CHAPTER 3 DEVELOPMENT FRAMEWORK

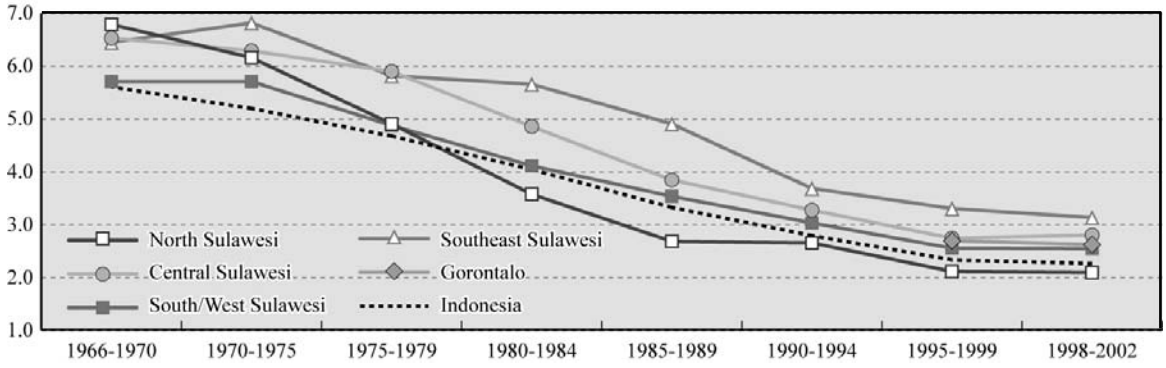
3.1 Social Framework

Based on the historical trends and development direction, social frameworks are discussed and defined in terms of population and work force at the province and regency (Kabupaten) levels.

(1) Trends of Population Growth

Fertility and Mortality

The total fertility rates (TFR) of provinces in Sulawesi as well as in Indonesia have had a decreasing trend over the past 40 years, at the level between 2.1 and 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 (2.27). The TFR of other provinces are higher than the national average, especially in Southeast Sulawesi showing the highest TFR since 1980-1984.



Source: BPS, Indonesia

Figure 3.1.1 Total Fertility Rates in Sulawesi

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

Table 3.1.1 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
Gorontalo	63.33	50.34	56.65	61.13	64.9	63.07
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
Indonesia	-	-	36.0	70.78	71.97	74.05

Source: Census 2000

Migration

Internal migration trends in Sulawesi have been reviewed using the census data from 1971, 1980, 1990, and 2000. The migration includes not only government-initiated transmigration but also 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 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 net migratory outflows.

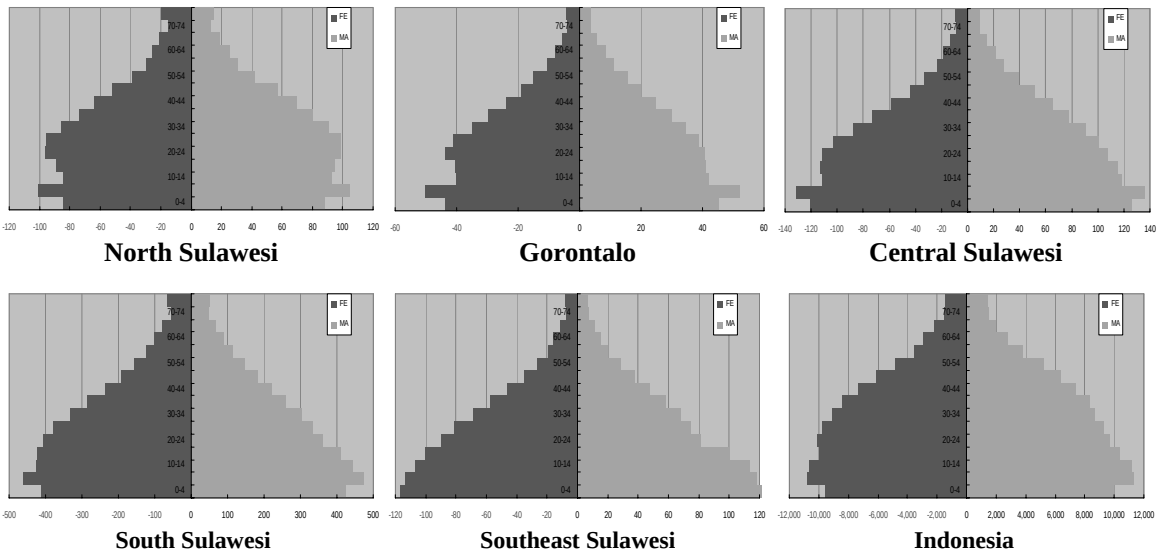
Table 3.1.2 Changes in the Net Migration in Sulawesi

	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%
Gorontalo	-	-	-	-86,162	-	-	-	-10.34%
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%
Sulawesi Total	-175,113	-271,202	-121,089	-124,061				

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

Population Pyramid

The following figures show the population pyramid of Sulawesi provinces and Indonesia. The 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 a higher age band. The pyramid implies that there is a higher birth rate, a higher death rate, and a shorter life expectancy in Southeast Sulawesi.



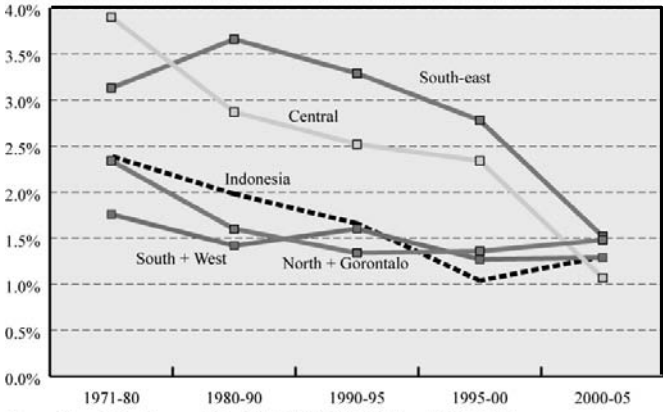
Source: Intercensus 2005, BPS

Figure 3.1.2 Population Pyramids of Sulawesi and Indonesia

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, Southeast Sulawesi has a higher potential for population growth, while North Sulawesi and Gorontalo have a lower potential of population growth in the future.

Trends of Population Growth

The population growth rates of Sulawesi are basically on a declining trend, similar to the national trend. The growth rates of Central and Southeast Sulawesi, in particular, have been decreasing faster than other provinces even though the population growth rates remained at around 2% per annum, which is still higher than the national average of 1.3% per annum in 2000-2005. On the other hand, the growth rates of North Sulawesi (1.25%) and South Sulawesi (1.05%) are lower than the national average.



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

Figure 3.1.3 Changes in the Population Growth Rates

(2) Population Projected by BAPPENAS

Future population has been forecasted by BAPPENAS and BPS. The 2005 forecast was based on the 2000 census, covering the period up to 2025. The forecast provides a reading of the population size as well as age and sex structures of the population of each province from 2000 to 2025. The forecast, based on the component/cohort-survival population model, applied to assumptions of fertility, mortality, and transmigration.

The component/cohort-survival method requires separate forecasts for each component 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 age groups based on migration between 1995 and 2000. BAPPENAS forecasted a net inflow for North Sulawesi, Central Sulawesi, and Southeast Sulawesi, and the outflow for South/West Sulawesi and Gorontalo.

Table 3.1.3 BAPPENAS's Forecast of Population in Sulawesi

		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 3.1.4 Population Growth Rates (BAPPENAS)

	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

BAPPENAS forecasted that the population growth rate would reduce gradually. The population growth rates of Central and Southeast Sulawesi would be higher (1.49%~2.76%), while it would be quite low in Gorontalo (0.35~0.91%) due to a significant net migratory outflow (about 6,100 people per year).

(3) Proposed Demographic Framework

Methodology

Methodology applied by JICA Study Team for the projection of the population by regency is shown on the following diagram. The forecast is made based on the 2005 Intercensus, and covers the period from 2006 to 2025. For the provincial level forecast, the population growth rates and speeds of urbanization are set similar to those of BAPPENAS's forecasts. The 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.

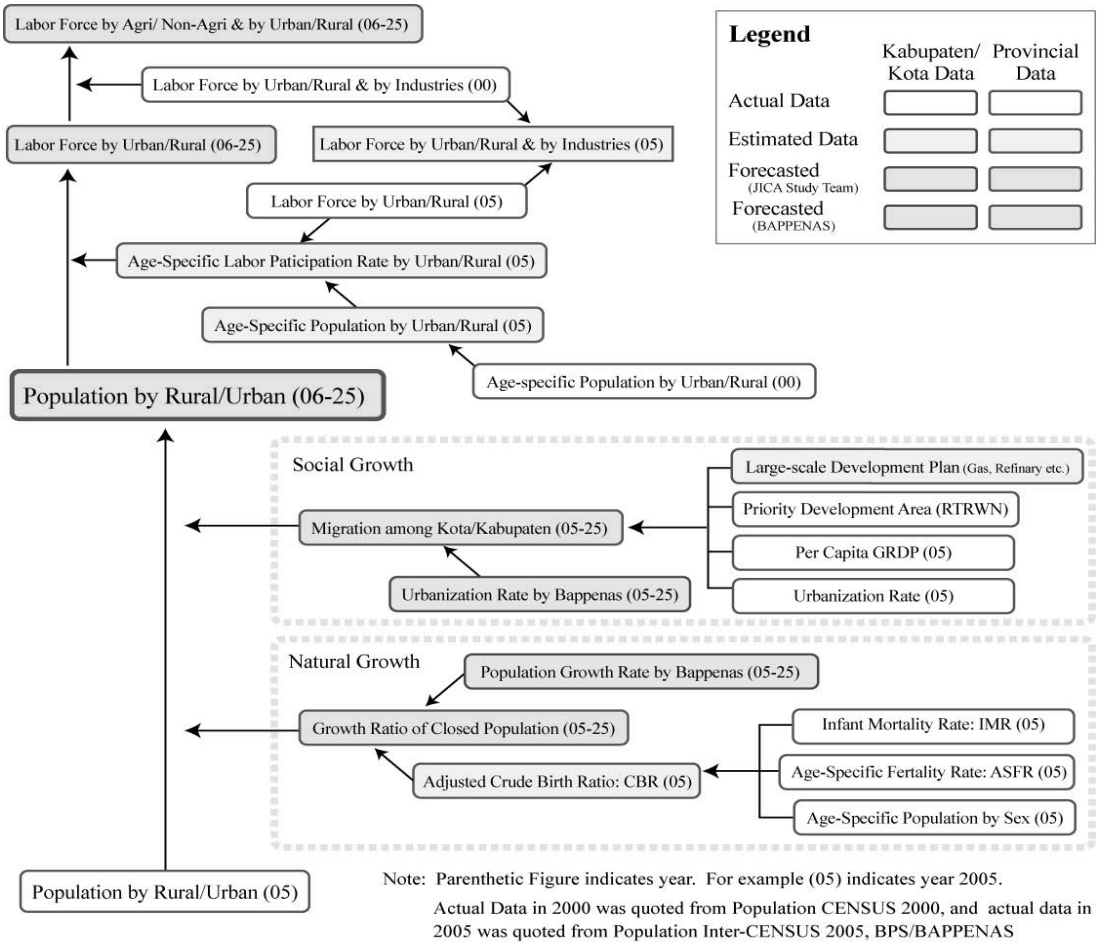


Figure 3.1.4 Diagram of Population Forecast

Population forecasts include not only the total population of each regency but also urban/rural population, the urban/rural labor force, as well as the labor force in agricultures (including forestry, fishery and livestock) and non-agriculture.

Closed Population per Regency

A regency-wise closed population growth is forecasted based on a net crude birth rate (NCBR). NCBR represents the rate of live infants per thousand population in a certain year. A higher figure means higher natural growth potentials. The NCBR of each regency is calculated based on the 2005 Intercensus, applying the following formula:

$$NCBR_{r1} = \sum_{x="15\text{-}19"}^{"45\text{-}49"} ASFR_{xi} \times FP_{xi} \times \{1\ (IMRM_i \times SR + IMRF_i) \div (1 + SR)\}$$

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)

The figure shows the estimated NCBR of each regency. The darker color indicates higher NCBRs. The fertility of regencies in Southeast and Central Sulawesi are higher than those in the other areas. Likewise, 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 with lower fertility rates are: 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.

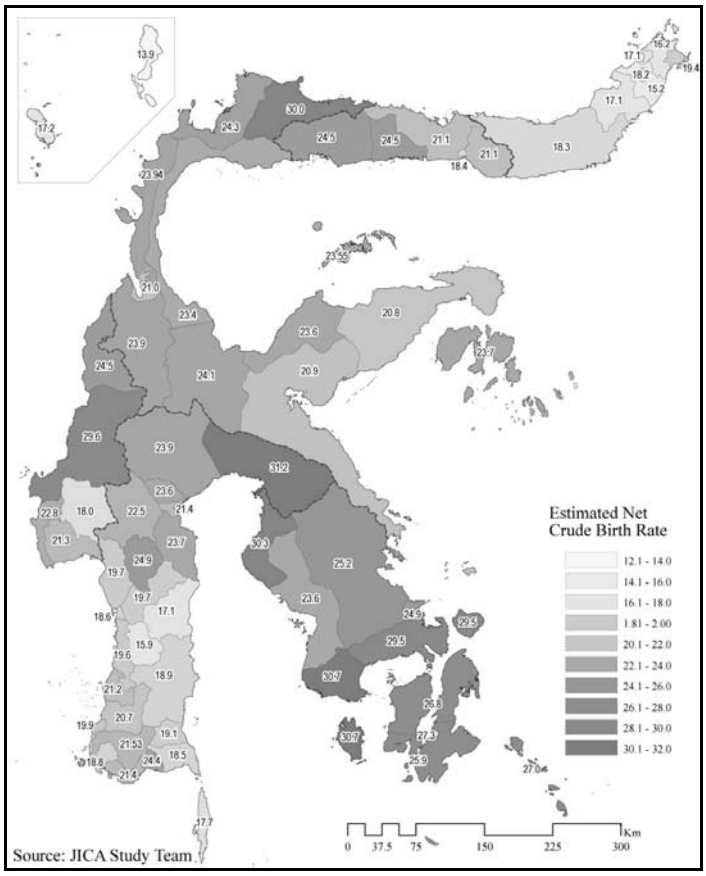


Figure 3.1.5 Estimated Net Crude Birth Rates

Inter-provincial Migratory Movements

Inter-provincial migration is influenced by a wide variety of economic, demographic, social, and political factors. Generally, inter-provincial migration is considered 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 non-economic conditions in the affected areas.

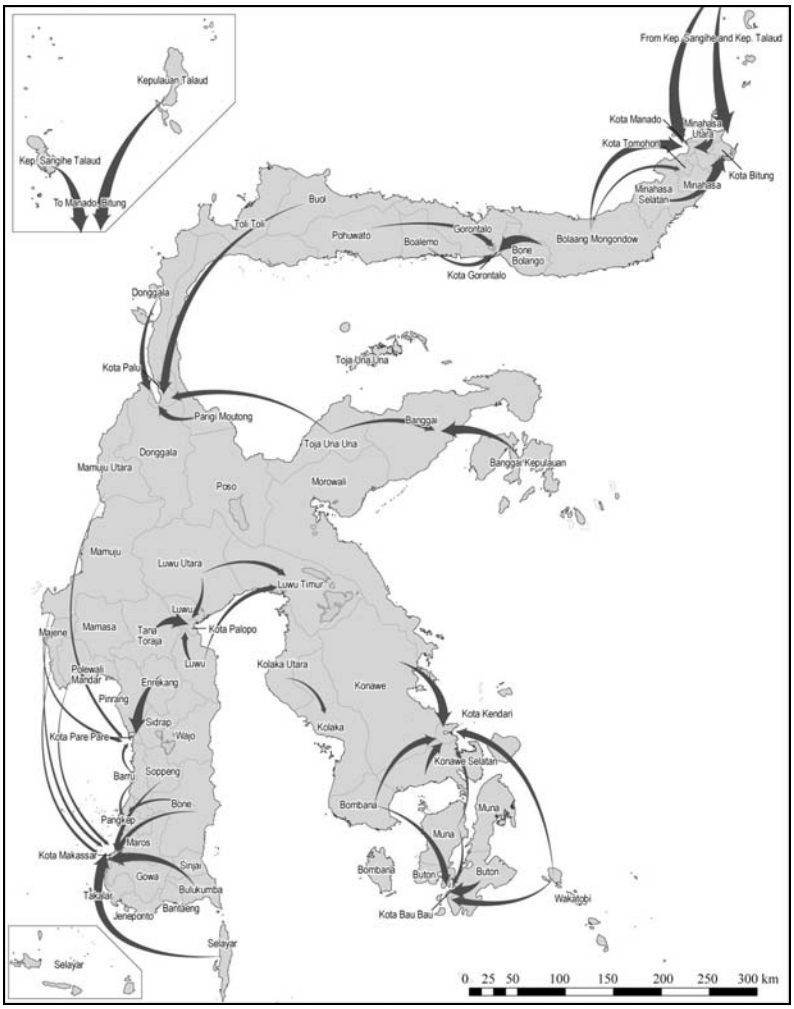
In this forecast, it is assumed that the differences in per-capita GRDP and urbanization rates among regencies would likely play a role of influencing population movements. For example, people will move from the regencies with lower per-capita GRDP to regencies with higher per-capita GRDP in order to seek better job opportunities and gain higher incomes. Likewise, people will move to urban areas to enjoy better administrative services, better entertainment, and attain non-agricultural job opportunities. The hypothesis and synthesis variables of the per-capita GRDP and urbanization rates are calculated for all regencies. Here, these synthesis variables are called “attractiveness coefficient.”

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

Where:
- NM_{rx} : Net migration at regency "x"
- NM_{pa} : 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 is assumed to be double.

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 will encounter. Also, it is assumed that out-migration will occur in the rural parts of regencies and flow into the urban parts of other regencies. The extent of annual migration is decided based on the forecast urbanization rate in each province by BAPPENAS. The figure schematically illustrates the net migratory population movements estimated towards 2024.



Source: JICA Study Team

Figure 3.1.6 Estimated Migratory Movements in Sulawesi

Labor Force in Urban/Rural Areas and Agriculture/Non-agriculture Sectors

The number of labor force per regency is forecasted by urban and rural areas based on the age-specific labor participation rates, which in turn are 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 is 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 is estimated based on the number of labor force by major industry, in urban/rural areas, and on the forecast urban/rural populations by regency.

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

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

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"

(4) Regency-based Population Framework

Population Growth Rates

The annual average population growth rate of Sulawesi during the gestation period (2008-2024) is estimated to be 1.15%, which is lower than that the 2000-2005 rate (1.35%), and 1990-2000 rate (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 is estimated to increase from 16.4 million in 2008 to 19.7 million in 2024. (Refer to Table 3.1.6.)

