Social Impact Assessment of the PISAgro Corn Working Group NTB

November 2017

SIA of the PISAgro Corn Working Group NTB

Introduction 01

Smallholder Farmers in Indonesia

Overview

- Majority of smallholder farmers (≤ 2 ha) in Indonesia do not live a prosperous life.
  - Agriculture Census 2013: **87.63% (22.9 million)** household live below or just above the poverty line.
  - **5 millions** of these households are farmers with less than 0.5 ha of land (Petani Gurem).

- Smallholder farmers face a number of constraints to increasing their income:

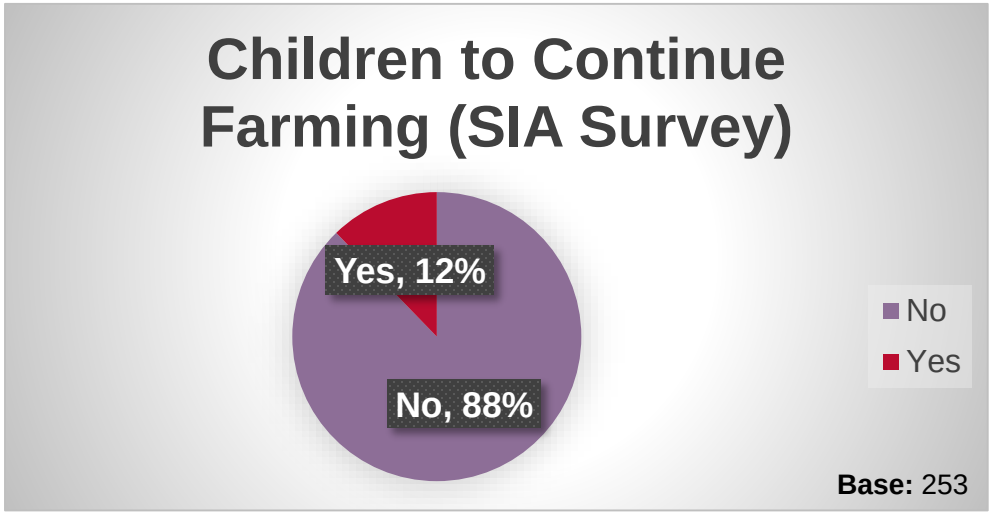
Limited Capital	Risk of Crop Failure
Farmer's struggle to find farming capital. The condition is much lower than the minimum economic scale	High risk of crop failure because of pest, diseases and climate change
Ineffective Government Subsidy	**Limited Control on PHH**
Ineffectiveness of government subsidy on inputs and credits/loans	Farmer's have no control over the selling price of the crops and other post-harvest handling (PHH) activities

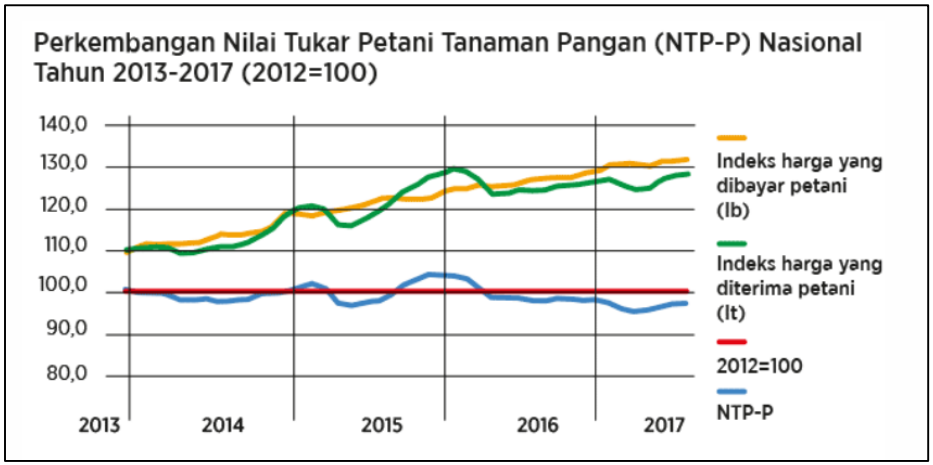
Source(s): BPS, Kompas

Smallholder Farmers in Indonesia

Overview

- Smallholder farmers generally have low incomes and are sometimes unable to fulfil their daily needs.
- Farmers choose to leave farming and move to the city for formal jobs. They do not want their children to continue farming.



