Indonesia Economic Development Corridors
Sulawesi Economic Development Corridor Master Plan

December 2010
Context and background

This master plan is commissioned by the Economic Research Institute for ASEAN and East Asia (ERIA) with the support from the Coordinating Ministry for Economic Affairs in Indonesia (CMEA) and the Ministry of Economy, Trade and Industry Japan (METI), and drafted by The Boston Consulting Group (BCG).

This work is carried out in close collaboration with ERIA, CMEA and METI along with government officials from various ministries and key academicians in Indonesia.

This master plan maps out the strategy for implementing the overall economic and social development of corridor. It serves as a reference document for the subsequent implementation of the master plan.

The documentation should be read in conjunction with verbal commentary from the BCG team to provide greater context of background and related insights. Reading this documentation in isolation, could result in different interpretations other than those intended by BCG team.

Please kindly contact the BCG, CMEA or ERIA for further details and information regarding this plan.
The Sulawesi Corridor (Sulawesi Corridor) was defined according to guiding principles formulated through rigorous benchmarking of established economic corridors. It connects the six key hubs of Manado, Gorontalo, Palu, Mamuju, Kendari, and Makassar, and includes the Kabupaten/Kota along the path.

Sulawesi Corridor was developed to help address the following gaps:
• Low income level within the corridor, coupled with large income disparity between the richest and poorest regions
• Agriculture, the largest sector (30% of corridor's GRDP), is less productive than regional peers
• Lagging investment into the region
• Low availability and quality of basic infrastructures such as roads, amenities, and social infrastructure

The vision for the master plan is to develop Sulawesi Corridor as the production and processing center for food crops, estate crops, and fishery

Several immediate targets identified to ensure the success of the master plan:
• Connect more developed regions to lagging regions
• Achieve higher growth through agglomeration effects
• Strengthen main economic drivers and diversify into new economic sectors
• Provide adequate access to key social infrastructure to enhance employability, living conditions and sustainability of development
• Enhance infrastructure development
• Focus policy making
Executive summary (II)

For the economic development strategy, two focus sectors were identified for Sulawesi Corridor. These were further broken down to sub-sectors for more detailed analysis.

- Food agriculture – broken down to food crops (rice and maize), estate crops (cocoa and coconut) and fishery (marine capture, shrimp farming and seaweed farming)
- Food, beverage and tobacco manufacturing

Food agriculture

Food crops is a key subsector in Sulawesi Corridor, contributing ~13% of corridor's GRDP

- Rice and corn are important staple food commodity in Indonesia
- Sulawesi rice and corn production form 10% and 15% of the national production respectively
- Government emphasized food-sufficiency as one of its main developmental goals

Gaps and improvement opportunities:

- Low productivity of rice farmers in Sulawesi compared to other regions
- Corn productivity in Sulawesi is at par with the national average, but still lower compared to peers in SEA
- Inadequate irrigation is main driver of lower productivity
- Lack of storage infrastructure has resulted in around 2.5-10% in handling losses

Enablers and infrastructure needs:

- Improve irrigation and storage infrastructure at key locations along the corridor
- Improve farmer knowledge and education on modern harvesting methods to boost yield and productivity
Executive summary (III)

Coconut and Cocoa
Estate crops are key export commodities in Sulawesi Corridor and contributes ~7% of GRDP
  • Indonesia is the world’s 1st and 3rd largest producer of coconut and cocoa, respectively
  • Sulawesi is number 1 in production volumes for cocoa and number 3 for coconut relative to other Indonesian regions
Gaps and improvement opportunities:
  • Cocoa quality is lower compared to other cocoa producing nations
  • Sulawesi cocoa trees are old and need to be rehabilitated
  • ~10% of coconut trees in Sulawesi are old and damaged and will need to be rehabilitation to stay productive
  • Poor roads and access to cocoa farms depress farm-gate prices and result in lower income for farmers
  • Industry is dominated by smallholder farmers that have lower productivity compared to large corporations
  • Value of coconut products from Indonesia is lower compared to key regional competitors
Enablers and infrastructure needs:
  • Create seed research institutes to help increase productivity
  • Educate farmers on intensive farming methods and the use of fertilizers
  • Improve port infrastructure

Fishery
Fishery production is a key economic driver for Sulawesi
  • Indonesia is the largest seafood producer in SEA, with Sulawesi having the highest total fishery production
  • Fishery sub-sector has a total contribution of ~6% to total GRDP in Sulawesi
  • Of the 2 Mn ton of seafood production, 50% is from marine capture and 50% is from aquaculture
  • Large volume of fish production in Sulawesi is for species with growing global demand
Fishery (cont.)

Gaps and improvement opportunities:
- Significant overfishing occurred in Sulawesi which put future sustainability at risk
- Aquaculture production is mainly focused on low value seaweed
- Industry is dominated by smallholder fishermen and farmers that make regulation more difficult
- Production and safety quality for export products has had some issues in the past

Enablers and infrastructure needs:
- Incentives to promote aquaculture
- Stricter execution of regulation to curb overfishing

Each focus sectors as well as corridor connectivity demand specific infrastructure:
- Enhance power supply and its reliability to support the growth of the corridor
- Enhance access to clean water for food products manufacturing
- Enhance port capacity and efficiency to remove bottle necks for exports
- Improve road network within the corridor to improve logistics and reduce operating costs and improve overall connectivity of the corridor
Executive summary (V)

Comprehensive list of 7 infrastructure projects identified for Sulawesi corridor
- Projects identified based on sector analysis, need for connectivity between hubs, and existing priority government plans

The social and environment development strategy focused on achieving three objectives three key risks
- Improving employability of the workforce to participate in the economy
- Developing the suburban/rural areas to mitigate excessive urban migration
- Enhancing environmental governance to ensure environmental preservation and sustainable use of natural resources

These objectives can be achieved with focus on improving conditions in four key areas
- Education, healthcare, basic amenities, and environmental governance

Key gaps and recommendations have been identified for each of these focus areas
- **Education**: There is a clear gap of lower enrollment and access to schools for secondary and tertiary education. There is a need to enhance this segments, as the corridor economy moves beyond primary industries
- **Healthcare**: While healthcare performance have improved, there remain gaps in terms of coverage and quality in particular for the lower income group and in rural areas
- **Basic amenities**: Access to clean water supply, and electricity continue to be an issue in rural areas, while urban areas face challenges in gaining access to proper sanitation
- **Environmental governance**: Robust environment governance process are in place, but there remain clear gaps in its implementation – poor alignment between policy and enforcement, and a lack of capacity to ensure compliance
Overview of Sulawesi Corridor Master Plan

1. Corridor definition and rationale
2. Vision and objectives
3. Economic development strategy
4. Social and environmental development strategy

Source: BCG analysis
Overview of Sulawesi Corridor Master Plan

1. Corridor definition and rationale
2. Vision and objectives
3. Economic development strategy
4. Social and environmental development strategy

Source: BCG analysis
An economic corridor will be made up of five key elements

IEDCs: Connectivity defined by a **main connectivity** connecting **economic centers**, and **supporting connectivity** connecting **key sectors** to **enablers**

- **A** Main connectivity
  - Linking economic centers
- **B** Economic centers
  - Commercial centers or trading hubs
- **C** Supporting connectivity
  - Linking focus sectors to supporting infrastructure
- **D** Focus sectors
  - Sectors prioritized in the economic corridor
- **E** Supporting infrastructure
  - Ports, power, etc.

**Economic centres (hubs)**
- **Industry node**
- **Main connectivity**
- **Supporting connectivity**
- **Airport, ports**
- **Power, water**

**Suggested SEZ connections**
#### Four steps employed to nominate IEDCs

Addressing need for connectivity but at the same time ensuring alignment with existing plans

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Identify economic centers (hubs)</td>
</tr>
<tr>
<td>2</td>
<td>Identify need for connectivity between economic centers</td>
</tr>
<tr>
<td>3</td>
<td>Validate with national development plan</td>
</tr>
<tr>
<td>4</td>
<td>Identify need for connectivity for focus sectors</td>
</tr>
</tbody>
</table>

- By default capitals of all provinces in Indonesia
- Other prominent cities possible e.g. National growth centers (PKN), strategic development region, industrial zone, bonded zone, FTZ and SEZs
- Primarily based on transportation analysis (inter-regional O-D matrix analysis)
- Take into account various modes of transportation
- Connect to mega hubs where feasible to leverage positive agglomeration
- Consider spatial usage from National Spatial Plan (RTRWN)
- Consider spatial structure from National Spatial Plan (RTRWN)
- Determine focus sectors within the main connectivity
- Determine infrastructure requirement to support focus sectors and value chain
- Identify supporting connectivity to connect focus sectors and infrastructures

*Source: Working group discussion, BCG analysis*
Content of IEDCs Master Plans
Covering comprehensive economic and social development strategy for each economic corridor

1. Background and challenges of the economic corridor

   Background and challenges of the economic corridor addresses existing condition and challenges within the economic corridor, such as level of economic disparity, level of foreign and domestic investment, level of infrastructure and social development. This section provides the foundation for the development theme of the economic corridor.

2. Development theme of the economic corridor

   Development theme of the economic corridor articulates the end destination of the economic corridor. The theme is broad, and it will later be translated into more concrete strategy and tactical plans.

3. Economic and social development strategy

   Economic and social development strategy section is the key section in the master plans. Economic development strategy covers identification of focus sectors and the strategy for each focus sectors, including assessment of prospect, challenges, government support requirement, and infrastructure requirements. Social development strategy focuses on initiatives to ensure inclusive development within the economic corridor.

4. Summary of economic impact and infrastructure requirement

   Summary of economic impact and infrastructure requirement section highlights economic impact resulting from implementation of economic and social development strategy. In addition to that, this section provides estimates of investment required to provide infrastructure requirements.

Source: Working group discussion, BCG analysis
## IEDCs provide new themes of economic & social development

<table>
<thead>
<tr>
<th>Moving from...</th>
<th>To...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic development focusing on extracting and exporting commodities</td>
<td>Economic development focusing on creating added value from focus sectors</td>
</tr>
<tr>
<td>Economic concentration</td>
<td>Diverse but inclusive economic development</td>
</tr>
<tr>
<td>Centrally-driven economic development</td>
<td>Synergy between sector and regional development to sustain National competitiveness advantages</td>
</tr>
<tr>
<td>Transportation focusing on land (especially toll-road) development</td>
<td>Transportation focusing on multi-modal development</td>
</tr>
<tr>
<td>Building only infrastructure we badly need now</td>
<td>Building infrastructure we want for long term economic competitiveness</td>
</tr>
</tbody>
</table>

Source: Working group discussion, BCG analysis
Hubs and nodes are the key building blocks of corridors

**Hubs: Large, dense urban agglomerations**

- **Definition of hubs:**
  - Large urban agglomerations with high population density, economic activity
  - Major demand centers
  - Interact with surrounding areas spreading prosperity from core to periphery
  - Anchors for investment

- **Examples of hubs:**
  - Bangkok, Phnom Penh and Ho Chi Minh for the Mekong India Economic Corridor
  - Mumbai and Delhi for the Mumbai-Delhi Industrial Corridor

**Nodes: Clusters of economic activity**

- **Definition of nodes:**
  - Clusters of economic activity with high potential to become future growth drivers
  - Generate positive externalities thus also benefiting region outside of node
  - Usually industry specific and have location advantage or availability of incentives
  - Generally in proximity to hubs and supporting infrastructure (e.g. ports)

- **Example of nodes:**
  - Kanchanaburi, Ayutthaya and Battambang for the Mekong India Economic Corridor
  - Meerut-Muzaffarnagar area and Dighi for the Mumbai-Delhi Industrial Corridor

Source: Experts interview: ERIA: BCG analysis

268532-02-Sulawesi IEDC masterplan-31Dec10-BC_YAK.ppt
Six guiding principles define successful corridors

1. **Corridor to connect at least two hubs**
   - Connecting at least two hubs helps ensure a path through lagging or rural areas
   - Greater number of hubs allows for larger spill over effect to lagging areas
   - Reducing logistics costs between multiple hubs shortens the distance allowing for amalgamation effects

2. **Corridor to link hubs with rural areas**
   - Linking leading and lagging areas allow for spillover effects through improved access to higher economic opportunity in lagging areas

3. **Corridor to connect hubs over land (or bridge)**
   - Over land (or bridge) connection helps maximise spill over benefits along the path of the corridor

4. **Corridor to connect to mega hubs where feasible**
   - Mega hubs are the largest growth poles and connectivity to the mega hubs helps maximise economic and socio-economic benefits for the corridor

5. **Avoid lengthy and highly heterogeneous corridors**
   - Lengthy, dense or heterogeneous corridors can dilute effect of corridors by limiting spill over benefits

6. **Corridors to link hubs to key industry nodes and supporting infrastructure**

Source: BCG analysis
## Guiding principles are based on other successful corridors

<table>
<thead>
<tr>
<th>Guiding Principle</th>
<th>ECER and NCER (Malaysia)</th>
<th>Iskandar Malaysia</th>
<th>Delhi–Mumbai Industrial Corridor (DMIC)</th>
<th>Shenzhen – Hong Kong</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Corridor to connect at least two hubs</td>
<td>~4 regional hubs connected through each corridor</td>
<td>Focus on Johor; enhancing connection w/ S’pore secondary obj.</td>
<td>Delhi, Mumbai and other regional hubs connected</td>
<td>Shenzhen and Hong Kong connected</td>
</tr>
<tr>
<td><strong>2</strong> Corridor to link hubs with rural areas</td>
<td>Corridors pass many rural areas and also focus on agri dev’t</td>
<td>Focus on existing towns/city but will spillover to surrounding rural</td>
<td>Corridor, that links hubs, passes through plenty of rural areas</td>
<td>Focus on linking two hubs with some rural areas in between</td>
</tr>
<tr>
<td><strong>3</strong> Corridor to connect hubs overland (or bridge)</td>
<td>Focus exclusively on overland developments</td>
<td>Focus exclusively on overland developments</td>
<td>Focus exclusively on overland developments</td>
<td>Focus exclusively on overland developments</td>
</tr>
<tr>
<td><strong>4</strong> Corridor to connect to mega hubs where feasible</td>
<td>Not linked to KL; however, long dist. may have prevented this</td>
<td>Focus on Johor; enhancing connection w/ S’pore secondary obj.</td>
<td>Delhi and Mumbai are the two focal mega hubs connected</td>
<td>Connecting to Hong Kong is one main objective</td>
</tr>
<tr>
<td><strong>5</strong> Avoid lengthy and highly heterogeneous corridors</td>
<td>Focus on specific regions with no obvious heterogeneity</td>
<td>Very location-focused dev’t with no obvious cultural divide</td>
<td>No obvious heterogeneity but distance as long as 1483 km</td>
<td>Very location-focused dev’t with no obvious cultural divide</td>
</tr>
<tr>
<td><strong>6</strong> Corridor to link hubs with key industry nodes and supporting infrastructure</td>
<td>One of the corridor’s main visions/objectives</td>
<td>One of the corridor’s main visions/objectives</td>
<td>The corridor’s number-one most important objective</td>
<td>Focus on leveraging off each other’s infra and resources</td>
</tr>
</tbody>
</table>

Source: Corridors’ and Authorities’ websites; Literature search; BCG analysis
Internationally, corridors have been established to boost growth of economic development

Other economic corridors around the world

**Mekong Economic Corridor - India**
- Intended to reduce poverty through infrastructure development and facilitate trade
  - *Hubs:* Bangkok, Phnom Penh & HCM
  - *Nodes:* Kanchanaburi, Ayutthaya and Battambang

**Delhi-Mumbai Industrial Corridor**
- Intended to create strong economic base with globally competitive environment and advanced infrastructure
  - *Hubs:* Mumbai and Delhi
  - *Nodes:* Meerut-Muzaffarnagar area and Dighi

**MSC Malaysia**
- Intended to spearhead transformation of Malaysia into a knowledge based economy driven by a knowledge society

Example: Delhi-Mumbai Industrial Corridor

Source: Stakeholder inputs; BCG analysis

THE BOSTON CONSULTING GROUP
Sulawesi Corridor: Defined by 6 hubs and the Kabupaten/Kota connecting them (I)

**Corridor Overview**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population&lt;sup&gt;1&lt;/sup&gt;</td>
<td>12.1 million</td>
</tr>
<tr>
<td>GRDP&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Rp 190.1 Tn (15.7 Mn per capita)</td>
</tr>
<tr>
<td>Top 3 sectors&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Agriculture, Trade, Services</td>
</tr>
<tr>
<td>No. of hubs linked</td>
<td>6 hubs</td>
</tr>
<tr>
<td>Income disparity&lt;sup&gt;4&lt;/sup&gt;</td>
<td>Rp 12.3 Mn (80.0% of richest Kab.)</td>
</tr>
<tr>
<td>Growth disparity&lt;sup&gt;5&lt;/sup&gt;</td>
<td>9.9%</td>
</tr>
<tr>
<td>Literacy rate&lt;sup&gt;6&lt;/sup&gt;</td>
<td>89%</td>
</tr>
<tr>
<td>Life expectancy&lt;sup&gt;6&lt;/sup&gt;</td>
<td>68.2 years</td>
</tr>
<tr>
<td>Electrification&lt;sup&gt;6&lt;/sup&gt;</td>
<td>81% households has access to PLN elec.</td>
</tr>
<tr>
<td>Road Length&lt;sup&gt;6&lt;/sup&gt;</td>
<td>16.4 metres per capita</td>
</tr>
<tr>
<td>Poverty level&lt;sup&gt;6&lt;/sup&gt;</td>
<td>15.0% of population under poverty line</td>
</tr>
</tbody>
</table>

1. 2007 estimate 2. 2006 nominal GRDP 3. By GRDP 4. 2006 GRDP per capita disparity between richest and poorest Kabupaten/Kota covered by corridor 5. Disparity between the 2006 growth rates in nominal GRDP of the fastest and slowest growing Kabupaten/Kota covered by the corridor 6. Provincial data used as proxies for the Kabupaten/Kota covered by the corridor

Note: Hub-to-hub connections shown here are illustrative only. Actual physical connection infrastructure to be further verified during master-planning and validated through technical feasibility studies.