At the regency level, Bau-bau City (3.00%) Kendari City (2.80%), and Kolaka Utara (2.40%) in Southeast

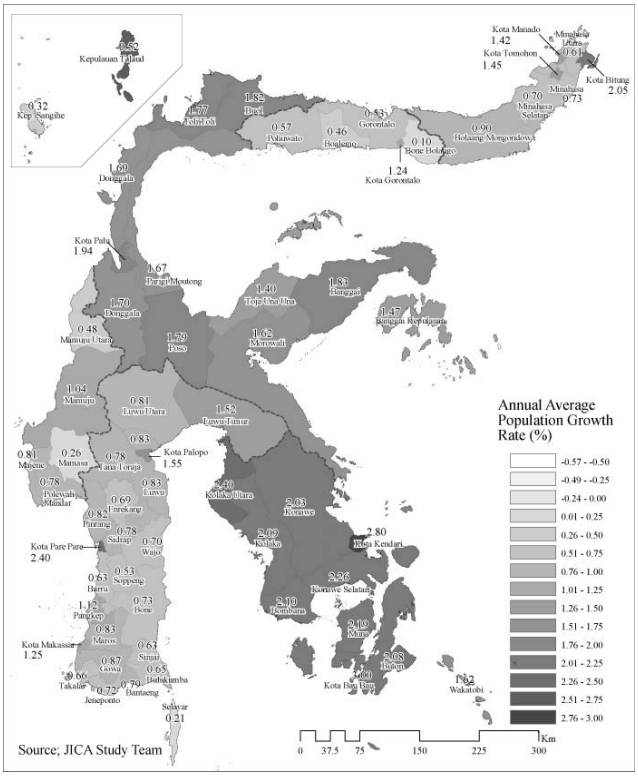


Figure 3.1.7 Population Growth Rate (2005-24)

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 is forecasted to reduce by -0.52% per annum.

Changes in Urban/Rural Population

Population growth in urban areas is higher (2.52%), while rural areas have a lower rate (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 Indonesian average of 42.1% (2005).

Similar to the BAPPENAS forecast, the progress of urbanization is predicted to become rapid in North Sulawesi (37.3% → 52.3%) and Gorontalo (31.3% → 53.2%). The rural population is expected to decrease in these provinces. On the other hand, total net population increases in rural areas in Central and Southeast Sulawesi will exceed 500,000. Substantial parts of rural population increases will occur as a result of inter-provincial migration.

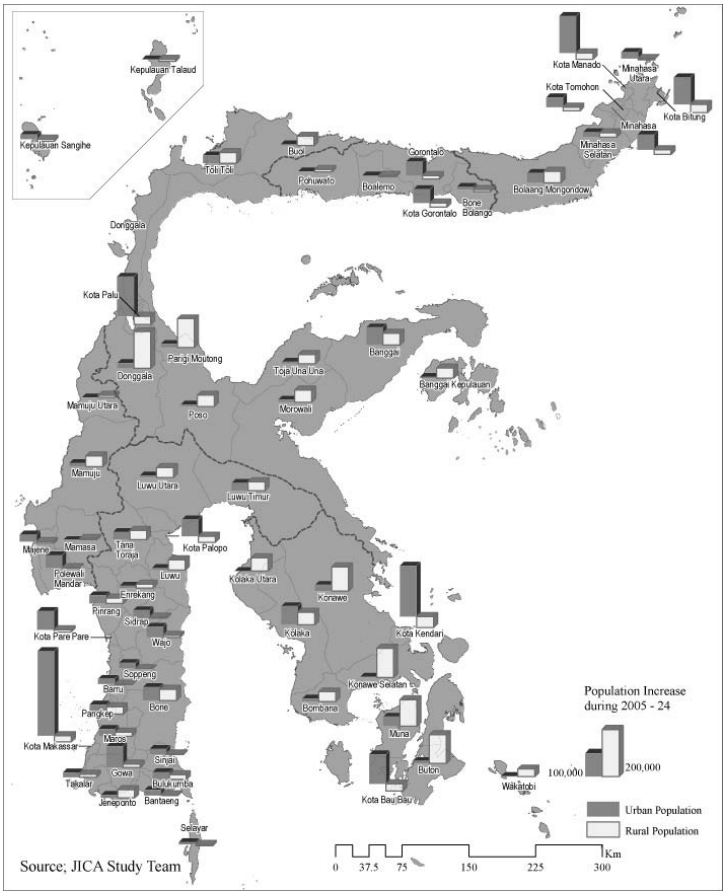


Figure 3.1.8 Urban and Rural Population Increases

Table 3.1.5 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	422,019,885
Gorontalo	31.3%	53.2%	259,788	-150,192	109,595,917
Central Sulawesi	19.5%	25.6%	364,352	513,630	877,982,421
West Sulawesi	17.4%	23.9%	99,601	52,119	151,720,642
South Sulawesi	31.2%	38.6%	1,092,940	299,423	1,392,363,500
Southeast Sulawesi	21.7%	30.2%	480,732	555,122	1,035,854,113
Sulawesi Total	28.0%	35.8%	2,660,762	1,328,774	3,989,536,478

Source: JICA Study Team

Population Densities

Population density of Sulawesi will increase from 80.0/km2 in 2005 to 100.3 per km2 by 2024 as shown in the following figure. 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).

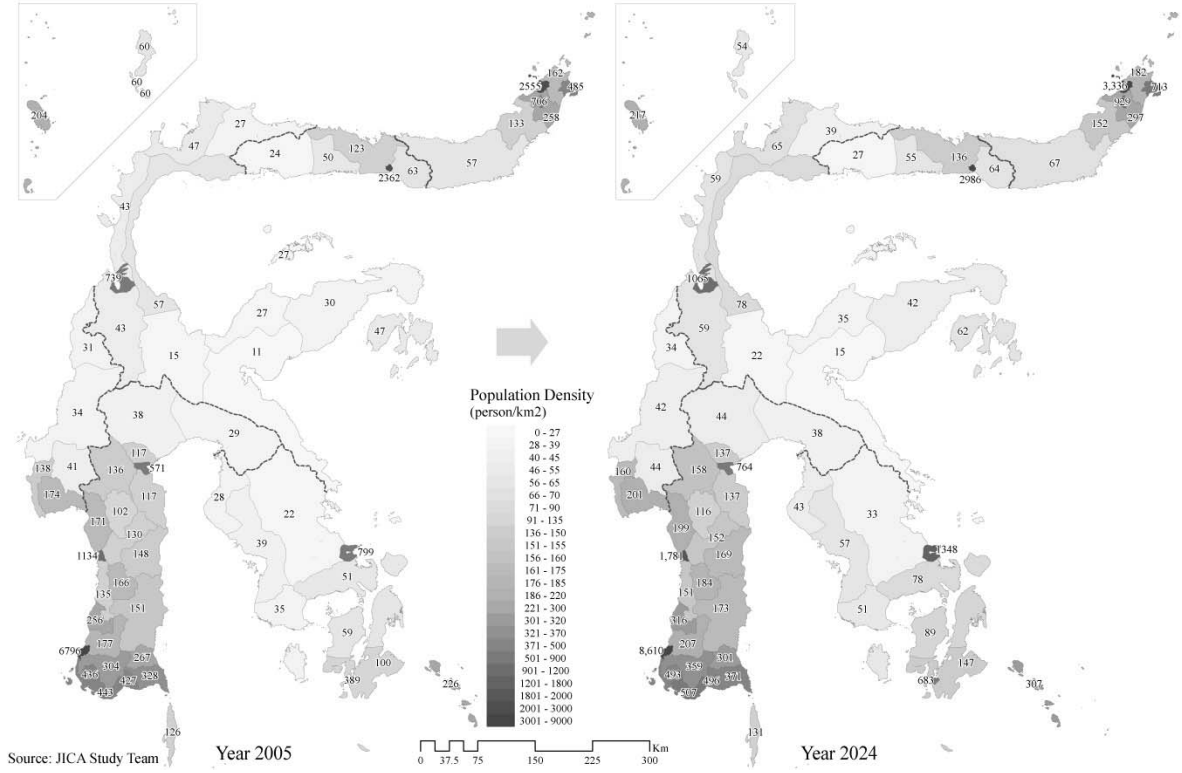


Figure 3.1.9 Changes in Population Densities

(5) Regency-based Labor Force Framework

The labor force in Sulawesi is estimated to increase from 6.3 million in 2005 to 9.8 million in 2024, with an average annual growth rate of 2.33%. Such a high growth rate is attributable to the increases in labor participation rates (labor participation rate above age 15 is assumed to increase from 60.3% in 2005 and 70.3% by 2024).

While the agriculture labor force is forecasted to remain stagnant (from 3.14 million in 2005 to 3.83 million by 2024 with an average annual growth rate of 1.05%), the non-agricultural labor force is forecasted 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 proportion of agricultural labor would decrease from 49.9% in 2005 to 39.3% by 2024. (Refer to Table 3.1.7 for details.)

Table 3.1.6 Proposed Population Framework

	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%
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%
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%
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%
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%

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

Table 3.1.7 Proposed Labor Force Framework

	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%
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%
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%
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%
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%

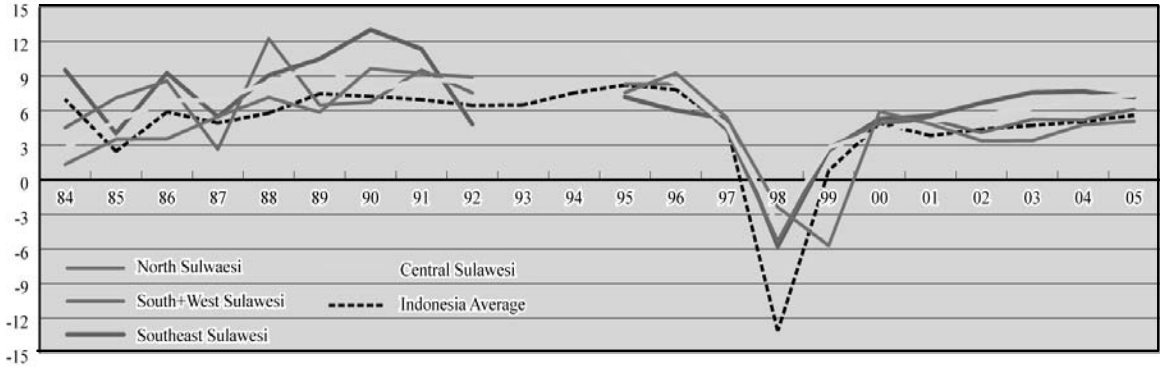
Source: JICA Study Team Note: AAGR= Annual Average Growth Rate

3.2 Economic Framework

(1) Trends of GRDP Growth

The following figure illustrates the changes in the GRPD growth rates by province in Sulawesi from 1984 to 2005 in real terms. The provincial GRDP fluctuated year by year and it was 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 was recorded to be 10.42% in 1988 and at 9.57% in 1991. However, such favorable economic development turned negative due to the Asian economic crisis in 1998. In 1998, South (including West), Southeast, and Central Sulawesi recorded -4% to -6% GRDP growth rates. North Sulawesi experienced negative growth not only in 1998 (-2.4%) but also in subsequent years (-5.7%).

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



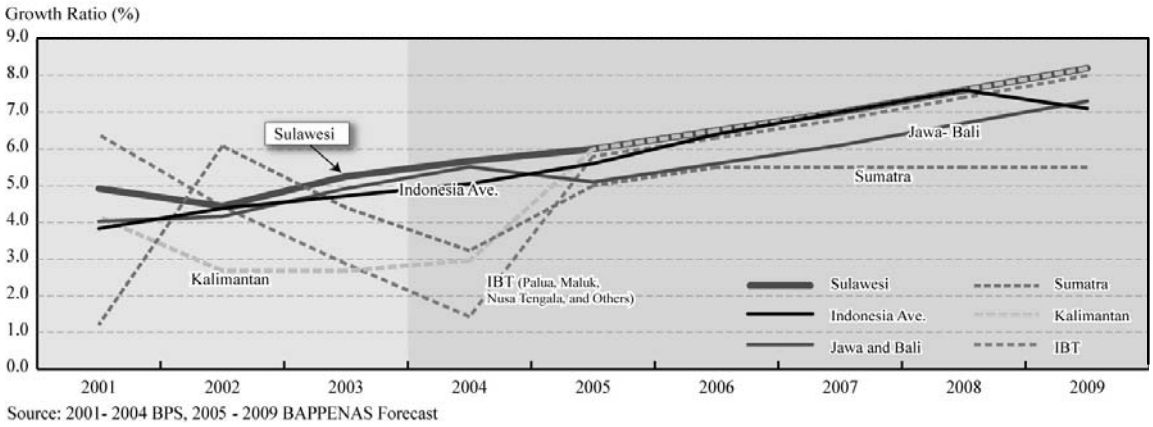
Source: BPS, Indonesia

Figure 3.2.1 Changes in the GRDP Growth Rates in Sulawesi and Indonesia

(2) GRDP Projected by BAPPENAS

BAPPENAS made a GRDP forecast for each island in 2003 for the preparation of the Mid-term National Development Plan 2005-2009 (RPJM). According to the forecast, the GRDP growth rate of Sulawesi Island was estimated to 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 other islands in Eastern Indonesia, namely Kalimantan and other islands (i.e., Papua, East and West Nusa Tenggara, and Maluku).

There is no other official GRDP forecast than the mid-term forecast (2005-2009). This mid-term forecast was only made at the island level, and not at the provincial level. (Currently, BAPPENAS is preparing a provincial-level long-term GRDP forecast using an econometric model.)



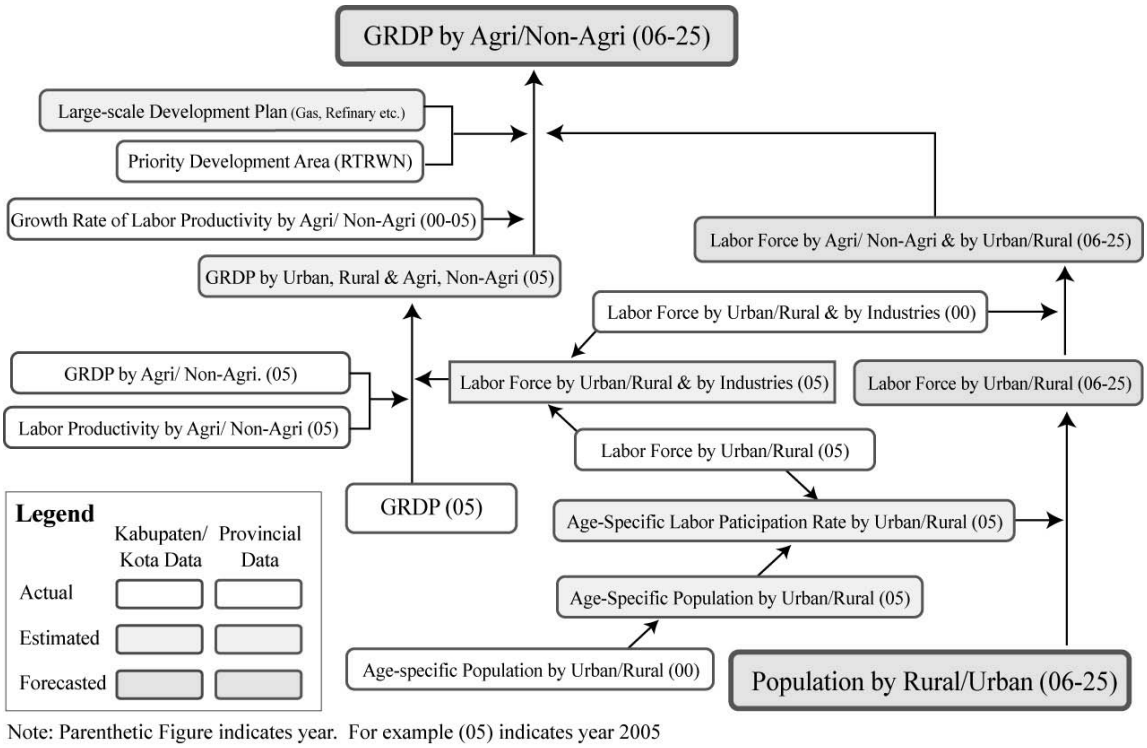
Source: 2001- 2004 BPS, 2005 - 2009 BAPPENAS Forecast

Figure 3.2.2 BAPPENAS's GRDP Forecast, 2005-2009

(3) Proposed GRDP Framework

Methodology

Given such conditions, a long-term and regency-wise GRDP forecast is made by JICA Study Team based on the population (labor force) forecasts. The base year of the forecast is 2005. The GRDP of each regency has been made available, but their GRDP compositions by major industries are unavailable with the exception of Gorontalo. JICA Study Team estimates the 2005 GRDP composition by classifying agricultural sector (including fishery, forestry, and livestock) and non-agricultural 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 3.2.3 Diagram of GRDP Forecast Methodology

The growth rate of labor productivities in each regency is forecasted based on the past trends as well as the future development plan, including the large-scale development plan (such as gas and oil fields, and LNG terminal in Banggai Regency in Central Sulawesi, and oil refinery in Parepare in South Sulawesi) and the priority development areas designated in the National Spatial Plan.

GRDP Growth Rates

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

At the regency level, the growth rates will be higher for Banggai Regency in Central Sulawesi (9.5%: development of gas fields and LNG terminal), Parepare in South Sulawesi (9.2%: development of oil refinery and rapid urbanization), Palu in Central Sulawesi (8.5%: rapid urbanization), and Kendari in Southeast Sulawesi (8.7%: rapid urbanization).

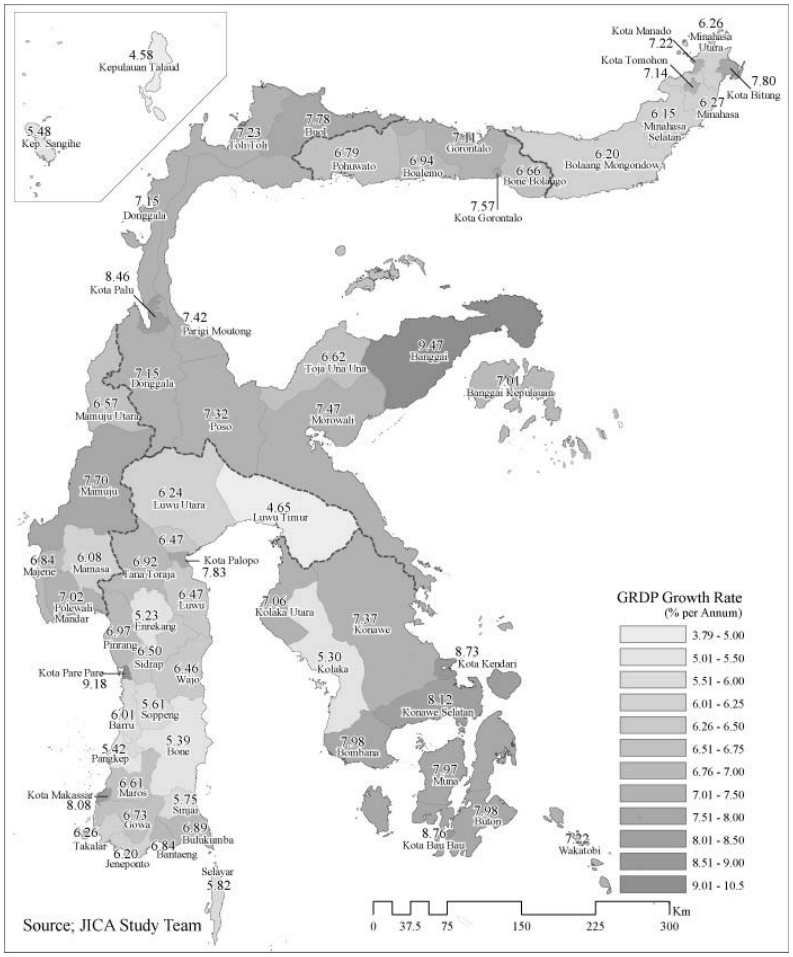


Figure 3.2.4 Planned GRDP Growth Rates (2005-24)

GRDP growth rates are also estimated to be higher in other urban areas, such as Makassar (8.1%), Palopo (7.8%), Baubau (8.8%), Manado (7.2%), Mamuju (7.7%), and Gorontalo (7.6%).

