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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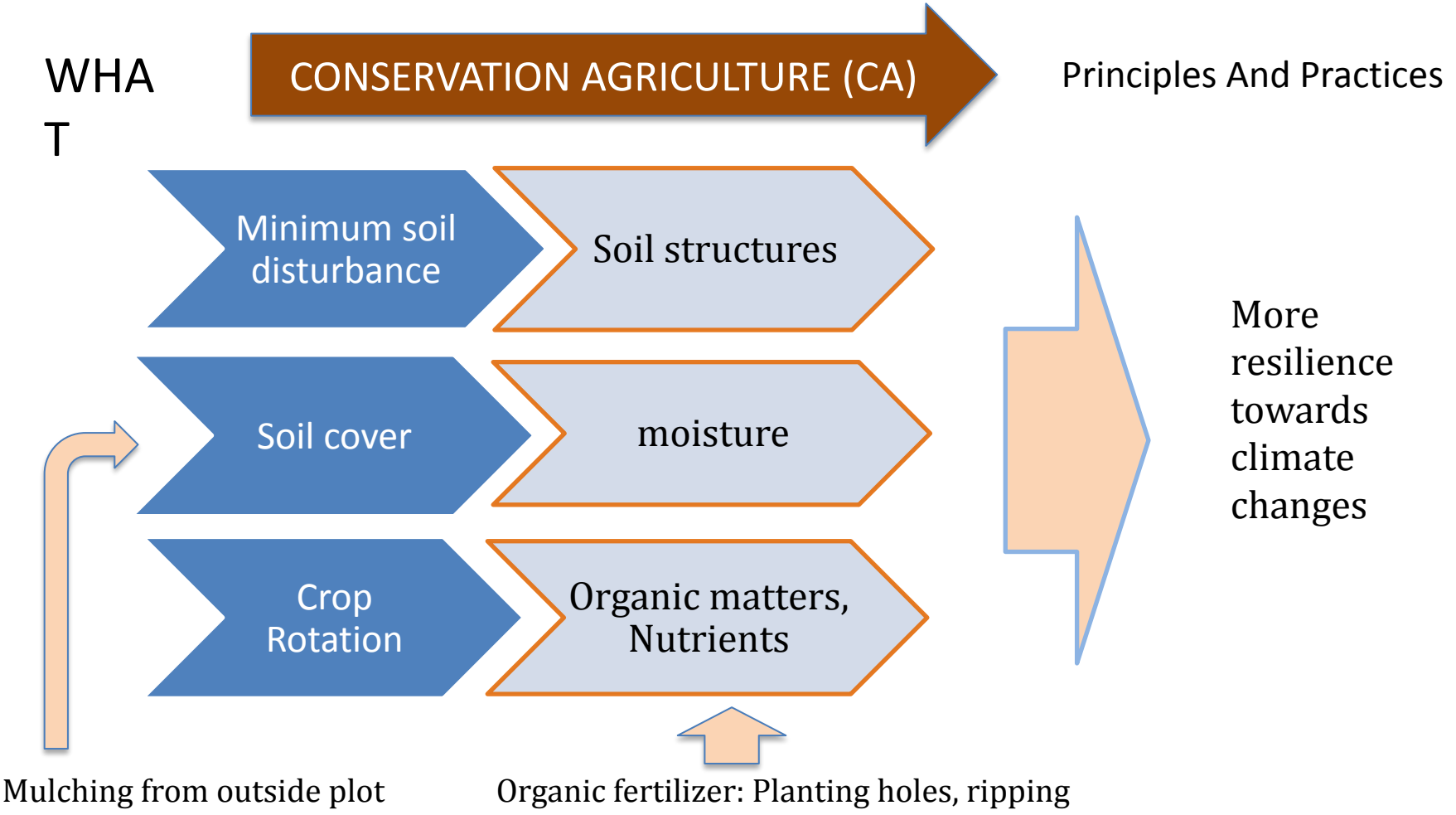
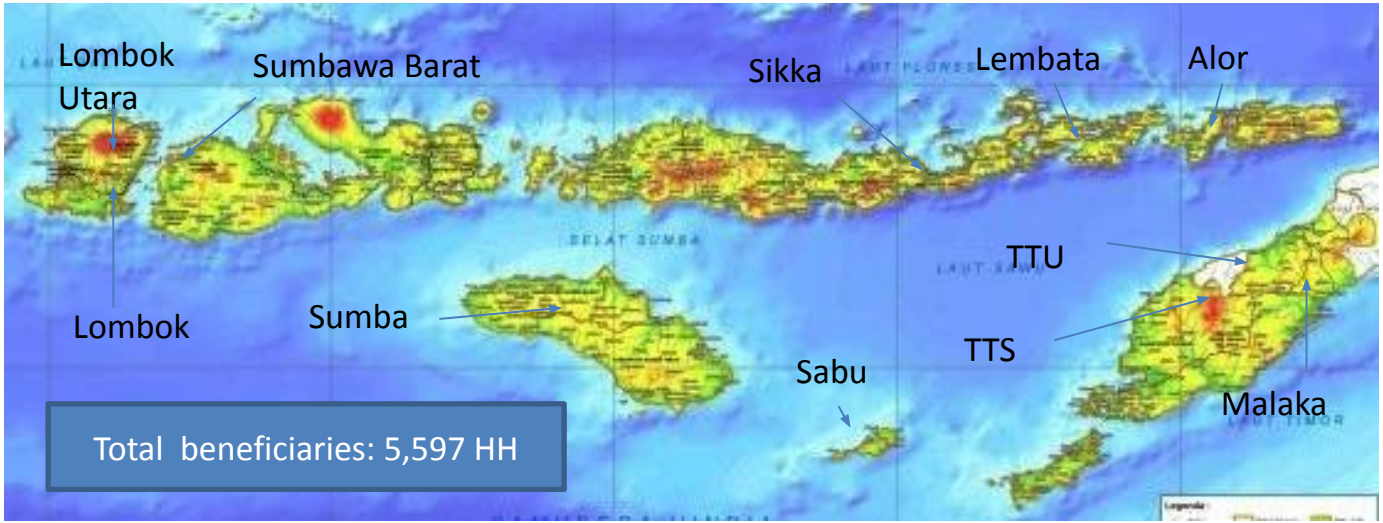