Note: 2008 data unless indicated otherwise; Kabupaten/Kota included in corridor are those within 50 km of each hub and those crossed along the length of corridor

Source: Badan Pusat Statistik; BCG analysis
Sulawesi Corridor: Defined by 6 hubs and the Kabupaten / Kota connecting them (II)

West Sulawesi
- Kab. Mamuju Utara
- Kab. Mamuju
- Kab. Mamasa
- Kab. Majene
- Kab. Polmas

South Sulawesi
- Kab. Bulukumba
- Kab. Bantaeng
- Kab. Jeneponto
- Kab. Takalar
- Kab. Gowa
- Kab. Sinjai
- Kab. Maros
- Kab. Pangkajene Kepulauan
- Kab. Barru
- Kab. Bone
- Kab. Soppeng
- Kab. Sidenreng Rappang
- Kab. Pinrang
- Kab. Enrekang
- Kab. Tana Toraja
- Kota Makassar
- Kota Pare-Pare
- Kab. Luwu
- Kab. Luwu Utara
- Kab. Luwu Timur

North Sulawesi
- Kab. Bolaang Mengondow
- Kab. Bolaang Mengondow Utara
- Kab. Minahasa
- Kab. Minahasa Selatan
- Kab. Minahasa Utara
- Kab. Minahasa Tenggara
- Kota Manado
- Kota Bitung
- Kota Tomohon
- Kota Kotamubago

South East Sulawesi
- Kab. Konawe
- Kab. Kolaka
- Kab. Konawe Selatan
- Kab. Bombana
- Kab. Kolaka Utara
- Kota Kendari

Gorontalo
- Kab. Boalemo
- Kab. Gorontalo
- Kota Gorontalo

Note: Hub-to-hub connections shown here are illustrative only. Actual physical connection infrastructure to be further verified during master-planning and validated through technical feasibility studies.

Note: Kabupaten/Kota included in corridor are those within 50km of each hub and those crossed along the length of corridor.

Source: Badan Pusat Statistik; City websites; Indonesia Investment Coordinating Board; BCG analysis.
# Overview of hubs identified for Sulawesi Corridor

<table>
<thead>
<tr>
<th>Hubs</th>
<th>GRDP (Rp Tn)(^1)</th>
<th>Population(^2) ('000)</th>
<th>Area (km(^2))</th>
<th>Top 3 sectors</th>
<th>Overview</th>
</tr>
</thead>
</table>
| Manado | 8.1                 | 424                      | 157              | • Wholesale and retail trade (21%)  
   • Transport & comm. (19%)  
   • Gov't services (11%) | • Emerging tourist destination with further ecotourism opportunities  
   • Business hub for trading in the minerals and raw materials sector |
| Gorontalo | 1.2           | 162                      | 65               | • Gov't Services (23%)  
   • Wholesale and retail trade (12%)  
   • Transport & comm. (15%) | • Province formed only in 2000  
   • Business development concentrated in agricultural industry  
   • Potential to expand fishery and animal husbandry |
| Kendari | 3.4                 | 251                      | 296              | • Transport & comm. (25%)  
   • Wholesale and retail trade (19%)  
   • Agriculture (18%) | • Large nickel deposits  
   • Cocoa is a major commodity in the area |
| Mamuju | 1.9                 | 296                      | 8,014            | • Agriculture (62%)  
   • Gov't Services (15%)  
   • Wholesaler and retail trade (5%) | • Plans made to build an international container port  
   • Center of trade for West Sulawesi |
| Makassar | 24.8               | 1,223                    | 176              | • Wholesale and retail trade (25%)  
   • Non-O&G Manufacturing (23%)  
   • Transport & comm. (16%) | • South Sulawesi produces 70% of Indonesia's cocoa  
   • Famous for exports of fishery products  
   • Large nickel deposits in Luwu area |
| Palu    | 4.4                 | 304                      | 395              | • Gov't Services (19%)  
   • Transport & comm. (13%)  
   • Wholesale and retail trade (12%) | • Large produced of coconut |

1. 2008 2. 2007  
Source: Provinsi dan Kabupaten dalam angka, Badan Pusat Statistik; BCG analysis
Sulawesi's economy is growing faster than the national average...

Most areas in Sulawesi have higher economic growth vs. overall...

<table>
<thead>
<tr>
<th>Region</th>
<th>Nat'l avg</th>
<th>Jakarta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulawesi</td>
<td>5.2</td>
<td>6.0</td>
</tr>
<tr>
<td>Sulawesi Utara</td>
<td>5.4</td>
<td></td>
</tr>
<tr>
<td>Sulawesi Tengah</td>
<td>7.6</td>
<td></td>
</tr>
<tr>
<td>Sulawesi Selatan</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>Sulawesi Tenggara</td>
<td>7.6</td>
<td></td>
</tr>
<tr>
<td>Gorontalo</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>Sulawesi Barat</td>
<td>7.2</td>
<td></td>
</tr>
</tbody>
</table>

However region is growing from a very small base

Real GRDP across regions (Rp Tn), 2006

Jawa | Sumatera | Kalimantan | Sulawesi | Bali – Nusa Tenggara | Maluku - Papua
1,137.2 | 408.4 | 165.7 | 84.7 | 50.8 | 31.2

3. Include: life expectancy, literacy rate, mean years of schooling, and adjusted per capita real expenditure

Source: Badan Pusat Statistik; Province and Kabupaten dalam angka; BCG analysis
...yet remains to be one of the poorest regions

GRDP per capita (Rp)

Kalimantan 15,000,000
Java 11,000,000
Sumatera 6,000,000
Maluku & Papua 4,000,000
Sulawesi 3,000,000
Bali & Nusa Tenggara 2,000,000
Indonesia 3,88%

CAGR, 2003-2007

Kalimantan 1.54%
Java 4.94%
Sumatera 2.41%
Maluku & Papua -2.30%
Sulawesi 4.97%
Bali & Nusa Tenggara 3.10%
Indonesia 3.88%
**Five rationales drive the need for Sulawesi Corridor**

<table>
<thead>
<tr>
<th>Key characteristics of Sulawesi drive the need for corridor development</th>
<th>Objectives of the Sulawesi Corridor tailored to address these key issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Low GRDP per capita along the corridor</td>
<td>1. To connect poor regions to more developed ones and to provide the necessary infrastructure to help boost regional income</td>
</tr>
<tr>
<td>2. Agricultural industry, the major portion of GRDP, is experiencing declining growth(^1)</td>
<td>2. To provide the necessary enablers/infrastructure to help boost agricultural productivity in the region</td>
</tr>
<tr>
<td>3. Lagging investments into the region</td>
<td>3. To identify and develop targeted policy initiatives in order to attract both foreign and domestic investments into W. Sulawesi</td>
</tr>
<tr>
<td>4. Inadequate economic infrastructure</td>
<td>4. To identify and develop the necessary economic infrastructure tailored to the identified industries in focus</td>
</tr>
<tr>
<td>5. Poor quality of life caused by inadequate social infrastructure, but improving</td>
<td>5. To implement social infrastructure projects to boost living standards and provide platforms for future economic development</td>
</tr>
</tbody>
</table>

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\(^1\) Agriculture forms the largest fraction of regional GRDP

Source: Badan Pusat Statistik; BCG analysis
Low income and income disparity

GRDP per capita significantly below national average in most areas of Western Sulawesi

Source: BPS; BCG analysis
Income is low across all provinces in the region

Source: Badan Pusat Statistik; BCG analysis
Corridor development can promote growth and improve rural income

Corridor promotes growth beyond congested hubs...
Corridors can drive development of regions surrounding hubs by
• Providing connecting infrastructure

Example:
• With good road access to markets in Indonesia, villages 50 km away from district center generate similar manufacturing activity with district center

... and increases income level of rural households
Development of transportation and supporting infrastructure directly impacts people welfare
• Providing access to economic engines of hub

Example:
• A UNESCAP study of 16 villages in Bangladesh showed that the development of roads, electricity, schools, health centres, banks and markets, had a significant positive impact on the income of rural households

Shenzhen is a good example of connecting infrastructure
Shenzhen has grown significantly
• 1980 – rural fishing village
• 2007 – the richest city in China

Shenzhen nominal GRDP per capita

Key factors for success:
• Accessibility to Hong Kong
  – Access to investment and human capital
• World class infrastructure
  – Connectivity via seaport, airport, road, rail, and telecommunication
• Supportive government policy
  – Lower tax rate at 15% to attract FDI
  – One stop services for MNCs

1. By GRDP per capita 2. Convenient, efficient and transparent government administration
Source: UNESCAP, reducing disparities; The World Bank; Daily China; Badan Pusat Statistik; BCG analysis
Sulawesi Corridor's economy largely driven by agriculture

Agriculture\(^1\) makes up almost \(\sim 28\%\) of GRDP in Western Sulawesi\(^2\)...

...with \(\sim 50\%\) of Western Sulawesi’s workforce\(^3\) in agriculture

---

1. Includes food and non-food agriculture  
2. Only include the Kabupaten/Kota covered by the corridor  
3. Provincial data used as proxies for the Kabupaten/Kota covered by the corridor  
4. 2005 data

Source: Badan Pusat Statistik; CIA World Fact Book; BCG analysis
However, agricultural sector growth in Sulawesi lags behind other sectors.

Source: Badan Pusat Statistik

- Finance, Real Estate & Biz Service: 17.5%
- Transport and Communication: 16.8%
- Electricity, Gas & Water: 16.0%
- Trade, Hotel & Restaurants: 15.3%
- Services: 13.9%
- Construction: 13.7%
- Non-Oil & Gas Manufacturing: 13.1%
- Non-Oil & Gas Manufacturing: 13.1%
- Food Agriculture: 11.7%
- Oil & Gas Mining: 7.5%

CAGR of Current GRDP of Sulawesi Sectors, 2000-2006 (%)
Agriculture sector productivity lags behind regional peers, thus presenting a huge opportunity.

Although comparable to national average, Sulawesi’s agricultural productivity significantly lags behind regional peers.

Nominal GRDP per laborer in Agriculture (Rp Mn), 2006

Corridor devt to provide necessary enablers/infrastructure to boost agricultural productivity in Western Sulawesi

Note: “Nominal GRDP per laborer in Agriculture” is calculated by dividing the nominal agriculture GRDP by the number of agriculture labourers.
Source: Badan Pusat Statistik; BPS Dalam Angka; CIA World Fact Book; Bank Indonesia; BCG analysis.
Sulawesi production is mostly used for internal consumption

Although export-import ratio in Sulawesi is high...

...Only 22% of GRDP is exported out of the region

Successful growth strategy could help Sulawesi become a significant net-exporter of agricultural goods

Source: Badan Pusat Statistik, BCG analysis
FDI and domestic investments into Sulawesi corridor lag behind other islands

### Portion of FDI to GRDP in W. Sulawesi well below national average

<table>
<thead>
<tr>
<th>Island</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sumatera</td>
<td>2.0</td>
<td>1.6</td>
<td>1.2</td>
</tr>
<tr>
<td>Java</td>
<td>4.5</td>
<td>3.7</td>
<td>2.2</td>
</tr>
<tr>
<td>Kalimantan</td>
<td>1.7</td>
<td>0.9</td>
<td>0.7</td>
</tr>
<tr>
<td>Sulawesi</td>
<td>3.2</td>
<td>1.8</td>
<td>0.6</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2.7</td>
<td>1.5</td>
<td>0.1</td>
</tr>
</tbody>
</table>

### Similarly, percentage of DDI to GRDP also lags behinds other regions in Indonesia

<table>
<thead>
<tr>
<th>Island</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sumatera</td>
<td>2.3</td>
<td>1.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Java</td>
<td>0.9</td>
<td>0.9</td>
<td>0.7</td>
</tr>
<tr>
<td>Kalimantan</td>
<td>0.9</td>
<td>0.9</td>
<td>0.5</td>
</tr>
<tr>
<td>Sulawesi</td>
<td>0.9</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1.2</td>
<td>1.0</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Note: For Sulawesi, data only includes the provinces to be covered by the corridor – i.e. Sulawesi Tenggara is not included.

Source: Indonesia Investment Coordinating Board; Badan Pusat Statistik; BCG analysis

Targeted incentive plans and policies to be identified and implemented to boost investment flow into the region.
Inadequate economic infrastructure

Poor roads in Sulawesi corridor require improvement to enhance connectivity and facilitate regional development

Majority of roads in Western Sulawesi in poor conditions...

<table>
<thead>
<tr>
<th></th>
<th>State%</th>
<th>Province%</th>
<th>Kabupaten%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good Condition</td>
<td>25.1</td>
<td>50.6</td>
<td>37.7</td>
</tr>
<tr>
<td>Below Good Condition</td>
<td>74.9</td>
<td>49.4</td>
<td>62.3</td>
</tr>
</tbody>
</table>

...exacerbated by poor transport practice and weak legal enforcement of traffic rules

- The damage to roads is due to overloaded trucks that are exceeding the legal axle limits
- Poor enforcement of axle load limits perpetuates the problem of overloaded trucks, and thus, even if road conditions are improved, damages to them will persist
  - "Drivers and firms also make payments to the police and to local mafia to avoid being stopped as well as to avoid being fined"

The Asia Foundation, 2008

Note: Provincial data used as proxies for the Kabupaten/Kota covered by the corridor; "Below Good Condition" covers roads classified as "Moderate", "Damaged" and "Badly Damaged" by BPS Source: Badan Pusat Statistik; Mongabay; The Asia Foundation; BCG analysis
Inadequate economic infrastructure

Electricity and water supply inadequate to meet demand

Electrification across Sulawesi is lower than national average

Electricity and water supply inadequate to meet demand

Clean water consumption is lower than national average

Source: PLN master plan, BPS, BCG analysis
Sulawesi seaports lack efficiency to facilitate trade

Inefficiency evident from high vessel turnaround time

Which decreases cost competitiveness of the regional exports

- Lack of port capacity, limits vessel size and hence opportunities for consolidation and bulk handling

- Many of the islands main agricultural commodities such as cocoa are shipped in bags, with a relatively high cost of around $165 per ton to Europe...if loaded and shipped in bulk, the rate will drop to $80 per ton and required vessel time would reduce from 6 to 2 days

"The dry bulk terminal in the Port of Makassar handling mainly wheat that could accommodate large dry bulk vessels... this dry bulk terminal is only operating at around 20 percent capacity"

Indonesia Port Sector Reform and the 2008 Shipping Law, USAID

Corridor development to improve necessary infrastructure to enhance export-led growth in the region

1. Based on 2007 data
Source: Badan Pusat Statistik; USAID; Bureau of Infrastructure, Transport and Regional Economics, Australian Government; Indonesia Infrastructure Report Q3 2009; BCG analysis

268532-02-Sulawesi IDEC masterplan-31Dec10-BC_YS-JAK.ppt
Sulawesi has shown improvement in social development, but still has room to improve

Sulawesi Utara well placed, but other areas are below national average...

