

# DEVELOPING VALUE-CHAIN LINKAGES TO IMPROVE SMALL HOLDER CASSAVA PRODUCTION SYSTEMS IN INDONESIA

**University of Brawijaya  
and  
Indonesian Legume and Tuber Crops  
Research Institute (ILETRI)**



Research collaboration between University of Brawijaya, Balitkabi (ILETRI), ACIAR, CIAT, University of Queensland







## Impact Pathways to Sustainability Smallholder cassava farming in East Nusa Tenggara Province, Indonesia

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# Outline

**01** Introduction -  
Background

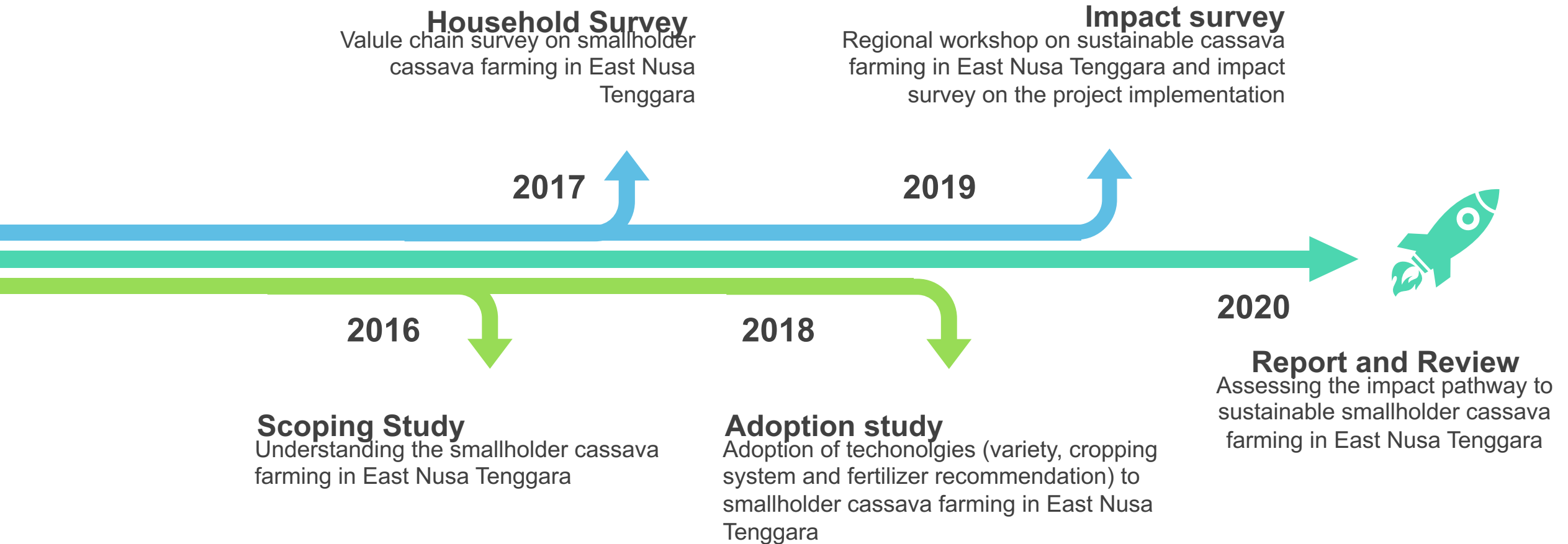
**02** Adoption

**03** Impact Survey and  
Sustainability

**04** Conclusion



# Project Timeline





# Introduction - Background

- Planting Period: October (early raining season) – January (late raining season)
- Harvesting Period: November (9-10 months) however, most of the local varieties is being harvest more than 1 year (in some cases up until 2 years)
- Cassava mainly used as food source, and as animal feedstock
- Price at the local market (for food) IDR 7,500-10,000 per kg (USD 0.75/kg)
- Most of the farmers keep the cassava as emergency food source
- Price for animal feedstock varied between IDR 1,500-2,000 per kg



# Introduction - Objectives

A

Understanding existing local and national policies of smallholder cassava farming and the implications for scaling out research outcomes

B

Facilitate dialogue between stakeholders (industry associations, government policy makers from key departments, farmers and researchers) to inform provincial planning and policies aimed at supporting industry development and smallholder livelihoods.

C

Promote learning alliances between smallholder farmers, local government, research partners and industry in East Nusa Tenggara to share lessons from the project



# Workshop for Business Model Development

- A workshop on “Cassava development in East Nusa Tenggara based on business model” was conducted on 14 – 15 March 2019 at Maumere - Sikka, East Nusa Tenggara.
- The workshop was attended by 40 participants from government officials (District Agricultural Service), Researchers from University and Research Institute, Extension Services, Cassava trader and industries, and farmers
- The workshop was aimed to collect information from various cassava stake holder industry for developing of cassava in East Nusa Tenggara.



