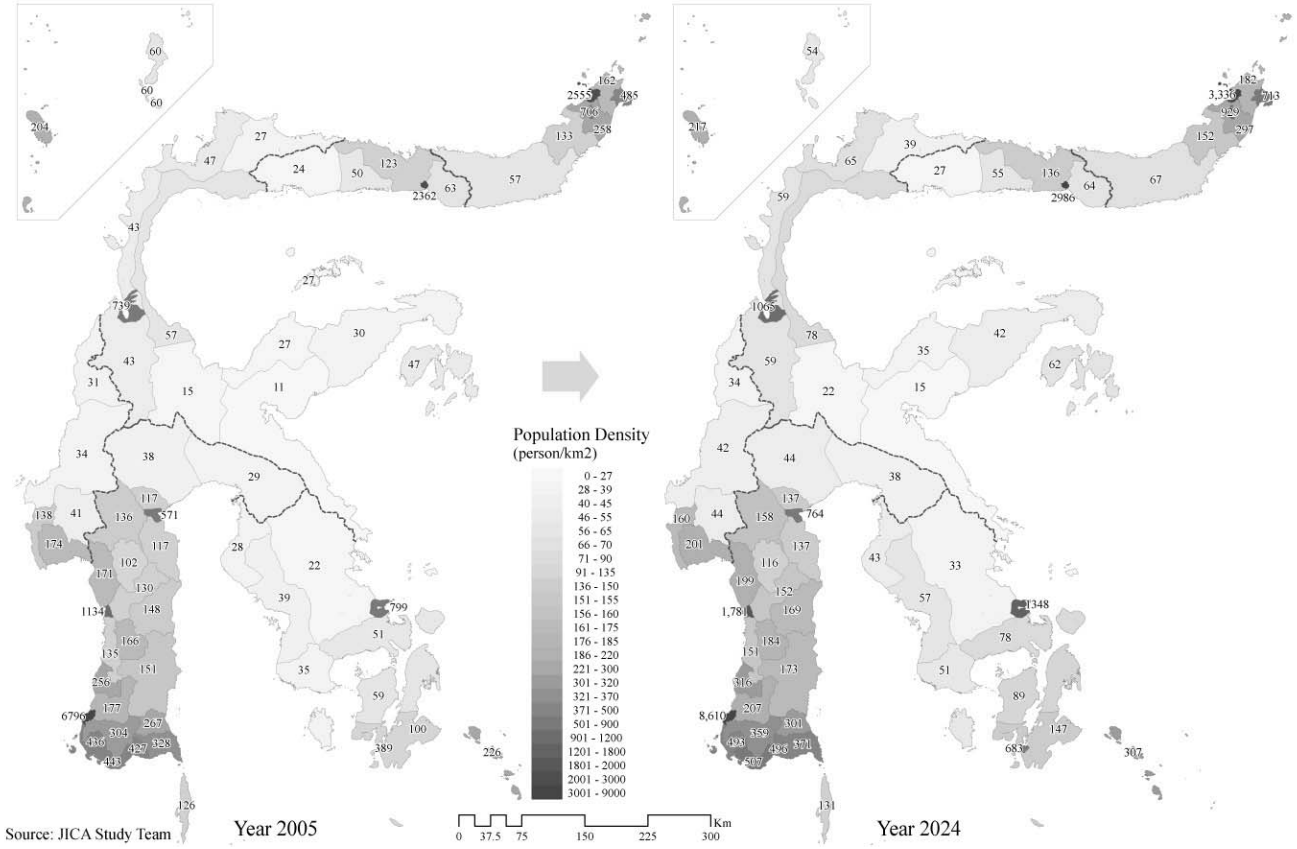


Figure 6.1.9 Changes in Population Densities

(4) Labor Force

The labor force in Sulawesi was forecasted to increase from 6.3 million to 9.8 million during 2005 - 2024, with an annual growth rate of 2.33%. Such high growth rate will result from increases in labor participation rates (labor participation rate above age 15 was assumed to increase from 60.3% in 2005 and 70.3% by 2024).

While the agriculture labor force would remain stagnant (from 3.14 million in 2005 to 3.83 million by 2024 with an annual growth rate of 1.05%), the nonagricultural labor force was seen to double (from 3.16 million in 2005 to 5.93 million by 2024 with a growth rate of 3.37%). As a result, the percentage of agricultural labor would decrease from 49.9% in 2005 to 39.3% by 2024.