...With 2 out of 6 provinces moving up the HDI rankings in Indonesia

<table>
<thead>
<tr>
<th>Province</th>
<th>2004 Rank</th>
<th>2008 Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulawesi Utara</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Sulawesi Selatan</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Sulawesi Tengah</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Gorontalo</td>
<td>28</td>
<td>24</td>
</tr>
<tr>
<td>Sulawesi Tenggara</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Sulawesi Barat</td>
<td>29</td>
<td>28</td>
</tr>
</tbody>
</table>

1. Include: life expectancy, literacy rate, mean years of schooling, and adjusted per capita real expenditure
Source: Badan Pusat Statistik; Province and Kabupaten dalam angka; BCG analysis
Inadequate social infrastructure

Education and healthcare form crucial platforms to drive productivity and growth

Good social conditions required for high productivity

"Education, skills and training allow people to participate in national development through improved wages and greater opportunities for mobility and advancement"

Asia Development Bank

"The availability of health facilities reduces the loss of man-hours and labor productivity due to timely treatment of illness"

ERIA Research Paper

Corridor to improve access to required social infrastructure

Improve access to education

- Transport infrastructure reduces the costs of reaching education facilities
- Access to adequate training programs to improve information flow for education
- Help access for hiring and attracting teachers/educators

Improve access to healthcare

- Transport infrastructure reduces the costs of reaching healthcare facilities
- Access to adequate educational/training programs to improve information flow for healthcare
- Help access for hiring and attracting health professionals

Inadequate social infrastructure

Access to education remains low

Low availability of secondary education in compared to regional peers...

...explain the larger drop in enrolment ratio after primary education

Development to be focused on this crucial propellant of future economic productivity and growth in the corridor

Note: Provincial data used as proxies for the Kabupaten/Kota covered by the corridor
Source: Badan Pusat Statistik; UNESCO Global Education Digest 2009; CIA World Fact Book; BCG analysis
Health problems in Sulawesi corridor well above national levels...

Occurrences of diarrhoea, respiratory disease and malaria in most areas of Western Sulawesi higher than nation averages

Note: Provincial data used as proxies for the Kabupaten/Kota covered by the corridor; Western Sulawesi only includes the provinces covered by the corridor.
Source: Badan Pusat Statistik; BCG analysis
**Inadequate social infrastructure**

...caused by poor access to healthcare and inadequate sanitation system

---

**Low availability of doctors in most areas of Western Sulawesi**

<table>
<thead>
<tr>
<th>Province</th>
<th>No. of population per physician</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulawesi Utara</td>
<td>4,330</td>
</tr>
<tr>
<td>Sulawesi Selatan</td>
<td>9,964</td>
</tr>
<tr>
<td>Sulawesi Tenggara</td>
<td>7,936</td>
</tr>
<tr>
<td>Gorontalo</td>
<td>6,196</td>
</tr>
<tr>
<td>Sulawesi Barat</td>
<td>9,077</td>
</tr>
</tbody>
</table>

**Sanitation in Western Sulawesi well below national level**

<table>
<thead>
<tr>
<th>Province</th>
<th>% of HHs with private toilet facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulawesi Utara</td>
<td>62.5</td>
</tr>
<tr>
<td>Sulawesi Tengah</td>
<td>50.6</td>
</tr>
<tr>
<td>Sulawesi Selatan</td>
<td>58.2</td>
</tr>
<tr>
<td>Gorontalo</td>
<td>31.8</td>
</tr>
<tr>
<td>Sulawesi Barat</td>
<td>46.1</td>
</tr>
</tbody>
</table>

---

Social infrastructure improvement critically needed to create healthy workforce to facilitate further development

---

Note: Provincial data used as proxies for the Kabupaten/Kota covered by the corridor; Thailand’s, Malaysia’s and Singapore’s data are as of 2007

Source: Badan Pusat Statistik; BPS Dalam Angka; World Health Statistics 2009, World Health Organization; BCG analysis

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Overview of Sulawesi Corridor Master Plan

1. Corridor definition and rationale
2. Vision and objectives
3. Economic development strategy
4. Social and environmental development strategy
Corridor seeks to promote sustainable development
6 key objectives defined to achieve corridor vision

Vision

Develop Sulawesi Corridor as production and processing center for food crops, estate crops, and fishery

Objectives

1 Connect more developed regions to lagging regions
2 Achieve higher growth through agglomeration effects
3 Strengthen main economic drivers and diversify into new economic sectors
4 Provide adequate access to key social infrastructure to enhance employability, living conditions, and sustainability of development
5 Enhance infrastructure development
6 Focus policy making
6 objectives to focus master plan design

1. Connect more developed regions to lagging regions
   - Corridors connect leading and lagging areas allowing surrounding (often lagging and poorly connected regions) to participate in economic activities generated by the hubs and nodes

2. Achieve higher growth through agglomeration effects
   - Connective infrastructures in corridors geographically amalgamate economic activity by reducing cost and time between centers of economic activity, allowing benefits of clustering to spur further growth

3. Strengthen main economic drivers and diversify into new economic sectors
   - Specific corridor infrastructure and measures to enhance high potential key economic drivers can further enhance the economic development of the hubs, nodes and the corridor’s area of influence

4. Provide adequate access to key social infrastructure to enhance employability, living conditions and sustainability of development
   - Specific social infrastructure and measures can complement economic development and ensure that ability for the workforce to participate in growth and surrounding regions to anchor the workforce to achieve balanced development across the region

5. Enhance infrastructure development
   - Corridors encourage infrastructure development by proving a framework to identify gaps in current infrastructure and by facilitating private sector investment in infrastructure

6. Focus policy making
   - Corridors provide a framework and platform through which policymakers can shape regulatory and legal environment as well as implement specific measures to create a conducive environment for economic activity and investment

Source: BCG analysis
Overview of Sulawesi Corridor Master Plan

1. Corridor definition and rationale
2. Vision and objectives
3. Economic development strategy
4. Social and environmental development strategy
Agenda

Identification of focus sectors

Positioning, gaps and economic development strategy for focus sectors
  • Food crops
  • Estate crops
  • Fishery
  • Nickel

Summary of infrastructure and high-level PPP recommendation
  • Summary of Infrastructure requirement for stage 1 (2011 – 2014)
  • Summary of Infrastructure requirement for stage 2 (2015 – 2030)
  • High-level PPP recommendation

Summary of GRDP impact
Agenda

Identification of focus sectors

Positioning, gaps and economic development strategy for focus sectors
• Food crops
• Estate crops
• Fishery
• Nickel

Summary of infrastructure and high-level PPP recommendation
• Summary of Infrastructure requirement for stage 1 (2011 – 2014)
• Summary of Infrastructure requirement for stage 2 (2015 – 2030)
• High-level PPP recommendation

Summary of GRDP impact
Identifying key focus sectors consist of three key steps

1. Future point of view: Sector attractiveness at national level
2. Current point of view: Current sector contribution in the corridor
3. Focus sectors

Key question: What sectors should EJBNT corridor focus on?

Source: BCG analysis
16 sub-sectors identified as most attractive and ranked

Industries classified along 5 sectors

16 sub-sectors\(^1\) with significant presence in Indonesia identified

16 priority sub-sectors ranked

**Sectors**
- Manufacturing
- Agriculture
- Mining
- Services
- Others

**Sub-sectors**
- Oil & Gas manufacturing
- Equipment & machinery\(^4\)
- Food products\(^3\) manufacturing
- Fertilizer chemicals & Rubber
- Textiles\(^2\)
- Paper & printing
- Food agriculture
- Non food agriculture
- Oil & Gas
- Non Oil & Gas mining
- Wholesale & retail trade
- Hotels & restaurants
- Transport services
- Banking
- Electricity
- Construction

**Only sub-sectors with significant presence in Indonesia**

**16 priority sub-sectors ranked**

1. Non food agriculture
2. Textiles\(^2\)
3. Non oil and gas mining
4. Food products\(^3\)
5. Equipment & machinery\(^4\)
6. Electricity
7. Transport services
8. Banking
9. Food agriculture
10. Hotels and restaurants
11. Fertilizer, chemicals & rubber
12. Paper & printing
13. Oil & gas
14. Wholesale & retail trade
15. Construction
16. Oil & gas manufacturing

---

1. 16 sub-sectors based on categories identified by BPS
2. Textiles includes leather and footwear
3. Food products include food, beverage and tobacco
4. Equipment and machinery includes transport equipment, machinery and apparatus

Source: Datamonitor; BPS; BCG analysis
## Attractiveness of sector

Attractiveness score based on weighted average scores of individual dimensions

<table>
<thead>
<tr>
<th>Sub-sector</th>
<th>Rating</th>
<th>Rank</th>
<th>Sub-sector</th>
<th>Growth</th>
<th>Quartile</th>
<th>Sub-sector</th>
<th>Profitability</th>
<th>Quartile</th>
<th>Sub-sector</th>
<th>Size ($Bn)</th>
<th>Quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textiles(^\text{3})</td>
<td>H</td>
<td>1</td>
<td>Electricity</td>
<td>12.50%</td>
<td>1</td>
<td>Non oil &amp; gas mining</td>
<td>21.8%</td>
<td>1</td>
<td>Wholesale, retail trade</td>
<td>11,974</td>
<td>1</td>
</tr>
<tr>
<td>Paper &amp; printing</td>
<td>H</td>
<td>1</td>
<td>Non oil &amp; gas mining</td>
<td>12.0%</td>
<td>1</td>
<td>Non oil &amp; gas mining</td>
<td>20.0%</td>
<td>1</td>
<td>Oil &amp; gas manufacturing</td>
<td>5,077</td>
<td>1</td>
</tr>
<tr>
<td>Equipment &amp; machinery(^\text{5})</td>
<td>H</td>
<td>1</td>
<td>Banking</td>
<td>9.70%</td>
<td>1</td>
<td>Hotels &amp; restaurants</td>
<td>11.41%</td>
<td>1</td>
<td>Oil &amp; gas</td>
<td>4,368</td>
<td>1</td>
</tr>
<tr>
<td>Food products manuf.(^\text{4})</td>
<td>H</td>
<td>1</td>
<td>Non food agriculture</td>
<td>7.0%</td>
<td>1</td>
<td>Food products manuf.</td>
<td>7.10%</td>
<td>1</td>
<td>Food products manuf.4</td>
<td>4,140</td>
<td>1</td>
</tr>
<tr>
<td>Fertilizer chem. &amp; rubber</td>
<td>H</td>
<td>1</td>
<td>Textiles(^\text{3})</td>
<td>6.90%</td>
<td>2</td>
<td>Oil &amp; gas</td>
<td>5.80%</td>
<td>2</td>
<td>Transport services</td>
<td>2,747</td>
<td>2</td>
</tr>
<tr>
<td>Electricity</td>
<td>H/M</td>
<td>2</td>
<td>Transport services</td>
<td>6.30%</td>
<td>2</td>
<td>Equipment &amp; machinery(^\text{5})</td>
<td>5.70%</td>
<td>2</td>
<td>Construction</td>
<td>2,323</td>
<td>2</td>
</tr>
<tr>
<td>Non food agriculture</td>
<td>H/M</td>
<td>2</td>
<td>Food agriculture</td>
<td>5.80%</td>
<td>2</td>
<td>Textiles(^\text{3})</td>
<td>4.10%</td>
<td>2</td>
<td>Equipment &amp; machinery(^\text{5})</td>
<td>2,104</td>
<td>2</td>
</tr>
<tr>
<td>Transport services</td>
<td>H/M</td>
<td>2</td>
<td>Wholesale, retail trade</td>
<td>4.72%</td>
<td>2</td>
<td>Construction</td>
<td>3.79%</td>
<td>2</td>
<td>Textiles(^\text{3})</td>
<td>1,972</td>
<td>2</td>
</tr>
<tr>
<td>Food agriculture</td>
<td>H/M</td>
<td>2</td>
<td>Hotels &amp; restaurants</td>
<td>4.0%</td>
<td>3</td>
<td>Banking</td>
<td>3.66%</td>
<td>3</td>
<td>Banking</td>
<td>1,875</td>
<td>3</td>
</tr>
<tr>
<td>Non oil &amp; gas mining</td>
<td>M</td>
<td>3</td>
<td>Paper &amp; printing</td>
<td>3.60%</td>
<td>3</td>
<td>Fertilizer chem. &amp; rubber</td>
<td>2.70%</td>
<td>3</td>
<td>Non oil &amp; gas mining</td>
<td>1,595</td>
<td>3</td>
</tr>
<tr>
<td>Oil &amp; gas</td>
<td>M</td>
<td>3</td>
<td>Construction</td>
<td>3.50%</td>
<td>3</td>
<td>Electricity</td>
<td>2.61%</td>
<td>3</td>
<td>Electricity</td>
<td>1,466</td>
<td>3</td>
</tr>
<tr>
<td>Oil &amp; gas manufacturing</td>
<td>M</td>
<td>3</td>
<td>Equipment &amp; machinery(^\text{6})</td>
<td>3.40%</td>
<td>3</td>
<td>Wholesale, retail trade</td>
<td>2.60%</td>
<td>3</td>
<td>Food agriculture</td>
<td>1,392</td>
<td>3</td>
</tr>
<tr>
<td>Banking</td>
<td>L</td>
<td>4</td>
<td>Food products manuf.(^\text{4})</td>
<td>3.0%</td>
<td>4</td>
<td>Food agriculture</td>
<td>1.57%</td>
<td>4</td>
<td>Hotels &amp; restaurants</td>
<td>1,208</td>
<td>4</td>
</tr>
<tr>
<td>Wholesale, retail trade</td>
<td>L</td>
<td>4</td>
<td>Fertilizer, chem. &amp; rubber</td>
<td>1.39%</td>
<td>4</td>
<td>Paper &amp; printing</td>
<td>0.90%</td>
<td>4</td>
<td>Paper &amp; printing</td>
<td>902</td>
<td>4</td>
</tr>
<tr>
<td>Hotels &amp; restaurants</td>
<td>L</td>
<td>4</td>
<td>Oil &amp; gas</td>
<td>-0.90%</td>
<td>4</td>
<td>Transport services</td>
<td>0.40%</td>
<td>4</td>
<td>Fertilizer chem. &amp; rubber</td>
<td>296</td>
<td>4</td>
</tr>
<tr>
<td>Construction</td>
<td>L</td>
<td>4</td>
<td>Oil &amp; gas manufacturing</td>
<td>-1.70%</td>
<td>4</td>
<td>Oil &amp; gas manufacturing</td>
<td>0.20%</td>
<td>4</td>
<td>Non oil food agriculture</td>
<td>22</td>
<td>4</td>
</tr>
</tbody>
</table>

### Notes

1. Analyst forecast vary, up to 2% growth.
2. Industry size measured in revenue.
3. Textiles includes leather and footwear.
4. Food products include food, beverage and tobacco.
5. Equipment and machinery includes transport equipment, machinery and apparatus.