# Actors and their role

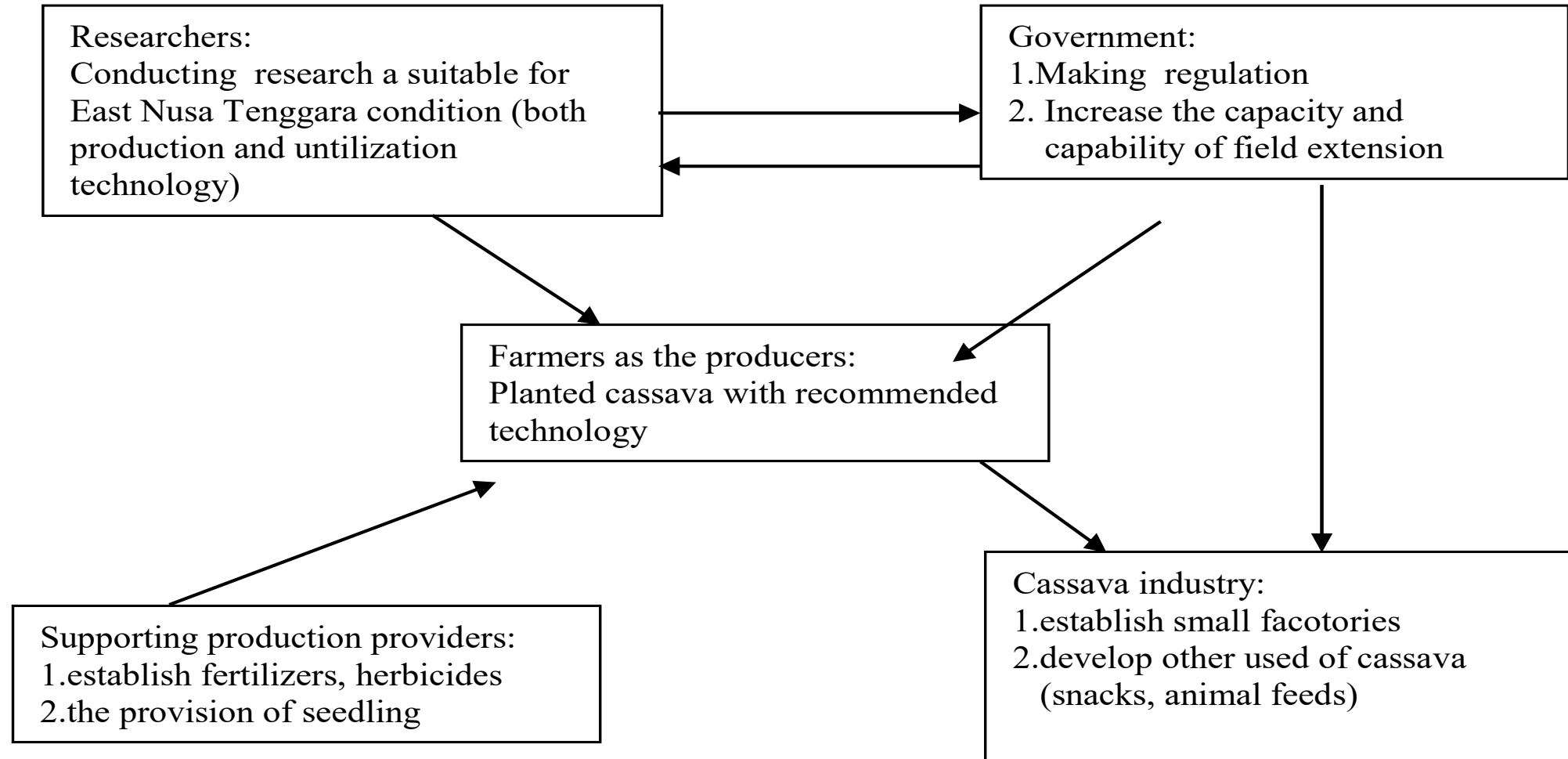
No.	Chain role	chain actor	Present condition
1	Producers	Farmers	<ol style="list-style-type: none"> <li>1. Familiar with cassava growing</li> <li>2. Traditional technology: used local variety, intercropped with maize low cassava population, no fertilizer</li> </ol>
2	Users	<ol style="list-style-type: none"> <li>1. Chip factory,</li> <li>2. Local market,</li> <li>3. Farmers</li> </ol>	<ol style="list-style-type: none"> <li>1. Farmers as one of the main diet</li> <li>2. Sold to local market in limited amount</li> <li>3. Small chip factory</li> </ol>
3	Policy makers	Local government	<ol style="list-style-type: none"> <li>1. No regulation or priority for cassava</li> <li>2. Field extension have little experience for modern technology of cassava production</li> </ol>
4	Researchers	<ol style="list-style-type: none"> <li>1. Institute Agricultural Technology (BPTP)</li> <li>2. Local University</li> <li>3. Indonesian Legumes and Tuber Crops Research Institute (BALITKABI)</li> </ol>	No research on cassava production and utilization For East Nusa tenggara
5	Supporting production providers	No chain actor	<ol style="list-style-type: none"> <li>1. No fertilizer supplier</li> <li>2. No seedling provider</li> </ol>



