Policy Brief:
Cacao Agroforestry

1. **TEEBAgriFood**, a project of UN Environment Program (UNEP), provides a framework and technical assistance for evaluating all **visible and invisible impacts** of agriculture & food systems.

2. The TEEBAgriFood Framework is a tool to evaluate or acquire **scientific evidence** to support policy making, such as **BAPPENAS** development plan for sustainable agricultural commodities.

3. This rapid assessment illustrates that **spatial planning** and training in good **agricultural practices** for cocoa agroforestry are necessary to ensure **win-win outcomes** for small-farmers, the cocoa sector, and the environment.
Tropical commodities such as oil palm, coconut, rubber, and cocoa are a core part of the Indonesian economy and development strategy, from small-scale farmers to large agribusinesses.

Agricultural commodities in Indonesia have been a driver of deforestation and associated greenhouse gas emissions, air pollution, erosion, water pollution, and loss of biodiversity.

Cocoa productivity is declining in Indonesia. The cocoa sector faces challenges in terms of production efficiency, quality, price fluctuations, lack of expertise and access to capital.

Because of rising demand and existing investments in the cacao value chain, Indonesia wants to boost cocoa output, add value, increase incomes, and increase exports.

Cocoa agroforestry is a potential alternative with unique strengths, weaknesses, opportunities, and threats compared to other agricultural commodities.
Is cocoa part of the solution?

- Cocoa agroforestry production can be intensified, increasing yields significantly without causing deforestation.
- Cocoa agroforestry can diversify incomes and protect vulnerable small farmers from price fluctuations.
- Cocoa agroforestry using good agricultural practices offers better ecosystem services than some other types of agriculture, but
- Policies should target practices with fewest trade-offs between increased productivity and long run impacts, and
- Spatial planning and regulation should be implemented to prevent expansion of cocoa into natural forest.
Potential benefits of adopting cacao agroforestry

In comparison to full-sun monoculture

• Increased productive lifetime of cacao trees through reduced physiological stress
• Increased biological pest & disease control through increased animal, bird, and insect diversity
• Increased nutrient cycling and addition with litter fall results in accelerated decomposition & improved soil quality
• Increased carbon sequestration and storage (GHG mitigation)
• Increased nitrogen input by legume shade trees
• Reduced weed cover under shade trees
• Minimized soil erosion after heavy rainfall
• Enhanced pollination success

Clough et al. (2009)
Abou Rajab et al. (2016)
• **Rehabilitate** existing plantations with younger plants and improved varieties

• Use proven **intercrop** agroforestry systems (e.g. coconut-cocoa)

• **Apply Good Agricultural Practices** including:
  • Appropriate type and timing of fertilizers and pesticides
  • Integrated pest management
  • Efficient water management
  • Preventing soil erosion and building soil organic matter

• **Increase the provision of knowledge and training** to smallholder farmers, with sustained extension service and traceable certification schemes

• **Analyze** economic viability of very small cocoa farms (<1ha)
## BAPPENAS and Cocoa Stakeholder Priorities and TEEB Recommendations

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<th>Topics material to BAPPENAS</th>
<th>Issues identified by cacao sector stakeholders</th>
<th>Recommendations</th>
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<td>Spatial Planning to conserve natural capital</td>
<td>Lack of knowledge about land suitability</td>
<td>Spatial planning for cacao restoration or expansion</td>
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<td>Water Quantity &amp; Quality</td>
<td>Land use change and land occupation</td>
<td>Life Cycle Assessment to select win-win good agricultural practices (GAP)</td>
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<td>Soil Quality</td>
<td>Lack of knowledge about agroforestry (intercrop species)</td>
<td>Promote agroforestry through training and extension</td>
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<td>Seed Quality</td>
<td>High soil acidity</td>
<td>Agronomy research</td>
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<td>Research and Development to improve agriculture production system</td>
<td>Anticipate Vascular Streak Dieback (VSD) and Black Pod (phytophthora fungus)</td>
<td>Financial assistance to promote R&amp;D</td>
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<td>Anticipate climate change (drought)</td>
<td>Collaboration with academics and research institution</td>
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<td>Lack of availability of local seeds</td>
<td>Collaborate with private sector to scale up best practices</td>
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<td>Poor seed productivity</td>
<td>Development of local seeds and evaluation of its environmental impact throughout its life cycle</td>
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<td>Research and database of seed types vs. taste</td>
<td>Seed distribution/logistics</td>
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<td>• Education/Skills for human capital</td>
<td>• Lack of knowledge of Good Agricultural Practice (GAP) and application of technology</td>
<td>• Promote Good Agricultural Practices through training and extension services</td>
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<td>• Local Spatial Planning for social capital (e.g. availability of local expertise)</td>
<td>• Lack of implementation of GAP</td>
<td>• Monitor uptake of training and implementation of GAP</td>
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<td>• Labour inputs (incl. skills)</td>
<td>• Aging trees</td>
<td>• Benchmarking with best practise on cacao assistance/extension programs (e.g. Cocoa Doctors)</td>
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<td>• Infrastructure development</td>
<td>• Inappropriate Pruning</td>
<td>• Provide knowledge management tool (digitisation) for smallholder farmers</td>
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<td>• Sanitation (fungicide application)</td>
<td>• Capacity building and knowledge management for certification</td>
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<td>• Inappropriate fertilizer application</td>
<td>• Assistance in building post-harvesting facilities</td>
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<td>• Lack of knowledge about fermentation techniques</td>
<td>• Infrastructure investments in rural areas with many small holder farmers</td>
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<td>• Insufficient farmers' assistance/extension (Penyuluh)</td>
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| • Food Security (Access/Distribution) | • Low income for farmers leads farmers to switch to other crops  
• Price indifference for fermented cacao on farmer level (no fair trade)  
• Aging farmers  
• Declining number of farmers  
• Farmers' assistance unavailable for low income farmers  
• Potential health impact to human (farmers) due to fungicide/chemicals/fertilizer application  
• Health benefit of consumption of cacao - cacao culture | • Cooperative for farmers to improve the livelihood, knowledge sharing, and bargaining power (BUMDES)  
• Development of regulation on fair trade  
• Implementation of fair trading  
• Pricing policy for premium market  
• Development of local education or vocational studies  
• Proper remuneration for extension/farmers’ assistance workers  
• Development of Occupational health and safety standards for farmers and workers  
• Establish cacao culture consumption |
Cacao Agroforestry policy can and should support:

- **Sustainable farms**
  - In the long term, agroforestry systems that use GAPs are resilient and ecologically sustainable

- **Sustainable incomes**
  - Diversifying income and adding value can improve wellbeing of small farms

- **Land sparing**
  - Increasing yield per hectare can increase cocoa output without deforestation

- **Non-market benefits (ecosystem services)**
  - Agroforestry and less deforestation together can mitigate climate change, save soil, and protect water
Possible Futures

• **Improve** cocoa yields per hectare by
  • Replacing old plants and using best proven density of intercrop systems
  • Improve soil health and timing of pesticide and fertilizer applications

• **Maximize benefits** with spatial planning of production
  • By replacing existing cropland and degraded land with cocoa agroforestry, and regulating areas with potential risk to water quality and biodiversity

• **Add** value by
  • i) increasing quality (fermentation or improved varieties),
  • ii) adding certification
Bibliography

- Aseantoday (8 June 2019), Asean’s top cocoa bean producers are struggling to cope with increasing demand or chocolate. Available from https://www.aseantoday.com/2019/06/aseans-top-cocoa-bean-producers-are-struggling-to-cope-with-increasing-demand-for-chocolate/