Source: Datamonitor, Literature search, BCG analysis.
16 sub-sectors ranked by score across dimensions

### Ranking of sub-sectors based on four dimensions

<table>
<thead>
<tr>
<th>Sub-sector</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non food agriculture</td>
<td>3.4</td>
</tr>
<tr>
<td>Textiles</td>
<td>3.3</td>
</tr>
<tr>
<td>Non oil and gas mining</td>
<td>3.2</td>
</tr>
<tr>
<td>Food products manufacturing</td>
<td>3.1</td>
</tr>
<tr>
<td>Equipment &amp; machinery</td>
<td>2.9</td>
</tr>
<tr>
<td>Electricity</td>
<td>2.8</td>
</tr>
<tr>
<td>Transport services</td>
<td>2.4</td>
</tr>
<tr>
<td>Banking</td>
<td>2.4</td>
</tr>
<tr>
<td>Food agriculture</td>
<td>2.3</td>
</tr>
<tr>
<td>Hotels and restaurants</td>
<td>2.3</td>
</tr>
<tr>
<td>Fertilizer, chemical and rubber</td>
<td>2.2</td>
</tr>
<tr>
<td>Paper &amp; printing</td>
<td>2.2</td>
</tr>
<tr>
<td>Oil &amp; gas</td>
<td>2.2</td>
</tr>
<tr>
<td>Wholesale and retail trade</td>
<td>2.2</td>
</tr>
<tr>
<td>Construction</td>
<td>2.1</td>
</tr>
<tr>
<td>Oil &amp; gas manufacturing</td>
<td>1.6</td>
</tr>
</tbody>
</table>

1. Textiles includes leather and footwear
2. Food products manufacturing include food, beverage and tobacco
3. Equipment and machinery includes transport equipment, machinery and apparatus

Source: BCG analysis

The Boston Consulting Group
### Definition of sub-sectors in Indonesia

Based on BPS definition

<table>
<thead>
<tr>
<th>Sector</th>
<th>Sub-sector</th>
<th>Major industries included in sub-sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>• Oil &amp; gas manufacturing</td>
<td>• Petroleum refinery, liquefied natural gas</td>
</tr>
<tr>
<td></td>
<td>• Equipment &amp; machinery</td>
<td>• Transport equipment, electrical machinery, industrial machinery, apparatus, iron and basic steel, fabricated metal products</td>
</tr>
<tr>
<td></td>
<td>• Food products</td>
<td>• Food, beverages, tobacco manufacturing</td>
</tr>
<tr>
<td></td>
<td>• Fertilizer chemical &amp; rubber</td>
<td>• Fertilizer, chemical and rubber and plastic products manufacturing</td>
</tr>
<tr>
<td></td>
<td>• Textiles</td>
<td>• Textiles, wearing apparel, tanning and dressing of leather, footwear</td>
</tr>
<tr>
<td></td>
<td>• Paper &amp; printing</td>
<td>• Paper and paper products, printing, publishing and reproduction of recorded materials</td>
</tr>
<tr>
<td>Agriculture</td>
<td>• Food agriculture</td>
<td>• Food crops (paddy, maize, peanuts etc), horticulture (fruits and vegetables etc), fishery, livestock</td>
</tr>
<tr>
<td></td>
<td>• Non food agriculture</td>
<td>• Non food estate crops (mainly palm oil and rubber), forestry</td>
</tr>
<tr>
<td></td>
<td>• Oil &amp; gas</td>
<td>• Crude petroleum and natural gas</td>
</tr>
<tr>
<td></td>
<td>• Non oil &amp; gas mining</td>
<td>• Metals and minerals, quarrying</td>
</tr>
<tr>
<td>Mining</td>
<td>• Wholesale &amp; retail trade</td>
<td>• Wholesale and retail trade</td>
</tr>
<tr>
<td></td>
<td>• Hotels &amp; restaurants</td>
<td>• Hotels and restaurants</td>
</tr>
<tr>
<td></td>
<td>• Transport services</td>
<td>• Railway, road, sea, river lake and ferry, air and all services allied to transport</td>
</tr>
<tr>
<td>Services</td>
<td>• Banking</td>
<td>• Financial and non financial institutions, services allied to finance</td>
</tr>
<tr>
<td></td>
<td>• Electricity</td>
<td>• Electricity, gas, water</td>
</tr>
<tr>
<td></td>
<td>• Construction</td>
<td>• Construction</td>
</tr>
</tbody>
</table>

Note: Sub sectors as defined by government. Sub-sector list is not exhaustive as some sub-sectors filtered out due to small contribution to economy.

Source: BPS; BCG analysis
### Proxies used to derived sub-sector attractiveness

Proxy attractiveness based on Datamonitor global sector data

<table>
<thead>
<tr>
<th>Sector</th>
<th>Sub-sector</th>
<th>Proxy</th>
<th>Industries incl. in proxy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>• Oil &amp; gas manufacturing&lt;br&gt;• Equipment &amp; machinery&lt;br&gt;• Food products&lt;br&gt;• Fertilizer chemical &amp; rubber&lt;br&gt;• Textiles&lt;br&gt;• Paper &amp; printing&lt;br&gt;• Food agriculture</td>
<td>• Oil &amp; gas refining&lt;br&gt;• Transport equipment&lt;br&gt;• Food, beverage &amp; tobacco&lt;br&gt;• Fertilizers &amp; agrochemicals, rubber based products&lt;br&gt;• Apparel and textile&lt;br&gt;• Paper and forestry products&lt;br&gt;• Agriculture (Food only)</td>
<td>• Oil &amp; gas refining and marketing activities&lt;br&gt;• Automobiles and components manufacturing&lt;br&gt;• Food products, beverages &amp; tobacco&lt;br&gt;• Fertilizer, agrochemicals, tires and rubber&lt;br&gt;• Apparel, accessories, footwear &amp; textiles&lt;br&gt;• Paper and forest products&lt;br&gt;• Cereals, roots, sugar crops, oilseeds, fruit, vegetables, vegetable oil, beans and pulses, spices, coffee, tea, cocoa&lt;br&gt;• Palm oil&lt;br&gt;• Upstream oil &amp; gas&lt;br&gt;• Aluminium, iron &amp; steel, precious metals &amp; minerals, coal and base metal&lt;br&gt;• Distribution, wholesalers and retail&lt;br&gt;• Hotels, motels restaurants, cafes, fast food outlets&lt;br&gt;• Passenger &amp; freight transportation by air, road, &amp; rail&lt;br&gt;• Banks and similar institutions&lt;br&gt;• Electricity&lt;br&gt;• Includes civil engineering companies and large-scale contractors</td>
</tr>
<tr>
<td>Agriculture</td>
<td>• Non food agriculture&lt;br&gt;• Oil &amp; gas&lt;br&gt;• Non oil &amp; gas mining&lt;br&gt;• Wholesale &amp; retail trade&lt;br&gt;• Hotels &amp; restaurants&lt;br&gt;• Transport services</td>
<td>• Palm oil&lt;br&gt;• Oil &amp; gas exploration&lt;br&gt;• Metals and mining&lt;br&gt;• Distribution and retailing&lt;br&gt;• Hotels, restaurants &amp; cafes&lt;br&gt;• Transport services</td>
<td>• Palm oil&lt;br&gt;• Upstream oil &amp; gas&lt;br&gt;• Aluminium, iron &amp; steel, precious metals &amp; minerals, coal and base metal&lt;br&gt;• Distribution, wholesalers and retail&lt;br&gt;• Hotels, motels restaurants, cafes, fast food outlets&lt;br&gt;• Passenger &amp; freight transportation by air, road, &amp; rail&lt;br&gt;• Banks and similar institutions&lt;br&gt;• Electricity&lt;br&gt;• Includes civil engineering companies and large-scale contractors</td>
</tr>
<tr>
<td>Mining</td>
<td>• Oil &amp; gas&lt;br&gt;• Non oil &amp; gas mining&lt;br&gt;• Wholesale &amp; retail trade</td>
<td>• Distribution and retailing&lt;br&gt;• Hotels, restaurants &amp; cafes&lt;br&gt;• Transport services</td>
<td>• Distribution, wholesalers and retail&lt;br&gt;• Hotels, motels restaurants, cafes, fast food outlets&lt;br&gt;• Passenger &amp; freight transportation by air, road, &amp; rail&lt;br&gt;• Banks and similar institutions&lt;br&gt;• Electricity&lt;br&gt;• Includes civil engineering companies and large-scale contractors</td>
</tr>
<tr>
<td>Services</td>
<td>• Banking&lt;br&gt;• Electricity&lt;br&gt;• Construction</td>
<td>• Transport services&lt;br&gt;• Banks&lt;br&gt;• Electricity&lt;br&gt;• Construction &amp; engineering</td>
<td>• Transport services&lt;br&gt;• Banks&lt;br&gt;• Electricity&lt;br&gt;• Construction &amp; engineering</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Proxy used to match sub-sector defined by government to analysis reports in order to estimated global market information
Source: Datamonitor; BPS; BCG analysis
# Strategic priorities for sub-sectors based on government's strategic focus and positive externalities

<table>
<thead>
<tr>
<th>Score</th>
<th>Sub-sector</th>
<th>Rationale</th>
</tr>
</thead>
</table>
| 1     | • Equipment & machinery<sup>1</sup>  
• Food products<sup>2</sup>  
• Fertilizer chemicals & rubber  
• Textiles<sup>3</sup>  
• Paper & printing | • Government focus based on Presidential speech  
• Manufacturing is largest part of Indonesia’s current economy and significant driver of Indonesia’s exports |
| 2     | • Food agriculture  
• Non food agriculture (e.g. palm oil, forestry) | • Government focus based on Presidential speech  
• High degree of externalities by providing ~60% of total employment in Indonesia  
• Fast growing potential growth engines such as palm oil  
• Significant driver of Indonesia’s exports |
| 2     | • Transport services  
• Electricity | • High degree of externalities by helping development of other sectors through provision of basic enablers |
| 3     | • Oil & gas  
• Non oil & gas mining  
• Oil & gas manufacturing | • Royalty revenues  
• Significant driver of Indonesia’s exports  
• Directs development to resource rich but less urbanized and developed provinces |
| 4     | • Others  
– Wholesale & retails trade,  
– Hotels & restaurants  
– Banking  
– Construction | • Important sectors, however of lower strategic priority |

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<sup>1</sup> Equipment and machinery includes transport equipment, machinery and apparatus  
<sup>2</sup> Food products include food, beverage and tobacco  
<sup>3</sup> Textiles includes leather and footwear  
<sup>2</sup> Source: Press search; The National Industry Policy, BCG analysis
Agriculture based industries dominate GRDP of Sulawesi corridor

GRDP by sub-sector for provinces surrounding Western Sulawesi, 2006

- Food products manufacturing: 37%
- Services: 17%
- Manufacturing: 12%
- Mining & quarrying: 9%
- Agriculture: 8%
- Construction: 8%
- Wholesale, retail trade: 4%
- Other services: 2%
- Electricity: 1%

Total Sulawesi Corridor

Rp 73 Tn

Note: For purposes of GRDP calculations, Jakarta excluded from ESNWJ corridor as it is included in NJ corridor and is an outlier – but connectivity to Jakarta remains a key driver for development of the corridor

1. Other manufacturing includes wood products, cement and non metallic quarrying products and other manufacturing as defined by BPS
2. Equipment and machinery includes transport equipment, machinery and apparatus and base metals
3. Textiles includes leather and footwear
4. Food products include food, beverage and tobacco
5. Other services includes general govt services and private services, non institution financial service as defines by BPS

Source: Badan Pusat Statistik province report; BCG analysis
Focus sectors

Two key focus sub-sectors for Sulawesi Corridor
Food agriculture and nickel mining

Sub-sector prioritization

1. Priority sub-sectors for all corridors (score)

2. % contribution of industry sector vs overall corridor GRDP (%), 2006

Note: Priority sub-sectors for all corridors scores are based on four dimensions: projected market growth, profitability, market size, and strategic alignment.
Source: Badan Pusat Statistik; BPS Dalam Angka; Datamonitor; BCG analysis
Agenda

Identification of focus sectors

Positioning, gaps and economic development strategy for focus sectors

- Food crops
- Estate crops
- Fishery
- Nickel

Summary of infrastructure and high-level PPP recommendation

- Summary of Infrastructure requirement for stage 1 (2011 – 2014)
- Summary of Infrastructure requirement for stage 2 (2015 – 2030)
- High-level PPP recommendation

Summary of GRDP impact
Summary: Focus on rice and maize farming

**Strategy:**
- **Improve productivity:**
  - Increase use of technology
  - Improve access to input material
  - Increase farmer’s knowledge
- **Reduce post-harvest losses:**
  - Improve storage facilities
  - Improve access routes

**Enablers:**
- Improve access to financing for smallholder farmers
- Strengthen farmer education
- Set-up governing body to coordinate across programs

**Infrastructure:**
- Upgrade irrigation
- Improve silos and warehousing facilities
- Improve access roads between farms and trading centers
Four-step methodology employed for sector analysis

Food crops sector

1. Base-lining importance of food crops in Sulawesi
   - Determine importance of food crops in Sulawesi
     - Identify key crops and food commodities
   - Determine Indonesia's position over food crops
     - Explore goals and targets for self sustainability
   - Identify key food crops nodes in Sulawesi
     - Current production output
     - Potential production output

2. Sulawesi's positioning and resulting gaps along the value chain
   - Benchmark local industry and their participation in the food agriculture value chain
     - All across the value chain, from farming to marketing
   - Determine resulting 'gaps' and opportunities to grow further
     - Across the value chain from farming to shipping

3. Proposed strategy for Sulawesi to further develop food crops
   - Recommend specific strategies, either at the value chain step level or at the industry level to help improve
     - Competitiveness of industry
     - Provide avenue to improve yields and increase exports

4. Implications on required infrastructure and enablers
   - Recommend specific enablers required to address the gaps identified
     - Key enablers to support the sector
     - Infrastructure to support sector strategy

Source: BCG analysis
Rice and maize identified as focus commodities for food crops sub-sector

1. Based on 2006 GRDP data
Source: Indonesia's Investment Coordinating Board (BKPM); Badan Pusat Statistik; BPS Dalam Angka; BCG analysis
Food agriculture node identified in Southern Sulawesi

- **Rice and maize node**: Kab. Soppeng, Kab. Sid. Rappang, Kab. Pinrang, Kota Pare-Pare, Kota Makassar
- **Major port**: Pantoloan Port, Mamuju Port, Ujungpandang Port, Makassar, Gorontalo Port, Bitung Port, Kendari, Manado

Source: Indonesia’s Investment Coordinating Board (BKPM); National Spatial Planning PP no.7, 2005; Badan Pusat Statistik; BPS Dalam Angka; Port Directory; BCG analysis
One rice node identified
Southern Sulawesi Selatan is the centre for rice agriculture in Sulawesi Corridor

11 Agriculture Kawasan Andalans along the corridor

Majority with sizeable presence in the rice industry – top 3 identified as the main focus areas for Western Sulawesi

Production of rice (wetland and dryland paddy) in the Kabupaten/Kota covered by the Agriculture Kawasan Andalans (’000 Ton), 2006

K. Pare-Pare 968.0
K. Bulukumba Watampone 743.0
K. Mamminasata 484.1
K. Dumoga Kotamobagu 286.1
K. Palu 220.8
K. Mamuju 138.1
K. Gorontalo 132.0
K. Palopo 94.4
K. Toli-Toli 88.4
K. Manado 81.4
K. Poso 43.2

Kaw. Pare-Pare & sekitarnya, Kaw. Bulukumba Watampone and Kaw. Mamminasata & sekitarnya identified as focus rice areas

1. Due to adjacency to each other, these three Kawasan Andalans are grouped together as one rice node in the corridor
Source: National Spatial Planning PP no.7, 2005; Indonesia's Investment Coordinating Board (BKPM); BCG analysis
One maize node identified
Southern Sulawesi Selatan is the centre for maize agriculture in Sulawesi Corridor

11 Agriculture Kawasan Andalans
along the corridor

Majority with presence in the maize industry – top 2 identified as the focus areas for Western Sulawesi

Production of maize in the Kabupaten/Kota covered by the Agriculture Kawasan Andalans ('000 ton), 2006

<table>
<thead>
<tr>
<th>Kabupaten/Kota</th>
<th>Production ('000 ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K. Bulukumba Watampone</td>
<td>189.2</td>
</tr>
<tr>
<td>K. Mamminasata</td>
<td>154.2</td>
</tr>
<tr>
<td>K. Gorontalo</td>
<td>90.1</td>
</tr>
<tr>
<td>K. Dumoga Kotamobagu</td>
<td>86.1</td>
</tr>
<tr>
<td>K. Manado</td>
<td>84.9</td>
</tr>
<tr>
<td>K. Pare-Pare</td>
<td>38.7</td>
</tr>
<tr>
<td>K. Palu</td>
<td>30.1</td>
</tr>
<tr>
<td>K. Mamuju</td>
<td>13.1</td>
</tr>
<tr>
<td>K. Poso</td>
<td>4.1</td>
</tr>
<tr>
<td>K. Toli-Toli</td>
<td>3.1</td>
</tr>
<tr>
<td>K. Palopo</td>
<td>1.8</td>
</tr>
</tbody>
</table>

1. Only top 2 selected due to the large difference between the production levels of the second and third Kawasan Andalans (in terms of maize production output)
2. Due to adjacency to each other, the 2 Kawasan Andalans are grouped together as one maize node in the corridor

Source: National Spatial Planning PP no.7, 2005; Indonesia’s Investment Coordinating Board (BKPM); BCG analysis

Backup

Kaw. Bulukumba Watampone and Kaw. Mamminasata & sekitarnya identified as the focus maize areas

1. Only top 2 selected due to the large difference between the production levels of the second and third Kawasan Andalans (in terms of maize production output)
2. Due to adjacency to each other, the 2 Kawasan Andalans are grouped together as one maize node in the corridor

Source: National Spatial Planning PP no.7, 2005; Indonesia’s Investment Coordinating Board (BKPM); BCG analysis
Indonesia is the world's 3rd largest rice producer, used mainly for domestic consumption.

Indonesia has 9% of worldwide rice production and consumption, only after China and India.

<table>
<thead>
<tr>
<th>Top 5 rice producing and consuming nations, ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
</tr>
<tr>
<td>Vietnam</td>
</tr>
<tr>
<td>Bangladesh</td>
</tr>
<tr>
<td>India</td>
</tr>
<tr>
<td>PRC</td>
</tr>
</tbody>
</table>

Sulawesi is the 3rd largest rice producing province.