CONSERVATION AGRICULTURE (CA)
Principles And Practices
Minimum soil disturbance
Soil structures
Soil cover
moisture
Crop Rotation
Organic matters, Nutrients
More resilience towards climate changes
Mulching from outside plot
Organic fertilizer: Planting holes, ripping

WHERE

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



Why in NTB & NTT Provinces

- ✔ 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 yea**r 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.

Response to the problems

Jointly developed a project by the **Food and Agriculture Organization** of the United Nations (FAO) and the Government of Indonesia (**Ministry of Agriculture**) 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**

Target Output

- **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

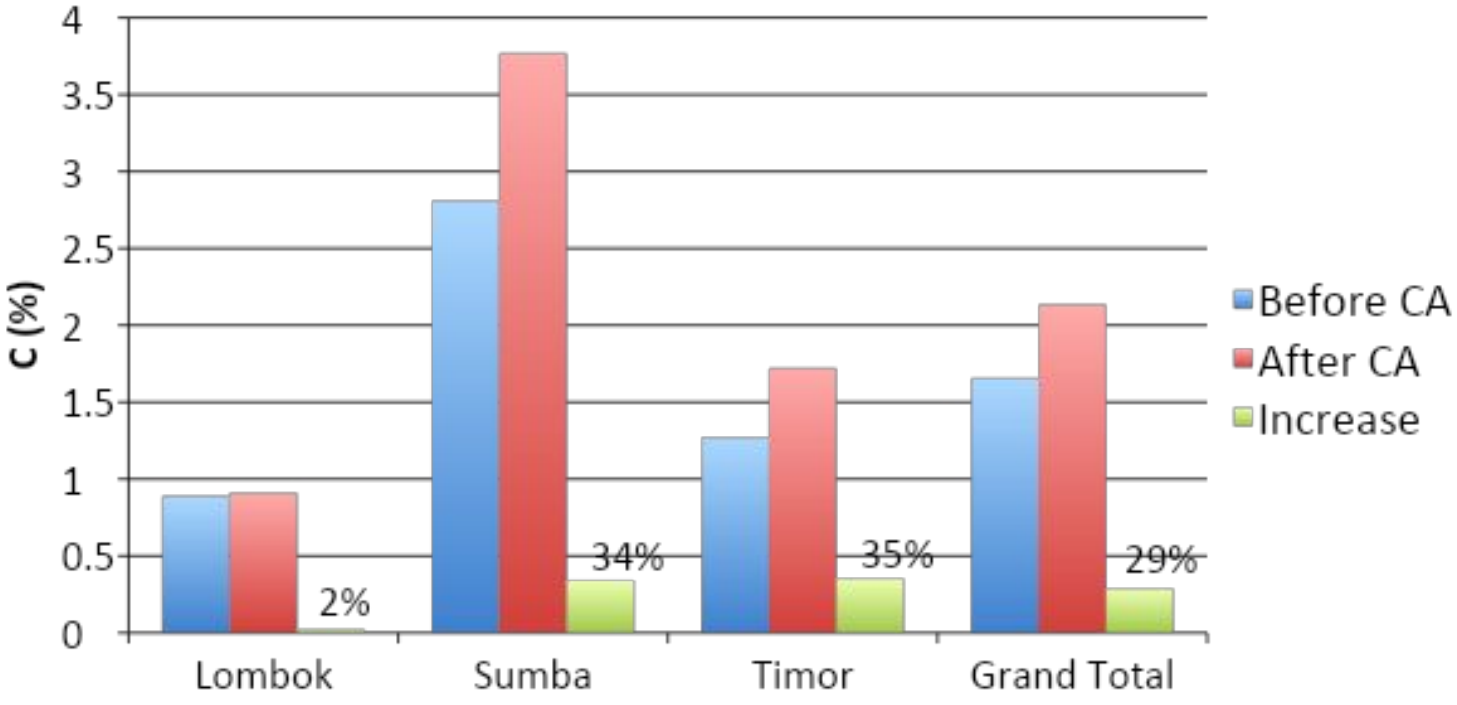
Pemongkong Village, Lombok Timur

Jerowaru Village, Lombok Timur

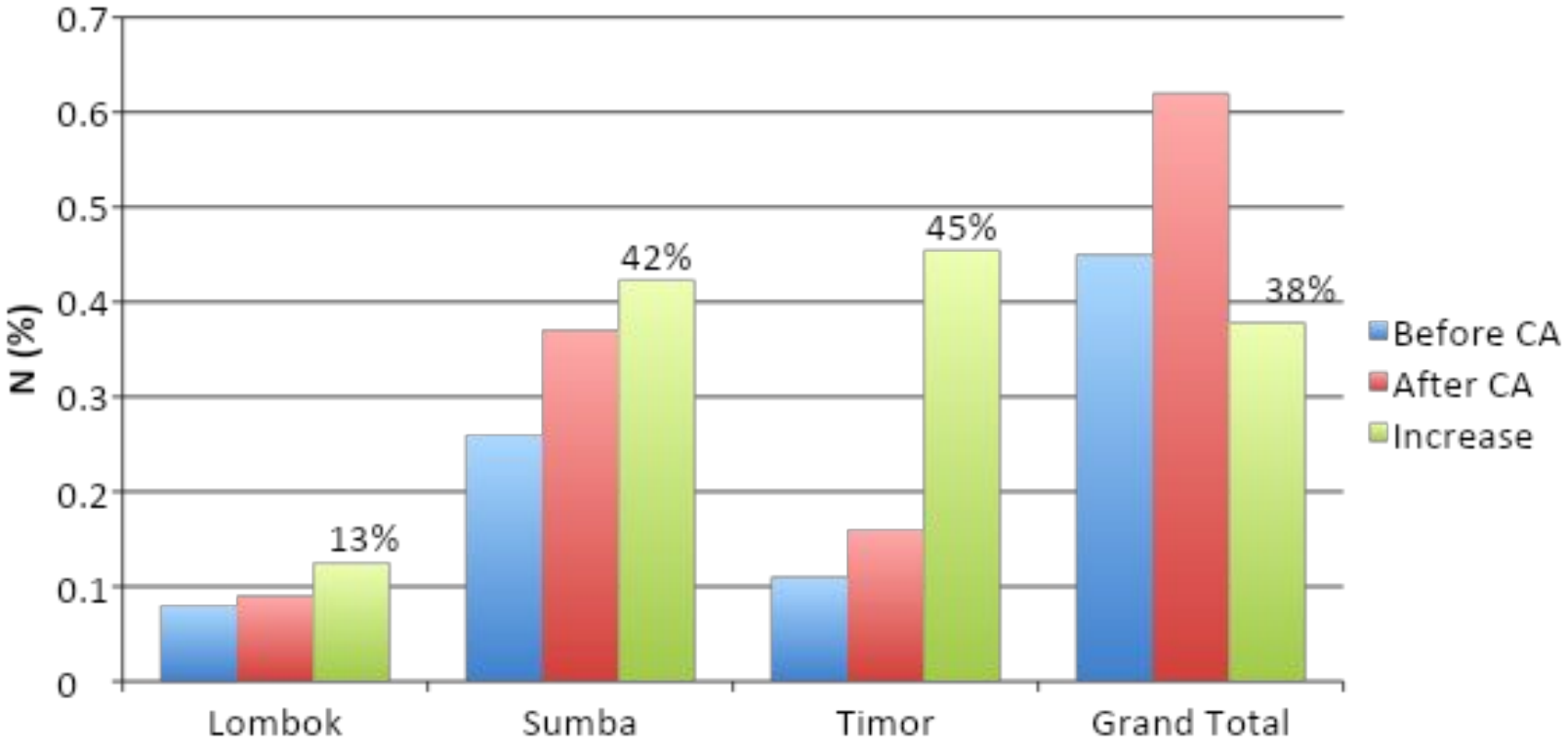
Achievement of Results

- 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

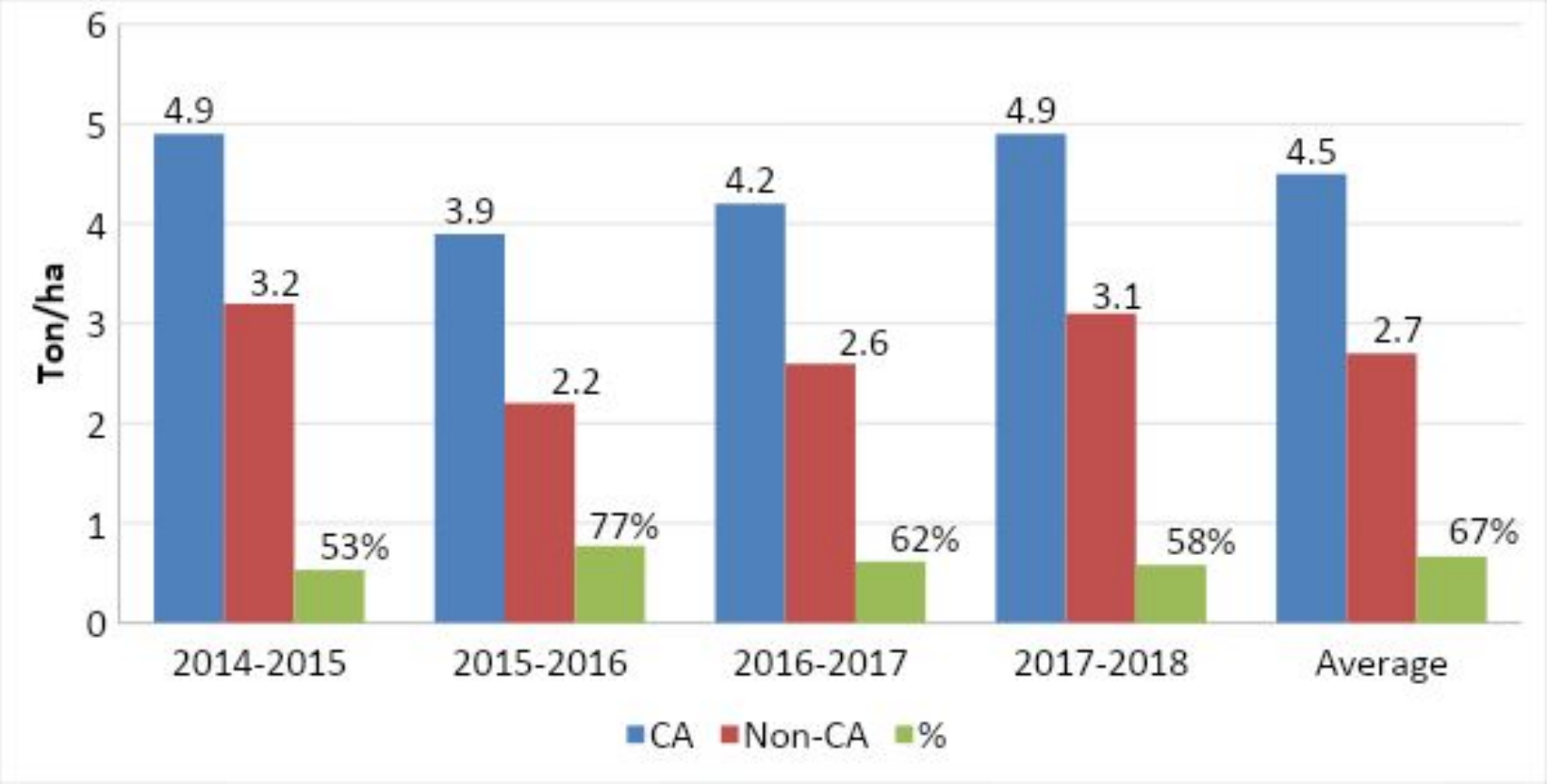
Soil C-org increase after 4 years with CA