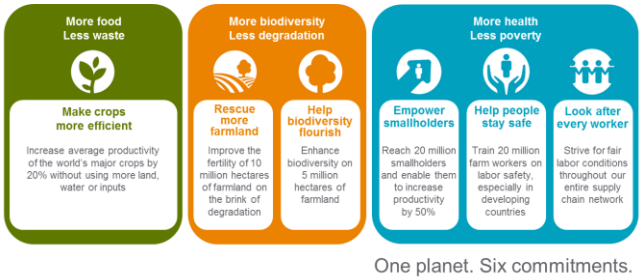


- National Crop Exchange Rate (2013-2017) with a basis of 2012=100 shows that it has been fluctuating and since mid-2016 till mid-2017 it has been below 100.
- It means that the price index that farmer's pay is higher than the prices received (food production).
- This is not a description of the farming profitability, but the tendency of decreased purchasing power of farmers to consumer goods, inputs, and obtaining investment funds.

Source(s): BPS, Survey

PISAgro Corn Working Group

Context



Vision:

Syngenta's Good Growth Plan has a target of reaching 20 million smallholder farmers and increasing average productivity by 50% with its products by 2020.

By 2020 Syngenta's Integrated Corn Supply Chain model in Sumbawa plans to work in 10,000 hectare (~5000 smallholder farmers) which aim to reach an average yield of 8 MT/ hectare (~30% increase from current average).

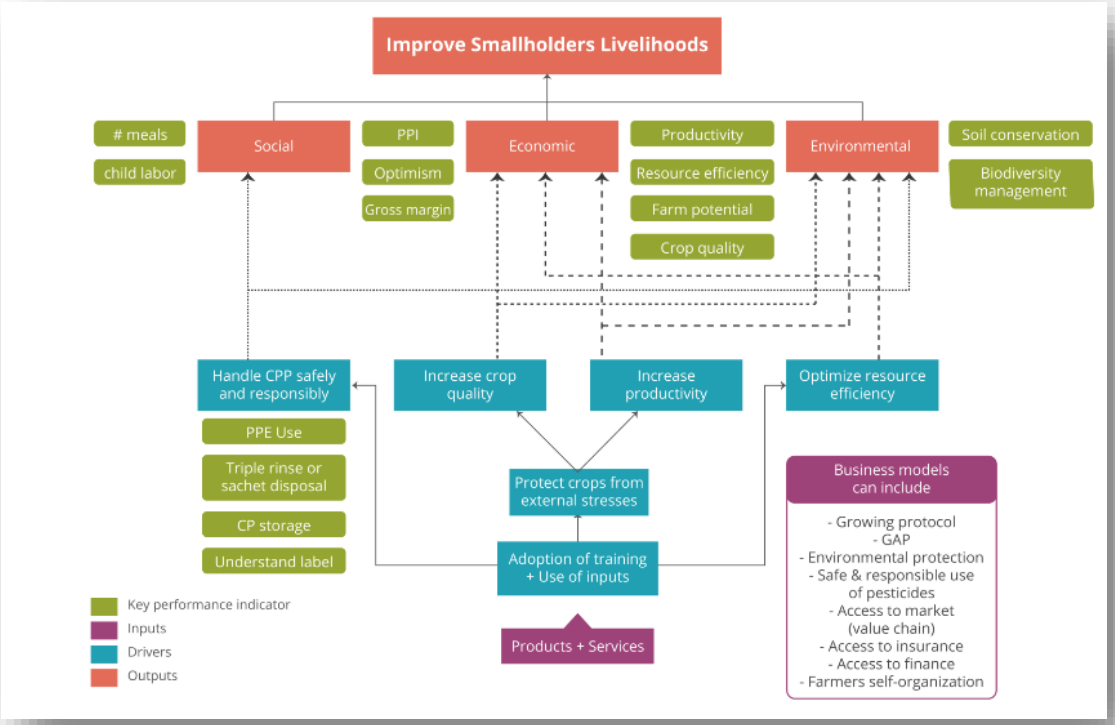
Goals of Syngenta's Integrated Corn Supply Chain Model	Higher income for farmers	Decreased risk related to all stages of corn production	Improved 'bankability'	Improved market knowledge that can ultimately help farmers achieve better outcomes independently

PISAgro Corn Working Group

Context

How does Syngenta impact smallholder livelihoods?