<table>
<thead>
<tr>
<th>Share of rice produced in Indonesia (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bali &amp; Nusa Tenggara</td>
</tr>
<tr>
<td>Kalimantan</td>
</tr>
<tr>
<td>Sulawesi</td>
</tr>
<tr>
<td>Sumatra</td>
</tr>
<tr>
<td>Java</td>
</tr>
</tbody>
</table>

Source: FAO, BPS, BCG Analysis
Indonesia is largest SEA corn producer, but production still unable to meet local demand

Indonesia largest corn producer in SEA...

However, locally produced corn is not sufficient to meet local demand

Indonesia will import 800,000 tons of corn in 2010 to fulfill domestic needs as the country is predicted to be unsuccessful in meeting its production target

Kompas Daily

The FAS also forecasts that due to an estimated decrease in corn production in MY 2009/10, Indonesian corn imports will increase by an estimated 700 thousand metric tons

USDA FAS

Source: FAO, BCG Analysis
Sulawesi is among the largest corn producing regions in Indonesia

~20% of national corn production from Sulawesi

Total of ~550 thousand ha of plantations in Sulawesi is for corn

Source: Deptan

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Corn production in Sulawesi has been decreasing in the last few years.

Sulawesi corn production steadily increasing over the past 5 years

And has identified investments to further build the corn sub-sector

A Korean investment firm plans to build a multi-function corn processing plant in Gowa, South Sulawesi, with an investment of $279 Mn in a project that it says will benefit local farmers.

Jakarta Post, 2009

As we are boosting our corn production, we hope more investors will be willing to construct processing plants in South Sulawesi and export the products as the price is higher.

Jakarta Post, 2008

Source: Department of Agriculture Indonesia, Literature Search, BCG Analysis
### Base-lining

**Food agriculture sector growth in Sulawesi lags behind other sectors in the region**

#### CAGR of Current GRDP of Sulawesi by sectors (%), 2000-2006

<table>
<thead>
<tr>
<th>Sector</th>
<th>2000-2006 CAGR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance, Real Estate &amp; Biz Service</td>
<td>17.5</td>
</tr>
<tr>
<td>Transport and Communication</td>
<td>16.8</td>
</tr>
<tr>
<td>Electricity, Gas &amp; Water</td>
<td>16.0</td>
</tr>
<tr>
<td>Trade, Hotel &amp; Restaurants</td>
<td>15.3</td>
</tr>
<tr>
<td>Services</td>
<td>13.9</td>
</tr>
<tr>
<td>Construction</td>
<td>13.7</td>
</tr>
<tr>
<td>Non-Oil &amp; Gas Manufacturing</td>
<td>13.1</td>
</tr>
<tr>
<td>Non-Oil &amp; Gas Manufacturing</td>
<td>13.1</td>
</tr>
<tr>
<td>Food Agriculture</td>
<td>11.7</td>
</tr>
<tr>
<td>Oil &amp; Gas Mining</td>
<td>7.5</td>
</tr>
</tbody>
</table>

**Source:** Badan Pusat Statistik

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268532-02-Sulawesi iEDC masterplan-31Dec10-BC_YS-JAK.ppt
Food security and self-sufficiency is a key target of Gov

Government has indicated its goals to become self-sufficient basic commodity products

Indonesia had so far been able to achieve rice self-sufficiency twice, namely in 1982 and (2009)... we hope this year’s achievement could be maintained and even improved so that the country’s self-sufficiency in rice would continue.

*VP of Indonesia, 2009*

Indonesia’s ultimate goal is to provide sufficient food to ensure all its citizens a varied and healthy diet rich in carbohydrates, protein, vitamins and minerals.

*UNDP*

Between now and 2030 Indonesia expects to become one of the world’s biggest producers of rice, maize...

*Agricultural Ministry, 2010*

Policies on food security have three main components

- **Food availability**
  - Keep imports to less than 7% of consumption
  - **Key Policies**: Import Rice Ban; Ministry of Agriculture efforts to boost food production; BULOG's maintenance of rice stock

- **Food affordability**
  - Ensure that poor can obtain the food
  - **Key Policies**: RASKIN program that delivers subsidized rice; BULOG's attempts at defending floor price for paddy; Trade restrictions resulting in higher domestic prices

- **Food quality and nutrition**
  - Ensure consumption of sufficient nutrients
  - **Key Policies**: Fortify key foods; Supplemental feeding programs; Disseminate nutritional information

Source: Literature search
Current food security situation is at critical levels

Damaged wetlands have led to crisis in food security levels...

...With a further ~350 thousand ha of wetland at risk from rising sea levels
Sulawesi value chain for food agriculture established, but still inefficient

### Farming and Harvesting
- **Rice**
  - Lower yield vs other regions due to basic irrigation and harvesting methods

- **Maize**
  - Higher yields vs other regions
  - Sulawesi production has been declining

### Collection and Trading
- **Rice**
  - Lack of adequate storage facilities leads to losses
  - Multiple layers of traders that create inefficiency

- **Maize**
  - Lack of adequate storage facilities leads to losses
  - Multiple layers of traders that create inefficiency

### Distribution
- **Rice**
  - Local distribution to consumers done via established local distribution channels (i.e. Pasar Indo)

- **Maize**
  - Local distribution to consumers done via established local distribution channels (i.e. Pasar Indo)

### Average price per kg (Rp '000)
- **Rice**:
  - 2.5 – 3
  - 1.8 – 2

- **Maize**:
  - 5
  - 3 – 3.3

### Presence
- **Strong presence**
- **Weak presence**

Source: Literature Search, Expert Interviews, BCG Analysis
Rice yields in Sulawesi lower than Java and international peers

South and SE Sulawesi have great potential to increase rice production, and so the National Rice Increase Program has identified these provinces to boost rice supply...The objective is to increase rice yields by 10%

ACIAR-SADI, 2009

Source: Dalam Angka Province, Australia Indonesia Partnership

Rice yields, 2009 (100 kg / ha)

- Sulawesi Utara: 48
- Sulawesi Tengah: 45
- Sulawesi Selatan: 50
- Sulawesi Tenggara: 42
- Gorontalo: 53
- Sulawesi Barat: 48
- Jawa Barat: 58
- Jawa Tengah: 56
- Jawa Timur: 59
- Bali: 58
- Nusa Tenggara Barat: 50
Sulawesi corn yield is better than national average, but behind Java
Unlike in other regions, there is limited land potential to further grow rice and corn industry in Sulawesi.

Any increase in production in Sulawesi will need to come from increase in productivity.

Source: Departemen Pertanian, Literature search
Irrigation systems in Sulawesi are basic compared to other regions

Only 60% of Sulawesi Selatan has some form of irrigation

<table>
<thead>
<tr>
<th>Region</th>
<th>Technical Irrigation</th>
<th>Non-technical irrigation</th>
<th>Semi-technical irrigation</th>
<th>Rain fed</th>
<th>Valley</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Java</td>
<td>24</td>
<td>19</td>
<td>12</td>
<td>45</td>
<td>19</td>
<td>8</td>
</tr>
<tr>
<td>Sulawesi Selatan</td>
<td>40</td>
<td>23</td>
<td>10</td>
<td>27</td>
<td>23</td>
<td>14</td>
</tr>
<tr>
<td>Other Sulawesi</td>
<td>15</td>
<td>26</td>
<td>22</td>
<td>36</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>Others</td>
<td>8</td>
<td>14</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>14</td>
</tr>
</tbody>
</table>

Source: Departemen Pertanian, Literature search
Use of fertilizer is also lower in Sulawesi compared to other regions.

**Positioning and gaps**

<table>
<thead>
<tr>
<th>Urea</th>
<th>SP-36$^1$</th>
<th>KCl$^2$</th>
</tr>
</thead>
</table>

- **kg/ha**
- **W Lmbk**
- **E Lmbk**
- **Rangkas**
- **Sragen**
- **Kara-wang**
- **Solok**
- **50 Kota**
- **Polmas**

1. SuperPhosphate
2. Potassium Chloride

Source: FAO, Literature Search, BCG Analysis

---

**Outside of Sulawesi**

**Sulawesi Province**
Indonesia has lower number of tractors in the region
Most of the existing equipment is found in Java

![Graph showing tractors per 100 km of arable land for Indonesia, Philippines, China, Vietnam, and Thailand.](Image)

**Positioning and gaps**

More than 50% of power tiller are located in Java even though Java is the most densely populated area.

*ICAERD, 2005*

Source: World Bank

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Programs initiated to improve access to capital for farmers

Poverty alleviation a top concern

Poverty alleviation identified as a key priority:

Poverty in rural areas is the main problem to overcome national poverty and can not be delayed ... this should be a top priority in the implementation of social welfare development

Source: PNPM-Mandiri Website, Literature search

Fundamental problem faced by farmers identified as lack of access to capital and funding

PNPM-Mandiri established to meet poverty alleviation goal

Established in April 2007 by the President of Indonesia to help in poverty alleviation and job creation

Rural agribusiness program (PUAP) conducted by the Ministry of Agriculture was established in 2008

- Ministry of Agriculture established Rural Agribusiness Development Team through the Minister of Agriculture (KEPMENTAN) Number 545/Kpts/OT.160/9/2007
- Meant to provide venture capital assistance to farmer members, peasant owners, agricultural workers, etc.
Positioning and gaps

However, several challenges encountered by PNPM-M in loan use and repayment

<table>
<thead>
<tr>
<th>Examples of misuse of PUAP funds</th>
<th>Examples of repayment issues</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 Biau, Central Sulawesi</strong></td>
<td><strong>1 Puhowato, Gorontalo</strong></td>
</tr>
<tr>
<td>• Issue: Misappropriation of funds by the UPK</td>
<td>• Issue: Long time to repay loan</td>
</tr>
<tr>
<td>• Status: Still in the legal process in the Attorney's office</td>
<td>• Status: Already being handled by the authorities</td>
</tr>
<tr>
<td><strong>2 Petasai, Central Sulawesi</strong></td>
<td><strong>2 Tana Toraja, Central Sulawesi</strong></td>
</tr>
<tr>
<td>• Issue: Results of UEP calculation reveal that there are some funds that cannot be accounted for</td>
<td>• Issue: Congestion of community funds and no visible repayment efforts</td>
</tr>
<tr>
<td>• Status: No progress</td>
<td>• Status: No refund, continued government support and has conducted a surveillance loan</td>
</tr>
<tr>
<td><strong>3 Kotabunan, North Sulawesi</strong></td>
<td><strong>3 Wajo, South Sulawesi</strong></td>
</tr>
<tr>
<td>• Issue: Found out in December that there was fund abuse by the chairman of UPK</td>
<td>• Issue: High number of funds borrowed temporarily by the two managers of the group</td>
</tr>
<tr>
<td>• Status: Legal proceedings in the district court</td>
<td>• Status: Partial repayment made</td>
</tr>
<tr>
<td><strong>4 Puhowato, Gorontalo</strong></td>
<td></td>
</tr>
<tr>
<td>• Issue: Deposit used by unscrupulous sub-district head</td>
<td></td>
</tr>
<tr>
<td>• Status: Former district personnel have made a statement to return funds to UEP</td>
<td></td>
</tr>
</tbody>
</table>

Source: PNPM-Mandiri Website
Poor off-farm practices lead to production losses

~40% of losses due to poor off-farm handling

Losses driven by several factors

Total losses from harvest to market can reach 30–50% in value, which means that, conservatively, farmers are losing around $30 per ton of rice harvested.

Losses are due to:
- spoilage and wastage at the farm level
- delay in drying
- poor storage
- poorly maintained or outdated rice mills
- losses to pests throughout the postharvest chain

Source: IRRI, Literature Search

IRRI, 2008
To ensure food security, Gov has taken efforts to improve distribution of basic commodities...

BULOG has been established to ensure availability of rice to the poor...

- State-owned enterprise which was established through Government Regulation (PP) No. 7/2003

The main purpose in establishing this entity is to manage the supply and logistic of basic foodstuffs, especially rice to meet people demands

- Public service obligations include:
  - Carrying out purchase of paddy/rice with the government purchase price
  - Distributing subsidized rice to vulnerable people
  - Retaining and managing national rice reserve stock
  - Price stabilization, particularly for rice

...However, scope is limited and purchase prices are not very favorable

- BULOG purchases only 5% of total annual production

- BULOG purchase price is at lower bound of farmgate prices
  - Rp 2,640 / kg vs Rp 2,500-3,000 / kg by traders
  - Increased its purchase price by 10% in 2010

Source: Bulog website, Literature search
...Furthermore, BULOG warehouses facilities will be upgraded to maintain quality of stored rice.

BULOG has 233 warehouses in Sulawesi, but smaller.

The need for better warehouses has been recognized by the government.

All of Bulog warehouses in Indonesia since first built in 1980 have never undergone renovation, plans for renovation within the next three years have been set out for the

Press search, 2010

In order to raise farmer income, revitalization toward warehouse and storage is needed

Ministry of Trade, 2010

This warehouse & storage renovation, means that stores commodities can be keep longer than before still with a good quality assurance.

Press search, 2010
Multiple layers required before the commodity reaches the end consumer creating inefficiency in the chain

Multiple layers of traders and middlemen required to facilitate trading

- Farmer
- Local collector
- Traders
- Wholesalers
- Retailers

This has several implications on the farmer’s livelihood and productivity

Significant value retained from the collector to the wholesaler levels

- ~30% of the final selling price
- Buyers are limited to collectors inside their villages

Farmers lack bargaining power to command higher prices

- Services provided by the collectors will help ensure a price favorable to the collector

Due to depressed farmgate prices, farmers have lower revenue

- No funds to purchase necessary fertilizers
- Will not have access to the right equipment

Multiple layers are necessary because of lack of infrastructure for the farmer to trade his products himself

Source: Literature search, BCG Analysis, Expert Interviews
Summary: Low yields and post harvest losses plague the food crops industry

Lower yields compared provincial and regional peers

- Rice yields, 2009 (100 kg / ha)
  - Central Sulawesi: 45
  - Other Sulawesi: 50
  - Central Java: 58
  - West Java: 56
  - East Java: 59
  - China: 60

Weak irrigation technology implemented in the region

- % of land
  - Rain fed: 24
  - Non-technical irrigation: 19
  - Semi-technical irrigation: 12
  - Technical irrigation: 40

Poor post harvest activities makes up ~40% of the losses

- % of total production
  - On Farm Losses: 6
  - Off Farm Losses: 10
  - Total Losses: 12

Source: Literature search, BCG analysis, Departemen Pertanian
Strategic focus: Strengthen downstream activities to improve production yields

**Strategic Goals**

- **Improve yield and productivity**
- **Reduce post harvest losses**

**Strategic actions**

- **Farming and Harvesting**
  - Increase use of technology
    - Improve technical irrigation
    - Access to tractors
  - Improve access to input material
    - Provide quality seeds
    - Provide required fertilizers
  - Increase farmer knowledge
    - Educate farmers on proper farming and harvesting methods

- **Collection and trading**
  - Improve storage facilities
    - Ensure adequate number of warehouses located
    - Lengthen life of rice and corn in storage
  - Improve access routes
    - Allow farmers to trade directly with end markets
    - Reduce dependence on middlemen

Source: BCG Analysis, Expert interviews
Three key enablers to grow food crops in Sulawesi

1. Improve access to financing for smallholder farmers
   - Ensure efficient support funds distribution through PUAP program under PNPM-Mandiri
   - Funding meant to purchase quality input material (i.e. seeds and fertilizers) as well as technology (i.e. tractors)
   - Stricter enforcement to avoid abuse and misuse of funds allocated through PUAP

2. Strengthen farmer education
   - Provide education on better crop management
     - Harvesting techniques
     - Types of input material available
   - Educate via farmer groups
     - Re-establish Farmer Field School programs or BIMAS type program for poor, inaccessible farming areas

3. Set-up governing body to coordinate across programs
   - Independent industry body with meant to coordinate the different programs
     - Multiple programs have been conducted to increase food self-sufficiency, often at overlapping periods
     - Meant to drive where programs are implemented as well as oversee budget

Source: Literature search; BCG analysis
Infrastructure enablers identified to support productivity goals

1. Upgrade irrigation
   - Significant areas in Sulawesi still do not have full technical irrigation
   - Irrigation will become increasingly important in times of erratic climate conditions

2. Improve silos and warehousing facilities
   - Build adequate number of storage facilities
   - Speed up upgrade of BULOG warehouses to avoid damage of stock by pest or spoilage