Composition of Agriculture and Non-Agriculture Sectors

The average annual growth rates for the agricultural and non-agricultural sectors in 2005-2024 are estimated to be 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%) and South Sulawesi (18.0%), and will still be relatively higher in Central

Sulawesi (31.3%) and West Sulawesi (30.0%). 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).

Table 3.2.1 GRDP of Agricultural and Non-agricultural 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%
Gorontalo	624	1,401	2,025	30.83%	1,431	6,008	7,439	19.24%
Central Sulawesi	5,348	5,808	11,156	47.94%	14,507	31,852	46,359	31.29%
West Sulawesi	1,727	1,532	3,259	52.99%	3,546	8,267	11,813	30.02%
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%
Sulawesi Total	24,307	48,782	73,089	33.26%	55,656	209,494	265,150	20.99%

Source: JICA Study Team

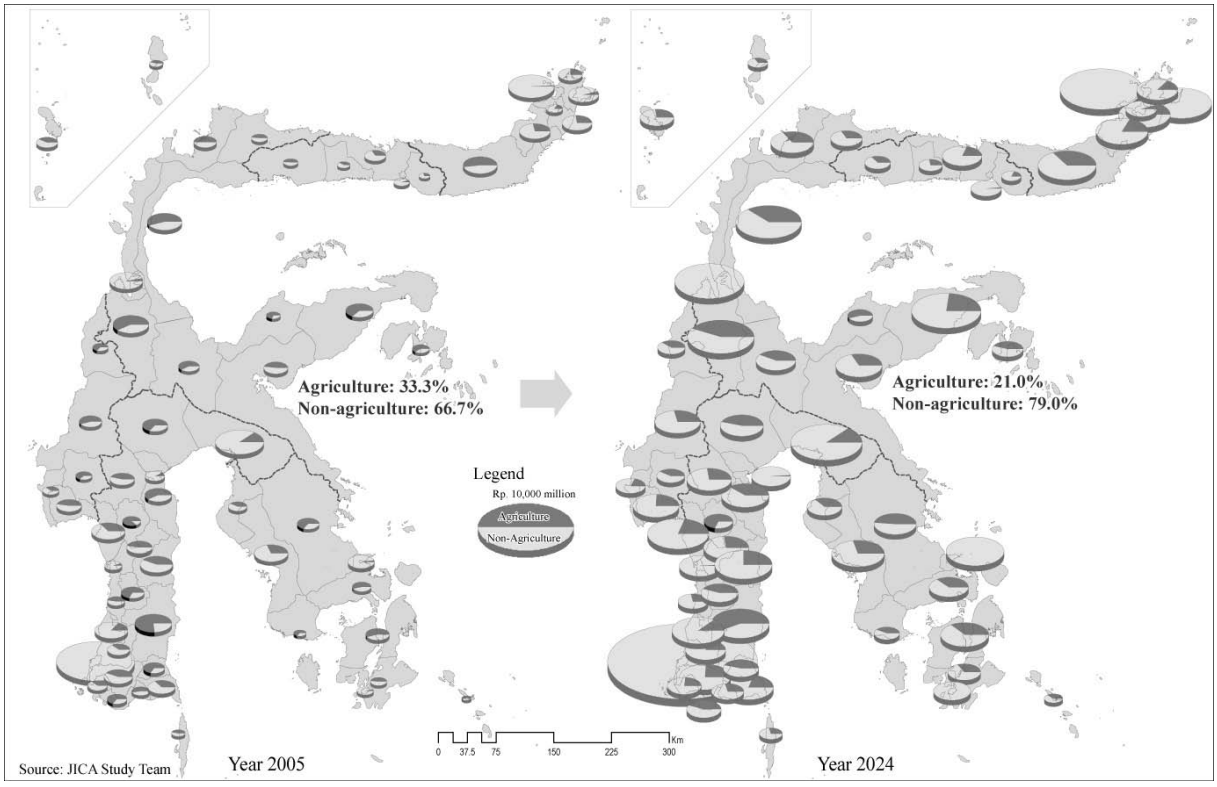


Figure 3.2.5 Changes in GRDP, 2005-2024

Per-capita GRDP

Per-capita GRDP will increase at an average annual rate of 5.7%. As a result, the per-capita GRDP of Sulawesi will reach US$ 1,700 in 2024 (at 2005 constant prices), which is 2.9 times bigger than the per-capita GRDP in 2005 (US$ 594). Similar to 2005, North Sulawesi's per-capita GRDP will remain the largest and Gorontalo the smallest. However, the gap between these provinces will decrease from 2.4 times to 2.1 times. Likewise, regional disparities in per-capita GRDP will be

reduced. The coefficient variation of per-capita GRDP of all regencies in Sulawesi will decrease from 0.6 in 2005 to 0.5 by 2024.

Table 3.2.2 Planned Per-capita GRDP

	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
Gorontalo	2,201	7,200	3,093	10,117	298.1	974.9
Central Sulawesi	4,870	14,426	6,491	19,230	625.5	1,853.1
West Sulawesi	3,365	10,514	4,057	12,675	390.9	1,221.4
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
Sulawesi Total	4,643	13,322	6,160	17,674	593.6	1,703.1

Source: JICA Study Team

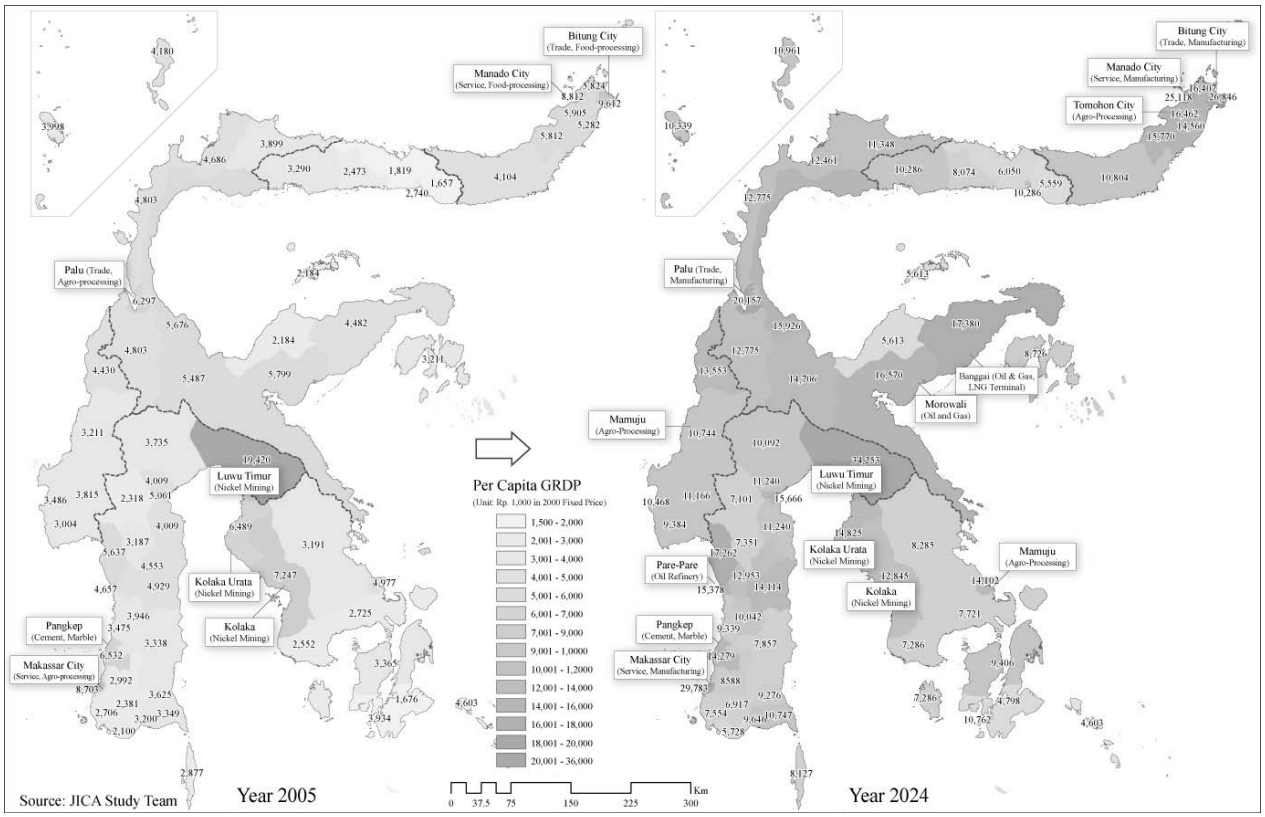


Figure 3.2.6 Changes in Per-capita GRDP

Table 3.2.3 Proposed GRDP Framework (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%
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%
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%
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%
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%

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

3.3 Land Development Framework

(1) Basic Concept

Land is the fundamental element for regional development planning, as the people conduct various forms of economic activities. Generally, a land-use plan is proposed as a framework for the regional development plans; however, it is premature to determine such a land-use plan at the level of this study. Consequently, some principles have been studied and proposed in terms of land development in Sulawesi.

The review of the current land use in Sulawesi implies that the land available for extensive development is quite limited and future social and economic growth should count more on intensive use of the built-up and developed areas. For instance, agricultural development would not be able to depend on the sizable expansion of cultivated areas and it should be attained through improvements in productivity and vertical development with more intensive use of the existing farm lands, particularly on the land currently classified into the "dry land farming and bush". (Some strategies to attain the increased productivity in agriculture will be discussed in subsequent Section 4.1)

Urban and industrial land use, though its land requirement is relatively small when compared with agricultural land requirement, should also be managed so as not to cause disorderly sprawl into the agricultural lands and forest areas. (Some strategies to promote industrial productivity will be discussed in Section 4.2)

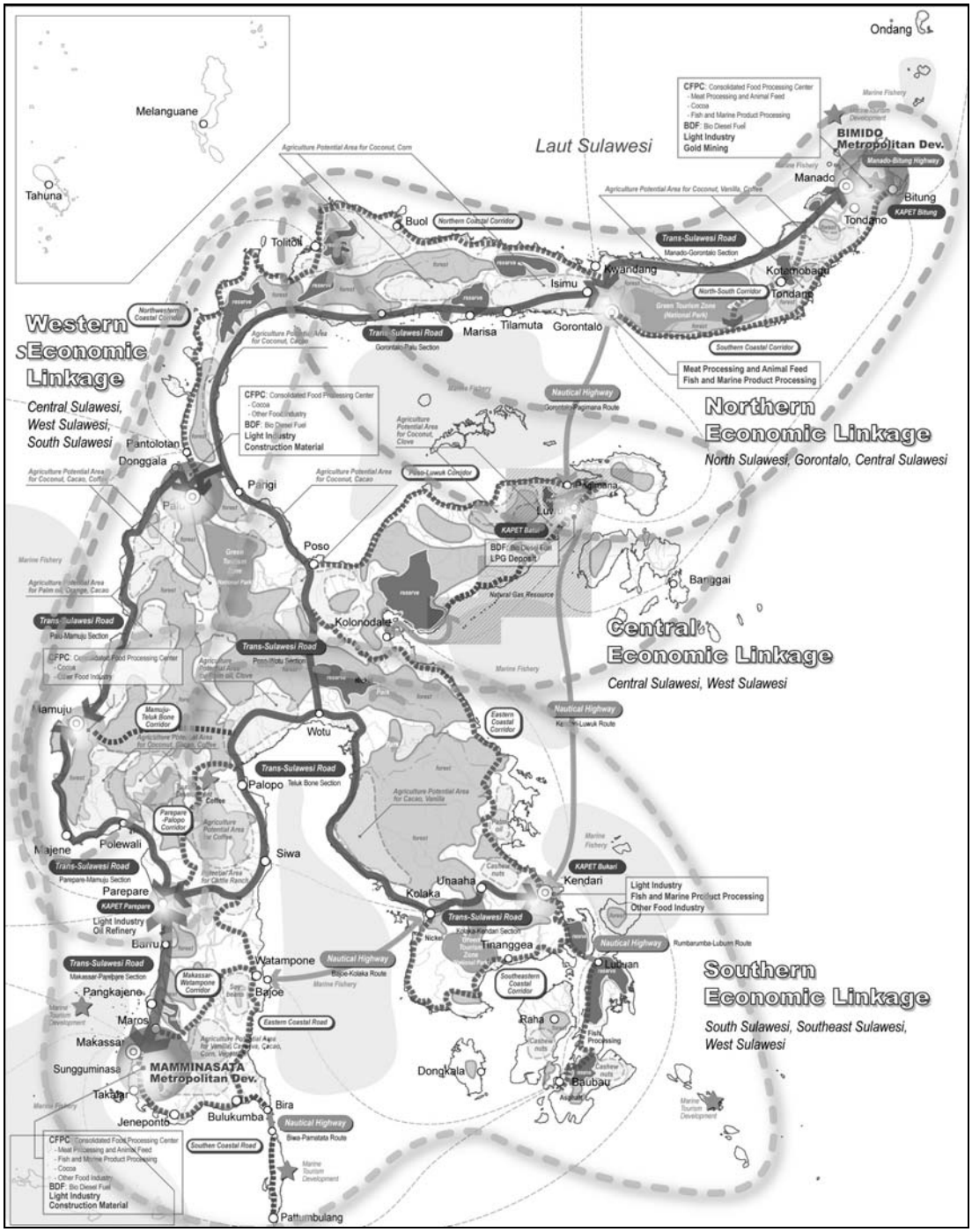
At the level of this study, a land development pattern is proposed under the zonal classification of i) international/inter-regional centers, ii) inter-regional centers, iii) agricultural zone, iv) forest zone, v) natural parks, and vi) nature/wildlife reserves, as shown in the following table.

Table 3.3.1 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

In addition to the general land development framework, some regional linkages would be better considered from the viewpoint of regional development planning. For instance, the formulation of industrial clusters is encouraged in the light of regional linkages from production to processing and marketing chains. Some regional linkages are therefore envisaged together with the land development pattern.



Source: JICA Study Team

Figure 3.3.1 Land Development Pattern for Sulawesi towards 2024

(2) Land Development Pattern by Province

Direction of land development by province has been studied, though preliminary as it is. Deployment of land development patterns and land-use plans should be further discussed in each province to define respective development plans, taking into account the inter-regional linkages and clusters to be promoted across the provincial boundaries.

North Sulawesi

North Sulawesi province would play a leading role in Northern Economic Linkage. Particularly, Manado and its surroundings, called BIMIDO (Bitung-Minahasa-Manado) designated as the interregional/international center, is expected to grow as an international trading core in the future. BIMIDO has the potential as an integrated industrial development supported by key infrastructures such as an international deep-sea port (Bitung) and an international airport (Manado), with the relatively abundant natural resources in their seas, as well as resources transported from Maluku Islands. 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.

Particular attention should be paid to agricultural land use, as the flat lands are relatively limited in North Sulawesi. Coconut plantations and farmlands (about 251,000 ha) should draw specific attention so as to improve their productivity to support the processing in Bitung, where the supply of raw materials to the existing processing plants has been decreasing. Bio-diesel fuel made from copra and jatropha could be planned in the BIMIDO area. Likewise, improvement of agricultural and agro-forestry productivity should be attained in and around Tondano (as proposed by JICA study in 2001). The target set for the agricultural GRDP in North Sulawesi under the economic framework (3.5% on an annual average) is considered attainable by the improvement of productivity under the current land use for agriculture.

To strengthen the linkage to the west towards Gorontalo, the northern coastal road will be 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 due attention to the protected green area.

Gorontalo

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. Specific attention should be paid to the expansion of corn cultivation in Gorontalo, particularly on the sloped lands. Introduction of highly productive varieties should be promoted with improved cultivation practices, learning lessons from the experiments in Barru (South Sulawesi). Coconut plantations and farmlands (54,000 ha) should also draw attention so as to improve their productivity and processing in and around BIMIDO. Although the target set for the agricultural GRDP in Gorontalo under the economic framework is relatively high (4.5%), it would be attainable

by the gradual improvement in the productivity.

Gorontalo City is in a key location in transportation, from which national roads and national sea lanes extend to 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.

Central Sulawesi

Palu, the capital of Central Sulawesi, is designated as the inter-regional/international center, while Luwuk is the inter-regional center. Palu has a strategic location to connect with Sulawesi and Kalimantan. 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 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.

Central Sulawesi is largely covered with forests and conservation areas, and sizable land development for agricultural expansion would not be recommended. However, in view of the current land use patterns, there remain large rooms to improve productivity in agriculture, particularly tree crops, as evidenced by the relatively high labor productivity as reviewed in Section 1.4. Although the target for the agricultural GRDP in Central Sulawesi under the economic framework has been set relatively high (5.4% on an annual average), it could be attained through the improvements in productivity and transportation/marketing systems, as well as through vertical development for agriculture. For instance, productivity of the existing coconut plantations (173,000 ha) and cacao farmlands will be envisaged in the short and medium terms.

To open this area to the Sulawesi economy, sea lane transportation to and from 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

Mamuju, the capital of West province, is in a strategic location with the potential hinterland agriculture zones, which is expected to contribute to several economic linkages, i.e. Central Economy Linkage, Western Economy Linkage and Southern Economy Linkage. Currently, the road network between Mamuju and Palu is under improvements for better 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 and marketed.

Sizable unexploited lands are extended to the north of Mamuju, as their accessibility has been limited until recently. However, exploitation of plantations has been accelerated even in such areas, mainly for cultivation of oil palm. Further expansion of plantations is foreseeable and attention should be paid to the protection of the swampy lands along the coastal flat lands. Although the

agricultural output could be enhanced to a considerable extent in West Sulawesi, the target set for the agricultural GRDP has been set at a relatively low level (3.9%) in view of the environmental protection in West Sulawesi.

South Sulawesi

Makassar, the capital of South Sulawesi province, and its surroundings called Mamminasata (Makassar-Gowa-Maros-Takalar) are designated as the inter-regional/international center, while Parepare is the inter-regional center. Makassar, with its relatively good infrastructure, is the largest city in Sulawesi Island in terms of population and economic activities. To further enhance more intensive industrial development, the Mamminasata Integrated Spatial Plan has recently been worked out through coordination with a provincial development coordination body (BKSPMM). Several new industrial areas are proposed for development after KIMA. Parepare is located 150km to the 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.