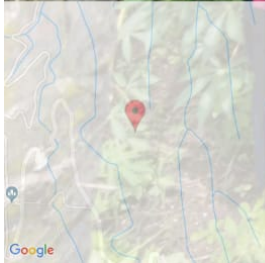
# S W O T Analysis

No.	The factors influence cassava development in Sikka	Characteristics
1	<ol style="list-style-type: none"><li>1. Land: a large area available for cassava</li><li>2. Farmers used to plant cassava</li></ol>	Strength
2	<ol style="list-style-type: none"><li>1. There are no markets</li><li>2. Farmers practiced traditional technology</li><li>3. Farmers used low yield local varieties</li><li>4. No supporting production (seedling and fertilizer) providers</li></ol>	Weakness (limitation)
3	Demand for cassava product is high	Opportunity
4	The price of cassava is highly fluctuated	Threat

# Business Model

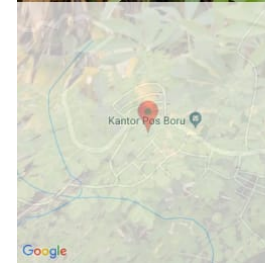






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## IMPACT OF THE PROJECT. EAST NUSA TENGGARA AND NORTH SUMATERA

### East Nusa Tenggara

- In 2019, there were 86 farmers from Sikka and East Flores District participated the project by adopting the improved technology demonstrated by the project (new varieties, improved cropping system, and fertilizer application).
- Project help with the seeds (cassava and maize), fertilizers, and supervision (in cooperation with the Field Extension officer). Because maize is the main food for East Nusa Tenggara people, all farmers planted cassava in between their maize crops.





## Adoption by Farmers:

- The yield of cassava in maize of the adopter farmers. In general, the yield of cassava is far higher than the yield of farmers cassava before their adopt the technology recommend by the project.
- This yield increases surely as a result of increasing cassava population and proper fertilizer application.
- In the past farmers in East Nusa Tenggara planted cassava about 2.500 to 4000 plant/ha, and if they used fertilizer it applied for maize only.



# Yield of maize and cassava of adopter farmers

No	Name	Village/subdisdriect	Land area (ha)	Maize yield (t/ha)	Cassava yield (t/ha)
	DISTRICT: Sikka				
1	Frans Don	Worohuler, Koting	0.25	2,98	39.60
2	Rubensia		0.20	3.25	30.55
3	Jeremius Nurak		0.25	3.80	35.72
4	Mateus Hulir		0.25	2.40	36.09
5	Agsutina		0.25	2.46	33.84
6	Sebastianus Sabul;		0.20	2.62	35.25
7	Angelo		0.20	3.80	30.55
8	Henderikus Sili		0.25	2.58	32.90
9	Dorino Noeng		0.25	2.86	35.72
10	Danianus jati		0.20	3.72	34.07
11	Jaja wangsa		0.25	2.70	36.66
12	Zakarias Dili		0.20	3.25	35.50
13	Robinson		0.20	6.50	35.25
14	Timotius Poin	Takaplangir, Nita	0.25	3.80	27.20
15	Tomas Mori		0.20	5.00	27.62
16	Anelmus Kiok		0.20	4.20	31.87
17	Henderikus Gleko		0.20	4.62	27.62
18	Yovita Dua	Langir, Kangae	0.15	3.90	24.42
19	Arnoldus Yansen		0.20	3.82	28.30
20	Herman Hewot		0.20	3.25	28.12