3. Improve access roads between farms and trading centers
   - Improvement of roads between farms and trading areas to allow for more efficient transport method (vs. simple motorcycles)
   - Will help to reduce number of low value-add middlemen

Source: BCG Analysis, Expert interviews
## Value add

### Sulawesi should focus on upstream and distribution

Improving yields creates most value; better distribution will help decrease product losses

<table>
<thead>
<tr>
<th>Farming and harvesting</th>
<th>Value chain steps</th>
<th>Initiatives to add value</th>
<th>Revenue</th>
<th>Margins&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Potential value add</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve yield of rice</td>
<td>Improve yield of rice</td>
<td>Increase yield from 4.7 ton/ha to 6 ton/ha&lt;sup&gt;1&lt;/sup&gt;</td>
<td>~Rp 2400/kg</td>
<td></td>
<td>$ 485 Mn</td>
</tr>
<tr>
<td>Improve yield of corn</td>
<td>Improve yield of corn</td>
<td>Increase yield from 4.7 ton/ha to 6 ton/ha&lt;sup&gt;1&lt;/sup&gt;</td>
<td>~Rp 750/kg</td>
<td></td>
<td>$74 Mn</td>
</tr>
</tbody>
</table>

| Distribution | Improve storage and distribution | 4% post harvest loss eliminated<sup>2</sup> | ~Rp 2400/kg |  | $ 90 Mn |

### Significant potential upside (~$650Mn) from further developing food crops industry in Sulawesi

1. Java Average  
2. Reduction on all rice produced in Sulawesi, including future potential  

Source: Expert interviews; industry reports; literature search; BCG analysis
Agenda

Identification of focus sectors

Positioning, gaps and economic development strategy for focus sectors
  • Food crops
  • Estate crops
  • Fishery
  • Nickel

Summary of infrastructure and high-level PPP recommendation
  • Summary of Infrastructure requirement for stage 1 (2011 – 2014)
  • Summary of Infrastructure requirement for stage 2 (2015 – 2030)
  • High-level PPP recommendation

Summary of GRDP impact
Summary: Key commodities are coconut and cacao

- **Farming & harvesting**
- **Processing**
- **Distribution**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Processing Products</th>
<th>Distribution Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coconut</td>
<td>Copra</td>
<td>Oil, coconut milk</td>
</tr>
</tbody>
</table>

**Strategy:**
- **Improve productivity:**
  - Rehabilitation and intensification of plantations
  - Improve access to input material
  - Increase farmer’s knowledge
- **Increase value of products:**
  - Incentives value added products
  - Subsidize processing facilities
  - Establish supporting port facilities

**Enablers:**
- Improve farmer education
- Create a more efficient marketing channel
- Provide one-stop shop for investors
- Subsidies for re-planting and input materials

**Infrastructure:**
- Set-up integrated coconut processing plants
- Build access road and community buying
- Upgrade of port capacity and supporting infrastructure
## Four-step methodology employed for sector analysis

### Estate crops sector

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Base-lining importance of estate crops in Sulawesi</td>
</tr>
<tr>
<td>2</td>
<td>Sulawesi's positioning and resulting gaps along the value chain</td>
</tr>
<tr>
<td>3</td>
<td>Proposed strategy to further develop estate corps sector in Sulawesi</td>
</tr>
<tr>
<td>4</td>
<td>Implications on required infrastructure and enablers</td>
</tr>
</tbody>
</table>

### 1. Base-lining importance of estate crops in Sulawesi
- Determine Indonesia's global position for key estate crops produced in Sulawesi
- Determine importance of estate corps in Sulawesi
  - Identify key crops and food commodities

### 2. Sulawesi's positioning and resulting gaps along the value chain
- Understand current capabilities of local industry along the value chain
  - Across entire value chain, from farming to marketing
- Determine resulting 'gaps' and opportunities to grow sub-sector

### 3. Proposed strategy to further develop estate corps sector in Sulawesi
- Recommend specific strategies at the value chain level or at the industry level to improve
  - Sector sustainability
  - Industry competitiveness
  - Increase exports

### 4. Implications on required infrastructure and enablers
- Recommend specific enablers required to address the gaps identified
  - Key enablers to support the sector
  - Infrastructure to support sector strategy

Source: BCG analysis
Cocoa and coconut identified as focus sub-sectors for estate corps

Food agriculture GRDP composition of the Kabupaten/Kota covered by the corridor, 2006

- Livestock: 6.2%
- Fishery: 22.3%
- Estate Crops: 25.3%
- Food Crops: 46.1%

Cocoa and coconut utilize >2/3 of estate plantation area

- Cocoa: 629.4 ha, 46%
- Coconut: 603.0 ha, 14%
- Nutmeg: 157.5 ha, 8%
- Clove: 148.1 ha, 6%

1. Based on 2006 GRDP data 2. Raw coconut
Source: Indonesia's Investment Coordinating Board (BKPM); Badan Pusat Statistik; BPS Dalam Angka; BCG analysis
5 industry nodes identified for Sulawesi Corridor
Based on 2 focus sub-sectors: estate crops

Source: Indonesia’s Investment Coordinating Board (BKPM); National Spatial Planning PP no.7, 2005; Badan Pusat Statistik; BPS Dalam Angka; Port Directory; BCG analysis
Five estate crops locations identified
Based on the two focus commodities: cocoa and coconut

9 Estate Kawasan Andalans lie along the corridor

1. Kawasan Gorontalo
   • Kab. Gorontalo
   • Kota Gorontalo
2. Kawasan Dumoga Kotamobagu
   • Kab. Bolaang Mengondow
3. Kawasan Poso dan Sekitarnya
   • Kab. Poso
4. Kawasan Mamuju dan Sekitarnya
   • Kab. Majene
   • Kab. Mamasa
   • Kab. Mamuju
5. Kawasan Toli-Toli dan Sekitarnya
   • Kab. Toli-Toli
   • Kab. Buol
6. Kawasan Palu dan Sekitarnya
   • Kab. Donggala
7. Kawasan Pare-Pare dan Sekitarnya
   • Kab. Barru
   • Kab. Soppeng
   • Kab. Sidenreng Rappang
   • Kab. Pinrang
   • Kota Pare-Pare
8. Kawasan Bulukumba Watampone
   • Kab. Bulukumba
   • Kab. Sinjai
   • Kab. Bone
9. Kawasan Palopo dan Sekitarnya
   • Kab. Tana Toraja

Majority with sizeable presence in cocoa and coconut plantations – top 5 identified as the focus estate areas for Western Sulawesi

Cocoa and coconut (both tall and hybrid) plantation areas in the Kabupaten/Kota covered by the Estate Kawasan Andalans ('000 ha), 2006

Kaw. Mamuju & sekitarnya, Kaw. Dumoga Kotamobagu, Kaw. Bulukumba Watampone, Kaw. Pare-Pare & sekitarnya and Kaw. Palu & sekitarnya identified as cocoa & coconut nodes

1. Due to adjacency to each other, Kawasan Bulukumba and Kawasan Pare-Pare dan Sekitarnya are to be grouped together as one node

Source: National Spatial Planning PP no.7, 2005; Indonesia’s Investment Coordinating Board (BKPM); BCG analysis
Indonesia is the world's largest coconut producer and a key player in coconut product exports.

Indonesia has 27% of the world's coconut production.

Indonesia is the 2nd largest exporter of coconut oil...

...and the 2nd largest exporter of copra meal.

Source: APCC Coconut Yearbook

The Boston Consulting Group
Sulawesi has the 3rd largest coconut plantation area in Indonesia

Sulawesi has ~20% of the national coconut plantations

With existing and growing opportunities in processing activities

The re-industrialization policies in 2010 – 2014 are targeting a solid growth in the coconut processing industry

Faculty of Agriculture, University of Sydney

Copra and commercial coconut oil production continue to dominate the industry’s processing sector in North Sulawesi, and Indonesia in general

Faculty of Agriculture, University of Sydney

More than 90 per cent of the coconuts produced are exported after some degree of processing

Faculty of Agriculture, University of Sydney

Source: Prospek Dan Arah Pengembangan Agribisnis
268532-02-Sulawesi IEDC masterplan-31Dec10-BC_YS-JAK.ppt

The Boston Consulting Group
North Sulawesi has the largest coconut node in the region
Dense coconut plantations, 1 research institute, 4 integrated processing units

Presence of 4 integrated coconut processing units in North Sulawesi

Coconut plantation as a % of total area of coconut growing regencies (%)

1. Indonesian Coconut and Palmae Research Institute
Source: BPS Dalam Angka, Development Prospects and Directions of Coconut Agribusiness 2007, Dewan Kelapa Indonesia, BCG analysis
Gaps identified along the value chain for coconut products

**Positioning and gaps**

---

**Farming and Harvesting**

*Growing and harvesting on coconuts*

Yields in Sulawesi higher than national average but can still be improved

- More intensive farming methods
- Better land management

Dominated by smallholders

- Important social drivers
- Lower yields compared to large corporations

---

**Upstream Processing**

*Conversion of coconuts into Copra*

Farmers are focused on lower value copra

- Higher value added products need more intensive processing methods

---

**Downstream processing**

*Processing of input into consumable or industrial products*

Processing made up of small, sub-scale plants

Coconut not fully utilized to create coconut based products

---

**Profit margins**

<table>
<thead>
<tr>
<th>Farming and Harvesting</th>
<th>Upstream Processing</th>
<th>Downstream processing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>20 – 40%</strong></td>
<td><strong>25%</strong></td>
<td><strong>50 – 80%</strong></td>
</tr>
</tbody>
</table>

Source: Literature search, Expert interviews, BCG analysis
Various types of coconut products can be produced

Coconut

- Copra
  - Oil
  - Cake
- Husked Nuts
  - Milk
  - Virgin Coconut Oil
  - Desiccated Coconut
  - Others (Coconut water, charcoal, shell, etc.)

Makes up ~93% of volume and value of total coconut related exports from Indonesia

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Avg. 2008 Prices¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Food industries</td>
<td>$ 1,163 / ton</td>
</tr>
<tr>
<td>• Chemical industries</td>
<td>$ 5,000 / ton²</td>
</tr>
<tr>
<td>• Houses</td>
<td></td>
</tr>
<tr>
<td>• Feed</td>
<td>$ 129 / ton</td>
</tr>
<tr>
<td>• Houses</td>
<td>$ 1,103 / ton</td>
</tr>
<tr>
<td>• Food industries</td>
<td></td>
</tr>
<tr>
<td>• Houses</td>
<td>$ 650 / ton</td>
</tr>
<tr>
<td>• Food industries</td>
<td></td>
</tr>
<tr>
<td>• Houses</td>
<td></td>
</tr>
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<td></td>
</tr>
<tr>
<td>• Houses</td>
<td></td>
</tr>
</tbody>
</table>

¹ Average prices for Indonesian Exports
² 2010

Source: APCC Coconut Yearbook, BCG Analysis
Sulawesi coconut yield is higher compared to other regions, but still lags behind regional peers.

Sulawesi has the highest productivity among the top producing areas.

India has highest productivity among the large producers.

Indian Coconut Development Board committed to improving productivity of the sector:
- Established demonstration and seed production (DSP) farms
- Setup coconut nurseries near DSP farms

Systematic and scientific system of farming

Presence of younger coconut trees

Improvements in climate have reduced incidence of mite's disease

Source: APCC Coconut Yearbook, Press search, BCG Analysis
Coconut production is dominated by smallholder farmers
Coconut plantations is a source of livelihood for a significant portion of the agricultural population

98% of coconut plantation is farmed by smallholder farmers

Coconut is a main agricultural commodity of villages in Sulawesi

1. Less than 2ha of land managed
Source: BPS, Journal Articles, BCG Analysis
**Positioning and gaps**

Smallholder farmers have lower yield compared to large corporations

Smallholder farms have 20% lower yield than private farms

Mainly due to weak farm management practices of smallholder farmers

Limited access to financing for:
- Purchase of tools and technology to make production more efficient
- Purchase of fertilizers to increase yield

Smallholder farmers seldom apply fertilizers and lack proper irrigation systems

No systematic process of replanting and replacing old trees that have low productivity

In addition, management of farm enterprises is still far from being modern including the management of copra, cooking oil, and other coconut products

Source: Ministry of Agriculture Dalam Angka, Academic Journal Articles, BCG Analysis
Around ~10% of trees are damaged and needs rehabilitation

21 thousand ha of plantation in North Sulawesi deemed to be damaged & unproductive

Rehabilitation program needs to be in place to boost productivity

Of the 380 thousand ha of coconut plantations are not productive, only 25,391 ha which has been rejuvenated

Due to the extent of non-productive land, he continued productivity of coconut plantations in the country is low

Continuous rejuvenation and rehabilitation is required as plants get older and damaged from pests, diseases and natural disasters

Source: CMIC, Press search, BCG Analysis

Indonesian coconut report
Farmers prefer producing low value copra instead of higher value products

Copra is still the preferred product for smallholder farmers

Production of copra can be done on the farm and requires locally available, low cost heating and drying equipment

Lower hygiene and sanitation requirements for copra production
- Meat will be further refined when manufacturing crude coconut oil
- Shell will be turned into animal feed

Smallholder farmers should venture to produce higher value add products

Higher value products can be produced on the farm, but would require more sanitary production processes to be in place:
- Virgin coconut oil
- Desiccated coconuts
- Food from coconut
- Coconut handicrafts

The economic value of coconut is no longer based on Copra

Indonesian coconut report

Varying the coconut product can help increase coconut farmer income and local income

Source: Academic Journal Articles, Press search, BCG Analysis
Positioning and gaps

Poor transport infrastructure for coconuts negatively impacts the farming community

Poor road and access infrastructure...

Road infrastructure from coconut plantations to processing plants needed to provide farmers with input needed more efficiently (fertilizer, seeds)

Infrastructure will also allow farmers to move into production of higher value added products like desiccated coconut or VCO
  • Less time in transit will reduce probability of spoilage

Development of road infrastructure of around 50km in North Sulawesi and Central Sulawesi is needed

Departemen Pertanian, 2007

...Results in several negative effects on farmers and the industry as a whole

Poor infrastructure will impact the cost of farming and result in less competitive products
  • Conditions can lead to suppress farmers income

Inability of farmers to source for buyers can lead to a monopsony situation that is disadvantageous for the farmers

Lack of access to funding creates a barter system
  • Farmers unable to maximize value of products
  • Lack of flow of basic necessities into the farming communities further promote trading

Source: Ministry of Agriculture, Expert interviews, BCG Analysis
Indonesia production mainly for coconut oil and copra

Production in Sulawesi dominated by coconut oil and copra

Over-reliance to one commodity exposes the participants to significant financial risk as their returns are determined almost entirely by that commodity

University of Sydney, 2007

Source: CMIC, APCC Coconut Yearbook, Press search, BCG Analysis
Most processors in Indonesia are considered small which can lead to inefficiency and lower value add production.

Sulawesi has largest mills among Indonesia regions, however subscale vs. regional peers.

Avg annual coconut oil production capacity of mills (ton), 2008

Improvements in processing capacity and capabilities can increase value and efficiency.

Product development within the industry has also been slow, and traditional processing methods and products have persisted over time.

Many producers seem content manufacturing products with minimal value-added components that are easily distributed.

Most plants are small scale oil producing plants that cater only to the domestic market...all small coconut oil plants are labour intensive and raw materials are purchased at farmgate prices.

Source: APCC Coconut Yearbook

North Sulawesi Tourism Promotion Board
Compared to Indonesia, Philippines is able to extract more value add products from its coconuts

Although there is only a small difference in nuts exported...

...The Philippines is able to utilize its nuts more

Export volume by product, 2008 (ton)

Source: APCC Coconut Yearbook, BCG Analysis

University of Sydney, 2006

Coconut water, another major byproduct is currently discarded as waste during copra and desiccated coconut production
Indonesia lags behind peers in value of exported coconut products

Value of exports is ~37% below that of the Philippines...

...And its products have higher average price compared to Indonesian products

<table>
<thead>
<tr>
<th></th>
<th>Indonesia</th>
<th>Philippines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg coconut value ($/Nut equivalent)</td>
<td>0.13</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Source: APCC Coconut Yearbook, BCG Analysis
Indonesia is the world's 2\textsuperscript{nd} largest producer of Cocoa

Most of locally harvested cocoa is meant for export

Source: FAO Stat, USAID
Sulawesi has the largest cocoa area, but production has been declining in recent years.