Under the Mamminasata master plan, lands for agricultural use have not been envisaged for expansion. Instead, paddy fields have been envisioned to decrease to some extent due to urbanization in and around major urban centers. However, the agricultural GRDP has been planned to increase at the annual average rate of around 3.0% by means of improvement in productivity and shift in cropping patterns on the existing farmlands. Since there still remain sizable rooms for the improvement in agricultural productivity in South Sulawesi other than the Mamminasata area, it appears that the target set for agricultural GRDP in South Sulawesi under the economic framework (3.9%) would be attainable through the improvement in productivity.

Southeast Sulawesi

Kendari, the capital of Southeast province has been designated as a KAPET, and has been ranked first in per-capita GRDP in Sulawesi because of the mining production of nickel and asphalt. To integrate this area with the overall Sulawesi economy, an enhanced sea lane transport is ideal as nautical highways to South Sulawesi and to Central Sulawesi. At the same time, since the province has a lot of small islands with less efficient accessibility, local transportation system in such remote areas should be taken into consideration.

Combined with the improvements of transportation networks, agricultural production in Southeast Sulawesi could be enhanced at a higher growth rate than other provinces. Under the economic framework, it has been envisaged that the annual average growth rate would be around 5.7% in the agriculture sector. Such a growth rate would be attainable by means of improvements in productivity and expansions of cultivation on lands currently used for bush areas.

3.4 Environmental Framework

It might be premature to define some environmental frameworks for integrated development of Sulawesi Island at this moment. It would require further assessments and prediction of the environmental loads over the island and further discussions among the stakeholders. Some preliminary observations, however, are discussed in order to facilitate further discussion and assessment concerning the Sulawesi environment.

Major concerns about the environment in Sulawesi are conservation of biodiversity, protection of the forest area, degradation of water quality, increased emission of NOx, CO_2 and other pollutants.

(1) Conservation of Biodiversity

As briefly reviewed in Section 1.2 and further discussed in Section 4.5, Sulawesi Island is full of biodiversity located between the Wallace's line and Weber's line that are essential in terms of zoology, botany and biology. There lives a number of endangered and vulnerable species in mammals, birds, reptiles, amphibians, and fishes. The ratio of endemic species is quite high.

Most endemic species are living in the conservation areas; i.e., nature reserves, wildlife reserves, national parks, nature recreational parks, hunting game reserves and grand forest parks. The conservation areas total 3.5 million hectares or 35,000 km^2 in Sulawesi. Prohibition and permission of activities in the conservation areas have been clearly defined by the government. Basically, these conservation areas should not be altered, maintaining the present level of the extension and prohibition.

Further studies are to be made on the characteristics of the movements of mammals as the conservation areas are rather dispersed and there might be fears that their movements exceed the designated conservation areas. For instance, some biological corridors could be studied to cope with the possible movements of mammals and other endemic species. Likewise, the management and research system should be better strengthened to strictly monitor the protection, and even extension, of the conservation areas.

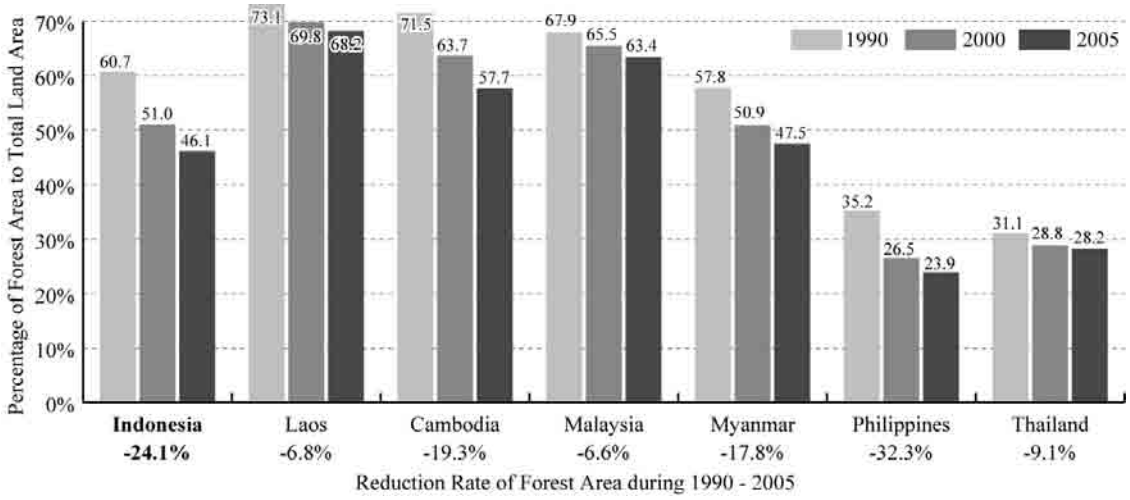
(2) Protection of Forests

Biological conservation is closely related to the protection of forests in Sulawesi. According to the land use information, the forest area covers 53.4% of the island. The forest coverage has been on the decreasing trend due to exploitation of forest resources and invasion of cultivation lands. Such a trend should be halted by all means.

Provisionally, it is proposed that the forest coverage should not be less than 50% over the island, and efforts are to be made for prevention of further degradation of forests and for promotion of reforestation programs. Some provinces have more forest areas while some others remain at the lower levels of forest coverage. For instance, the Mamminasata Metropolitan area in South Sulawesi has planned to increase the forest area by 25,000 hectares towards 2020 increasing from the current forest coverage of 29% to 38%, though it is composed of major urban centers.

Environmentally, South Sulawesi would have to support the protection of forest areas in West Sulawesi and Central Sulawesi, in order to maintain the framework of forest ratio set to be over 50%. Each province and regency is to set a respective target for the enhancement of the green and forest coverage.

Protection of the forest area is a national target as well. The forest coverage in other ASEAN countries is cited for reference in the following.



Source: FAO, Global Forest Resources Assessment 2005

Figure 3.3.2 Change in the Forest Coverage in Major ASEAN Countries

(3) Prevention of Water Contamination

Sulawesi Island has sufficient rainfall and is endowed with water resources. The forest coverage has maintained ecology of the water system of the island, as well as biodiversity as noted above. Such an ecosystem should be protected against degradation in short and long terms.

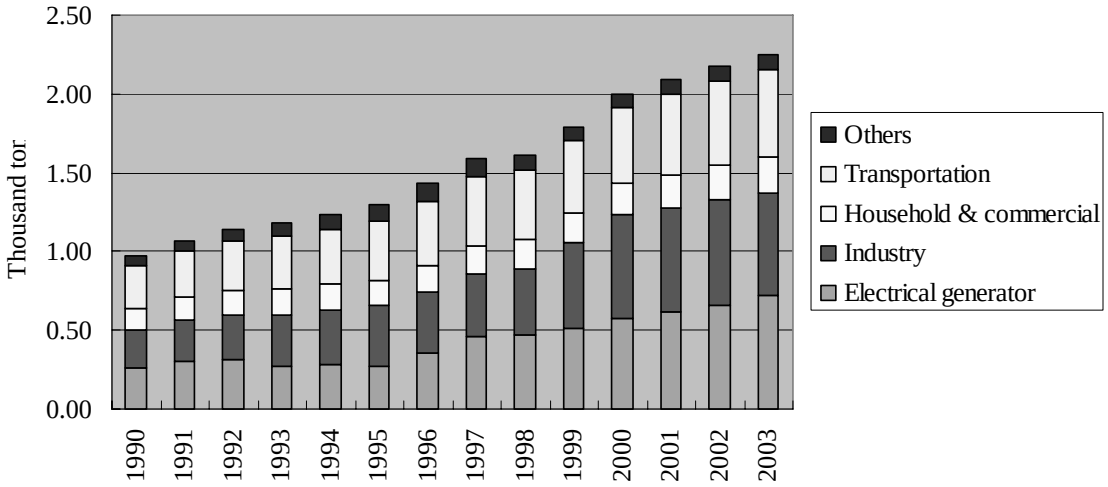
Recent growth in urban areas has caused contamination of rivers and sea water, as most urban centers in Sulawesi are located in coastal flat lands on river banks (e.g., Makassar, Kendari, Palu). Waste water in all these urban centers has been discharged into rivers and ocean without treatment and water contamination by effluents has increased substantially. For instance, BODs, COD and total suspended solid (TSS) in rivers, streams and drainage canals in Makassar show relatively high values. Although the contamination by heavy metals has not been serious yet due to less advanced industrialization, further contamination of surface and groundwater should be prevented by all means. The regulations on the management of water quality should be observed through periodic monitoring.

Application of chemical fertilizers and pesticides to agriculture has also caused water contamination in river basins. The increased use of pesticides has negative impacts on the ecosystem as well as on the biodiversity of the island. Special attention is to be taken for irrigated farming in the elevated lands as it would cause water contamination in the downstream areas. In farming practices, less use of fertilizer and pesticides should be disseminated, inducing the promotion of organic farming. Values of organic products are increasingly recognized by the Sulawesi people in recent years.

Waste water treatment in the urban centers should be planned and implemented as the quality of effluents is getting worse and the quantity is increasing year by year. Although investments in the sewerage treatment system would be relatively large, such social costs should be recovered in combination with the improved management of the water supply systems and other social services.

(4) Minimization of CO_2,NOx and other Emission

Energy consumption has been remarkably increasing in Sulawesi as well as in Indonesia. Emission of CO_2, NOx and other air pollutants has thus increased causing various environmental impacts. The following figure demonstrates the increased emission of NOx from energy consumption in Indonesia.



Source: The State Ministry of Environment: The State of Environment Report in Indonesia 2005

Figure 3.3.3 NOx Emission from Energy Utilization in Indonesia

Increase in the emission is quite notable in electric power generation and transportation. Similar trends are observed in CO_2 emission in Indonesia and Sulawesi as well. Although such increases in the emission might be inevitable in the process of economic development, further increase in the emission should be minimized through more efficient use of energy resources.

In Sulawesi, a notable increase has caused by the emission from diesel power generation in rather isolated electric power grids, as further discussed in Section 4.6. Since Sulawesi has large potentials for hydropower generation (estimated to be 12,600 MW), policies of electric power supply would have to be reviewed with more attention to the mitigation of the environmental loads. Increase is also notable in the emission from land transport with the increased number of vehicles. Measures should be taken to minimize the emission of CO_2 and NOx in the transportation sector, too.

Although it is premature to set any target or framework on the emission of CO_2, NOx, SO_2 and other pollutants quantitatively over Sulawesi Island, any development projects and programs should be planned and designed to minimize the emission of air pollutants to the maximum extent. To this end, alternative approaches and solutions should be worked out and evaluated at the planning stages.

Laws, regulations and standards on the environments are well established in Indonesia as well as in Sulawesi. The issue is how to maintain incessant monitoring of the environments for strict observation of such regulations and standards. For any development programs in Sulawesi, appropriate measures are to be systematically taken for monitoring of the environments.

CHAPTER 4 SECTOR DEVELOPMENT STRATEGY

4.1 Agricultural Development

The current situation of agriculture, fishery and livestock sector is reviewed and some strategies are proposed to attain the framework set for agricultural development in Sulawesi.

(1) Overview of Sulawesi Agriculture

As noted in Section 1.4, the agriculture sector plays a vital role in the Sulawesi economy, contributing 33.7% of the GRDP (2005) and absorbing from 44% (North Sulawesi) to 75% (West Sulawesi) of work force. A variety of agricultural activities are in practice ranging from traditional to modern agriculture.

Grain Crops

Major food crops in Sulawesi are rice (paddy), maize, cassava, sweet potato, peanuts, and soybeans. In 2005, the production volumes of rice and maize in the island were 9.9% and 11.6% of the total production volume of the country, respectively. South Sulawesi is the most salient in producing food crops. In 2005, the province alone produced 63.1% of rice, 48.5% of maize, 49.7% of cassava, 32.8% of sweet potatoes, and 65.4% of soybeans in Sulawesi. Particularly, Bone regency located in the eastern part of South Sulawesi, is a major production center of rice, maize, and soybean.

Rice, maize, and cassava produced in Sulawesi are consumed in both local and regional markets. According to the available data in 2005, Gorontalo exported maize totaling 91,615 tons (equivalent to US$ 3.93 million in FOB value), accounting for 55.3% of the total exports value of Gorontalo province.

Rice/ Paddy

Rice is the staple food of Indonesia and is widely cultivated in Sulawesi on both wet and dry fields. In 2005, the total paddy production volume was 5.37 million tons, and total harvested land was 1.20 million ha.

The self-sufficiency ratio of rice in Sulawesi is estimated to be 175.7%, which means production exceeds demand within the island. While South Sulawesi supplies rice to Java and other provinces, North and Central Sulawesi imports it from other provinces as well as abroad. In 2005, these provinces imported 28,500 tons of rice from Vietnam and Thailand.

As shown in the figure, the unit yield of paddy in South Sulawesi (4.64 ton/ha on an average) is higher than other provinces. South Sulawesi accounted for 63.1% (3,390,036 tons) of production and 60.9% (730,602 ha) of cultivated area in Sulawesi. Pirang, Sidrap, Wajo, and Bone regencies in South Sulawesi and Bolaang Mongondow regency in North Sulawesi are the major rice producers.

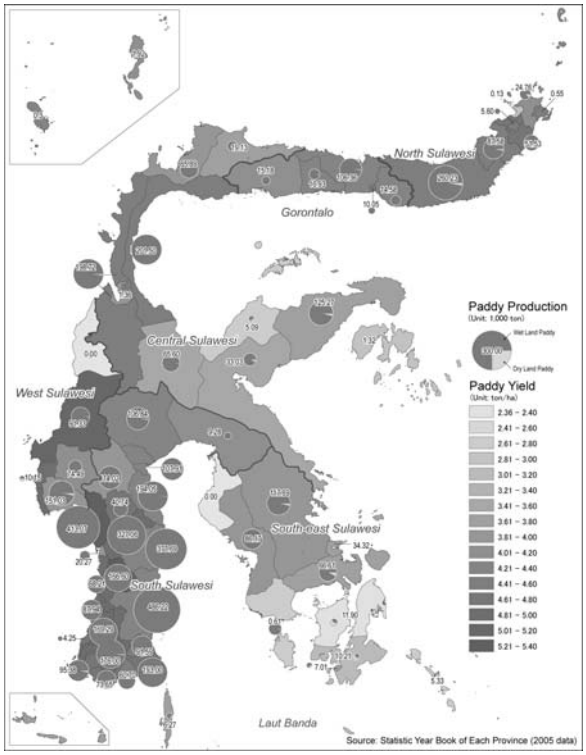


Figure 4.1.1 Rice Production Volume and Yield

Maize

Maize is the second most important grain crop after rice. It is mainly cultivated on dry lands through a multiple cropping system. In 2005, maize was used for human consumption (67.4%,), feed (25.7%) and for other purposes (6.9%).

Maize is widely cultivated in western Gorontalo including Pohuwato (126,385 ha), Boalemo (58,058 ha), and Gorontalo (61,705 ha) regencies, and southern part of South Sulawesi, such as Bantaeng (138,071 ha), Jeneponto (123,046 ha), Gowa (103,636 ha), Bone (95,572 ha), and Bulukumba (89,361 ha). Unit yields in Gowa regency in South Sulawesi and Pohuwato regency in Gorontalo exceed 4.7 ton/ha, higher than the national average of 3.5 ton/ha. Maize harvested areas, production volumes, and yields in Gorontalo has rapidly increased in recent years (from 45,718 ha, 130,251 tons, and 2.85 ton/ha in 1999 to 107,752 ha, 400,046 tons, and 3.71 ton/ha in 2005).

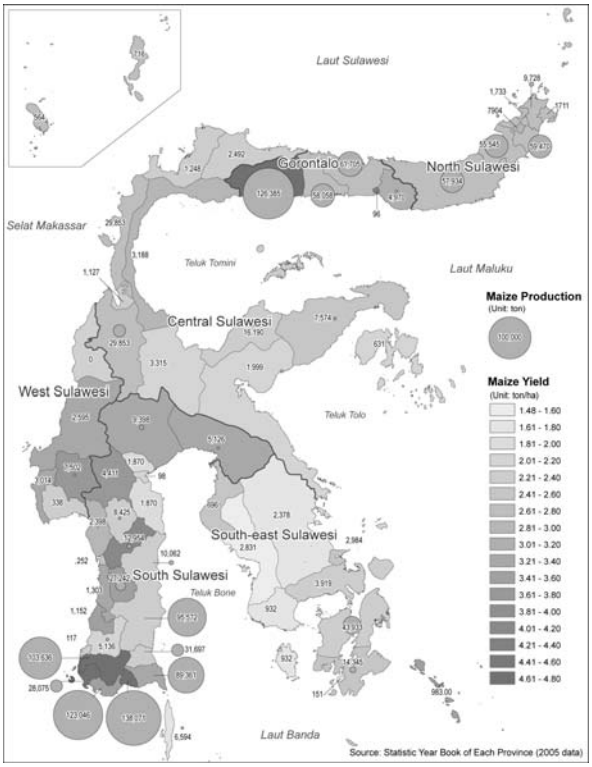


Figure 4.1.2 Maize Production Volume and Yield

Cassava

Cassava is the third most important food crop used for a variety of food products. Total production volume in Sulawesi was 934,000 tons in 2005, with a self-sufficiency ratio of 104.8%.

Gowa regency in South Sulawesi is the single biggest cassava producing area (12,087 ha), producing 220,000 tons (23.5% of Sulawesi). Muna and Buton islands and Kolaka Utara regency in Southeast Sulawesi also cultivates cassava. Unit yields in these areas are 18.2~21.2 ton/ha, well exceeding the national average of 15.9 ton/ha.

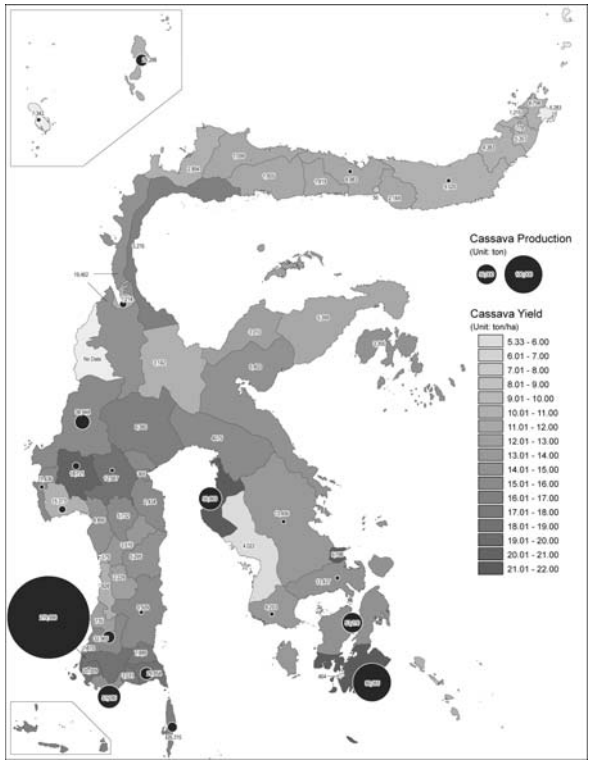


Figure 4.1.3 Cassava Production Volume and Yield

Soybeans and Other Food Crops

Soybean is consumed in the form of tofu, “tempe”, soy sauce, and other manufactured foods. Soybean yield in South Sulawesi (1.66 ton/ha) is higher than the national average of 1.30 ton/ha. Bone regency solely produces 10,400 tons or 24.9% of the total production in Sulawesi.