Table 6.1.6 Results of Population Forecast

	Population					AAGR (%)	Population Density		Urbanization Rate (%)	
	2005	2008	2014	2019	2024	2005-24	2005	2024	2005	2024
Sulawesi Total	15,740.8	16,429.2	17,755.1	18,791.0	19,730.4	1.20%	80.0	100.3	28.0%	35.8%
North Sulawesi	2,121.0	2,201.6	2,355.0	2,457.8	2,543.0	0.96%	137.9	167.3	37.3%	52.3%
Bolaang Mongondow	474.9	492.1	525.6	546.7	563.3	0.90%	56.8	67.4	11.9%	17.1%
Minahasa	288.5	296.8	312.6	323.0	331.3	0.73%	258.3	296.6	30.2%	44.8%
Kepulauan Sangihe	191.1	195.5	201.7	203.1	202.9	0.32%	204.1	216.7	14.0%	22.4%
Kepulauan Talaud	74.5	75.7	75.6	72.1	67.5	-0.52%	59.6	54.0	0.1%	0.1%
Minahasa Selatan	276.0	284.5	299.7	308.6	315.1	0.70%	132.7	151.6	10.4%	15.5%
Minahasa Utara	165.8	170.1	178.5	183.0	186.1	0.61%	161.8	181.6	22.2%	33.8%
Kota Manado	405.7	426.1	467.1	499.9	529.9	1.42%	2,554.6	3,336.2	93.4%	100.0%
Kota Bitung	163.8	175.8	200.8	221.5	240.9	2.05%	484.6	712.6	78.9%	100.0%
Kota Tomohon	80.6	85.1	93.3	99.9	106.1	1.45%	706.2	928.9	57.9%	81.8%
Central Sulawesi	2,291.0	2,425.1	2,701.4	2,937.1	3,169.0	1.72%	33.5	46.3	19.5%	25.6%
Banggai Kepulauan	150.2	157.9	173.6	186.6	198.1	1.47%	46.7	61.6	4.6%	6.4%
Banggai	288.4	303.7	337.7	370.9	407.4	1.83%	29.8	42.1	21.6%	32.5%
Morowali	169.7	178.5	198.7	215.0	230.5	1.62%	10.6	14.5	6.3%	9.3%
Poso	134.0	141.8	157.4	169.8	187.6	1.79%	15.4	21.5	6.5%	8.6%
Donggala	450.4	477.1	531.5	577.3	621.0	1.70%	43.0	59.3	5.8%	7.6%
Toli Toli	190.2	202.0	225.9	245.0	265.6	1.77%	46.6	65.1	21.0%	27.3%
Buol	110.4	117.8	132.6	144.8	155.5	1.82%	27.3	38.5	7.2%	9.3%
Parigi Moutong	353.4	374.0	416.1	451.0	484.2	1.67%	56.7	77.7	5.0%	6.6%
Toja Una Una	152.4	159.7	174.6	187.4	198.4	1.40%	26.6	34.7	6.7%	9.3%
Kota Palu	291.9	312.6	353.4	389.2	420.7	1.94%	738.8	1,064.8	88.0%	100.0%
South Sulawesi	7,479.7	7,743.4	8,219.1	8,572.9	8,872.1	0.90%	164.1	195.8	31.2%	38.6%
Selayar	114.2	116.1	118.5	119.3	118.8	0.21%	126.4	131.4	14.8%	22.1%
Bulukumba	378.4	388.8	406.7	418.8	427.8	0.65%	327.7	370.5	13.9%	19.2%
Bantaeng	169.1	174.9	185.2	191.8	196.3	0.79%	427.1	496.0	24.0%	32.3%
Jeneponto	326.4	336.8	353.1	364.9	374.0	0.72%	442.5	507.0	7.2%	9.7%
Takalar	246.8	254.0	264.6	272.8	279.5	0.66%	435.7	493.4	14.0%	19.3%
Gowa	572.7	593.1	627.8	653.9	675.7	0.87%	304.1	358.8	26.7%	35.4%
Sinjai	219.0	225.0	235.6	242.3	247.0	0.63%	267.1	301.2	19.1%	26.4%
Maros	286.8	296.7	312.4	324.7	335.3	0.83%	177.2	207.1	18.9%	25.3%
Pangkep	284.4	296.5	317.2	335.0	351.8	1.12%	255.7	316.3	14.2%	22.2%
Barru	158.1	162.4	170.2	175.0	178.1	0.63%	134.6	151.6	24.8%	34.3%
Bone	686.8	707.1	743.0	768.2	788.0	0.73%	150.6	172.9	13.9%	18.9%
Soppeng	225.9	231.0	240.2	246.0	249.8	0.53%	166.2	183.8	18.3%	25.8%
Wajo	371.1	381.3	400.6	413.8	424.1	0.70%	148.1	169.2	20.6%	28.2%
Sidrap	245.4	252.8	267.3	276.9	284.2	0.78%	130.3	150.9	23.7%	32.0%
Pinrang	334.5	345.2	365.7	379.8	390.9	0.82%	170.5	199.3	17.6%	23.5%
Enrekang	180.1	186.1	195.6	201.5	205.2	0.69%	102.0	116.2	9.3%	12.8%
Luwu	312.9	323.9	343.1	356.1	365.8	0.83%	117.0	136.8	5.4%	7.2%
Tana Toraja	436.9	451.6	476.6	493.8	506.8	0.78%	136.3	158.1	12.7%	17.1%
Luwu Utara	287.3	297.4	314.7	326.3	334.8	0.81%	38.0	44.2	4.4%	5.9%
Luwu Timur	206.2	217.9	242.8	260.3	274.8	1.52%	28.6	38.1	16.0%	23.4%
Kota Makassar	1,194.6	1,247.6	1,347.2	1,431.7	1,513.4	1.25%	6,796.3	8,610.1	97.8%	100.0%
Kota Pare Pare	112.6	121.7	138.8	156.8	176.9	2.40%	1,133.8	1,780.9	91.1%	100.0%
Kota Palopo	129.3	135.5	152.0	163.3	173.1	1.55%	570.8	764.4	79.7%	100.0%
Southeast Sulawesi	1,960.7	2,116.3	2,438.1	2,716.7	2,996.6	2.26%	51.4	78.6	21.7%	30.2%
Buton	266.4	286.5	327.8	361.8	394.0	2.08%	99.6	147.3	3.5%	5.1%
Muna	287.7	310.1	356.6	395.9	434.5	2.19%	58.9	88.9	12.0%	16.9%
Konawe	260.8	279.5	318.3	350.7	382.1	2.03%	22.4	32.7	8.3%	12.1%
Kolaka	266.0	285.0	324.7	359.1	393.8	2.09%	38.5	56.9	24.1%	35.5%
Konawe Selatan	228.8	247.8	286.0	318.4	349.9	2.26%	50.7	77.5	1.1%	1.5%
Bombana	105.8	114.4	131.0	144.5	157.0	2.10%	34.6	51.4	10.2%	14.6%
Wakatobi	96.4	102.6	114.6	123.5	130.8	1.62%	226.3	307.0	2.6%	4.1%
Kolaka Utara	93.4	101.8	117.5	131.9	146.6	2.40%	27.5	43.2	0.1%	0.1%
Kota Kendari	236.3	258.0	305.0	349.7	398.9	2.80%	798.5	1,348.3	80.9%	100.0%
Kota Bau Bau	119.0	130.8	156.6	181.3	208.8	3.00%	389.3	683.1	74.3%	100.0%
Gorontalo	920.0	942.1	982.1	1,010.8	1,029.6	0.59%	75.3	84.3	31.3%	53.2%
Boalemo	113.0	115.3	118.5	120.6	123.3	0.46%	50.3	54.9	6.2%	9.9%
Gorontalo	422.2	431.3	447.0	458.0	466.5	0.53%	123.2	136.1	18.0%	28.6%
Pohuwato	106.8	109.5	115.0	118.4	119.0	0.57%	23.8	26.5	2.4%	3.7%
Bone Bolango	124.9	126.5	128.7	129.5	127.4	0.10%	62.9	64.2	11.4%	19.6%
Kota Gorontalo	153.0	159.5	172.9	184.3	193.5	1.24%	2,362.0	2,986.3	88.6%	100.0%
West Sulawesi	968.4	1,000.8	1,059.3	1,095.7	1,120.2	0.77%	57.2	66.3	17.4%	23.9%
Majene	130.3	134.6	143.1	148.4	152.0	0.81%	137.5	160.3	37.9%	50.7%
Polewali Mandar	351.7	363.0	383.2	396.9	407.3	0.78%	173.9	201.4	26.5%	35.8%
Mamasa	120.4	122.6	125.6	126.8	126.6	0.26%	41.4	43.5	0.0%	0.1%
Mamuju	272.9	284.9	307.8	322.2	332.3	1.04%	34.1	41.5	9.5%	12.2%
Mamuju Utara	93.1	95.7	99.6	101.5	102.0	0.48%	30.6	33.5	0.1%	0.1%