"Theory of Change"



- Syngenta product and services help smallholders protect crops from external stresses and to handle CP products safely and responsibly, to increase crop quality, productivity and optimize resource efficiency.

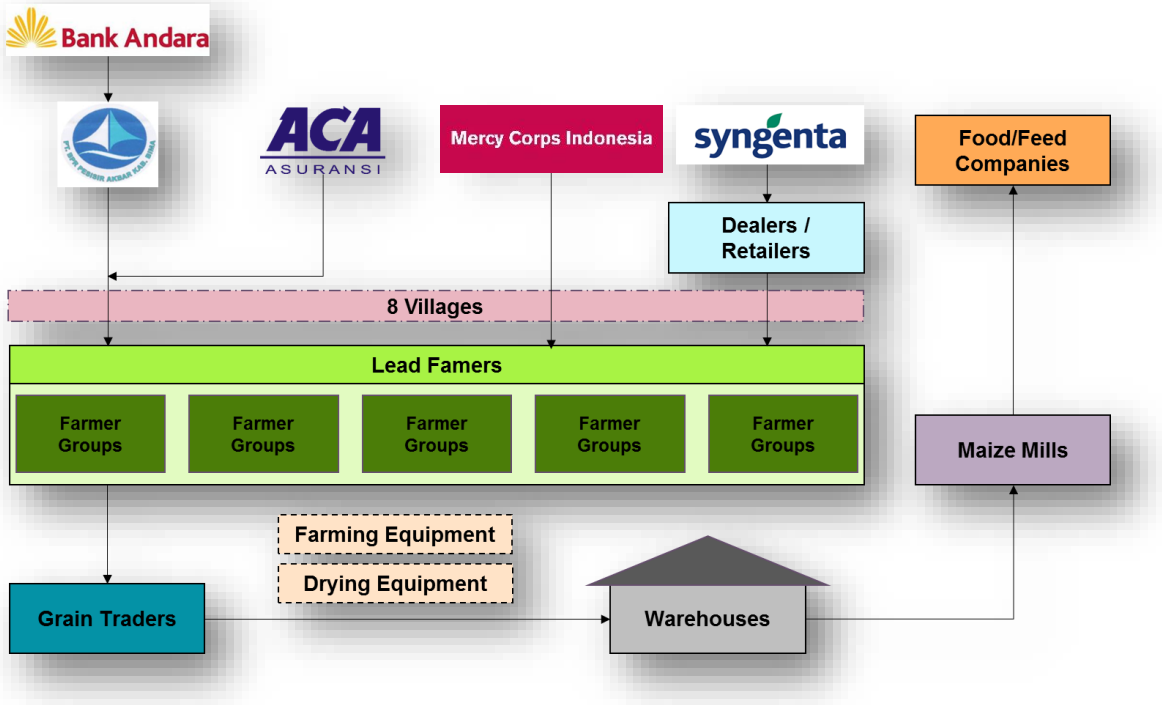
- This enables them: to improve their farm economics, their environmental awareness, health & safety and to be more optimistic toward the future of their farm

- Consequently this allows them to invest in and **improve their rural livelihoods**