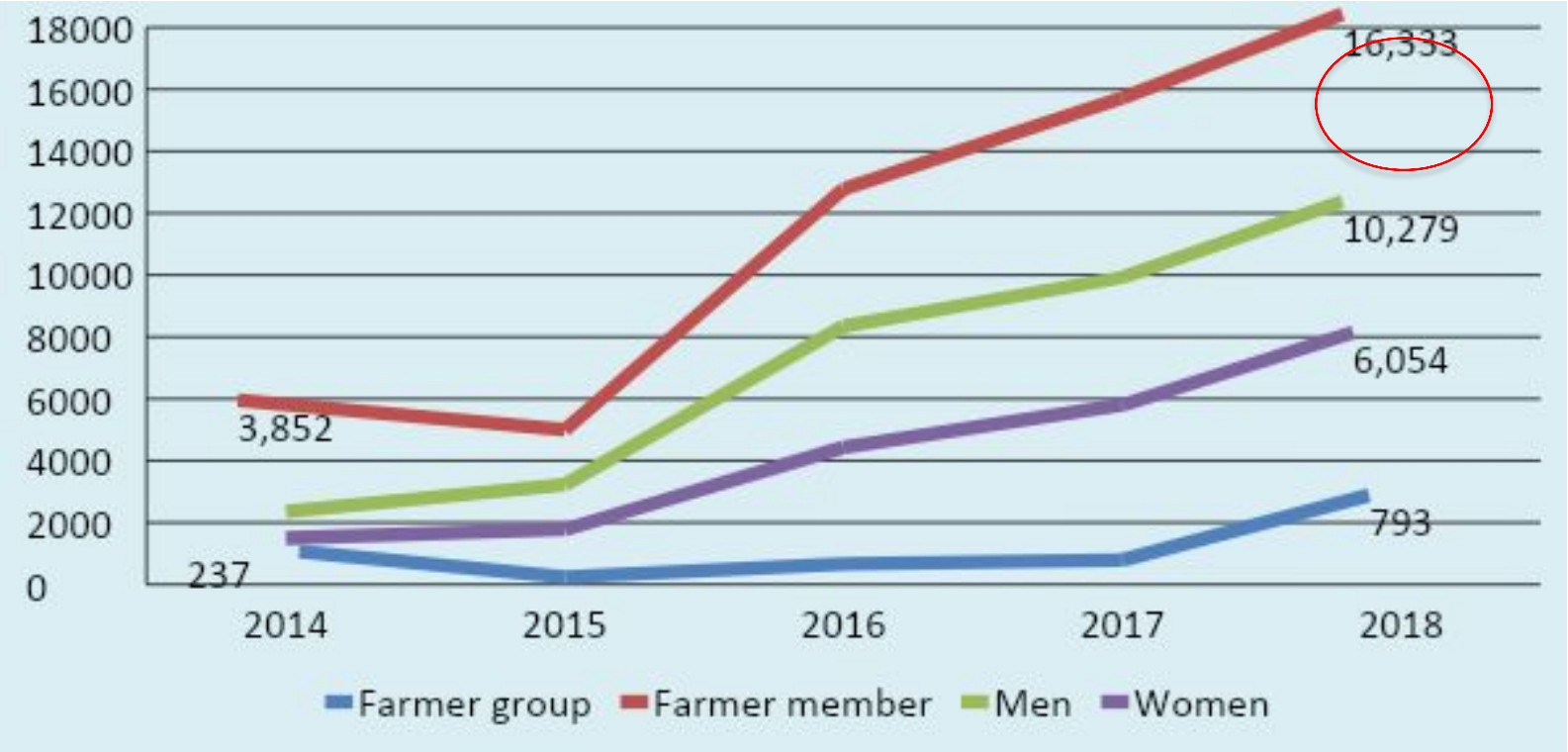
Soil Nitrogen increase after 4 years with CA



Average maize yield



Progress Farmer Implementing CA



Achievement of intended indicator & target

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

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).

LESSONS LEARNED (Elements of success)

- ✔ 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