~63% of all cocoa produced is from Sulawesi

% of share of Indonesia
Cocoa production by Province (%), 2008

Production in Sulawesi Selatan has been on a declining trend

Source: Departemen Perkebunan, BCG analysis
Globally, cocoa is a commodity with promising growth

Increase in cocoa prices by 37% seen in since Jan 2008

Recent increase in prices driven by both increase in demand and constraints in supply

The International Cocoa Organization Secretariat envisages a supply deficit of cocoa beans of 69,000t for the current 2009/10 cocoa year

Confectionery News, June 2010

Growers say low rainfall has hurt crops. Swollen shoot disease also has cut production

Businessweek, March 2010

Cocoa futures rose to a 10-week high after a report showed North American consumption climbed

Bloomberg, July 2010

Source: NY Board of Trade, Literature search, BCG analysis

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Cocoa value chain

Farming / Harvesting
- Cocoa Fruit → Cocoa Beans

Upstream Processing
- Cocoa Beans → Fermented Beans
  - Very little upstream processing of beans
    - 90% of beans exported as raw beans

Downstream Processing
- Fermented Beans → Cocoa Powder, Cocoa Butter
- Edibles, Pharma, Cosmetics
  - Significant processing capacity but largely unutilized
    - 1/3 of total production capacity in Sulawesi

Dominated by smallholder farmers
- Lower yields than government and private holdings

Production in Sulawesi has been declining due to lower yields
- Plant disease and pest infestation
- Old and damaged trees

Prices sold to next step
- Cocoa $2,500\(^1\)
- Cocoa Powder $2,800
- Cocoa Butter $3,150\(^2\)

1. August 2010 prices less a quality discount of $300
2. Blended price of cocoa powder and butter

Source: Literature search, Expert interviews, BCG analysis
Cocoa farming predominantly made up of smallholders with have lower yields compared to the private or government.

~87% of area is owned by smallholder farmers

Smallholders have lower yields compared to bigger players and Gov

Currently, cocoa yields in Indonesia range from 400-800 kg/ha, with the potential to increase yields as 1 to 1.5 ton/ha

Indonesia Cocoa Board, 2004

Source: Departemen Perkebunan Dalam Angka, BCG analysis
Decline in production due by lower yields

Even as plantation areas are being expanded...

...Yields have been declining

Cocoa Yield in Top 3 Producing Provinces (ton/ha)

Source: Departemen Perkebunan, BCG analysis
Drop in yields largely due to disease and pest infestation

Infestation in pests and diseases as impacted production

Output (in 2009) may be little changed at 480,000 tons after dropping last year as trees were felled because of diseases and pests, the Indonesian Cocoa Association said.

_Bloomberg, May 2009_

Some reasons for the decline include ageing cocoa trees and poor handling of diseases.

- Indonesia Cocoa Association, 2008

The cocoa pod borer disease has been a persistent problem for the crop

The Cocoa Pod Borer disease leads to damaged crops and lower yields

- Outright crop losses due to aborted development
- Smaller beans
- Unable to extract beans from pod
- Premature ripening
- Reduced cocoa butter content

The cocoa pod borer had first appeared in Central Sulawesi in 1987, but there was no action to prevent it spreading and it had now become widespread.

_Jakarta Globe, Feb 2010_

In 2007, however, the island’s cocoa farmers lost about $127 million to the ravages of the Cocoa Pod Borer and other pests and diseases.

_USAID, Dec 2009_
Government has initiated a rehabilitation program meant to improve yield

Last year, the government launched a three-year program to revitalize cocoa plantations, including curbing disease and cutting down aging trees. The Agriculture Ministry allocated Rp 1 trillion ($107 million) for the program in 2009 and has allocated the same amount this year.

Jakarta Globe, 2010

<table>
<thead>
<tr>
<th>Condition</th>
<th>Area identified</th>
<th>Proposed approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old and Damaged</td>
<td>70,000 ha</td>
<td>Replanting</td>
</tr>
<tr>
<td>• Heavily attacked by pests and disease</td>
<td></td>
<td>• Use high yielding clones of cocoa seeds</td>
</tr>
<tr>
<td>• &lt;500kg/ha a year</td>
<td></td>
<td>• Use of approved pesticides</td>
</tr>
<tr>
<td>• Plants over 25 years old</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Productive</td>
<td>235,000 ha</td>
<td>Rehabilitate</td>
</tr>
<tr>
<td>• Are attacked by pests and disease</td>
<td></td>
<td>• Using entres(^1) that have been certified and labeled, free from disease</td>
</tr>
<tr>
<td>• &lt;500kg/ha a year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Plants are &lt;15 years old</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Maintained</td>
<td>145,000 ha</td>
<td>Intensification</td>
</tr>
<tr>
<td>• Untreated plants with less maintenance</td>
<td></td>
<td>• Better plant maintenance in accordance with technical standards</td>
</tr>
</tbody>
</table>

1. Stem/bar of superior quality cocoa crop which pasted with a side graft technology
Source: Literature search, Gernas Kakao
Training and support program initiated to increase farmer knowledge and drive productivity

AMARTA Sulwesi Cocoa Alliance

Partnership between public and private entities:
• Funding from: USAID, Olam International Ltd.
  • Partners: Blommer Chocolate Company, Big Tree Farms and World Cocoa Foundation

Program objectives:
• Provide training in pest and disease control technologies and cocoa best practice management
• Improve farm productivity
• Increase income of rural coconut farmers

Program has achieved considerable progress:
• 20k+ farmers trained, representing 820 farmer groups in Sulawesi
• 30% higher price per kg for farmers who sell to exporters
• 2008 versus 2007 productivity has increased
• 57% and 32% of farmers are meeting export standards for bean count and moisture content respectively
• 82% of farmers compared with 4% initially have sold to an exporter

Production and Quality Improvement of National Cocoa Program

Farmer Empowerment for Estate Escorts:
• Improve the knowledge and skills of officers in the management of cocoa farmers through training
• Increase knowledge and skills about cocoa cultivation technology
• Increase knowledge and skills about farmer extension
• Monitoring and evaluation of farmer groups

Reinforcement Field Laboratories:
• Improve facilities and equipment
• Strengthen laboratory functions such as observation technique development and pest control research

Source: Gernas Kakao, Literature search, BCG analysis
Indonesian cocoa beans have higher fat content...

West Africa produces cocoa beans that have a generally high content of both fat and flavor, which accounts for the global premium. Indonesian cocoa beans, on the other hand, are traded at a discount to the standard NY terminal price...Indonesia’s primary competitive advantage in global cocoa trade lies in its ability to supply large quantities of fat beans.

Source: USAID, 2010
...Which necessitates better transport infrastructure

Beans with high fat content need to be handled with greater care to avoid losses

Supply chain for raw unprocessed beans

- Smallholder farmers with land size of 1-1.5 ha each
- Located in areas that are difficult to access due to poor road conditions
- Sell in small plastic bags

- Collects from different smallholder farmers
- Typically collects via motorcycles
- Poor storage conditions

- Consolidates from local traders
- Will have some warehouses and storage facilities

- Majority will go through multinational affiliate exporters
- Exported via Makassar port

Losses of around 3-5% due to poor packing and storage practices

- High fat content beans have tendency of self heating in storage
- Rancidity and over-fermentation occur at >25° Celsius

Losses amount to ~$300 per ton due to high waste content

Source: Expert interviews, Literature search, BCG analysis
Buying stations have been piloted by large companies to maintain product quality

Buying stations set up...

Set up by PT Effem and Olam in key areas around Sulawesi
- Offers "slightly" higher prices and relatively more transparent buying process than local traders
- Meant to ensure consistent supply of higher quality cocoa beans

...However met with resistance from local community

Threatened the livelihoods of existing cocoa bean traders and collectors

Local traders and collectors vehemently opposed (sometimes violently) the buying station in central Sulawesi

USAID, 2007

Source: USAID, Literature search, BCG analysis

Stakeholder management will be key if supply chain improvements are to be made and accepted
Due to low processing knowledge at farmer level, Indonesia is unable to extract value from its production. Production is exported as raw beans. Processed products have significantly higher value.

Source: USAID, Expert Interviews, BCG Analysis
## Initiatives being taken by the government to export higher value add cocoa products

<table>
<thead>
<tr>
<th>Export tax on cocoa beans to promote local grinders</th>
<th>Government has made explicit plans to boost fermented cocoa bean production</th>
</tr>
</thead>
</table>
| Indonesia will apply a 10 percent export tax on cocoa beans for April as it seeks to boost its domestic cocoa grindings industry, the trade ministry said in a statement.  
*Reuters, 2010* | Because it is not fermented, the price cut of Indonesia's cocoa product can reach up to $350 per ton from the reference prices in New York and London.  
*Indonesian Cocoa Industry Association* |
| Indonesia's trade ministry said ... it plans to apply a new export tax on the struggling cocoa sector to boost the domestic cocoa-grinding industry and create higher value exports.  
*BMI, 2010* | Indonesia has decided to begin giving the commodity added value by marketing or exporting it in fermented form starting 2010.  
*Antara News, 2010* |
| the government use funds gathered from the cacao tax to help cacao farmers, particularly to improve both their productivity and quality of their produce.  
*Jakarta Post, 2010* | With the higher tax on beans export, Indonesian Cacao Industry Association hoped that companies that traditionally exported cacao beans would promote exports of fermented or processed cacao  
*Reuters, 2010* |
Indonesia has adequate but unutilized production capacity

Sulawesi has ~1/3 of national cocoa grinding capacity...

...Capacity is underutilized

Of the 40 processing factories with a production capacity of 300,000 tons, only five were still in production this year because they were not able to compete in the world market.

*Jakarta Post, 2010*

Indonesia is well-poised to position itself as Asia’s hub for cocoa processing, but local farmers aren’t producing enough of the fermented cocoa beans needed by grinders due to the risks involved and a lack of expertise in the fermentation process.

*Dj Newswire, 2009*

**Source:** Literature search, World Cocoa Foundation, BCG Analysis

Issue not in pack of processing capacity, but willingness and ability to process locally
Positioning and gaps

Estate crops exported via 2 major ports
Ujung Pandang port getting increasingly congested

Congestion at Ujung Pandang Port has increased

Rice, corn, beans, rattan, cocoa, flour are some of inter-island commodities move through Port of Makassar

Pelabuhan Indonesia IV, 2004

Port congestion at Bitung has decreased

North Sulawesi's seaports have adequate capacities and facilities to serve passenger, fishery and cargo/container ships plying international, inter-island and cabotage routes.

Jakarta Post, 2006

Source: Badan Pusat Statistik; BPS Dalam Angka; Port Directory; BCG analysis

The Boston Consulting Group
Plans to turn Sulawesi ports into international hubs underway

**Makassar to be developed as a key port for Eastern Indonesia**

Nominated as one of the four gateway ports in Indonesia

Planned improvements at the port made include:
- 850m full container berth
- Land reclamation of up to 250m
- Construction of container pier area
- Improve access to hinterland

**Improvement of Bitung port facilities essential to development of eastern region**

Exports from Bitung need to first go to Tanjung Priok in Jakarta and Tanjung Perak in Surabaya
- Nearer to ship cargo directly from Bitung to their export destinations
- Results in higher transportation costs
- More difficult for products from the eastern region to compete in the global market

Two investors from Hong Kong and China have agreed to build the traditional port of Bitung into international transshipment port with an investment of $200 Mn

*Indonesian Commercial Newsletter, 2003*

The original master plan jointly prepared by the government and state port operator PT Pelindo IV showed that Bitung Port would be fully developed as an international port by 2015

*Asia Africa Intelligence Wire, 2005*

For strategic development of sea transport, the government deems it necessary to build port facilities with better service, and a secure and conducive environment... making the port of Makassar have the ability to export commodities directly to the country of destination

*Press Search, 2009*

Looking ahead, all foreign shipping to eastern Indonesia will be through the Port of Makassar

*Press Search, 2009*

Source: Literature search, BCG analysis
Summary: Estate crop sub-sector has heavy dependence on low value products

- Low value achieved in coconut exports
  - 90% of cocoa is exported as raw beans
  - Processing industry is underutilized

Source: BCG analysis, Literature search, APCC, Expert interviews

The real capacity for the coconut processing industry was only 40 percent from the installed capacity due to difficulties in getting the raw material.

APCC, 2010
Strategic focus: Strengthen upstream activities while developing downstream value-add processing

**Farming and Harvesting**
- Rehabilitation and intensification of plantations
  - Rehabilitate old and damaged trees
  - Improve management of plantations
- Improve access to input material
  - Provide quality seeds
  - Provide required fertilizers
- Increase farmer’s knowledge
  - Educate farmers on more intensive methods

**Upstream Processing**
- Incentives to produce value add products
  - Impose tax on raw material exports
  - Lower import taxes for processing equipment and input materials
- Subsidize processing facilities
  - Government to building of processing facilities for private sector to run
- Establish supporting port facilities
  - To maintain hygiene and quality
  - Reduce value lost

**Downstream Processing**
- Improve yield and productivity
- Increase value of products
Key enablers required to improve capabilities along the value chain

1. Improve farmer education
   - Educate farmers income uplift from value-add products
     - Train farmers for on-farm processes to create value add products (i.e. VCO, fermented cocoa)
   - Train farmers for proper farming and harvest and post harvest methods
     - Proper use of fertilizer
     - Proper storage techniques

2. Create a more efficient marketing channel
   - Reduce over-dependence on low value add middlemen
     - Farmer group purchasing cooperatives
     - Enable farmer to achieve better income
     - Need to anticipate negative reaction from traders
   - Promote benefits of value-add products, eg. health benefits of VCO
   - Facilitate access to supporting input material, eg. packaging

3. Provide one-stop shop for investors
   - Have an umbrella organization that investors can approach
     - Facilitate application process
     - Reduce time it takes to get an operating permit

4. Subsidies for re-planting and input materials
   - It takes about 3-4 years for cocoa and 5-6 years for coconuts re-plantations to mature, resulting in no interim cash flow for small holders
     - Government needs to provide sufficient subsidy to ensure that re-plantation becomes economically attractive

Source: Literature search; BCG analysis
Infrastructure identified to support value add processing goals

1. **Set-up integrated coconut processing plants**
   - Government should support and drive the setup of integrated coconut processing plants at the farmer group level
     - Secured source of raw materials
     - Reduce wastage of coconut fruit
   - **To be structured under a PPP partnership**
     - Government can set-up the facility to be run by private
     - Provide technical assistance to farmers

2. **Build access road and community buying**
   - Create better access roads from plantation to trading center
     - Help to reduce dependence on middle men
     - Reduce in-transit spoilage

3. **Upgrade of port capacity and supporting infrastructure**
   - Improve port infrastructure to handling additional value-added products
     - Ensure proper hygiene when products are being handled and stored at the ports
     - Dedicated facilities to handle edible coconut value-add products
     - Proper handling facilities for fermented cocoa

Source: Expert interviews; BCG analysis
# Sulawesi should strengthen both upstream & downstream (I)

Improving yields creates most value; Downstream value creation potential attractive

<table>
<thead>
<tr>
<th>Value chain steps</th>
<th>Initiatives to add value</th>
<th>Revenue</th>
<th>Margins</th>
<th>Potential value add</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plantations</strong></td>
<td>Improve yield of coconuts</td>
<td>Yield increase from 1.1 ton/ha to 2-5 ton/ha; $50/ton</td>
<td>~40%</td>
<td>$15 – 60 Mn</td>
</tr>
<tr>
<td><strong>Upstream processing</strong></td>
<td>Farmer education</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Downstream processing</strong></td>
<td>Extract more value from coconuts</td>
<td>$170Mn¹ - $660Mn</td>
<td>~50 – 80%</td>
<td>$135 – 515 Mn</td>
</tr>
</tbody>
</table>

**Significant potential upside ($150– 575Mn) from further developing coconut industry in Sulawesi**

---

**Notes:**
1. Based on current production to maximum production potential

Source: Expert interviews; industry reports; literature search; BCG analysis
### Sulawesi should strengthen both upstream & downstream (II)

Improving yields creates most value; Downstream value creation potential attractive

<table>
<thead>
<tr>
<th>Value chain steps</th>
<th>Initiatives to add value</th>
<th>Revenue</th>
<th>Margins</th>
<th>Potential value add</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plantations</td>
<td>Improve yield</td>
<td>Yield increase from 0.6 ton/ha to 1.25 ton/ha; $2500 – 2900/ton</td>
<td>~50%⁴</td>
<td>$1,200 - $1,400 Mn³</td>
</tr>
<tr>
<td>Upstream processing</td>
<td>Fermented cocoa bean</td>
<td>On all exported beans¹</td>
<td>~$200/ton</td>
<td>$340 Mn⁴</td>
</tr>
<tr>
<td>Downstream processing</td>
<td>Butter and powder processing</td>
<td>$1.1Bn¹</td>
<td>~30-35%</td>
<td>$330 - $380 Mn</td>
</tr>
</tbody>
</table>