Source: JICA Study Team Note: AAGR= Annual Average Growth Rate

Table 6.1.7 Results of Labor Force Forecast

	Agri. Sector Labor Force		AAGR (%)	Other Sectors Labor Force		AAGR (%)	Total Labor Force		AAGR (%)
	2005	2024	2005-24	2005	2024	2005-24	2005	2024	2005-24
Sulawesi Total	**3,144,356**	**3,832,672**	**1.05%**	**3,155,220**	**5,926,424**	**3.37%**	6,299,577	9,759,096	2.33%
North Sulawesi	**331,563**	**351,473**	**0.31%**	**517,536**	**914,722**	**3.04%**	849,099	1,266,195	2.13%
Bolaang Mongondow	122,168	145,054	0.91%	65,562	131,589	3.73%	187,730	276,643	2.06%
Minahasa	49,957	48,551	-0.15%	66,845	118,208	3.05%	116,802	166,760	1.89%
Kepulauan Sangihe	37,706	38,762	0.15%	38,024	61,267	2.54%	75,730	100,029	1.48%
Kepulauan Talaud	16,394	16,023	-0.12%	12,537	16,617	1.49%	28,931	32,641	0.64%
Minahasa Selatan	53,171	60,901	0.72%	57,142	95,319	2.73%	110,313	156,220	1.85%
Minahasa Utara	28,707	29,481	0.14%	35,137	60,284	2.88%	63,843	89,766	1.81%
Kota Manado	4,810	2,666	-3.06%	161,515	265,738	2.66%	166,324	268,404	2.55%
Kota Bitung	8,996	2,851	-5.87%	57,047	118,329	3.91%	66,043	121,180	3.25%
Kota Tomohon	9,655	7,182	-1.54%	23,727	47,370	3.71%	33,382	54,553	2.62%
Central Sulawesi	**562,124**	**771,956**	**1.68%**	**422,250**	**887,048**	**3.98%**	984,374	1,659,004	2.79%
Banggai Kepulauan	42,341	58,367	1.70%	19,408	41,791	4.12%	61,749	100,158	2.58%
Banggai	79,249	100,850	1.28%	49,065	117,905	4.72%	128,314	218,755	2.85%
Morowali	44,827	61,856	1.71%	29,503	60,813	3.88%	74,330	122,670	2.67%
Poso	42,198	59,973	1.87%	18,893	43,311	4.46%	61,091	103,284	2.80%
Donggala	122,211	174,611	1.90%	68,958	147,675	4.09%	191,169	322,286	2.79%
Toli Toli	43,141	57,856	1.56%	38,258	80,600	4.00%	81,399	138,456	2.84%
Buol	29,652	43,441	2.03%	14,999	34,145	4.42%	44,651	77,586	2.95%
Parigi Moutong	106,615	150,743	1.84%	46,417	104,708	4.37%	153,032	255,451	2.73%
Toja Una Una	45,392	60,883	1.56%	18,582	41,161	4.27%	63,974	102,044	2.49%
Kota Palu	6,498	3,376	-3.39%	118,166	214,938	3.20%	124,664	218,314	2.99%
South Sulawesi	**1,402,229**	**1,595,833**	**0.68%**	**1,549,968**	**2,734,074**	**3.03%**	2,952,197	4,329,907	2.04%
Selayar	24,059	24,428	0.08%	21,842	34,451	2.43%	45,901	58,879	1.32%
Bulukumba	94,497	105,784	0.60%	63,555	112,989	3.07%	158,052	218,773	1.73%
Bantaeng	44,650	48,710	0.46%	22,283	47,251	4.04%	66,932	95,961	1.91%
Jeneponto	94,334	112,147	0.91%	34,630	70,904	3.84%	128,964	183,051	1.86%
Takalar	39,255	43,939	0.60%	61,965	96,867	2.38%	101,219	140,806	1.75%
Gowa	123,369	135,165	0.48%	109,604	202,713	3.29%	232,973	337,878	1.98%
Sinjai	56,313	61,607	0.47%	29,894	58,687	3.61%	86,207	120,293	1.77%
Maros	50,212	57,537	0.72%	63,741	107,033	2.77%	113,953	164,570	1.95%
Pangkep	30,381	36,179	0.92%	85,407	139,865	2.63%	115,788	176,043	2.23%
Barru	26,950	27,867	0.18%	36,593	60,224	2.66%	63,543	88,091	1.73%
Bone	181,558	208,423	0.73%	96,353	184,493	3.48%	277,911	392,916	1.84%
Soppeng	63,138	66,110	0.24%	32,508	63,074	3.55%	95,646	129,184	1.59%
Wajo	81,577	88,479	0.43%	75,513	130,671	2.93%	157,090	219,150	1.77%
Sidrap	54,954	59,503	0.42%	45,844	83,807	3.23%	100,798	143,309	1.87%
Pinrang	70,328	80,858	0.74%	60,304	108,359	3.13%	130,632	189,217	1.97%
Enrekang	51,300	60,789	0.90%	14,947	33,987	4.42%	66,248	94,775	1.90%
Luwu	76,556	95,508	1.17%	37,845	72,859	3.51%	114,400	168,367	2.05%
Tana Toraja	96,086	115,295	0.96%	57,887	110,923	3.48%	153,972	226,219	2.05%
Luwu Utara	73,048	90,894	1.16%	32,054	63,271	3.64%	105,102	154,165	2.04%
Luwu Timur	49,171	64,439	1.43%	25,741	61,070	4.65%	74,912	125,509	2.75%
Kota Makassar	10,315	6,640	-2.29%	461,096	733,335	2.47%	471,412	739,976	2.40%
Kota Pare Pare	4,064	2,803	-1.94%	37,983	79,659	3.97%	42,047	82,462	3.61%
Kota Palopo	6,115	2,730	-4.16%	42,382	77,582	3.23%	48,496	80,312	2.69%
Southeast Sulawesi	**450,327**	**666,260**	**2.08%**	**368,991**	**851,388**	**4.50%**	819,317	1,517,648	3.30%
Buton	58,139	91,328	2.41%	43,662	96,234	4.25%	101,801	187,562	3.27%
Muna	71,744	108,994	2.23%	44,307	106,144	4.71%	116,051	215,138	3.30%
Konawe	73,567	108,522	2.07%	39,981	93,038	4.55%	113,548	201,560	3.07%
Kolaka	78,362	102,999	1.45%	38,164	103,546	5.39%	116,526	206,545	3.06%
Konawe Selatan	68,464	109,766	2.52%	32,280	77,458	4.71%	100,744	187,224	3.32%
Bombana	35,016	51,791	2.08%	11,341	31,407	5.51%	46,357	83,198	3.13%
Wakatobi	23,742	33,519	1.83%	17,609	35,365	3.74%	41,351	68,884	2.72%
Kolaka Utara	34,076	56,163	2.66%	7,803	23,490	5.97%	41,879	79,653	3.44%
Kota Kendari	4,614	2,114	-4.02%	90,366	189,418	3.97%	94,981	191,532	3.76%
Kota Bau Bau	2,601	1,064	-4.60%	43,477	95,288	4.22%	46,078	96,352	3.96%
Gorontalo	**162,820**	**172,343**	**0.30%**	**186,588**	**311,487**	**2.73%**	349,408	483,830	1.73%
Boalemo	26,409	29,823	0.64%	16,928	28,940	2.86%	43,337	58,763	1.62%
Gorontalo	79,904	83,215	0.21%	76,964	131,797	2.87%	156,868	215,012	1.67%
Pohuwato	26,317	31,047	0.87%	15,798	27,084	2.88%	42,115	58,131	1.71%
Bone Bolango	26,439	26,228	-0.04%	23,190	35,918	2.33%	49,629	62,146	1.19%
Kota Gorontalo	3,751	2,030	-3.18%	53,708	87,749	2.62%	57,459	89,779	2.38%
West Sulawesi	**235,293**	**274,807**	**0.82%**	**109,889**	**227,704**	**3.91%**	345,182	502,511	2.00%
Majene	18,412	18,649	0.07%	24,701	45,071	3.22%	43,114	63,720	2.08%
Polewali Mandar	79,296	86,363	0.45%	47,027	96,615	3.86%	126,324	182,978	1.97%
Mamasa	31,091	36,294	0.82%	9,525	18,421	3.53%	40,617	54,715	1.58%
Mamuju	78,190	99,719	1.29%	22,617	54,104	4.70%	100,807	153,823	2.25%
Mamuju Utara	28,304	33,782	0.94%	6,017	13,493	4.34%	34,321	47,275	1.70%