Peanuts and green peanuts are important income sources for farmers in South Sulawesi. Sweet potato is mainly cultivated in Mamuju in West Sulawesi, and Talaud Island in North Sulawesi.

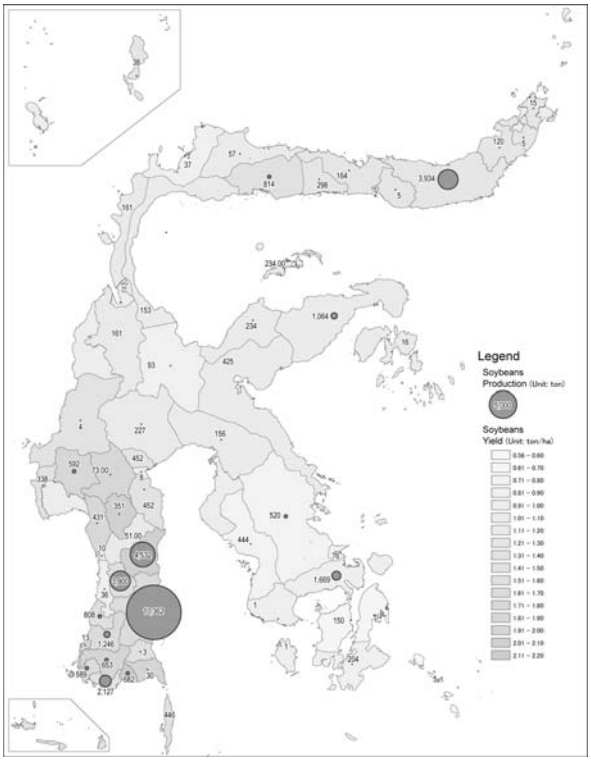


Figure 4.1.4 Soybeans Production Volume and Yield

Estate Crops

The plantation products in Sulawesi are coconuts, cacao, coffee, cashew nuts, vanilla, clove, and tobacco. By cultivation area, major crops are coconuts (714,357 ha in 2005), cacao (683,380 ha), cashew nuts (213,851 ha), clove (175,197 ha), coffee (129,439 ha), and vanilla (15,986 ha). It is notable that cacao

production accounted for as much as 71.2% of the national production in 2005. Cashew nuts and coconut production in Sulawesi represent 45.1% and 17.9% of national production volumes, respectively.

Coconuts

Indonesia is the largest producer of coconuts in the world, and copra is one of the most important export commodities. According to the FAO statistics, the total production in Indonesia accounted for 31.6% of the total production in the world (2005). Coconut production in Sulawesi represents 17.9% of the national total. About two-thirds of coconuts are harvested in Central Sulawesi (33.5%) and North Sulawesi (30.8%).

Minahasa Selatan and Bolaang Mongondow regencies in North Sulawesi; Luwuk Banggai and Donggala in Central Sulawesi, as well as Majene in West Sulawesi, are the major coconut-producing areas. In the case of North Sulawesi, most coconut trees are aged and production volumes have progressively decreased. In addition, the trees are tall, adding a constraint in harvesting.

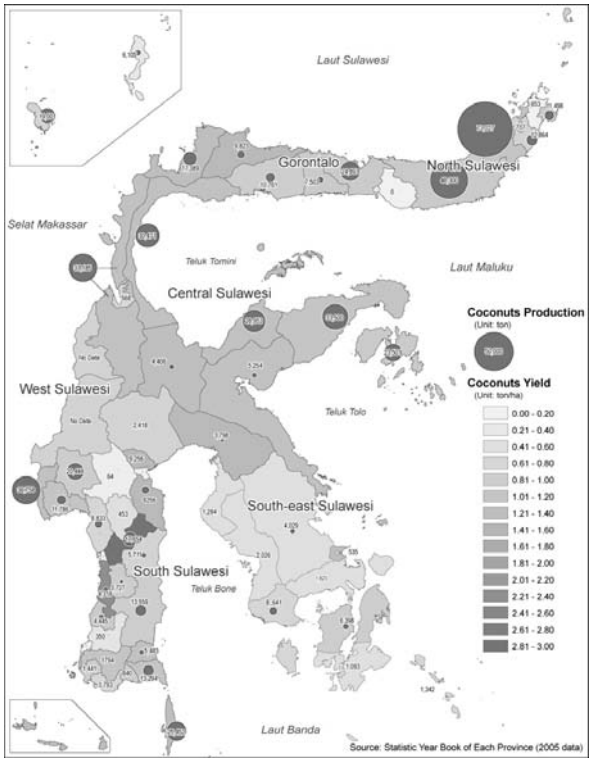


Figure 4.1.5 Coconuts Production Volume and Yield

Many coconut processing factories are located in KAPET Manado-Bitung, including a coconut fiber manufacturer, coconut oil factory, dried coconuts processing factory, coconut charcoal and activated carbon processing factory, and a coconut wood furniture factory. However, since the production volume of coconuts in North Sulawesi has been gradually decreasing from about 320,000 tons in 2000 to about 180,000 tons in 2005, factories have to procure about 40% of raw materials from North Maluku.

Cacao

Indonesia is the third-largest producer of cocoa in the world after Ivory Coast and Ghana, accounting for 15.9% of the world production (2005). Cocoa cultivated areas in Sulawesi total 683,380 ha, or 71.2% of Indonesia, and production reached 417,107 tons (2005). South Sulawesi produces 51.6%, followed by Central Sulawesi (27.0%), and West Sulawesi (20.1%).

About 86% of total cocoa plantations in Indonesia are smallholders (887,700 ha), and the rest are cultivated in large estates (143,900 ha). In South Sulawesi, however, 222,567 ha, or 99.1% of harvested areas, are cultivated by smallholders. Sulawesi exported 217,300 tons in the form of cocoa bean, butter, cake, liquor, and powder.

Major constraints are: low productivity and infestation from cocoa pod borer (CPB) and vascular streak dieback (VSD), as well as low bean quality. The Indonesian Cocoa and Coffee Research Institute, in collaboration with international institutions, has conducted researches in the development of superior clones, biological control systems, crop management and post harvest technologies.

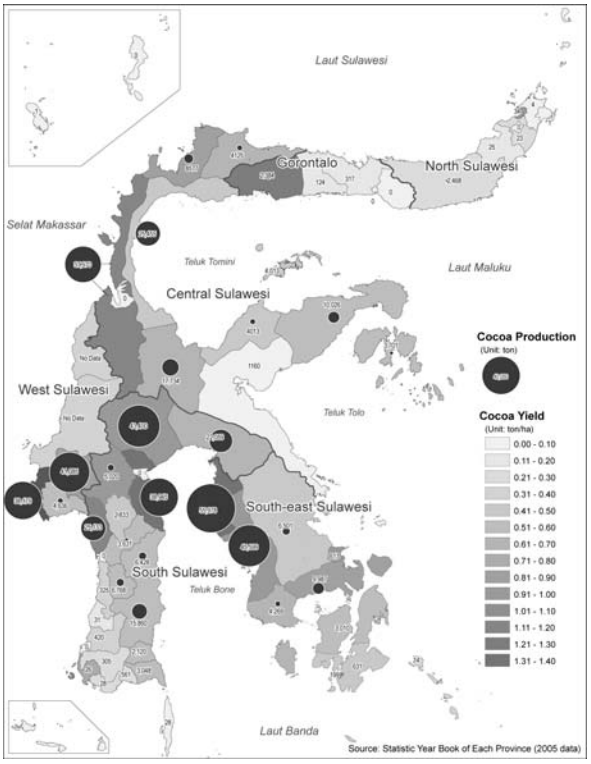


Figure 4.1.6 Cocoa Production Volume and Yield

Coffee

Coffee production in Indonesia ranked third in the world, accounting for 11.5% of the world production. In 2005, Indonesia exported 442,700 tons, equivalent to US$ 497.8 million, to the United States (27.4% in FOB value), Germany (15.7%), and Japan (12.9%). Production of coffee has been increasing steadily with an annual growth rate of 5.25% in 1995-2005.

Sulawesi's coffee, called "Sulawesi Toraja" or "Celebes Kalossi", is grown in both plantations and in small farmlands. Harvested areas and production volumes in Sulawesi were 125,498 ha and 57,325 tons, respectively in 2005. The average yield (423 kg/ha) is lower than the national average (728 kg/ha). Majene (25,547 ha), Tana Toraja (21,495 ha), and Enrekang (10,721 ha) are major producers.

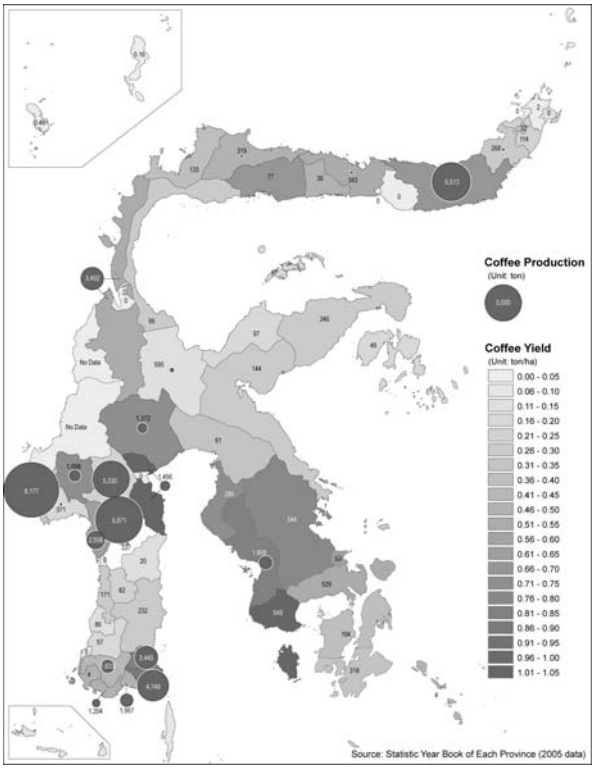


Figure 4.1.7 Coffee Production Volume and Yield

Fishery

Fisheries play a significant role in exports and foreign exchange earnings. Fisheries in Sulawesi are more labor-intensive, and there are a large number of fishermen engaged. Major marine products in Sulawesi are tuna, skipjacks, pelagic fishes, seaweeds, shrimps, crabs, sea cucumbers, and lobsters. Aquaculture, involving pearl shells, shrimps, seaweeds, and sea cucumbers, is a traditional activity along the coasts.

Figure 4.1.8 illustrates the fish catches either by marine or inland fisheries. Fish catches in South Sulawesi account for 46.8% of the Sulawesi total. Bitung (136,001 tons), Bone (116,863 tons) and Jeneponto (47,083 tons) are major centers.

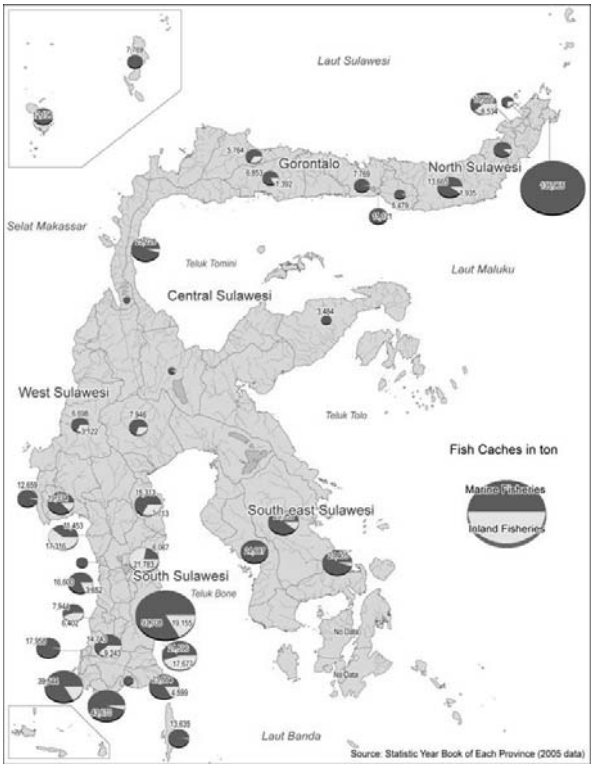


Figure 4.1.8 Fish Catch by Marine and Inland Fishery

Inland fishery is active along the coast of South Sulawesi, accounting for 78.9% of the Sulawesi total. Inland fishery is particularly active in Wajo (21,783 tons), Bone (19,155 tons), Sinjai (17,677 tons), and Pinrang (17,316 tons).

Livestock

Livestock in Sulawesi has a potential in either inter-island or export markets. Cows and goats are primary export commodities under the growing demands overseas.

Cows are mainly raised in South Sulawesi and Gorontalo. Goats are widely raised in the southern part of South Sulawesi and West Sulawesi. Broiler and domestic hen are particularly raised in South and Southeast Sulawesi and the southern part of West Sulawesi.