PISAgro Corn Working Group

Context

PISAgro



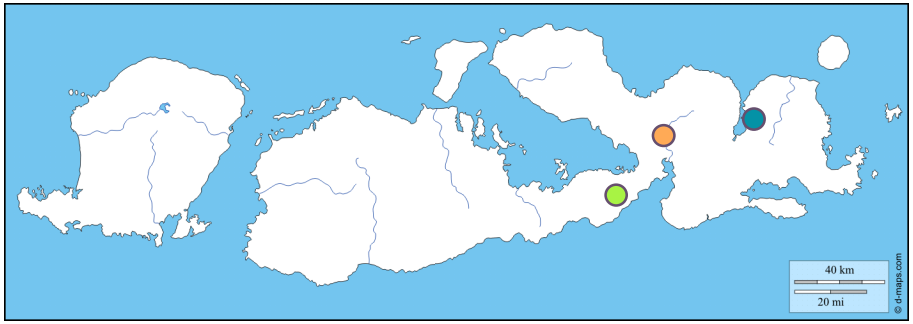
Syngenta collaborates with **Bank Andara**, **Mercy Corps Indonesia**, **ACA Insurance**, and **BPR Pesisir Akbar (rural bank)** to provide a bundle of services (technology, micro-loan, financial literacy, digital payment, micro crop insurance and market access) for corn farmers.

The business model of this Corn Working Group involves:

- Providing high quality inputs (seeds & pesticides).
- Access and training for GAP, Growing Protocol, Safe Used Pesticide.
- Access to Financial Literacy Training.
- Access to Finance & Crop Insurance
- Farmer Groups.
- Linkages to Guaranteed Offtakers (Grain Trades).

PISAgro Corn Working Group

Context



Current Locations in West Nusa Tenggara:

- Bima (Sumbawa Island)
- Dompu (Sumbawa Island)
- Sumbawa (Sumbawa Island)

Program Progress:

	Phase 1	Phase 2	Phase 3	Phase 4 (Target)
Number of Farmers	194 farmers	642 farmers	805 farmers	2,500 farmers
Land Coverage	385 ha	1,202 ha	1,546 ha	5,000 ha
Yield Increase	20%	~10%	~10%	TBC
Geography	Bima, Dompu	Bima, Dompu	City of Bima, Kab. of Bima, Dompu, Sumbawa	Other regencies in Sumbawa

Gradual increase in all categories shows promising progress in the implementation of the program

Source(s): Grow Asia Case Study, Site Visit

Social Impact Assessment

Objectives & Scope

- **Syngenta** has been leading the **PISAgro Integrated Corn Supply Chain Model** in Sumbawa, West Nusa Tenggara Province, Indonesia; an initiative that aims to increase smallholder yields and associated livelihoods.
- **Syngenta** wishes to assess **the social impact of this initiative on smallholders** and, looking forward, how the achievements and lessons from this initiative could inform Syngenta's future business strategy and **create additional value for Syngenta, its smallholder customers and other actors in the corn sector**.
- **Palladium** is grateful to deliver the two interrelated research components as required:
  - **Research Component 1:** Social Impact Assessment (SIA)
  - **Research Component 2:** Systemic Value Assessment (SVC)
- These two research components are highly interconnected. The findings of the Social Impact Assessment were used to frame the assessment of Systemic Value and inform recommendations on future business opportunities.
- Questions on the systemic value and the analysis of the backwards and forward linkages from the farm level during the Social Impact Assessment (SIA) was integrated.

Methodology

02

Social Impact Assessment

Assessment Segmentation

Hypothesis

Smallholder farmers that has been involved in more PISAgro Corn Working Group in NTB for more cycles would have greater access to good seeds, crop protection products and the services (access to finance, insurance, training, growing protocol, farmer groups, etc.) Syngenta and the partners provide to lead to an improvement in their overall livelihood.

Program Participation

- 2 Planting Cycle or More
- 1 Planting Cycle
- Control Group

There are a total of 3 planting cycle in the corn working group so far. The samples was divided into 3 groups: farmers who has been involved in the program for 2 planting cycles or more, 1 planting cycle and control group farmers to compare the impact of the program with farmers who are not in the program.

Gender

- Male
- Female

Asses the impact of the program and the performance of the male and female farmers.

