Conservation Agriculture
Implementation of CA to Reduce Disaster Risks caused by Climate Change in the Provinces of NTB and NTT in Indonesia

A SUCCESS STORY OF THE CONSERVATION AGRICULTURE IMPLEMENTATION IN INDONESIA

G-20 Technical Workshop on Climate Change Lesson Learned on Climate Resilient Agriculture

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CONSERVATION AGRICULTURE (CA)

- Minimum soil disturbance
- Soil cover
- Crop Rotation

Soil structures
- moisture
- Organic matters, Nutrients

Principles And Practices

More resilience towards climate changes

Mulching from outside plot
Organic fertilizer: Planting holes, ripping
WHERE

Nusa Tenggara Barat and Nusa Tenggara Timur (NTB & NTT)

Total beneficiaries: 5,597 HH
The Nusa Tenggara Barat (NTB) and Nusa Tenggara Timur (NTT) provinces are the most food insecure in Indonesia. Agriculture (the main source of livelihood) has a high risk for climate disasters mainly drought. Because of low rainfall, only one crop per year is possible food shortages during the lean season become a recurrent problem. Environmental constraints to produce rice and corn (the staple foods in these provinces) are poor soil fertility, inadequate agricultural inputs, recurrent extreme climate events, and lack of means to increase production.
Jointly developed a project by the **Food and Agriculture Organization** of the United Nations (FAO) and the Government of Indonesia (**Ministry of Agriculture**) to introduce **Conservation Agriculture** (CA) technologies and approaches to help farmers **increase productivity** and resilience to climate change.
Project Objective and Outcome

• **Objective** □ To introduce Conservation Agriculture (CA) technologies in selected districts

• **Outcome** □ To enhance the resilience of rural livelihoods in the targeted districts against climate related threats and emergencies through:
  
  □ the **promotion of climate smart agriculture** (CSA) and increasing the understanding of **disaster risk reduction** (DRR) through the adoption of CA by **resource-poor and vulnerable smallholder** farmers in **dryland areas**.

□ Target □ **less food insecure & increase farmer income**
Enhanced soil fertility within demonstration sites through accelerated validation and adoption of CA technologies and practices,

Appropriate conservation agriculture technologies and practices are adopted and practised by smallholder farmers through community-based participatory extension approaches, and

Policy reform at Province and District level enabled to streamline climate related Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) into local government agricultural policies.
**Minimum Soil Disturbance**

- **Trench development** □ Trench is a furrow of 80 cm width and 50 cm depth, filled up with topsoil + organic fertilizers (1:1). Two rows of maize planted in a trench with 70 cm between rows and 20 cm space in the row. Permanent trenches only provided one time

- **Permanent planting holes** □ Small pits (40 x 40 x 40 cm). The distance between holes in the line is 40 cm and distance between rows is 80 cm. About 5 kg organic fertilizer applied in each hole and mixed with topsoil. Four seeds of maize planted in each corner of the hole. Permanent planting holes are also developed one time

- **ripping lines** □ A narrow slot in the soil surface (5–10 cm deep). Organic fertilizers 1 kg/meter. Maize seeds planted with 20 cm apart on the line
Planting hole & Minimum soil disturbance

Maize growth performance

Pemongkong Village, Lombok Timur

Jerowaru Village, Lombok Timur
Achievement of Results

- Improvements in maize productivity: maize cultivated with the traditional farming methods was mostly affected or damaged, but maize cultivated using CA techniques in the same drought-affected areas could be harvested, and

- Enhancement of soil nutrients and fertility.

- These results built trust and confidence in CA by farmers and led to the adoption of CA in dryland areas.
Soil C-org increase after 4 years with CA
Soil Nitrogen increase after 4 years with CA
Progress Farmer Implementing CA
## Achievement of intended indicator & target

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<tr>
<th>Intervention</th>
<th>Indicator &amp; Target</th>
<th>Achievements</th>
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<tr>
<td>Improved yields, <strong>reduced crop losses</strong> with enhanced <strong>soil fertility and structure</strong> through well-managed conservation agriculture techniques</td>
<td>2,278 men &amp; women smallholder farmers tested &amp; validated CA.</td>
<td><strong>16,333</strong> farmer members (6.054 women) have tested and validated CA.</td>
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<td>25% <strong>reduction in labour required</strong> for maize production.</td>
<td>CA reduced <strong>33%</strong> labour cost but in total increased by 3% compared to conventional.</td>
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<td>50% increase in <strong>maize yields</strong> within three years.</td>
<td><strong>63% increase</strong> Average maize yields with CA 4.5 t/ha (conventional 2.7 t/ha)</td>
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<td>50% increase in <strong>soil C</strong> within three years.</td>
<td>29% increase soil C (from previously 1.66% to 2.13%).</td>
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SUSTAINABILITY

• **Capacity development**  the project trained 721 extension officers and 134 agriculture vocational teachers and academicians in the provinces through farmer FS approach;

• **Technological sustainability**  the project promoted CA technologies and practices, which **do not require a great deal of external inputs** and are locally available;

• **Economic sustainability**  income of CA farmers were higher by 37% in Lombok, 57% in Sumba and 77% in Timor. Implementation of CA in the drylands is promising in terms of economic benefits and sustainability;

• **Environmental sustainability and climate resilience**  CA implementation improved soil quality (soil physical, chemical, and biological properties).
CA technologies and practices were highly applicable to the dryland areas of NTT and NTB provinces of Indonesia, but planting methods must be chosen according to the agro-ecological zone and soil conditions.

Inviting policy makers to the field (through field meetings and harvesting ceremony) has helped government officials recognize the advantages of CA over conventional systems. This has influenced officials to promote CA in national and provincial/district policies.

CA has proven to be a successful approach for combatting land degradation and restoring degraded agricultural land to productive use with healthier soils.
LESSONS LEARNED (Impediments/Constraints)

✔ It was **difficult** and time consuming to **persuade farmers** to adopt new technologies and practices. The farmer **field school training approach** was key to the success of the adaptive research and expansion.

✔ The permanent planting holes method, requires significant amounts of organic compost (more than 50 tonnes/ha), which is **not easy to obtain** for farmers who do not raise livestock and have no income to purchase it.
Thank you