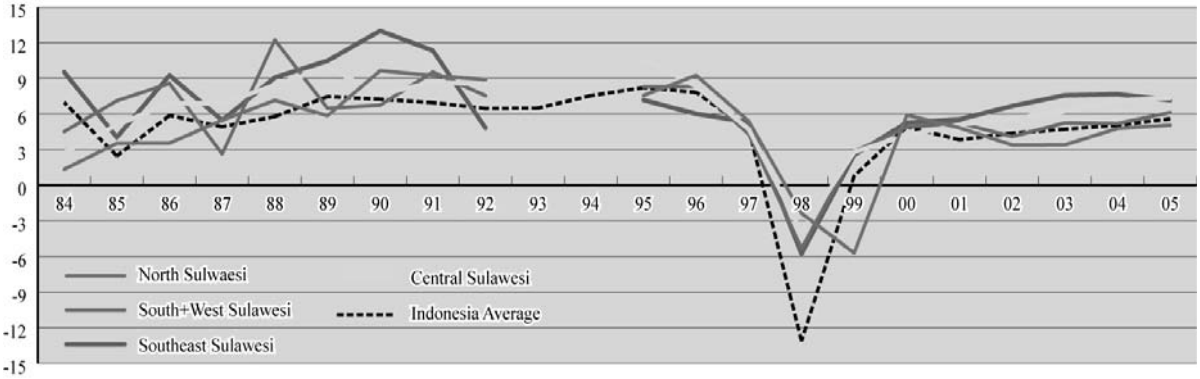
Source: JICA Study Team Note: AAGR= Annual Average Growth Rate

6.2 GRDP Forecast

6.2.1 Review of GRDP Growth Trends

Figure 6.2.1 illustrates the changes in the GRPD growth rates of Indonesia and the provinces in Sulawesi Island from 1984 to 2005 in real terms. The provincial GRDPs of Sulawesi Island fluctuated year by year and were generally higher than the national GDP growth rate. From 1984 to 1992, the GRDP growth rates of each province were on an increasing trend. The average GRDP growth rate of Sulawesi Island was recorded at 10.42% in 1988 and at 9.57% in 1991. However, such favorable economic developments turned negative due to the Asian economic crisis in late 1998. In 1998, South (including West), Southeast, and Central Sulawesi recorded around -4% to -6% GRDPs. North Sulawesi experienced negative growth not only in 1998 (-2.4%) but also in subsequent years (-5.7%).

After the economic crisis, the economy of Sulawesi Island developed. In 2005, the GRDP growth rate of each province was between 5.1% (North and Gorontalo) and 7.4% (Central Sulawesi).



Source: BPS, Indonesia

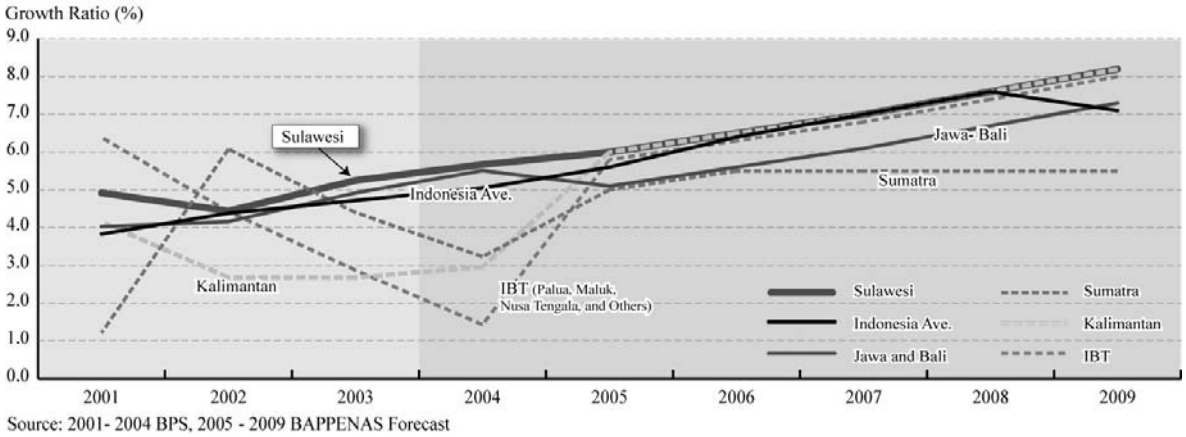
Figure 6.2.1 Changes in the GRDP Growth Rates in Sulawesi and Indonesia

6.2.2 Review of BAPPENAS's GRDP Forecasts

BAPPENAS made a GRDP forecast for each island in 2003 during the preparation of the Mid-term National Development Plan 2005-2009 (RPJM). According to the forecast, the GRDP growth rate of Sulawesi Island would progressively increase from 5.67% in 2004 to 8.20% by 2009.

The GRDP growth rate of Sulawesi is higher than those of Jawa-Bali and Sumatra, and is almost similar to the other islands in Eastern Indonesia, namely Kalimantan and the other islands including Papua, East and West Nusa Tenggara, and Maluku.

Except for this mid-term forecast (2005-2009), there is no other official GRDP forecast for Indonesia. This mid-term forecast covers only the island, and not the provincial level. Currently, BAPPENAS is preparing a provincial-level long-term GRDP forecast using an econometric model. However, it is currently not available.