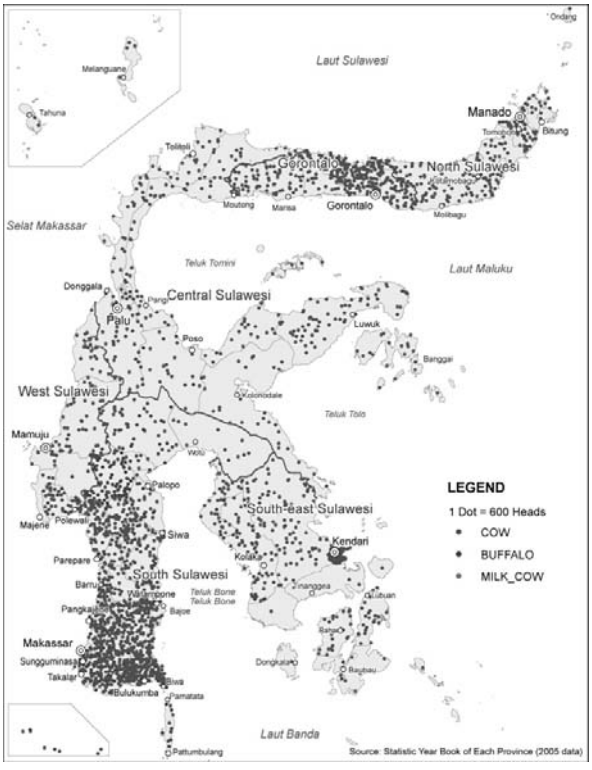


Figure 4.1.9 Distribution of Cattle Raising

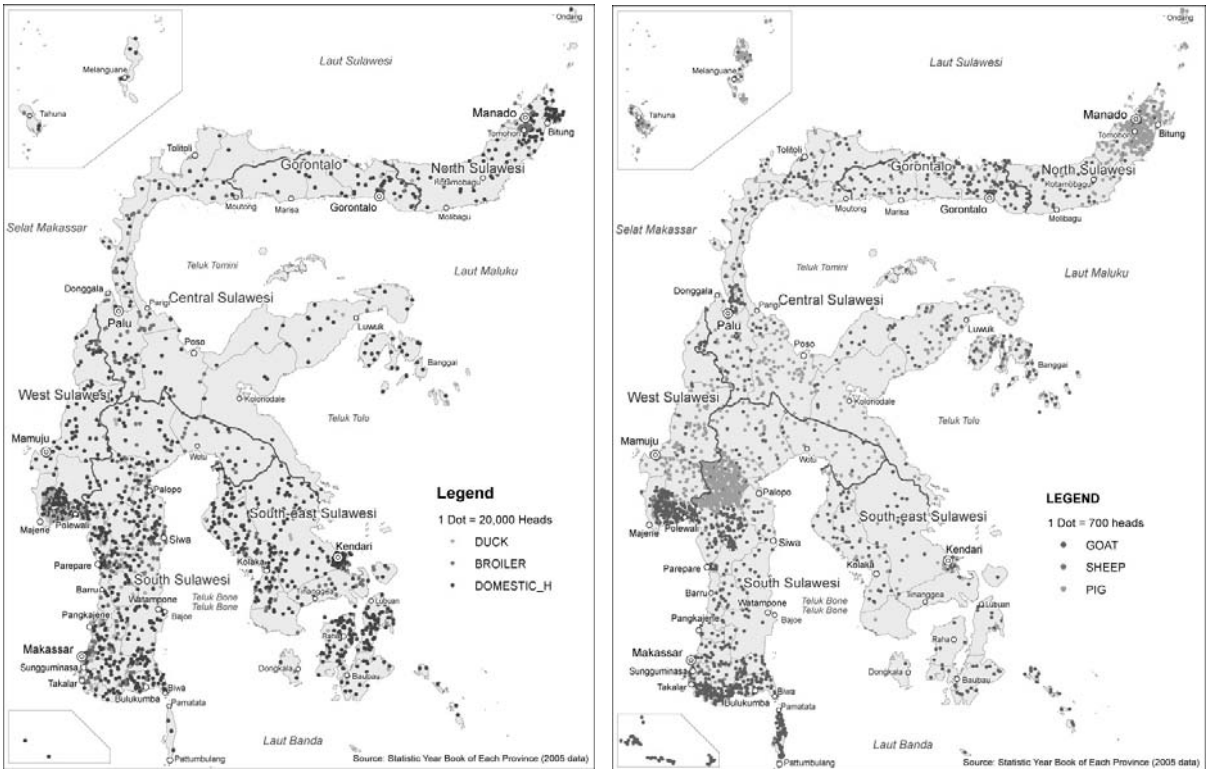


Figure 4.1.10 Distribution of Poultry and Goat/Sheep

Table 4.1.1 Harvested Area, Production Volume and Yield of Major Crops, 2005

		North Sulawesi		Central Sulawesi		South Sulawesi		Southeast Sulawesi		Gorontalo		West Sulawesi		Sulawesi Total	
			Ratio A		Ratio A		Ratio A		Ratio A		Ratio A		Ratio A		Ratio B
Paddy	Harvested Area (ha)	94,946	7.91%	175,489	14.62%	730,602	60.86%	91,585	7.63%	39,110	3.26%	68,820	5.73%	1,200,552	10.14%
	Production (ton)	432,625	8.05%	716,905	13.34%	3,390,036	63.09%	339,846	6.32%	167,153	3.11%	326,996	6.09%	5,373,561	9.92%
	Unit Yield (ton/ha)	4.56		4.09		4.64		3.71		4.27		4.75		4.48	
Maize	Harvested Area (ha)	71,644	15.95%	26,769	5.96%	206,551	45.99%	32,485	7.23%	107,752	23.99%	3,931	0.88%	449,132	12.39%
	Production (ton)	195,305	13.42%	67,617	4.65%	705,996	48.50%	73,152	5.03%	400,010	27.48%	13,449	0.92%	1,455,529	11.62%
	Unit Yield (ton/ha)	2.73		2.53		3.42		2.25		3.71		3.42		3.24	
Cassavas	Harvested Area (ha)	6,695	11.29%	3,597	6.07%	27,558	46.49%	14,820	25.00%	1,048	1.77%	5,559	9.38%	59,277	4.88%
	Production (ton)	68,464	7.33%	48,255	5.16%	464,434	49.71%	256,467	27.45%	12,211	1.31%	84,474	9.04%	934,305	4.84%
	Unit Yield (ton/ha)	10.23		13.42		16.85		17.31		11.65		15.2		15.76	
Sweet Potatoes	Harvested Area (ha)	4,457	26.25%	2,510	14.78%	4,890	28.80%	2,993	17.63%	352	2.07%	1,779	10.48%	16,981	9.52%
	Production (ton)	38,670	23.67%	23,768	14.55%	53,514	32.76%	24,822	15.19%	3,308	2.02%	19,277	11.80%	163,359	8.80%
	Unit Yield (ton/ha)	8.68		9.47		10.94		8.29		9.4		10.84		9.62	
Soybeans	Harvested Area (ha)	3,179	11.07%	2,099	7.31%	16,347	56.95%	3,580	12.47%	2,907	10.13%	594	2.07%	28,706	4.62%
	Production (ton)	4,112	9.89%	2,240	5.39%	27,186	65.38%	3,069	7.38%	4,038	9.71%	934	2.25%	41,579	5.14%
	Unit Yield (ton/ha)	1.29		1.07		1.66		0.86		1.39		1.57		1.45	
Clove	Harvested Area (ha)	69,222	39.51%	47,374	27.04%	46,924	26.78%	7,634	4.36%	2,090	1.19%	1,953	1.11%	175,197	N.A
	Production (ton)	12,672	23.99%	12,417	23.51%	24,848	47.05%	1,601	3.03%	661	1.25%	619	1.17%	52,818	N.A
	Unit Yield (ton/ha)	0.18		0.26		0.53		0.21		0.32		0.32		0.3	
Coffee	Harvested Area (ha)	9,690	7.49%	15,651	12.09%	63,719	49.23%	9,794	7.57%	854	0.66%	29,731	22.97%	129,439	14.56%
	Production (ton)	5,930	10.82%	5,170	9.43%	31,825	58.07%	1,601	2.92%	38	0.07%	10,246	18.69%	54,809	8.48%
	Unit Yield (ton/ha)	0.61		0.33		0.5		0.16		0.04		0.34		0.42	
Cocoa	Harvested Area (ha)	9,683	1.42%	192,834	28.22%	218,775	32.01%	191,855	28.07%	6,452	0.94%	63,781	9.33%	683,380	76.88%
	Production (ton)	2,555	0.61%	112,761	27.03%	215,356	51.63%	1,601	0.38%	933	0.22%	83,900	20.11%	417,107	71.18%
	Unit Yield (ton/ha)	0.26		0.58		0.98		0.01		0.14		1.32		0.61	
Vanilla	Harvested Area (ha)	5,240	32.78%	1,781	11.14%	6,181	38.66%	2,153	13.47%	110	0.69%	521	3.26%	15,986	N.A
	Production (ton)	1,165	28.50%	146	3.57%	1,176	28.79%	1,543	37.77%	42	1.02%	14	0.34%	4,085	
	Unit Yield (ton/ha)	0.22		0.08		0.19		0.72		0.38		0.03		0.26	
Coconuts	Harvested Area (ha)	250,923	35.13%	172,581	24.16%	119,498	16.73%	50,375	7.05%	53,967	7.55%	67,013	9.38%	714,357	19.00%
	Production (ton)	175,185	30.76%	191,050	33.54%	126,685	22.24%	1,601	0.28%	6,029	1.06%	68,992	12.11%	569,541	17.93%
	Unit Yield (ton/ha)	0.7		1.11		1.06		0.03		0.11		1.03		0.8	
Cashew Nut	Harvested Area (ha)	713	0.33%	22,680	10.61%	63,631	29.75%	120,429	56.31%	1,534	0.72%	4,864	2.27%	213,851	39.14%
	Production (ton)	135	0.25%	5,063	9.51%	27,508	51.65%	19,226	36.10%	171	0.32%	1,151	2.16%	53,254	45.13%
	Unit Yield (ton/ha)	0.19		0.22		0.43		0.16		0.11		0.24		0.25	

Source: Statistics Yearbook of each province and Indonesia, BPS. Note: Ratio A: % to Sulawesi total, Ratio B: % to Indonesia total

(2) Agricultural Development Strategy

As reviewed in the foregoing section, Sulawesi agriculture has been developed to a certain extent in the last decades, enhancing the production in food crops, estate crops and fisheries. However, there still remains much to be improved in the agriculture sector, particularly in the enhancement of productivity and value added.

Under the economic framework for Sulawesi development, as discussed in Section 3.2, targets of the agricultural sector have been set as summarized in the following.

Table 4.1.2 Target/Framework for Agricultural GRDP

Province	GRDP		Average Annual Growth Rate (%)
	2005	2024	
Sulawesi Total	24,307	55,656	4.46
North Sulawesi	2,778	5,377	3.54
Gorontalo	624	1,431	4.46
Central Sulawesi	5,348	14,507	5.39
West Sulawesi	1,727	3,546	3.86
South Sulawesi	11,032	22,771	3.89
Southeast Sulawesi	2,798	8,024	5.70

Source: JICA Study Team

The targets above are challenging to all Sulawesi provinces. They are, however, attainable if appropriate efforts and measures are taken by farmers, private and public sector concerned in agriculture.

In order to attain such targets, it is proposed that the following strategies would be applied for development of the agriculture sector in Sulawesi.

1) Enhancement of productivity in food crops

Productivity in paddy cultivation has been improved significantly due mainly to the improved irrigation systems and farming practices. Unit yield of rice in South Sulawesi has reached a level (4.6 tons/ha) higher than the national average. Further efforts are to be made for the enhancement of the productivity in paddy, because there remains less possibility to expand its cultivation areas in most provinces in Sulawesi.

Successful experience in irrigated paddy cultivation by applying SRI method is to be disseminated more widely in Sulawesi in order to attain higher productivity and competitiveness. Under the DISIMP (Decentralized Irrigation System Improvement Project), the SRI method has attained a successful result in high yields with less input in farming. Application of the SRI method will be one of the strategies to be applied in the enhancement of productivity in paddy in every part of Sulawesi.

High yields of maize cultivation experienced in Barru are to be examined for dissemination in other part of Sulawesi, particularly in Gorontalo where maize production has been targeted as a major crop for promotion. Since the demands and prices in the world maize markets are

sharply increasing in recent years, promotion of highly productive maize will be another strategy to be applied in Sulawesi.

2) Gradual shift to higher value-added crop cultivation

Understandably, paddy farmers are reluctant to shift their traditional cultivation. However, it is apparent that paddy farmers find it difficult to double or triple their income in 20 years unless their current cropping pattern (mostly paddy+paddy+palawija) is gradually shifted in line with the market demands. (For reference, the economic framework is set to the level that per-capita GRDP in 2024 would be 2.8 times higher than in 2005.)

Such a shift may be introduced partly by cultivation of fruit, vegetables and other high value added crops. Cultivation of fruit is to be encouraged particularly in the sloped areas and for promotion of processing industries. Vegetable cultivation is encouraged in and around the urban centers where consumption will increase in line with the enhancement of consumers' income levels.

3) Introduction of "vertical development" for combined cultivation

Land in Sulawesi has been utilized to almost the full extent, and sizable horizontal expansion for agricultural use will not be expected from the viewpoint of environmental protection. Consequently, vertical land use by replacing over-aged coconut trees, for instance, in the existing croplands will be one of the strategies to be applied in agricultural development. Inter-cropping and multiple cropping with high-yielding corn will also be recommended.

An example is vertical development of "coconut and corn cultivation". The existing over-aged coconut trees in North and Central Sulawesi will be replaced with more productive species at a grid of 10m x 10m, and high-yielding corn and/or jatropha will be planted in-between these trees. Coconut will be harvested every 45 days so as to provide raw materials for the production of bio-diesel and other products. It is expected that coconut production would double in those areas. Copra meal will be used as organic fertilizer in coconut field. Substantial increase in corn production is expected at the same time. Combination with cattle rising in coconut fields could also be encouraged.

4) Introduction of better management in estate crop cultivation

Cultivation of estate crops in Sulawesi (e.g., coconut, cacao, coffee) has been mainly promoted by smallholders, with the exception of estate-type oil palm cultivation recently expanded by large investors. Such small scale cultivation has hindered qualitative and quantitative improvements in cultivation of estate crops. Lowered quality and quantity of coconut and cacao is a serious constraint of Sulawesi agriculture now.

Lessons should be learned from the case of coffee cultivation in Tana Toraja where a coffee estate has been developed by foreign direct investment and a great number of small traditional coffee growers around the estate have been trained for improvements in quality and increases in their production under the guidance and management of the coffee estate. It is said that

small scale oil palm growers in West Sulawesi have not been guided well by large domestic investors in oil palm plantation.

It is suggested that coconut and cacao growing provinces would study if investors could be found to lead the combined development of estate and surrounding small growers as in the case of TOARCO coffee in Tana Toraja.

5) Promotion of "integrated farming"

Most farmers in Sulawesi are paddy growers to substantiate themselves and market surplus to traders. Most popular cropping pattern is paddy+paddy+palawija as noted above. Farmers would better be guided to introduce more profitable cropping patters, as well as integrated farming with livestock breeding. Integrated farming would bring additional income to farmers, and farmers would be able to use residuals and husks to feed livestock thus creating a cycle-oriented integrated farming.

Livestock breeding should be more strategically promoted in Sulawesi, particularly on the land of undulated topography in Central, South and Southeast Sulawesi. The land of "bushes" as classified under the current land use may possibly be utilized for cattle breeding. As the demands for protein is increasing in line with the increasing household incomes, further studies should be made on where and how to promote livestock breeding over Sulawesi Island. Improvement in transportation network over the island would facilitate marketing of the livestock products.

Another integrated farming approach is the promotion of agro-forestry. Instead of single estate crop cultivation, agro-forestry would encourage cultivation of various kinds of fruit trees and cacao/coffee in combination with planting mahogany and other high-valued trees. Since harvesting seasons vary and market prices fluctuate, cultivation of multiple species would stabilize the farmers' income with fewer risks in marketing, as well as promote a program for reforestation. (The case of the Tome Acu Cooperative in Brazil is a referable case in such an agro-forestry development program.)

6) Promotion of fisheries along the coastal zones and surrounding the bay areas

As noted in Section 1.4, marine and inland fishery potentials have not been fully utilized in Sulawesi, except for the case in South Sulawesi province. Although fish catch in North Sulawesi has recently increased, it is reported that a large part of catches are sold offshore to traders in the Philippines.

The Tomini Bay and Tolo Bay, as well as Bone Bay, are reported to have large potentials for marine fishery, though the current catches are relatively small. The authorities in North Sulawesi, Gorontalo and Central Sulawesi are encouraged to work out specific plans to promote fisheries in collaboration with fishermen in and around those bays.

The Sulawesi people are fond of fish products and their demand is expected to further increase in the future. In addition, demands overseas for fish meals are increasing and processing of

fishery would also be promoted in Sulawesi. Improvement in transportation network over the island would facilitate marketing of the increased volume of fish products.

7) Maximum use of available land for agricultural use and protection of the environment

From the viewpoint of future land use in Sulawesi, available lands for expansion of agricultural development are quite limited. In the event that the land currently classified into "secondary dry land forest" and "bushes" could be turned into agricultural lands, they are estimated to be around 2 million ha in gross and 1 million ha in net, or around 6% of the total land in Sulawesi, as shown in the following table and figure.

Table 4.1.3 Land Classified into Secondary Dry Land Forest and Bushes

(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

It should be noted that the above estimated lands will not necessarily be allowed for agricultural use and they should be studied in detail as to how and to what extent they would be utilized for production purposes and for protection of the environment.

In the event that the strategies proposed above are implemented, the target set for agricultural GRDP would be attainable though strenuous efforts by both the private and public sectors.

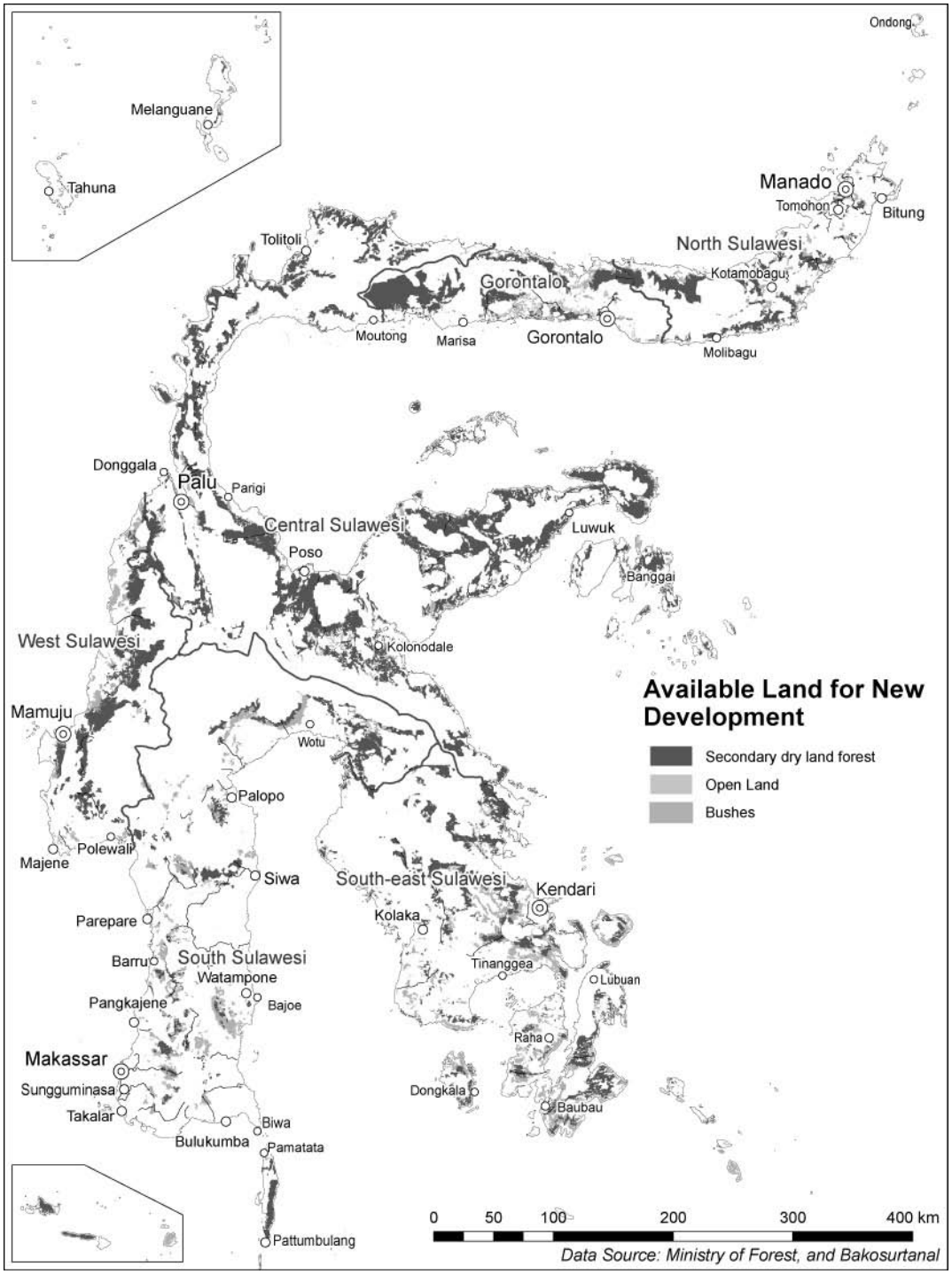


Figure 4.1.11 Land Classified into Secondary Dry Land Forest and Bushes

4.2 Industrial Development

The current situation of the manufacturing and mining industries in Sulawesi is reviewed and some strategies for industrial development are proposed though preliminary as they are at this level of the study.

(1) Overview of Sulawesi Industry

Contribution of the manufacturing sector and the mining/quarrying sector to the Sulawesi economy was 10.7% and 6.8% respectively in 2005. Their contributions are substantially small if compared with the national average at 28.1% and 9.3%, respectively. Manufacturing industries are mostly local-resource based industries.

Manufacturing Industry

Major manufactured products other than agro-based products in Sulawesi are summarized in the following table.

Table 4.2.1 Major Non-agriculture-based Manufactured Products

(Unit: US$ Million)

Major Product	Total Export Amount	South Sulawesi	Southeast Sulawesi	Central Sulawesi	North Sulawesi
Processed Wood	26	12	5	9	0
Garment	17	17	0	0	0
Furniture	4	3	0	1	0
Fabricated Steel	2	0	0	0	2
Others	51	33	4	14	0
Total	100	65	9	24	2
Share	100%	65%	9%	24%	2%

Source: JICA Study Team

Total value and volume of export of non-agriculture-based manufactured goods from Sulawesi in 2003 was around US$ 100 million and 61,000 tons, respectively. Manufactured goods in Sulawesi accounted for 8.7% of the total export value and 3.8% of the total export volume.

Table 4.2.2 Value and Volume of Manufactured Goods Exported by Sulawesi (2003)

Total	South Sulawesi	Southeast Sulawesi	Central Sulawesi	North Sulawesi
Export Value (US$ million)	64 (64.5)	9 (9.3)	24 (23.6)	3 (2.6)
Export Volume (000 tons)	31 (51.1)	12 (20.0)	15 (23.8)	3 (5.0)

Note: Figures in parentheses refer to percentage in total by province.
Source: JICA Study Team, based on trade statistics of the Ministry of Trade, 2005

Industrial development in Sulawesi has been mainly planned and promoted by designating several Integrated Economic Development Zones (KAPETs) initiated by the Indonesian government in 1996 in order to reduce regional unbalance between Western and Eastern Indonesia. So far, 12 KAPETs have been designated in Eastern Indonesia, including four in Sulawesi (i.e., Batui, Parepare, Bukari and Bitung). Entrepreneurs who do business within each KAPET are supported by the government through both fiscal and non-fiscal incentives.

However, it has been observed that these new initiatives have achieved little success. According to a report conducted by the executive director of the Development Council of Acceleration of Eastern Indonesian and the Developing Body of KAPET in 2003, two KAPETs in Sulawesi (Parepare and Bitung) showed some achievements but the remaining two KAPETs (Bukari and Batui) have been lagged.