#### Significant potential upside ($1.9– 2.1Bn) from further developing cocoa industry in Sulawesi

1. 80% of beans exported
2. Based on 300K ton production capacity of existing processing plants and the current prices of cocoa butter and powder
3. On incremental production from improved yield productivity
4. At maximum production from higher yield

Source: Expert interviews; industry reports; literature search; BCG analysis
Agenda

Identification of focus sectors

Positioning, gaps and economic development strategy for focus sectors
  • Food crops
  • Estate crops
  • Fishery
  • Nickel

Summary of infrastructure and high-level PPP recommendation
  • Summary of Infrastructure requirement for stage 1 (2011 – 2014)
  • Summary of Infrastructure requirement for stage 2 (2015 – 2030)
  • High-level PPP recommendation

Summary of GRDP impact
Summary: Focus are marine capture and aquaculture

Strategy:
- Ensure sustainability
- Move to higher value aquaculture species
- Improve product quality

Enablers:
- Improve fishermen education and access to capital
- Stricter enforcement of regulations
- Targeted support for shrimp farming
- Stricter processing standards

Infrastructure:
- Conversion of mangrove to shrimp farms
- Set-up centralized hatcheries
## Four-step methodology employed for sector analysis

**Fishery sector**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1    | Base-lining importance of fishery in Sulawesi  
* Determine Indonesia's global position for key fishery products produced in Sulawesi  
* Determine importance of fishery in Sulawesi  
  - Identify key products  
  - Identify employment impact |
| 2    | Sulawesi's positioning and resulting gaps along the value chain  
* Understand current capabilities of local industry along the value chain  
  - Across entire value chain  
* Determine resulting 'gaps' and opportunities to grow sub-sector |
| 3    | Proposed strategy to further develop fishery sector in Sulawesi  
* Recommend specific strategies at the value chain level or at the industry level to improve  
  - Sector sustainability  
  - Industry competitiveness  
  - Increase exports |
| 4    | Implications on required infrastructure and enablers  
* Recommend specific enablers required to address the gaps identified  
  - Key enablers to support the sector  
  - Infrastructure to support sector strategy |

Source: BCG analysis
Two fishery nodes identified for Sulawesi Corridor
Based on fishery sub-sector

Source: Indonesia’s Investment Coordinating Board (BKPM); National Spatial Planning PP no.7, 2005; Badan Pusat Statistik; BPS Dalam Angka; Port Directory; BCG analysis
Marine capture and aquaculture identified as focus sub-sectors for fishery

Food agriculture GRDP composition of the Kabupaten/Kota covered by the corridor, 2006

- 6.2% Livestock
- 22.3% Estate Crops
- 25.3% Food Crops
- 46.1% Fishery

Fishery contributes ~ ¼ of total food agriculture GRDP

Fish commodity production by method (000 ton), 2006
- Marine: 910.0 (68%)
- Aquaculture: 1,050.0 (32%)

1. Based on 2006 GRDP data
Source: Indonesia’s Investment Coordinating Board (BKPM); Badan Pusat Statistik; BPS Dalam Angka; BCG analysis
Two fishery nodes identified
Kawasan Toli-Toli in Sulawesi Tengah and Kawasan Bulukumba Watampone in Sulawesi Selatan

11 Agriculture Kawasan Andalans lie along the Sulawesi Corridor

1. Kawasan Gorontalo
   - Kab. Gorontalo
   - Kota Gorontalo

2. Kawasan Manado dan Sekitarnya
   - Kab. Minahasa
   - Kab. Minahasa Utara

3. Kawasan Dumoga Kotamobagu
   - Kab. Bolaang Mengondow

4. Kawasan Mamuju dan Sekitarnya
   - Kab. Majene
   - Kab. Mamasa
   - Kab. Mamuju

5. Kawasan Poso dan Sekitarnya
   - Kab. Poso

6. Kawasan Palu dan Sekitarnya
   - Kab. Donggala

7. Kawasan Mamminasata dan Sekitarnya
   - Kab. Takalar
   - Kab. Gowa
   - Kab. Maros
   - Kota Makassar

8. Kawasan Toli-Toli dan Sekitarnya
   - Kab. Toli-Toli
   - Kab. Buol

9. Kawasan Bulukumba Watampone
   - Kab. Bulukumba
   - Kab. Sinjai
   - Kab. Bone

10. Kawasan Pare-Pare dan Sekitarnya
    - Kab. Barru
    - Kab. Soppeng
    - Kab. Sidenreng Rappang
    - Kab. Pinrang
    - Kota Pare-Pare

11. Kawasan Palopo dan Sekitarnya
    - Kab. Tana Toraja

Note: Kawasan Poso, Kawasan Palu and Kawasan Palopo are not illustrated in the chart above due to their very low focus in the fishery sub-sector (fishery production in 2006 below 5,000 tonnes).

Source: National Spatial Planning PP no.7, 2005; Indonesia’s Investment Coordinating Board (BKPM); BCG analysis
Global seafood production increasing at 2% CAGR

Source: FAO Fisheries and Aquaculture Dept.
Sulawesi is a key seafood producer in Indonesia

Sulawesi has the largest seafood production volume in Indonesia

Seafood production, 2007 (Mn ton)

- Sulawesi: 2.0
- Sumatera: 1.9
- Java: 1.6
- Bali & Nusa Tenggara: 1.1
- Maluku-Papua: 1.0
- Kalimantan: 0.4

Source: Indonesia Fisheries Book, 2009
Fishing / Farming | Up-stream processing | Collection and Distribution | Down-stream / final processing | Export

- Can be done via open capture or aquaculture (farming)
- Post harvest operations to keep catch fresh
- Consolidation of catch from different fishermen
- Cutting, freezing, packaging/canning of produce before export
- Processed products exported to local or int’l destinations

Sulawesi has significant open capture and aquaculture experience
Weak post harvesting procedures lead to lower value use of catch
Established practice of selling to middlemen as facilitators of trade
High presence of cost storage facilities
Sulawesi is already an established export source for high demand species

Overfishing is a persistent problem
Middlemen also play an important social function
Some processing facilities with potential to move to higher value products

50-100% | 5-20%

Margins | Level of Development

Source: Expert Interviews

THE BOSTON CONSULTING GROUP
Sulawesi has a large and fragmented fishermen community

Sulawesi has ~330k fishers, highest total compared to other regions

Fishers in top 10 fisher provinces ('000), 2007

Sulawesi region has the highest number of fishing vessels in Indonesia

Fishing vessels by province ('000), 2007

Source: Indonesia Fisheries Book, 2009; DKP
Sulawesi is one of the leading regions in marine capture volume.

Source: Indonesian Fisheries Book 2009
Sulawesi rich in species that have increasing global demand
National leader in tuna fish catch

% Global Demand CAGR, 2004-2008

Source: Indonesian Fisheries Book 2009

THE BOSTON CONSULTING GROUP
However, water around Sulawesi are suffering from overfishing.

<table>
<thead>
<tr>
<th>Body of water</th>
<th>Demersal</th>
<th>Shrimp</th>
<th>Small Pelagic</th>
<th>Big Pelagic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makassar Strait</td>
<td>F</td>
<td>O</td>
<td>M</td>
<td>UN</td>
</tr>
<tr>
<td>Tolo Bay / Banda Sea</td>
<td>U/UN</td>
<td>UN</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Tomini Bay / Maluku Sea / Halmerah Sea</td>
<td>M</td>
<td>-</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>Sulawesi Sea</td>
<td>UN</td>
<td>-</td>
<td>UN</td>
<td>O</td>
</tr>
</tbody>
</table>

M – Moderate
U – Uncertain
O – Over exploited
F – Fully exploited

Source: Indonesian Port Book, 2009
Overexploitation of fishery can lead to severe future consequences for the population

Production levels dangerously close to unsustainable level

Sulu-Sulawesi Sea sustainability rated to be in severe state

1. Total allowable catch (TAC) is the catch volume at which fishery should be managed to be sustainable, computed as 80% of total estimated yield.

Purse-seine fishing growth has contributed to overfishing

Seine fishing has seen growth over the last few years

- Sea Capture by Purse Seine (thousand ton)
- # of Seine Net Units ('000)

By-capture in Seine fishing has caused deterioration in tuna population

- Purse seine finishing results in catching of juvenile tunas thereby reducing the adult tuna population
  - Fishery Expert

Trawling and purse seine fishery have become a problematic issue in Indonesia, strongly contributing to the overfishing of mostly fully exploited juvenile tunas, and illegal, unregulated and unreported fishing in the area (IUU).

- WWF Press Release, 2010

Source: DKP Dalam Angka, Literature Search, Expert interviews

The Boston Consulting Group
Unregulated growth in number of fishing vessels contributed to overfishing situation

Number of vessels in Sulawesi has been growing marginally faster than the nation

Efforts being made to cut down on excessive growth through licensing regulations

- Vessels that are > 5 GT are required to attain a license from the national office
  - Annual license renewals are done automatically if there are no changes in vessel or equipment
  - Required to be inspected for safety before license is issued
- Vessels < 5 GT are considered artisanal and can register at the district/provincial level

Compliance with these requirements is still a challenge for the Ministry. Licensing has not been fully implemented as a management tool for fishery

FAO Policy and Planning Div, 2004

Source: DKP Dalam Angka, Literature search
268532-02-Sulawesi IEDC masterplan-31Dec10-BC_YS-JAK.ppt
Government have enacted legislation to help preservation, but results are mixed.

Laws have helped to increase autonomy and localization of coastal management.

However, even with decentralization problems still persist.

Problems of coastal environment degradation and depletion of coastal resources still occur... There is ambiguity and overlapping with respect to various laws.

- UN-Japan Foundation, 2010

- Many local governments lack the capacity to implement conservation activities
- Local governments enacted regulations that are not consistent with pre-existing central and provincial laws
- Regulations were more towards driving revenues vs. conservation

Increase sense of stewardship of local people to conserve and protect marine resources for destructive fishing methods.

Note: Law No 22/1999; Law No 32/2004
Source: UN, Press Search
268532-02-Sulawesi IEDC masterplan-31Dec10-BC_YS-JAK.ppt
Aquaculture is growing rapidly in Indonesia as a way to augment production and preserve the environment.

Government has recognized the importance of aquaculture.

In the long term the market is not only concerned with food safety but the environment. We want more aquaculture production but it will take time. We have to start now and then relax on marine fishery.

*DG for fishery and product processing, 2008*

Aquaculture development in Indonesia has been accelerated and is now considered as an important sector in supporting rural economic development.

*DG for aquaculture, 2008*

**Increase in aquaculture production nationwide**

<table>
<thead>
<tr>
<th>Year</th>
<th>Production volume by type (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>Aquaculture: 19, Capture: 81</td>
</tr>
<tr>
<td>2001</td>
<td>Aquaculture: 20, Capture: 80</td>
</tr>
<tr>
<td>2002</td>
<td>Aquaculture: 21, Capture: 79</td>
</tr>
<tr>
<td>2003</td>
<td>Aquaculture: 21, Capture: 79</td>
</tr>
<tr>
<td>2004</td>
<td>Aquaculture: 24, Capture: 76</td>
</tr>
<tr>
<td>2005</td>
<td>Aquaculture: 31, Capture: 69</td>
</tr>
<tr>
<td>2006</td>
<td>Aquaculture: 36, Capture: 64</td>
</tr>
<tr>
<td>2007</td>
<td>Aquaculture: 39, Capture: 61</td>
</tr>
</tbody>
</table>

**Source:** BDS, Literature search
Sulawesi is one of the leading aquaculture producers

Sulawesi has the highest production volume from aquaculture

Aquaculture production by type (thousand ton)

Sulawesi is seeking to improve its aquaculture industry

Marine culture and fishery development is often seen as an important strategy to contribute to poverty alleviation of rural coastal communities

Network of aquaculture centers in AP, 2009

(Cooperation of MMAF and Central Sulawesi Government) will help optimize the existing resources in increasing continually fishery production at Central Sulawesi

DKP, 2010

...MMAF along local government n public private build 12 seaweed cluster at South Sulawesi, Central Sulawesi, Southeast Sulawesi (and other provinces in Java and Sumatera)

DKP, 2010

Source: BDS, Literature search
268532-02-Sulawesi IEDC masterplan-31Dec10-BC_YS-JAK.ppt
Sulawesi aquaculture production is predominantly for marine culture and tambak

**Sulawesi region is top Marine commodity producer in Indonesia**

Marine production, 2007 (thousand ton)

**S Sulawesi is top Tambak commodity producer in Indonesia**

Brackishwater Production, 2007 (thousand ton)

**However, Sulawesi production for freshwater commodities is weak**

Freshwater Production, 2007 (thousand ton)

Source: Indonesian Fisheries Book 2009
Sulawesi has large marine culture and tambak areas

**Tambak Pond**
- Marine production, 2007 (’000 ha)

**Freshwater Pond**
- Freshwater Pond, 2007 (’000 ha)

**Inland Openwater**
- Inland Openwater, 2007 (’000 ha)

**Marine Culture**
- Marine Culture, 2007 (’000 ha)

Source: Indonesian Fisheries Book 2009
Positioning and gaps

Major aquaculture species with growing global demand present in Sulawesi

<table>
<thead>
<tr>
<th>Top 5 aquaculture commodities in Indonesia</th>
<th>2007 National production (thousand ton)</th>
<th>Habitat</th>
<th>Sulawesi prod. as a % of Nat'l</th>
<th>Global production growth (%)¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seaweed</td>
<td>1,700</td>
<td>Marine</td>
<td>53%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Shrimp</td>
<td>360</td>
<td>Tambak</td>
<td>7%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Common Carp</td>
<td>264</td>
<td>Freshwater</td>
<td>4%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Milk Fish</td>
<td>263</td>
<td>Tambak</td>
<td>27%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Nile Tilapia</td>
<td>207</td>
<td>Freshwater</td>
<td>7%</td>
<td>6.3%</td>
</tr>
</tbody>
</table>

1. 2005-2008
Source: DKP, Indonesia Fisheries Yearbook 2009, FAO
However, aquaculture in Sulawesi mainly focused on low value products.

<table>
<thead>
<tr>
<th>Product</th>
<th>$ / ton, 2007</th>
<th>% of total aquaculture production in Sulawesi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Udang</td>
<td>3,695</td>
<td>2%</td>
</tr>
<tr>
<td>Common carp</td>
<td>1,050</td>
<td>1%</td>
</tr>
<tr>
<td>Nile tilapia</td>
<td>855</td>
<td>1%</td>
</tr>
<tr>
<td>Milkfish</td>
<td>795</td>
<td>7%</td>
</tr>
<tr>
<td>Seaweed</td>
<td>209</td>
<td>87%</td>
</tr>
</tbody>
</table>

Source: DPK, Indonesia Fisheries Yearbook 2009
Potential exists to further increase value yield of tambak resources

Current yield is sub-optimal

$ thousand, 2006

<table>
<thead>
<tr>
<th>Value per MT of production</th>
<th>Value per Ha of Tambak Area</th>
<th>Value per Farmer Working in Tambak Aquaculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulawesi</td>
<td>Java</td>
<td>Sumatra</td>
</tr>
</tbody>
</table>

2 key reasons for sub-optimal position

Production in Sulawesi for lower value products compared to Sumatra
- 90% of production in Sumatra is for higher value shrimp
- 90% of Sulawesi production is for low value seaweed

Farming methods are more intensive in Sumatra
- Presence of large, vertically integrated aquaculture companies in Sumatra (i.e. CPRO)
- Intensive farming and high density ponds of 50-200 shrimps per m$^2$ found in Sumatra
- Sulawesi uses traditional Tambak method, <10 shrimps per m$^2$, that involves little use of feed supplements and irrigation systems

Source: Expert interviews, Aquaculture statistics, BCG Analysis
South Sulawesi has indicated desire to grow shrimp farming, but production still lags behind other provinces

South Sulawesi seeking to grow its shrimp farm business...

*Improve earning (in Sulawesi) by increasing productivity and production of higher value products...Shrimp production to increase to 33.2 thousand ton in 2013*
  
  - *South Sulawesi Gov, 2010*

*South Sulawesi province has a high potential for becoming Indonesia's largest shrimp producer*

  - *Head of S Sulawesi Dept of marine affairs and fishery, 2010*

*Next year's budget for shrimp and milkfish production is Rp 5.5Bn, including Rp 2.2Bn for South Sulawesi shrimp revival movement*

  - *Section Head of Marine and Brackishwater aquaculture Fishery, 2010*

...However, production is lagging far behind other provinces

Source: Literature Search, DPK, Indonesia Fisheries Yearbook 2009, BCG analysis

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