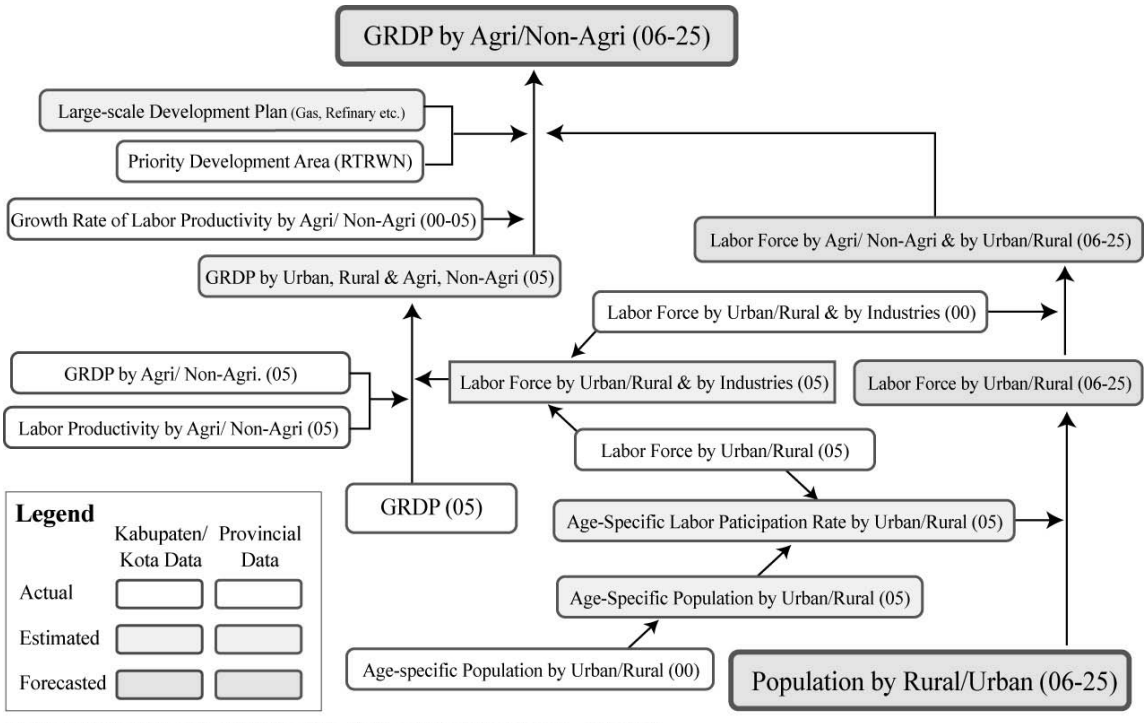


Source: 2001- 2004 BPS, 2005 - 2009 BAPPENAS Forecast

Figure 6.2.2 BAPPENAS's GRDP Forecast, 2005-2009

6.2.3 Methodology of the JICA Study Team's Long-term GRDP Forecast by Kabupaten/Kota

Given these conditions, a long-term and regency-wise GRDP forecast was made by the JICA Study Team based on the population (labor force) forecasts, as mentioned in Section 6.1. The base year of the forecast is 2005. The GRDP of each regency was available, but their GRDP compositions by major industries were not available with the exception of Gorontalo. The JICA Study Team estimated the 2005 GRDP composition by agricultural sector (including fishery, forestry, and livestock) and nonagricultural sector, based on the labor productivities of each major industry in each province and the number of labor force by major industry in each regency in 2005, as quoted in the Intercensus 2005.



Note: Parenthetic Figure indicates year. For example (05) indicates year 2005

Figure 6.2.3 Flow Chart of GRDP Forecast Methodology

Then GRDP forecast was made using the labor force and labor productivity forecasts for agricultural and nonagricultural sectors. The growth rate of labor productivities in each regency was forecasted based on past trends as well as the future development plan, including the large-scale development plan (such as gas & oil fields, and LNG terminal in Banggai Regency in Central Sulawesi, and oil refinery in Parepare City in South Sulawesi) and the priority development areas designated in the National Spatial Plan.

6.2.4 Results of the JICA Study Team's Long-term GRDP Forecast by Kabupaten/Kota

(1) GRDP Growth Rates

Total GRDP in Sulawesi was forecasted to increase from Rp. 73,089 billion in 2005 to Rp. 265,150 billion in 2024 with an annual average growth rate of 7.02%. Growth rates will be higher in Central Sulawesi (7.79%) and Southeast Sulawesi (7.44%), but will be lower in South Sulawesi (6.78%) and North Sulawesi (6.69%).

At the regency level, GRDP growth rates will be higher for Banggai Regency in Central Sulawesi (9.47%: development of oil & gas fields and LNG terminal), Parepare City in South Sulawesi (9.18%: development of oil refinery and rapid urbanization), Palu City in Central Sulawesi (8.46%: rapid urbanization), and Kendari City in Southeast Sulawesi (8.73%: rapid urbanization).

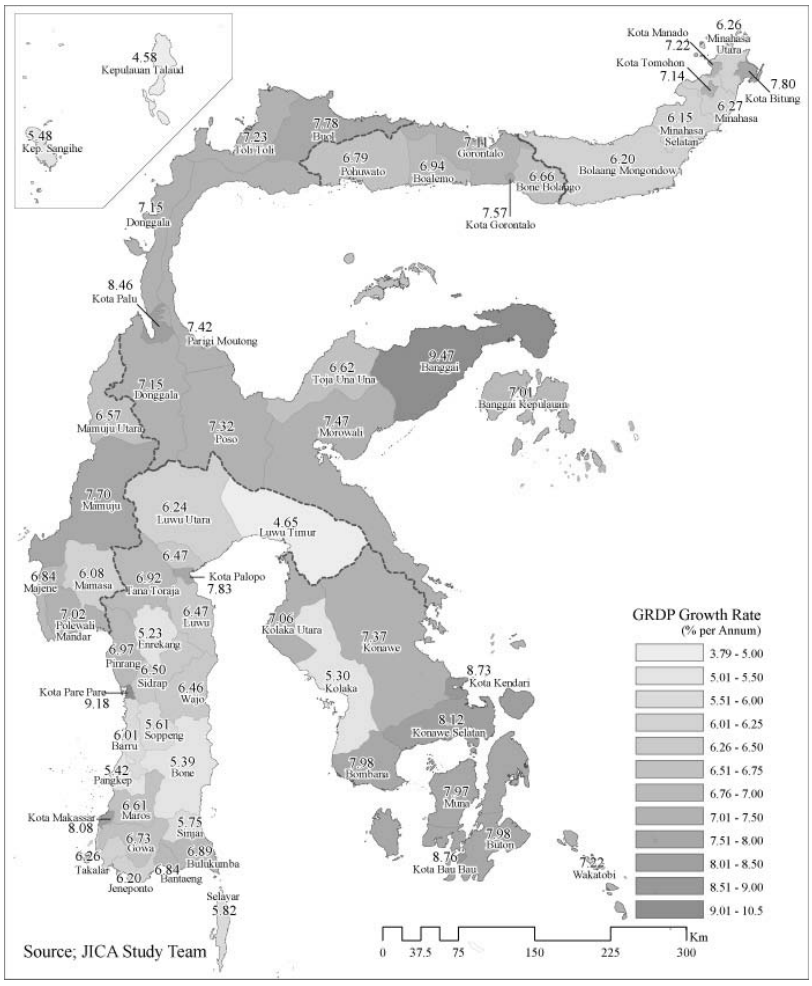


Figure 6.2.4 Forecasted GRDP Growth Rates (2005-24)

GRDP growth rates were forecasted also to be higher in other city areas, such as Makassar (8.08%), Palopo (7.83%), Baubau (8.76%), Manado (7.22%), Mamuju (7.70%), and Gorontalo (7.57%).