Districts

- Bima
- Dompu
- Sumbawa

Asses the impact of the program and the performance of farmers across 3 districts: Bima, Dompu and Sumbawa

Smallholder Farmers

Sampling Methodology

The different segmentations based on the current farmers in the working group

Bank BPR provided a list of farmers from the 3 cycles of the PISAgro program so far: 194 farmers (Phase 1), 642 farmers (Phase 2), 805 farmers (Phase 3)

**the numbers in the table indicate the total number of farmers for each category unless indicated otherwise*

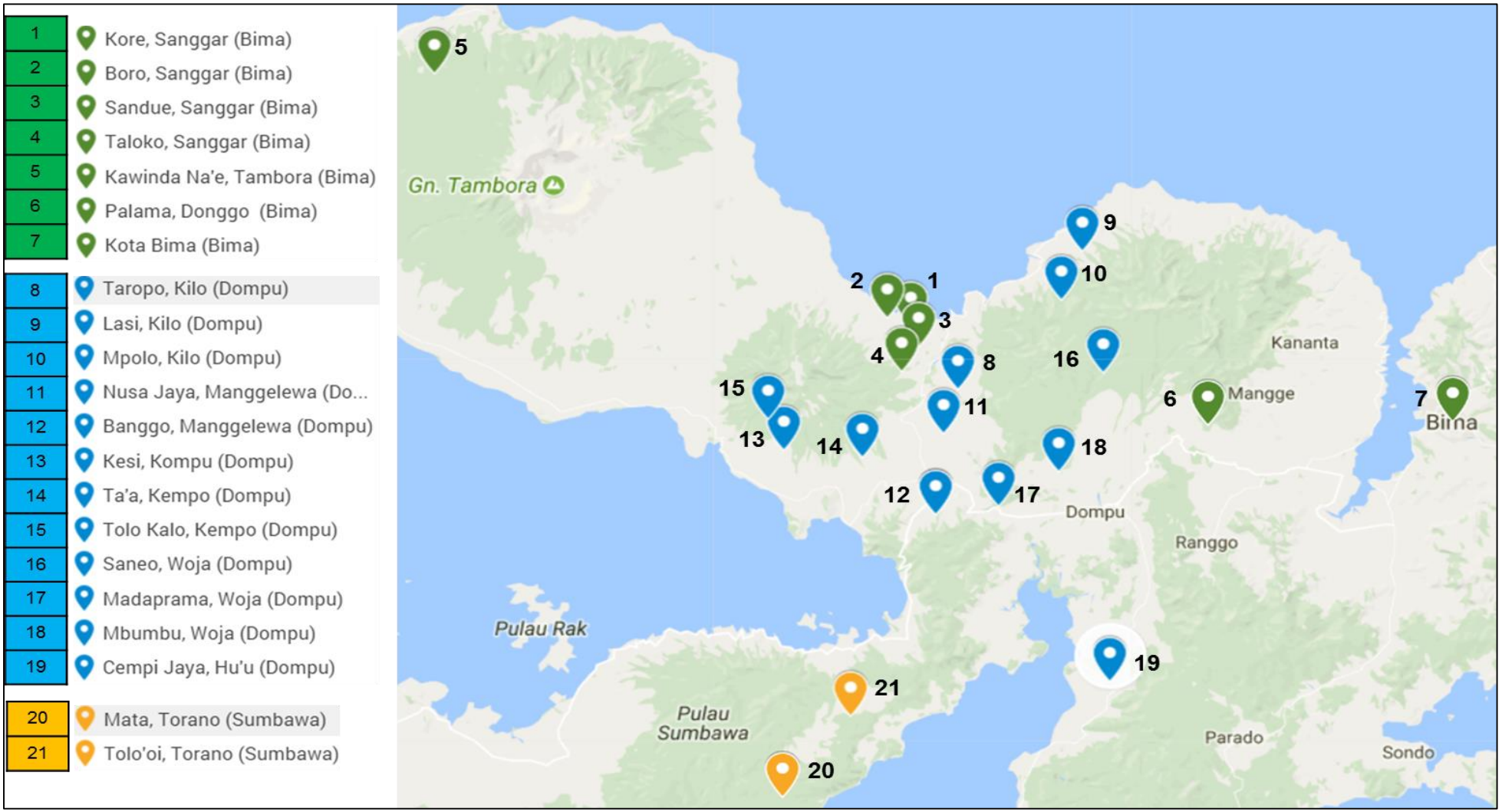
Category	Details / Numbers*																	
Total Farmers Interviewed	**250 farmers + 35 Backup (~15%) = 285 Farmers**																	
Kabupaten	**Bima**						**Dompu**						**Sumbawa**					
Total Sub-districts (database)	3 Sub-districts						5 Sub-districts						2 Sub-districts					
Representative Farmers	85						168						32					
Selected Sub-districts	Donggo, Sanggar, Kota Bima						Kilo, Hu'u, Woja, Kempo, Manggalewa						Torano, Sumbawa					
Gender (Male - 75%, Female - 25%)	68			17			124			44			25			7		
Program Participation (2 or more planting season – 30%, 1 planting season – 50%, control group – 20%)	**21**	**34**	**13**	**5**	**7**	**5**	**40**	**61**	**23**	**10**	**24**	**10**	**0**	**13**	**12**	**0**	**5**	**2**