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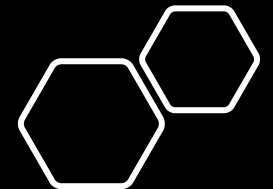
No	Name	Village/subdisdriect	Land area (ha)	Maize yield (t/ha)	Cassava yield (t/ha)
	DISTRICT: Sikka				
21	Laurensia Gori		0.10	4.08	37.00
22	Afrida Desensi		0.20	4.37	28.30
23	Trifonia Lendi		0.10	3.80	33.30
24	Maria Nona Turce		0.15	4.53	24.28
25	Maria Manis		0.15	3.80	24.28
26	Monika Plain		0.10	4.35	40.70
27	Ignasius Iking		0.25	2.80	39.20
28	Oliva Ons		0.10	5.60	52.56
29	Theresia Tensiana		0.15	4.25	33.30
30	Maria Angelina		0.15	4.20	23.40
31	Johanis Jonper		0.10	3.80	33.30
32	Masinona Sisilia		0.15	3.80	32.60
33	G. Karwayu da Md	Lapolima	0.15	4.50	28.86
34	Simpe Rompi	Habi, Kangae	0.15	4.44	27.75
35	Blasius Blaen	Munerana, Hewoldoang	0.15	3.80	30.42
36	Siti Rohani		0.15	3.80	28.00
37	Meli		0.15	3.80	28.30



No	Name	Village/subdisdriect	Land area (ha)	Maize yield (t/ha)	Cassava yield (t/ha)
	DISTRICT: East Flores				
1	Yeremias Jere		0.25	4.20	40.16
2	Yokis	Boru, Boru	0.4	3.58	33.20
3	Petrus Ego Mau		0.50	4.35	20.76
4	Matheus Boruk	Batas, Boru	0.50	3.36	50.30
			0.50	3.88	26.74
5	Gregorius Mau Dg	Ebang, Waiula			

(continuance)

- The other fields in East Flores District are ready to harvest by March 2020, but due to Covid-19 pandemic, the work could not be done.





### Objective

To investigate the impact of the project on the cassava farming behavior both in Nusa Tenggara and North Sumatra

### Number of sample

Adopter farmers: 25 farmers in Sikka, and 13 farmers in Boru  
Non adopter farmers: 5 farmers in Sikka, and 4 farmers in Boru

### Sample selection

Adopter farmers are farmers that involved with the project since 2017 (in Sikka) dan 2018 (in Boru)  
Non adopter farmers are the relatives and/or neighbor of the adopter farmers that want to follow the recommendation from the project (cropping system, variety and fertilizer)

# Impact Survey



## Key issues (question):

- How is the level involvement of farmers in the project throughout 2017-2019?
- How is the farmers perception of the new varieties introduced by the project (preferred varieties, distribution of new varieties, did the new varieties improve income/profit/food security)?
- How is the farmers reaction to the fertilizer recommendation/trial from the project (what is the suitable fertilizer type and amount for the farmers need, would the farmers continue to used fertilizer in their field)?
- Is there any changes in the way of profitability of cassava farmers?
- What is the main challenge to improve the cassava farming?



## Finding:

In Sikka, from the total of 25 farmers involved in the impact survey, 20 farmers involved with the project since 2017, and 5 farmers join the project from 2018 after visiting the participant fields.

In Boru, 13 farmers involved in the project since 2018.

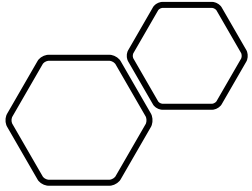
**All the farmers that involved in the project willing to continue applying the knowledge from the project.**

The positive impact from the project are:

1. improvement on the agronomic practices including better intercropping system of maize and cassava, fertilizer application, and new cassava varieties ;
2. linkages between farmers, field extension officer, trader and cassava based industry (tapioca starch and animal feedstock);
3. improvement on the yield of cassava and the possible market to sell the cassava (not only in the traditional market).



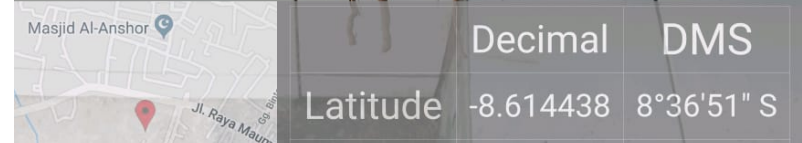




### Finding:

Farmers attending the field day in 2017 (in Sikka) and 2018 (in Boru) were given choice of new varieties that they want to plant in their field.

- Most of the farmers (78%) choose the Malang 4 Variety and Gajah, while 22 % choose Gajah and Faroka variety.
- Farmers are pleased with the results of the new varieties tested (Malang 4, Gajah, Faroka).
- **Overall, the yield of the new varieties is higher than the local varieties and the maturity age is relatively young (9 to 20 months) compare to the local varieties (12 to 14 months).**
- Farmers in Sikka mostly (90%) used the planting material for their own field. Only 20% of farmers in Sikka that plant to share the planting material (Malang 4 and Gajah) to their friends and neighbors, mainly due to shortage of planting material for the next planting season.
- In Boru, most of the farmers will used the planting material to upscale the cassava farming in their own field.