(2) Composition of Agricultural and NonAgricultural Sectors

The annual average growth rates for the agricultural and nonagricultural sectors in 2005 and 2024 had a forecast of 4.46% and 7.97%, respectively. As a result, the contribution of the agricultural sector to total GRDP will decrease from 33.3% to 21.0% (although this is still higher than the Indonesia average of 15.0% in 2005). The sector's share to the total GRDP will be lower in North Sulawesi (12.3%), South Sulawesi (18.0%), and will still be relatively higher in Central Sulawesi (31.3%) and West Sulawesi (30.0%) (refer to Table 6.2.5).

The number of regencies heavily dependent on the agricultural sector (more than 50% of total GRDP) will decrease from 24 regencies in 2005 to only 3 regencies in 2025 (Bone and Enrekang in South Sulawesi, and Parigi Moutong in Central Sulawesi).

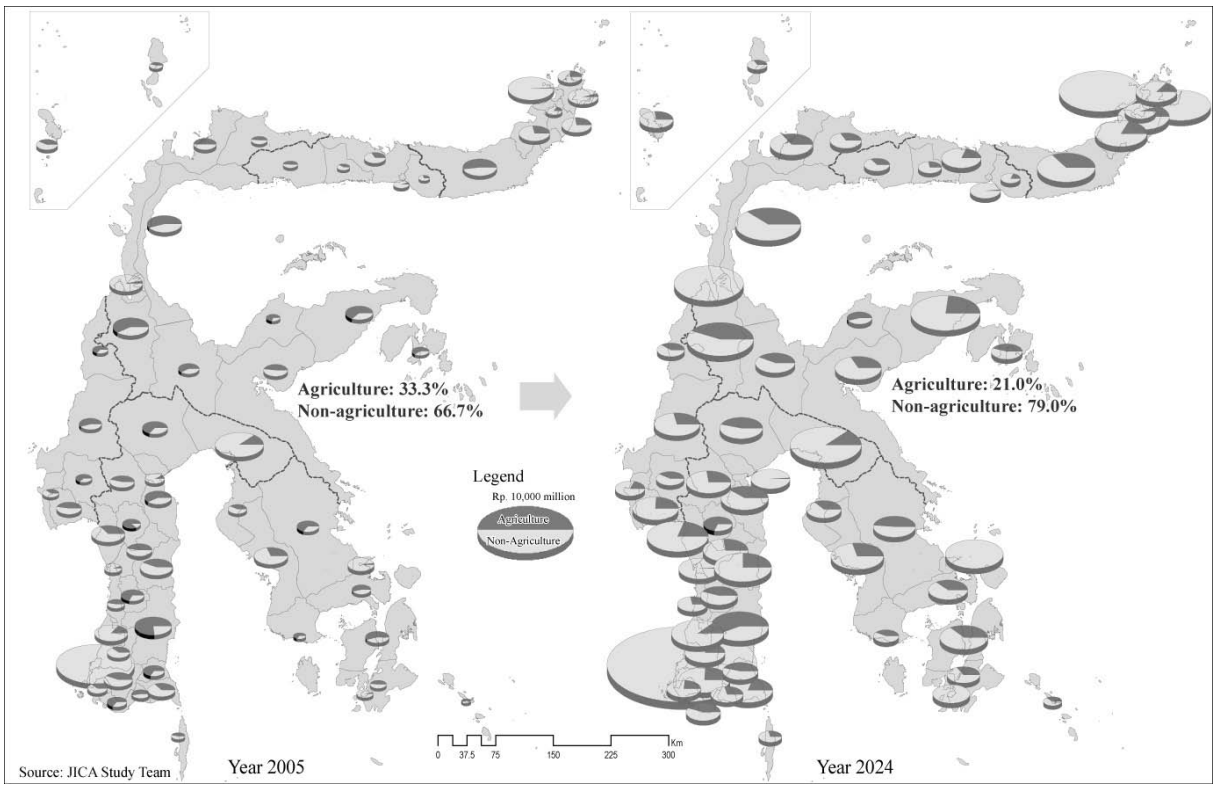


Figure 6.2.5 Forecast Changes in the GRDP, 2005-2024

Table 6.2.1 GRDP of Agricultural and Nonagricultural Sectors

	2005 (billion Rp.)				2024 (billion Rp.)			
	Agri'l (A)	Nonagri'l (B)	Total (C)	A / C	Agri'l (A')	Nonagri'l (B')	Total (C')	A'/C'
North Sulawesi	2,778	9,967	12,745	21.80%	5,377	38,236	43,614	12.33%
Central Sulawesi	5,348	5,808	11,156	47.94%	14,507	31,852	46,359	31.29%
South Sulawesi	11,032	25,392	36,424	30.29%	22,771	103,903	126,674	17.98%
Southeast Sulawesi	2,798	4,682	7,480	37.41%	8,024	21,228	29,252	27.43%
Gorontalo	624	1,401	2,025	30.83%	1,431	6,008	7,439	19.24%
West Sulawesi	1,727	1,532	3,259	52.99%	3,546	8,267	11,813	30.02%
Sulawesi Total	24,307	48,782	73,089	33.26%	55,656	209,494	265,150	20.99%

Source: JICA Study Team

(3) Per-capita GRDP

The per-capita GRDP will increase by an average of 5.70%. As a result, the per-capita GRDP of Sulawesi will reach US$ 1,703 in 2024 (2005 constant prices), which is 2.87 times bigger than the per-capita GRDP in 2005 (US$ 594). Similar to 2005, North Sulawesi's per-capita GRDP will remain the biggest by 2024 and Gorontalo the smallest. However, the gap between these provinces will to some extent narrow from 2.41 times to 2.09 times. Also, regional disparities in per-capita GRDP will be reduced. The coefficient variation[2] of per-capita GRDP of all regencies in Sulawesi will decrease from 0.59 in 2005 to 0.47 by 2024.