Based on the data and discussions with Syngenta, the above number of farmers were targeted to be interviewed for each **program participation**, **gender**, and **district**. The cut-off corn planting area for all the farmer respondents is **≤ 2 hectare** to ensure a fair comparison. Random sampling was done based on the segmentation. A list of **over 320 farmers** were provided to the enumerators to achieve the desired **285 farmers** to be interviewed.

Sampling Methodology

Coverage Area

The coverage area of the survey is across 3 districts, 10 sub-districts and around 20 villages:



Sampling Methodology

Social Impact Assessment (SIA) Timeline

		Day																												
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	25	27	28	29	30
		July															August													
		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Enumerator Training																															
Pilot																															
Kabupaten	**Kecamatan**																														
Bima	Kota Bima																														
Bima	Donggo																														
Dompu	Hu'u																														
Dompu	Kilo																														
Bima	Sanggar																														
Dompu	Kempo																														
Dompu	Manggalewa																														
Dompu	Woja																														
Sumbawa	Tarano																														
Sumbawa	Sumbawa																														
Survey Debriefing																															

Notes

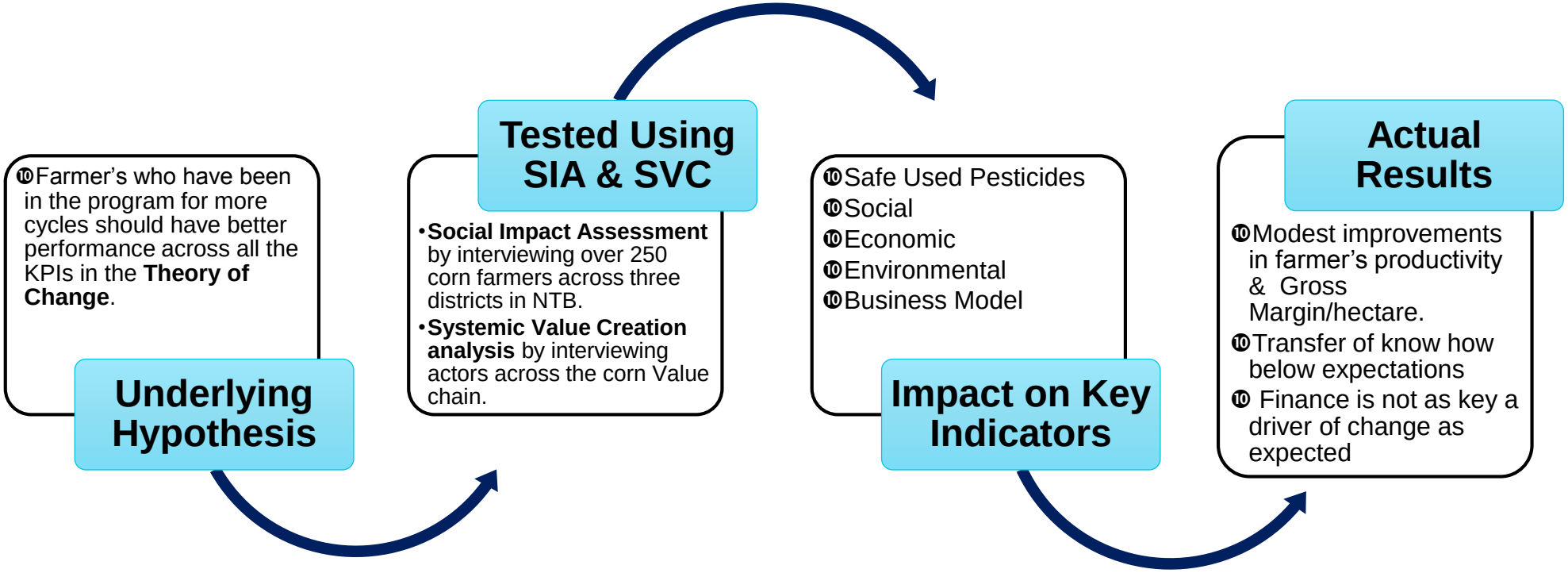
- 2-day Enumerator Training & Pilot was conducted on July 17 – 20
- The field supervisor and the 4 enumerators went to Kecamatan Ragi and Kecamatan Donggo to conduct a total of 9 pilot interviews (6 PISAgro members and 3 Control Farmers).
- Based on the Pilot, the survey questions was further refined into the local context.
- Field survey began on July 21, 2017.