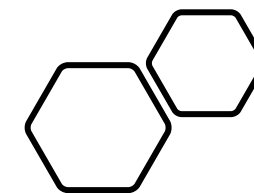






### Finding:

- **Adopter farmers in Sikka and Boru were attending the field day (2018), whereas the non-adopter farmers did not. However, the non-adopter farmers realize the benefit of applying fertilizer after visiting their relative/neighbor (adopter farmers)**
- Farmers understand the benefit of fertilizer for the cassava, and change the fertilizer application not only for maize, but also cassava.
- After the completion of the project 70% of farmers in Sikka are willing to continue buying fertilizer (subsidized fertilizer with the help from the extension officer in arrange the fertilizer plan for farmers/RDKK) for their intercropping maize and cassava, while 30% of farmers are reluctant since there will be an extra cost.
- **Farmers will follow the guideline from the project (300 kg per hectare of NPK 15:15:15 in the beginning of planting, and then 200 kg per hectare of Urea after harvesting the maize).**
- Farmers will also continue to intercrop maize and cassava with 1 x 1 m planting space for cassava





**Finding:**

Farmers that involved in the project agreed that the yield of cassava has improved due to new varieties (in particular Malang 4 and Gajah), uses of fertilizers (NPK and Urea) and improvement on cropping system.

- The increase of yield is ranged between 50 to 80% compared to what they used to have with the local varieties.
- The project also create linkage between farmers, traders, tapioca starch industry and animal feedstock industry.
- Consequently, the demand of cassava is increase in Sikka, and farmers get to sell their cassava more than before, in 2018 average farmers get additional 5 to 7 million IDR from selling their cassava.



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# Finding:

Farmers in Sikka and Boru are enthusiastic to upscaling their cassava farming. *However there are challenges:*

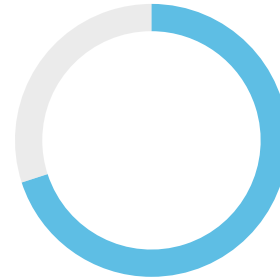
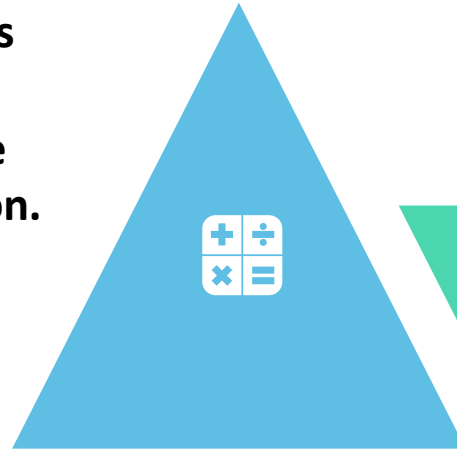
1. The availability of planting material is limited from the project only. Farmers are hoping the local government support to increase the planting material for farmers;
2. Farmers in East Nusa Tenggara are using subsidized fertilizer, thus it will need cooperation between farmers group and extension officer to formulate the fertilizer plan for farmers/RDKK;
3. Commitment between farmers – tapioca starch factory – animal feedstock factory in term of price and time of harvesting the cassava.





# Who in the value chain could capture benefits

The regional government will get the benefit from the farmers income increasing, and subsequently improving the agriculture sector in the region.

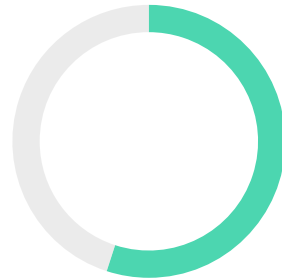


The farmers get benefits those are the new technologies which are new varieties, fertilizer application, farming system technologies to improve cassava productivity



The trader get opportunities for buying farmers cassava and it be processed to cassava chips for feed

Opportunities for animal feedstock factory to upscaling their production once the cassava farming in Sikka and East Flores are developed





# Is it now sustainable without a project?



The local government, agricultural extension field officers, and industry should develop collaboration to help farmers in developing the small holder cassava farming:

The project concluded that government should more active to take a supporting role, especially in providing cassava variety and technology.

Both the Sikka and East Flores Bupati (Chief regent of the district) are agree to support the upscaling of cassava farming by:

1. Government Agriculture project of developing cassava farming in East Flores
2. Access of agriculture production input (fertiliser, tractor) in Sikka





THANK YOU