Table 6.2.2 Per-capita GRDP Forecasts

	Rupiah (2000 Constant Prices)		Rupiah (2005 Constant Prices)		US Dollar (2005 Constant Prices)	
	2005	2024	2005	2024	2005	2024
North Sulawesi	6,009	17,055	7,460	21,175	718.9	2,040.5
Central Sulawesi	4,870	14,426	6,491	19,230	625.5	1,853.1
South Sulawesi	4,870	14,196	6,555	19,108	631.7	1,841.3
Southeast Sulawesi	3,815	9,586	5,309	13,340	511.6	1,285.5
Gorontalo	2,201	7,200	3,093	10,117	298.1	974.9
West Sulawesi	3,365	10,514	4,057	12,675	390.9	1,221.4
Sulawesi Total	4,643	13,322	6,160	17,674	593.6	1,703.1

Source: JICA Study Team

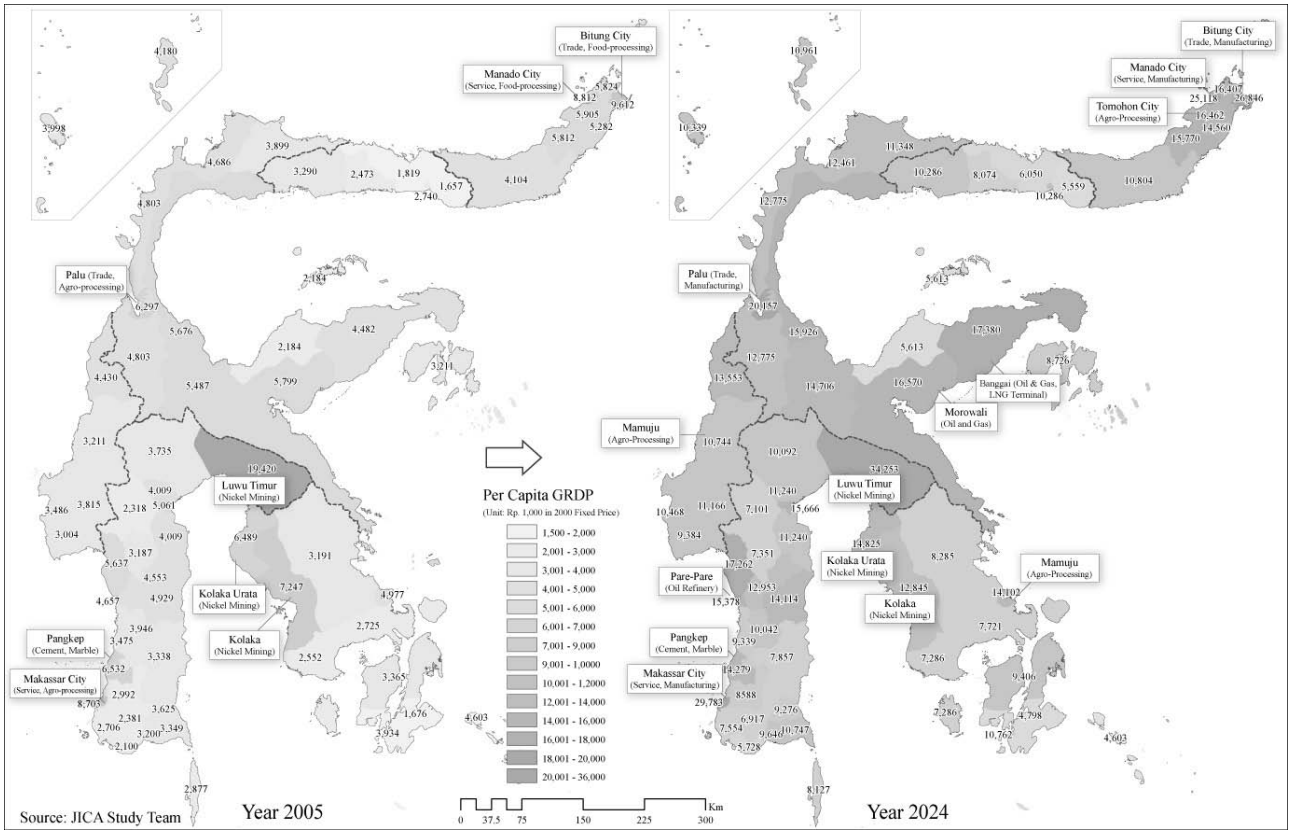


Figure 6.2.6 Changes in the Distribution of Per-capita GRDP

[2] The coefficient variation describes the degree of variation of samples: its standard deviation divided by its mean. Bigger figure means bigger difference of samples, and smaller figure means smaller distribution of samples.