Summary of Findings

03

Summary of Findings

Key Highlights

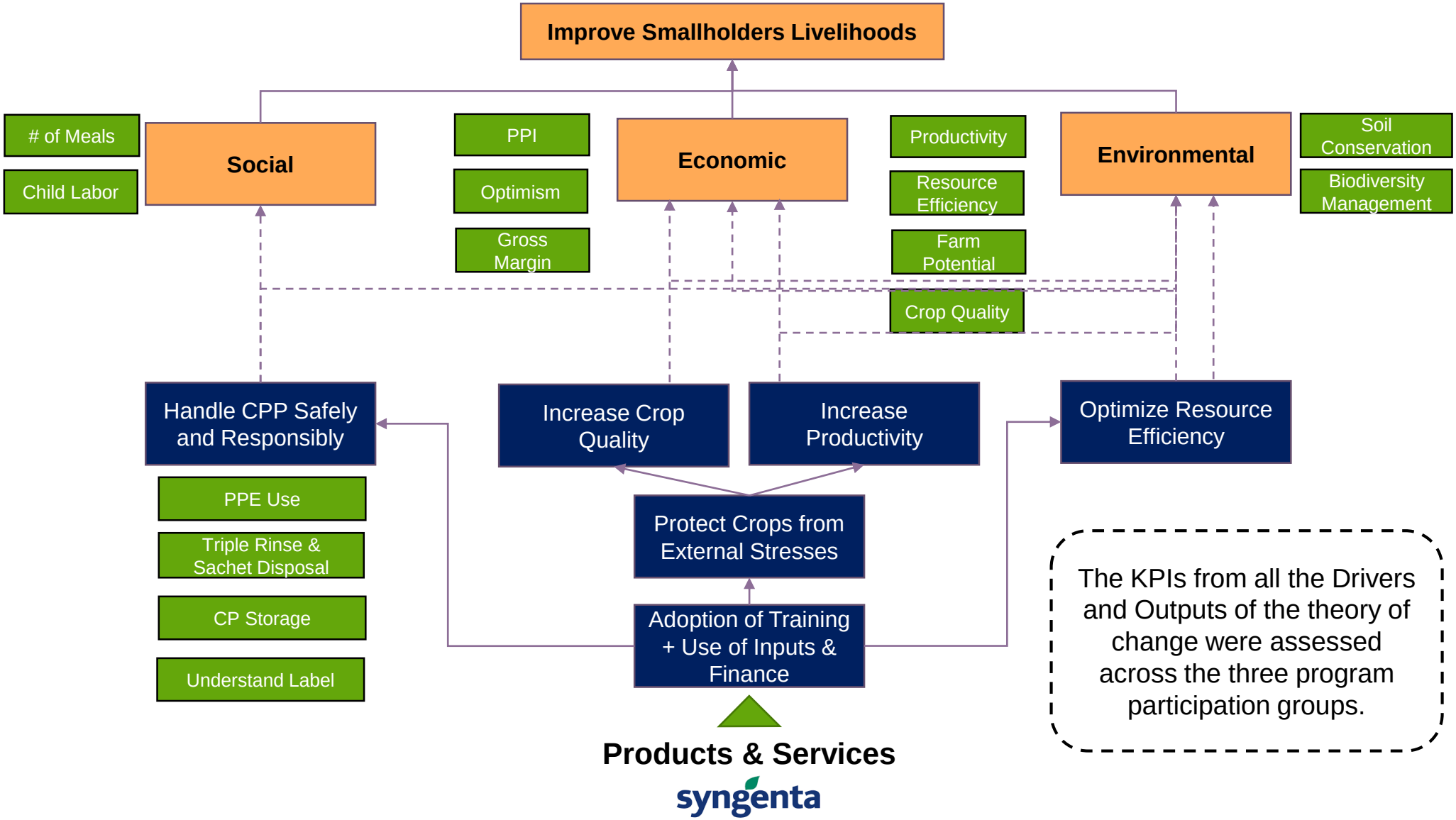


Hypothesis

"Smallholder farmers that have been involved in more PISAgro Corn Working Group in NTB for more cycles would have greater access to good seeds, crop protection products and the services (access to finance, insurance, training, growing protocol, farmer groups, etc.) Syngenta and the partners provide to lead to an improvement in their overall livelihood."

Summary of Findings

Theory of Change



The KPIs from all the Drivers and Outputs of the theory of change were assessed across the three program participation groups.

Summary of Findings