At the inception, KAPET management and development costs were paid for by the State budget (APBN), the Regional budget (APBD), and other valid statutory sources. Since the implementation of regional autonomy, however, fund allocations for KAPETs have no longer been supported by the State budget, resulting in insufficient budget resources in support of the KAPET programs. The regional autonomy also raises the problem of management control of KAPETs. With regional autonomy, the control of KAPETs automatically transferred from central government to local governments. However, in most of cases, local governments have insufficient capacities in managing KAPETs.

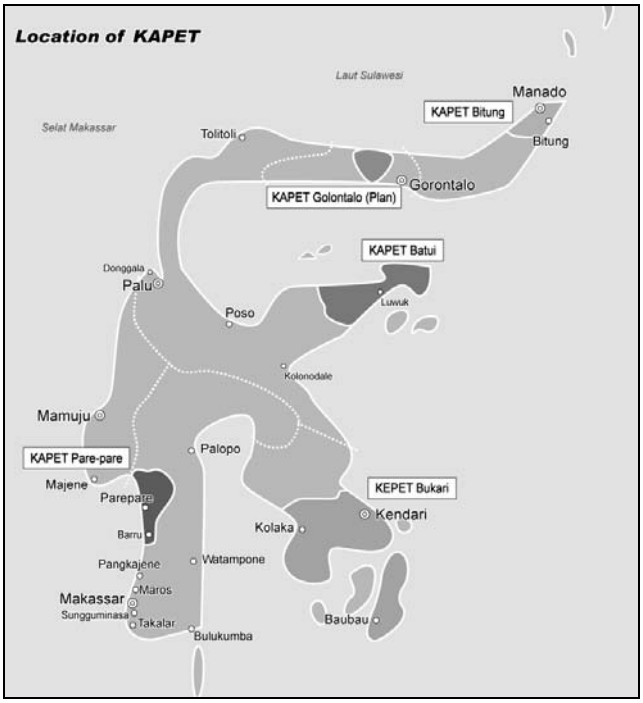


Figure 4.2.1 KAPETs Designated in Sulawesi

Unavailable infrastructure and/or poor facilities are considered to be among the major constraints faced by KAPETs. KAPETs in Parepare and Bitung are directly connected to the growth centers of the islands (Makasar and Manado) by road, while KAPETs in Batui and Bukari (particularly the latter) are located in regencies that are far from the main city of the island, without infrastructure hubs.

Other major constraints on the development of the manufacturing industry in Sulawesi include, but are not limited to, i) less attractiveness in the investment climate, ii) raw material supply of less quality, iii) unstable supply of power and energy, and iv) inadequate level of land and maritime transportation services. For instance, some investors in manufacturing industries have closed their factories in Makassar due mainly to the unstable power supply with frequent blackouts.

On the other hand, the comparative advantage of Sulawesi in developing its manufacturing sector and in attracting FDIs into manufacturing activities lies on its geographical location as well as its workforce, especially in and around the major cities of Sulawesi, namely Makassar in South Sulawesi and Manado or Bitung in North Sulawesi. Whether FDIs in the manufacturing sector, especially those export-oriented, will either be based on locally available materials or just on the availability of skilled or acceptable skill levels of labor, will be totally dependent on the attractiveness of Sulawesi.

FDIs in the manufacturing sector in Sulawesi cannot be realized in a short period of time. It will require coordination among all concerned agencies, not only in Sulawesi but outside for the promotion of Sulawesi as a competitive destination for FDIs. Coordination efforts for the promotion of industrial development in Sulawesi can be optimized when all the provinces in Sulawesi are governed by a single development policy, even though the nature of industrialization differs in each province.

Mining Industry

Major mineral resources in Sulawesi are nickel, gas, gold, cement, marble, oil, and asphalt. Mining provides significant local employment, directly at the mine site and indirectly through the supply of goods and services from local sources. Significant parts of Sulawesi mineral resources remain unexplored, and the mining sector could have potential to become a much larger contributor to the Sulawesi economy and to regional development. Figures show the location of current and potential mining areas for metals and nonmetals.

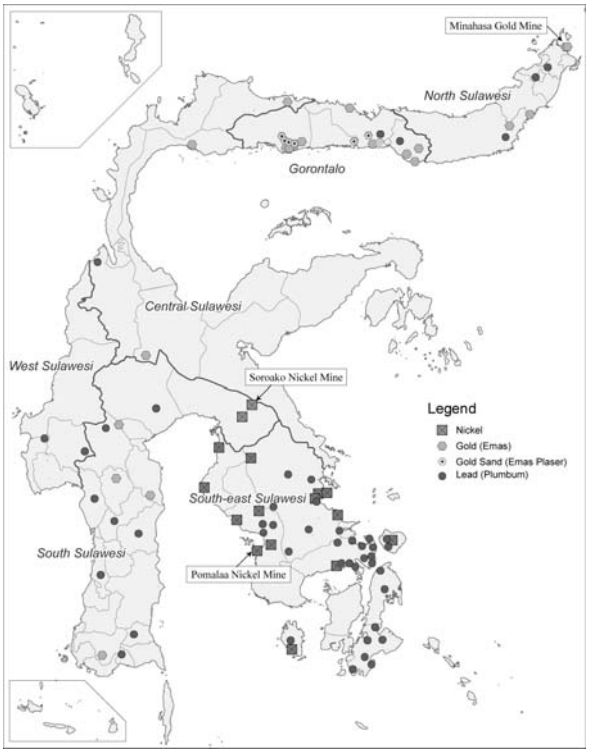


Figure 4.2.2 Mineral Resources (Metal)

Nickel

Indonesia produces around 140,000 tons of nickel-based alloys, ranking it fourth in the world after Russia, (315,000 tons), Australia (210,000 tons) and Canada (196,000 tons). Nickel in Indonesia is mined at the PT Antam sites in Pomalaa, Southeast Sulawesi, Soroako in South Sulawesi and in Gebe, Gees, and Tanjung Buli in North Maluku. Southeast Sulawesi is endowed with a considerable deposit of nickel ore and its mines have been developed by international companies. Nickel ore and ferro-nickel are shipped through a special private jetty located close to the mine fields along the sea near Pomalaa in Southeast Sulawesi as well as in Soloako in South Sulawesi. The volume of nickel shipped out from Sulawesi in 2006 was around 500,000 tons.

PT Inco plans to develop two nickel deposits, Bahodopi in Central Sulawesi and Plomalaa in Southeast Sulawesi. Because of the sharp prices of nickel in the international markets, the development of nickel mining in Sulawesi through more investments should be enhanced in the coming years.

Markets for primary nickel, which is used mainly for the production of stainless steel and nickel-based rechargeable batteries, have continuously increased since 2000. In 2004, world

demand for primary nickel registered at an all-time high, resulting in most nickel producers to operate at full capacity. Primary nickel demand in 2006 was around 1.2 million tons. This demand will be buoyed by spiraling consumption in China, a consumption which has risen from 43,400 tons in 1999 to 160,000 tons in 2006. China consumes more stainless steel than any other country. It consumed 4.7 million tons of stainless steel in 2004, with state-owned mills producing 1.32 million tons. Chinese imports of stainless steel totaled 2.90 million tons and are showing a steady increase in the future.

The further development of nickel mining will continue in Sulawesi as returns-on-investments on the expansion of mining operation, as well as the production of nickel ferro-alloy becomes lucrative. Likewise crude oil prices, which are undoubtedly considerably high in the international market, are predicted to continue in the future though it would also be dependent on the Chinese economy. Because of its proven reserves or deposits of nickel in Sulawesi, the development of nickel mining in Sulawesi will continue to be prospective, especially in Southeast Sulawesi.

Gold

PT Newmont Minahasa Raya (NMR) suspended its operation in Minahasa, North Sulawesi. Although gold mining began in 1996, mining operation ceased in October 2001 due to depletion of resources. Since then, activities have been limited to processing ore stocks. In 2004, villagers from Minahasa regency complained that NMR polluted nearby Buyat Bay. The issue is still in dispute. There are several gold mines in South Sulawesi and Gorontalo which have not been undeveloped.

Cement

Cement is the major mining product in Sulawesi. The marketing and production of cement produced in Indonesia, including Sulawesi, is mainly for domestic consumption and exports. Total cement volume produced in Indonesia was around 32.2 million tons (2005), and 1.9 million tons or 6% came from Sulawesi. Of this volume, around 0.9 million tons were distributed in Sulawesi and around 1.0 million tons were distributed outside Sulawesi.

Parallel to the recovering economy of Indonesia, cement consumption has been improving. Government officials are expecting that cement production will increase from the current 32 million tons a year to around 46 million tons a year by 2010.

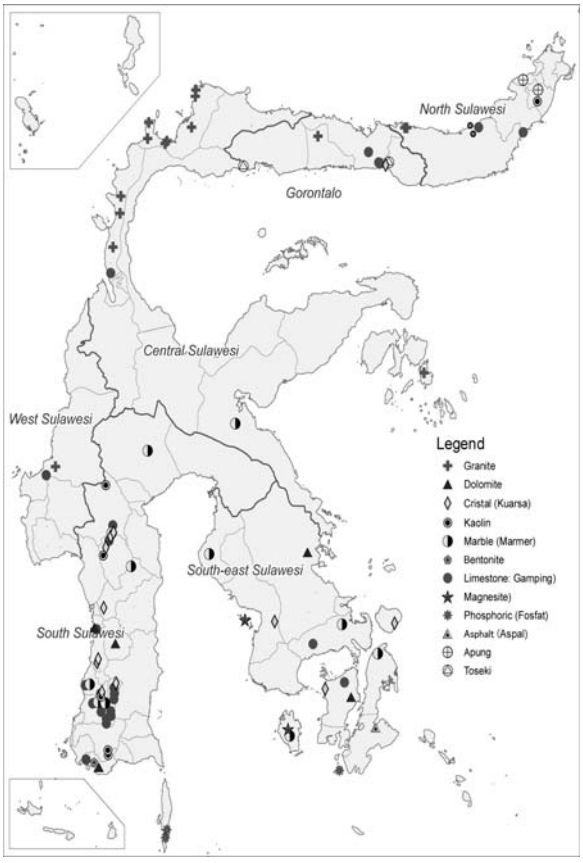


Figure 4.2.3 Mineral Resources (Non-Metal)

The total installation capacity of the cement production facilities in Sulawesi is estimated to be around 5.3 million tons. (PT Semen Bosowa Maros, Kabupaten Maros, South Sulawesi, 1.8 million tons; and PT Semen Tonasa, Pangkep, South Sulawesi, 3.5 million tons). Total cement produced in 2006 in Sulawesi was 1.9 million tons as noted above. This implies that there is huge capacity for increased production. Two other new companies have already obtained government permission to commence cement production in Sulawesi, namely PT Balocci Makmur and PT Lebak Harapan Makmur. These two companies also plan to operate in South Sulawesi. With this, it could be said that the promotion of further investments in cement production is not necessary in the coming years.

Oil and Gas

The production of crude oil in Indonesia was 1.09 million barrels/day in 2006. This accounted for approximately 1.4% of the world's daily production, ranking the country number 20th among the world's oil-producing countries. Export revenue from crude oil was US$ 6.2 billion which accounts for around 6% of the total foreign exchange trade earnings of Indonesia. The country's oil reserves are approximately 8.6 million barrels. Likewise, Indonesia has some of the largest known pools of natural gas in the world, with total estimated reserves of 187 trillion standard cubic feet (SCF). Indonesia produced 8.16 trillion cubic feet (TCF) of gas in 2006, ranking eighth among the world's gas-producing countries. Of this, 46% was dedicated to domestic demand for power generation, fertilizer production, and other industries, while the rest was exported mainly as liquefied natural gas (LNG). The major markets of Indonesia's LNG are Japan (71%), South Korea (20%), and Taiwan (9%).

Sulawesi's fuel consumption has totally been dependent on imported petroleum products coming from the nearest refinery operating in Balikpapan, East Kalimantan through PERTAMINA. The total fuel imported in 2006 by Sulawesi was 3.3 million kl (gasoline 1.2 million kl, heavy fuel 0.6 million kl, and diesel 1.5 million kl) and distributed through 19 fuel depots by liquid carriers and around 800 units of tank lorry throughout Sulawesi. Since April 2002, the exploration for oil and gas has continued in Central Sulawesi mainly by PERTAMINA. The offshore Tiaka oil field is one of five oil fields explored in the Banggai Basin and it has started production of crude oil at a rate of 6,500 bpd. The oil loading facility was constructed and put into operation off Batui, Central Sulawesi which is around 100km southwest from Luwuk and around 15km offshore. Luwuk has served as a supply base for the oil and gas field developments.

Four oil and gas fields, out of five explored in the Banggai Basin, have been certified as gas deposits with huge volumes of reserves. Tiaka, one of the five fields, has an oil deposit and is around 15 km offshore. It is expected that exploitation will last around 27 years. Shipments of crude oil already started in 2006. In addition, two big oil and gas projects have been studied then started in 2006. One is the building of a refinery in Parepare, South Sulawesi and the other is the production of LNG in Central Sulawesi. They are outlined below.

Parepare is an ideal unloading port for crude oil because of its deep water and relatively calm bay protected by several islands off Parepare's shore. The plan to build a petroleum refinery was studied in the past. Target production capacity of the refinery is 300,000 bbl/d with investments coming from one of the leading oil companies in the Middle East through a joint venture with PERTAMINA. The first phase of the project is designed to produce around 150,000 bbl/d and supply the products to East Indonesia (Sulawesi's total consumption may account for around 50% of the total volume produced by this refinery.). The second phase is designed to produce around 150,000 bbl/d for export overseas. Capital investments in order to build such a refinery are estimated to be around US$ 1.2 - 1.5 billion.

Central Sulawesi is considered as Indonesia's next big gas- producing area after Aceh. PT Medco Energi Internasional Tbk (Medco), together with PERTAMINA, plans to build a new LNG facility in Central Sulawesi underpinned by proven gas reserves of 28 TCF. If this is realized, it will be the fourth LNG plant in Indonesia. Once this project goes on stream, the Dongin, Senoro and Toili area in Central Sulawesi, could easily become Indonesia's current biggest natural gas-producing field because of its big gas reserves, which are twice as large as the gas reserves operated by Exxon Mobile in Arun, Aceh, which has been in operation since the late 1970s. The expected amount of capital investment for this LNG project would be in the US$ 1.5 - 2.0 billion range.

Other Mineral Resources

Marble is also an important mineral resource in South and Southeast Sulawesi. Asphalt is mined in Buton Island in Southeast Sulawesi, and it could be developed for pavement of provincial and/or regency roads. Other mined minerals found in Sulawesi include lead, granite, crystal, toseki, quartz sand, kaolin, and phosphoric.

(2) Strategy for Promotion of Manufacturing Industry

As overviewed above, the manufacturing sector in Sulawesi has been lagged and strenuous efforts are required to increase value added in the manufacturing process. Some strategic approaches are proposed as discussed in the following.

Principles

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

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

② To promote agro-industry through introduction of necessary techniques and skills, thereby creating further employment opportunities and raising value-added.

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.

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 medium and long terms. At the same time, ③ must be strategically prioritized in order to make the Sulawesi economy grow on a short-term basis. In other words, promotion of the industries between the primary sector and secondary sector would be required in the short and medium terms.

Assessment of Prospective Industries

The prospective products/industries of Sulawesi Island are to be selected in order to efficiently and effectively promote them for the acceleration of the future economic growth. To this end, it is necessary to look into the prerequisite for the industrialization, and thereby identify advantages and disadvantages of each product/industry.

With reference to the analytical framework of *Industrial Cluster*, 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.

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 of having a competitive advantage in general.

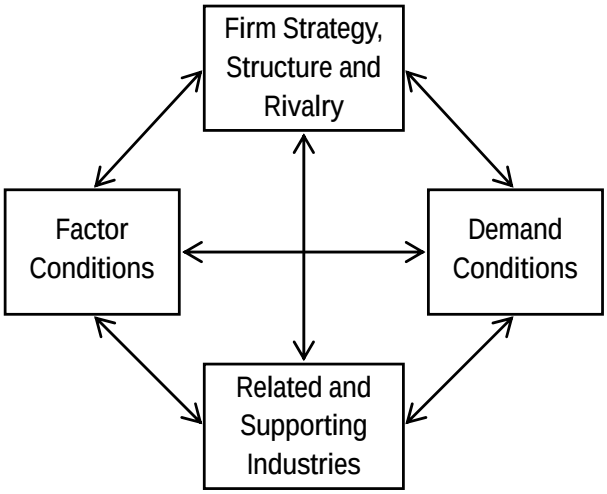


Figure 4.2.4 Elements for Competitive Advantage

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 degree of competition among them. It can be understood the more they compete, the more likely competitive advantages increase.

Related and Supporting Industries can be assessed on competitive advantage if there are a number of competent suppliers 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 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.

Following the framework of Industrial Cluster, the nine selected promising products/industries of Sulawesi Island (①~⑨ below) have been assessed, from the viewpoints of competitive advantage elements, 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 markets, 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 the assessment are shown in the latter part of this section, 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, which 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, an attempt is made 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. The following table summarizes the priority order with total scores by rating. If the 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 the 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 needs more effort until being promoted.

Table 4.2.3 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
① Agricultural Resource Processing (1) (bio-diesel fuel)	+	++	-	+	+++ B
② Agricultural Resource Processing (2) (food processing)	Cacao +	++	-	+	++++
	Coffee +	++	-	-	+
					Ave. B ++
③ Livestock/Meat Processing/Animal Feed Processing	Livestock, Meat Processing +	++	-	+	+++
	Animal Feed ++	+	-	+	+++
					Ave. B ++
④ Fishery and Marine Products	+	++	-	-	+ C
⑤ Mining Resource Processing (1) (oil and natural gas)	++	++	+	+	+++ A ++
⑥ Mining Resource Processing (2) (nickel, asphalt, gold, etc.)	++	++	+	+	+++ A ++
⑦ Construction Materials	++	+	+	+	++ A ++
⑧ Light Industry	+	++	-	-	+ C
⑨ 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 potential. On the other hand, fishery and marine industry, light industry and tourism industry are rather lowly prioritized (rank C) due to lack of supporting industries and management bodies. It seems these industries would take a longer time than the others though they are assessed positively in *factor conditions* and *demand conditions*. From a different angle, these industries are to be strategically prioritized with a strong government policy.

Strategic Industrial Promotion

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

Table 4.2.4 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 to support and accelerate the Sulawesi economy, by physical infrastructure improvement programs and institutional/capacity building programs.

✧ 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 highway) ii) Sea lane enhancement (Ro-Ro ferry) iii) 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 Communication)
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

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

Purpose	Capacity building for agricultural and marine producers for the purpose of increasing 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 export purposes, 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" 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

Proposed Industrial Promotion Programs

In order to reach the target economic growth, it is required that the stakeholders concerned (public and private) should make a comprehensive commitment for the industrial promotion.

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 4.2.5 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.