Table 6.2.3 GRDP Forecasts, 2000 Constant Prices

	GRDP		AAGR (%)	GRDP (Agri'l)		AAGR (%)	GRDP (Nonagri'l)		AAGR (%)	Per-capita GRDP		AAGR (%)
	2005	2024	05-24	2005	2024	05-24	2005	2024	05-24	2005	2024	05-24
Sulawesi Total	**73,089**	**265,150**	**7.02%**	**24,307**	**55,656**	**4.46%**	**48,782**	**209,494**	**7.97%**	**4,643**	**13,322**	**5.70%**
North Sulawesi	**12,745**	**43,614**	**6.69%**	**2,778**	**5,377**	**3.54%**	**9,967**	**38,236**	**7.33%**	**6,009**	**17,055**	**5.64%**
B.Mongondow	1,949	6,114	6.20%	1,024	2,219	4.16%	926	3,895	7.86%	4,104	10,804	5.23%
Minahasa	1,524	4,843	6.27%	419	743	3.06%	1,106	4,100	7.14%	5,282	14,560	5.48%
Kepulauan Sangihe	764	2,107	5.48%	316	593	3.37%	448	1,514	6.62%	3,998	10,399	5.16%
Kepulauan Talaud	311	729	4.58%	137	245	3.10%	174	484	5.53%	4,180	10,961	5.21%
Minahasa Selatan	1,604	4,984	6.15%	445	932	3.96%	1,159	4,052	6.81%	5,812	15,770	5.39%
Minahasa Utara	965	3,059	6.26%	241	451	3.36%	725	2,608	6.97%	5,824	16,407	5.60%
Kota Manado	3,575	13,447	7.22%	40	41	0.06%	3,535	13,406	7.27%	8,812	25,118	5.67%
Kota Bitung	1,575	6,566	7.80%	75	44	-2.84%	1,500	6,522	8.04%	9,612	26,846	5.55%
Kota Tomohon	476	1,765	7.14%	81	110	1.63%	395	1,655	7.83%	5,905	16,462	5.54%
Central Sulawesi	**11,156**	**46,359**	**7.79%**	**5,348**	**14,507**	**5.39%**	**5,808**	**31,852**	**9.37%**	**4,870**	**14,426**	**5.88%**
Banggai Kepulauan	482	1,747	7.01%	293	798	5.42%	189	949	8.85%	3,211	8,726	5.40%
Banggai	1,293	7,208	9.47%	822	2,068	4.97%	470	5,140	13.41%	4,482	17,380	7.39%
Morowali	984	3,868	7.47%	465	1,268	5.42%	519	2,600	8.85%	5,799	16,570	5.68%
Poso	735	2,815	7.32%	438	1,230	5.58%	297	1,585	9.21%	5,487	14,706	5.33%
Donggala	2,164	8,040	7.15%	1,268	3,580	5.61%	895	4,460	8.82%	4,803	12,775	5.28%
Toli Toli	891	3,360	7.23%	448	1,186	5.26%	444	2,174	8.72%	4,686	12,461	5.28%
Buol	430	1,787	7.78%	205	594	5.75%	225	1,193	9.17%	3,899	11,348	5.78%
Parigi Moutong	2,006	7,811	7.42%	1,106	3,090	5.56%	900	4,721	9.12%	5,676	15,926	5.58%
Toja Una Una	333	1,125	6.62%	235	624	5.26%	97	501	9.01%	2,184	5,613	5.09%
Kota Palu	1,838	8,598	8.46%	67	69	0.14%	1,771	8,529	8.63%	6,297	20,157	6.31%
South Sulawesi	**36,424**	**126,674**	**6.78%**	**11,032**	**22,771**	**3.89%**	**25,392**	**103,903**	**7.70%**	**4,870**	**14,196**	**5.79%**
Selayar	329	963	5.82%	154	285	3.27%	174	679	7.42%	2,877	8,127	5.62%
Bulukumba	1,267	4,494	6.89%	455	924	3.80%	812	3,570	8.10%	3,349	10,474	6.18%
Bantaeng	541	1,900	6.84%	287	567	3.66%	254	1,333	9.11%	3,200	9,646	5.98%
Jeneponto	686	2,150	6.20%	454	980	4.13%	231	1,170	8.91%	2,100	5,728	5.42%
Takalar	668	2,119	6.26%	252	512	3.80%	416	1,608	7.37%	2,706	7,554	5.55%
Gowa	1,364	4,699	6.73%	594	1,181	3.68%	770	3,519	8.33%	2,381	6,917	5.77%
Sinjai	794	2,297	5.75%	542	1,076	3.67%	252	1,221	8.67%	3,625	9,276	5.07%
Maros	858	2,895	6.61%	322	670	3.93%	536	2,225	7.78%	2,992	8,588	5.71%
Pangkep	1,858	5,067	5.42%	293	632	4.14%	1,565	4,435	5.63%	6,532	14,279	4.20%
Barru	550	1,667	6.01%	260	487	3.37%	290	1,180	7.67%	3,475	9,339	5.34%
Bone	2,293	6,217	5.39%	1,749	3,641	3.94%	544	2,576	8.53%	3,338	7,857	4.61%
Soppeng	892	2,514	5.61%	608	1,155	3.43%	283	1,359	8.60%	3,946	10,042	5.04%
Wajo	1,829	6,009	6.46%	786	1,546	3.63%	1,043	4,464	7.95%	4,929	14,114	5.69%
Sidrap	1,117	3,697	6.50%	529	1,040	3.62%	588	2,657	8.26%	4,553	12,953	5.66%
Pinrang	1,886	6,780	6.97%	677	1,413	3.94%	1,208	5,367	8.16%	5,637	17,262	6.07%
Enrekang	574	1,512	5.23%	494	1,062	4.11%	80	450	9.51%	3,187	7,351	4.50%
Luwu	1,254	4,129	6.47%	737	1,669	4.39%	517	2,460	8.56%	4,009	11,240	5.58%
Tana Toraja	1,013	3,613	6.92%	463	1,007	4.18%	550	2,606	8.53%	2,318	7,101	6.07%
Luwu Utara	1,073	3,391	6.24%	704	1,588	4.38%	370	1,804	8.70%	3,735	10,092	5.37%
Luwu Timur	4,004	9,501	4.65%	474	1,126	4.66%	3,530	8,376	4.65%	19,420	34,253	3.03%
Kota Makassar	10,397	45,534	8.08%	99	116	0.82%	10,297	45,418	8.12%	8,703	29,783	6.69%
Kota Pare Pare	524	2,783	9.18%	39	49	1.19%	485	2,734	9.53%	4,657	15,378	6.49%
Kota Palopo	654	2,742	7.83%	59	48	-1.10%	595	2,694	8.27%	5,061	15,666	6.13%
Southeast Sulawesi	**7,480**	**29,252**	**7.44%**	**2,798**	**8,024**	**5.70%**	**4,682**	**21,228**	**8.28%**	**3,815**	**9,586**	**4.97%**
Buton	447	1,920	7.98%	217	666	6.08%	230	1,254	9.35%	1,676	4,798	5.69%
Muna	968	4,158	7.97%	535	1,590	5.90%	433	2,568	9.83%	3,365	9,406	5.56%
Konawe	832	3,216	7.37%	549	1,583	5.73%	283	1,633	9.66%	3,191	8,285	5.15%
Kolaka	1,928	5,146	5.30%	585	1,503	5.09%	1,343	3,644	5.39%	7,247	12,845	3.06%
Konawe Selatan	623	2,749	8.12%	341	1,068	6.20%	283	1,681	9.84%	2,725	7,721	5.63%
Bombana	270	1,161	7.98%	174	504	5.75%	96	658	10.67%	2,552	7,286	5.68%
Wakatobi	162	608	7.22%	89	245	5.49%	73	363	8.81%	1,676	4,603	5.46%
Kolaka Utara	606	2,217	7.06%	254	819	6.35%	352	1,397	7.53%	6,489	14,825	4.44%
Kota Kendari	1,176	5,768	8.73%	34	31	-0.58%	1,141	5,737	8.87%	4,977	14,102	5.63%
Kota Bau Bau	468	2,308	8.76%	19	16	-1.17%	449	2,293	8.96%	3,934	10,762	5.44%
Gorontalo	**2,025**	**7,439**	**7.09%**	**624**	**1,431**	**4.46%**	**1,401**	**6,008**	**7.96%**	**2,201**	**7,200**	**6.44%**
Boalemo	280	1,001	6.94%	114	276	4.76%	165	724	8.09%	2,473	8,074	6.42%
Gorontalo	768	2,832	7.11%	250	557	4.31%	518	2,275	8.10%	1,819	6,050	6.53%
Pohuwato	351	1,223	6.79%	172	433	5.00%	180	790	8.10%	3,290	10,286	6.18%
Bone Bolango	207	705	6.66%	63	134	4.05%	144	571	7.53%	1,657	5,559	6.58%
Kota Gorontalo	419	1,678	7.57%	26	30	0.78%	394	1,648	7.83%	2,740	8,591	6.20%
West Sulawesi	**3,259**	**11,813**	**7.01%**	**1,727**	**3,546**	**3.86%**	**1,532**	**8,267**	**9.28%**	**3,365**	**10,514**	**6.18%**
Majene	454	1,597	6.84%	174	311	3.10%	280	1,286	8.35%	3,486	10,468	5.96%
Polewali Mandar	1,056	3,837	7.02%	499	960	3.50%	557	2,877	9.03%	3,004	9,384	6.18%
Mamasa	460	1,411	6.08%	294	605	3.88%	166	806	8.68%	3,815	11,166	5.81%
Mamuju	876	3,587	7.70%	492	1,108	4.36%	384	2,479	10.32%	3,211	10,744	6.56%
Mamuju Utara	412	1,381	6.57%	267	563	4.00%	145	818	9.53%	4,430	13,553	6.06%

Source: JICA Study Team Note: AAGR= Annual Average Growth Rate