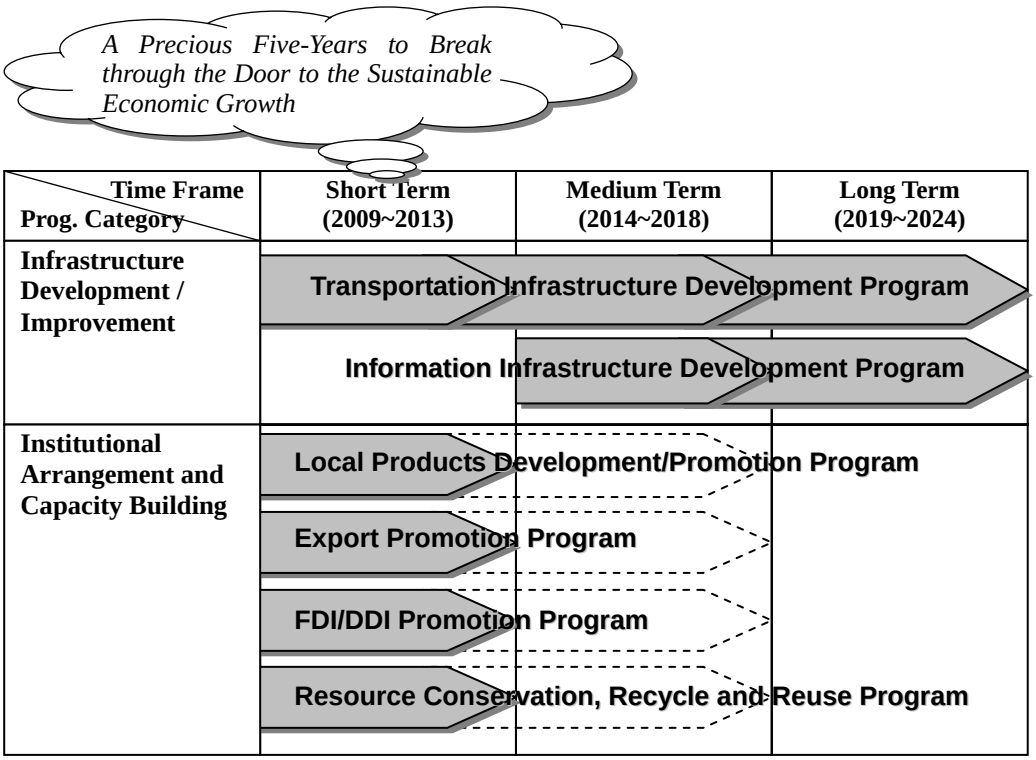


Figure 4.2.5 Stage-wise Industrial Promotion in Sulawesi

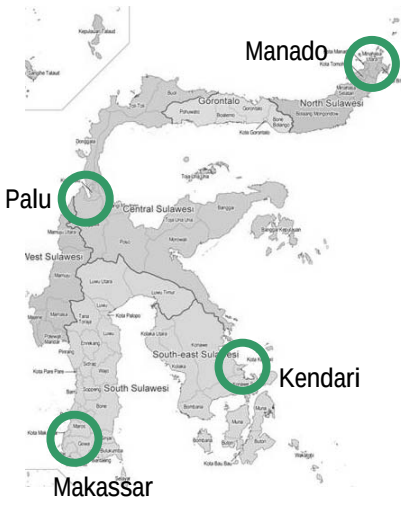
Table 4.2.5 Assessment by Proposed Industrialization (1/9)

Category of Industry / Prospective Product and Market

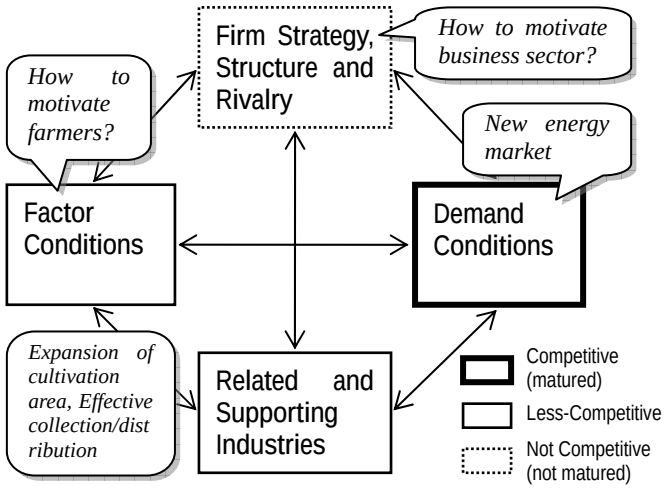
Agricultural Resource Processing_1

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 many years. Currently total cultivation area is around 710,000 ha or 22% of 3.2 million ha in Indonesia. However, most of the 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. However, they do not really seem 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

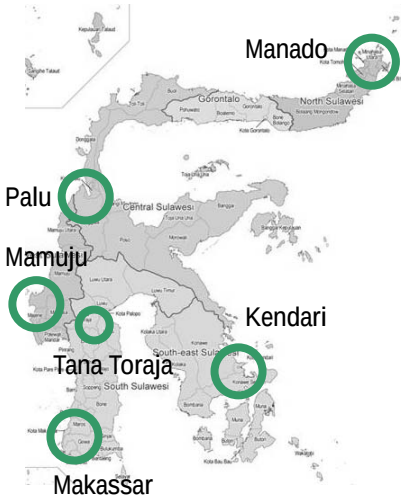
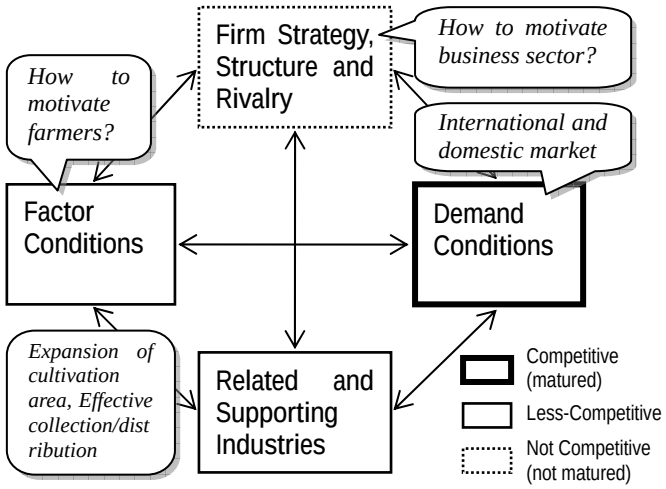
Since the bio-diesel production business is new to business players, necessary supports by the governmental agencies concerned should be extended to the players so as to hedge the business risk, while high priority must be put under a national policy of new energy source development.

Table 4.2.5 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. Meanwhile, productivity is low and fluctuated. Distance between production area and final collection area is far and therefore transportation cost is high. Farmers sell their product to local middlemen with low bargaining position as the price is 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, farmers may lose interest in continuing to grow cacao because of additional costs associated, if no increased income is 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 may possibly 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 necessary attention should be paid to 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 measures should be taken for farmers to increase productivity.		

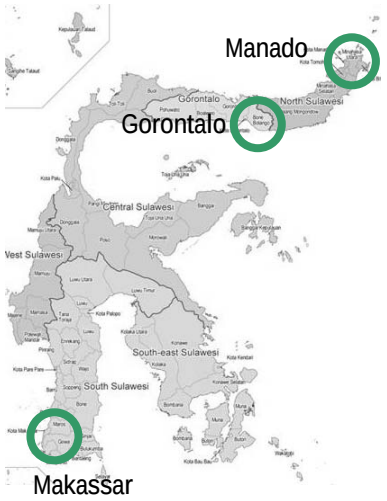
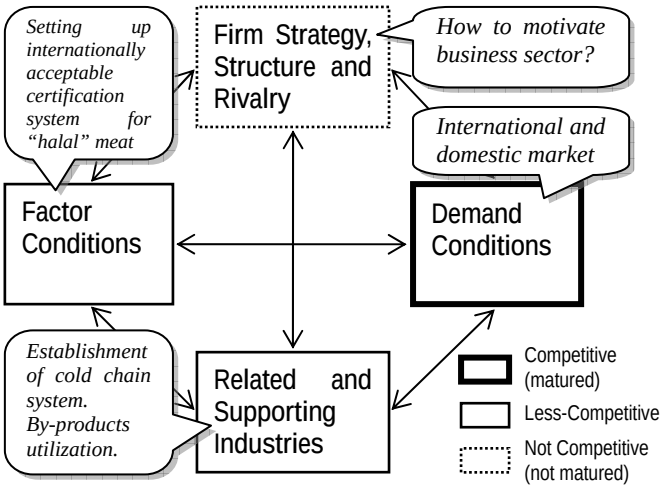
Table 4.2.5 Assessment by Proposed Industrialization (3/9)

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 considerable time for setting up regulation and inspection system. Ample 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 big volumes, 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**		
Ample attention should be paid to the by-product utilization.		

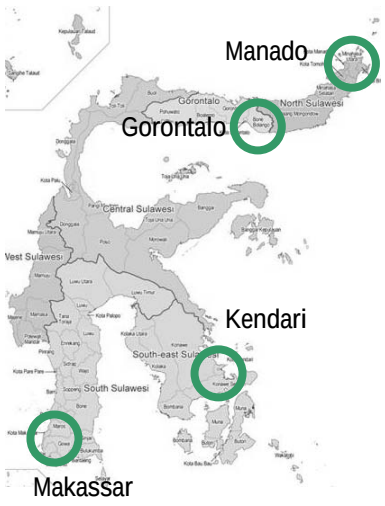
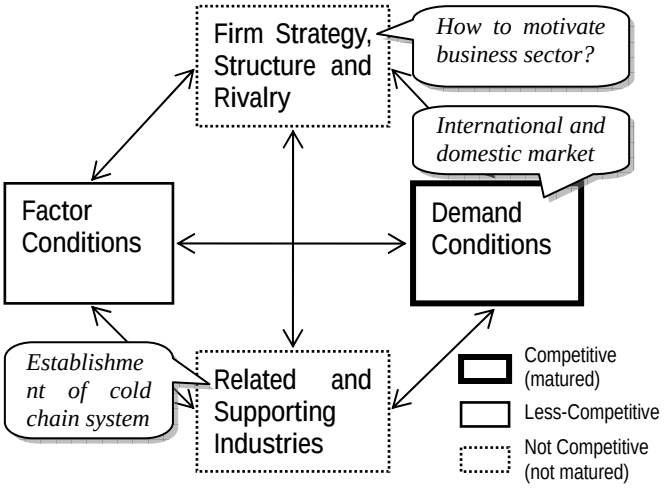
Table 4.2.5 Assessment by Proposed Industrialization (4/9)

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 of developing 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 4.2.5 Assessment by Proposed Industrialization (5/9)

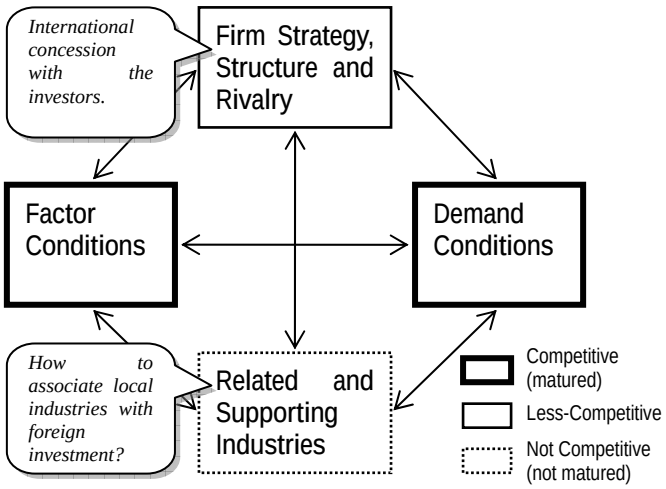
Category of Industry / Prospective Product and Market

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

Table 4.2.5 Assessment by Proposed Industrialization (6/9)

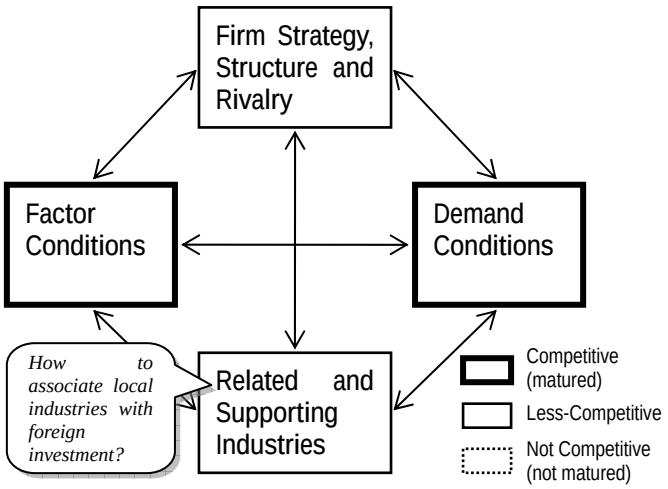
Category of Industry / Prospective Product and Market

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 is 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, while 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 (Asphalt)

Natural asphalt produced in Bauban on Buton Island could be utilized for improvements of Provincial and/or Kabupaten reads in Sulawesi, making use of local resources for regional development.

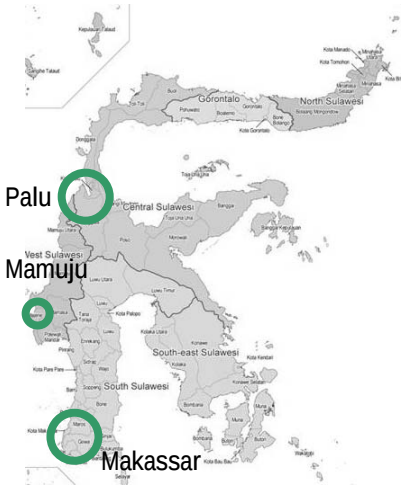
Table 4.2.5 Assessment by Proposed Industrialization (7/9)

Category of Industry / Prospective Product and Market

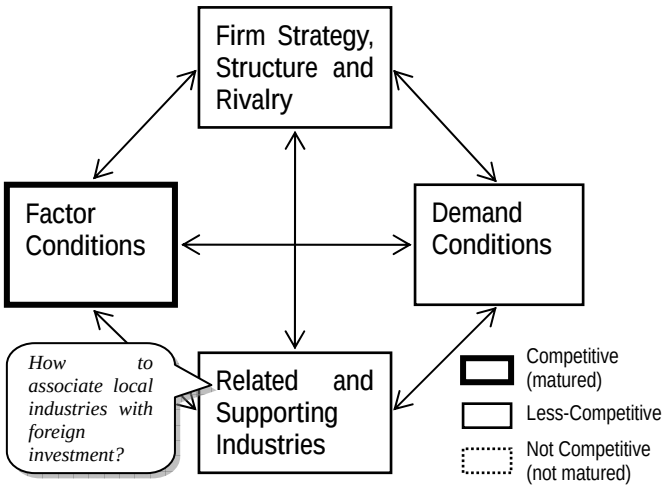
Construction Materials

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

Prospective Production Center



Summary of Competitive Advantage Assessment



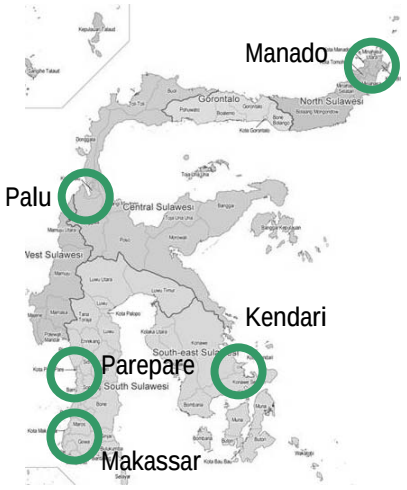
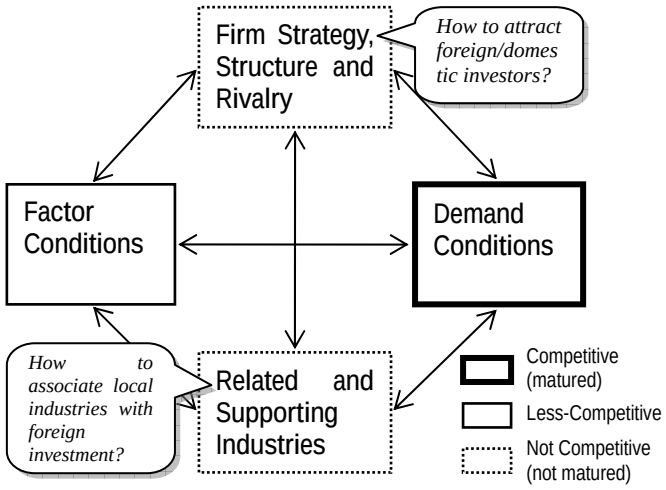
Detailed Assessment

	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 clay(?) 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 rebounds and regains vitality, the demand of cement will increase. Meanwhile, 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 engaged in 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

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

Table 4.2.5 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 fly between 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 manufactured 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 regulations, taxation, etc. concerning the foreign direct investments to Sulawesi is prepared to promote and attract such foreign manufactures Sulawesi will lose its competitive edge with other regions not only in Indonesia but also in the

		international sphere.
	Change of market needs	The comparative advantage of Sulawesi for promotion of foreign direct investment basically lies on the preparedness of inter-modal transport infrastructure in major cities ideal for light industrial products manufacturing center in 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 funds which are presently scarce 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.		

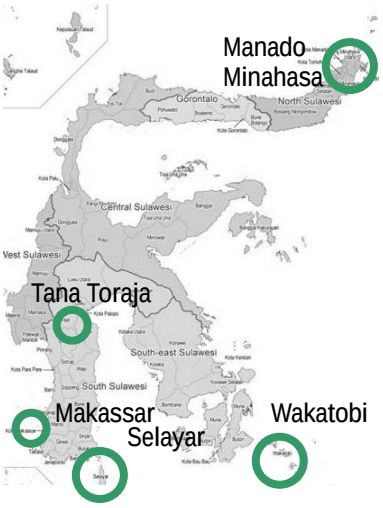
Table 4.2.5 Assessment by Proposed Industrialization (9/9)

Category of Industry / Prospective Product and Market

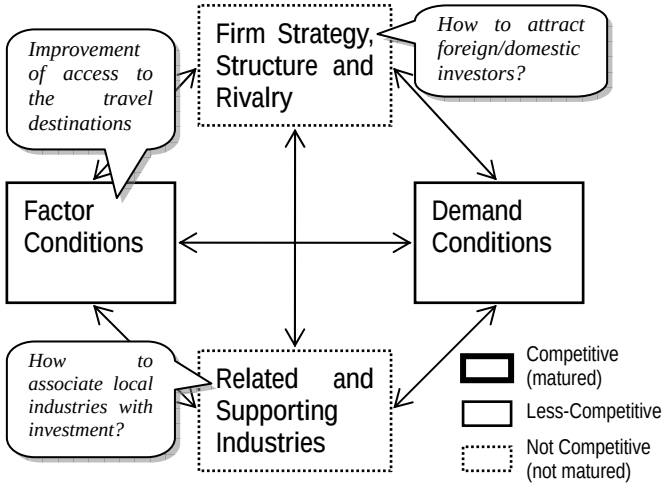
Tourism Industry

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 exist several potential marine resort areas 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 tourists 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 tourists).
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. Relationships between investors and the local economy do not seem 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.