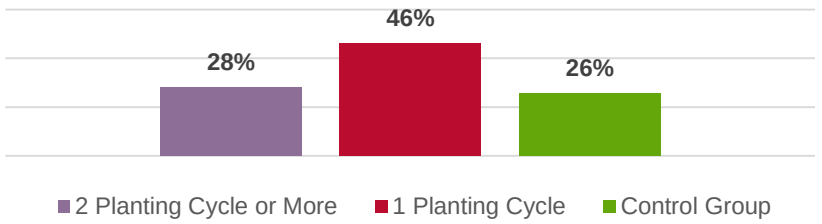
Key Highlights

Hypothesis:

"Smallholder farmers that has been involved in more PISAgro Corn Working Group in NTB for more cycles would have greater access to good seeds, crop protection products and the services (access to finance, insurance, training, growing protocol, farmer groups, etc.) Syngenta and the partners provide to lead to an improvement in their overall livelihood."

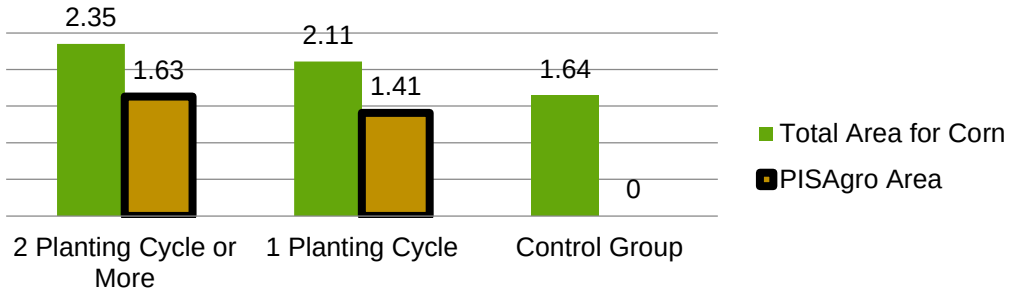
Sampling Frame (Program Participation)

Base: 253



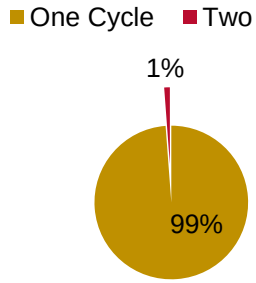
Breakdown of Survey Respondents by Program Participations

Average Corn Production Area (ha)



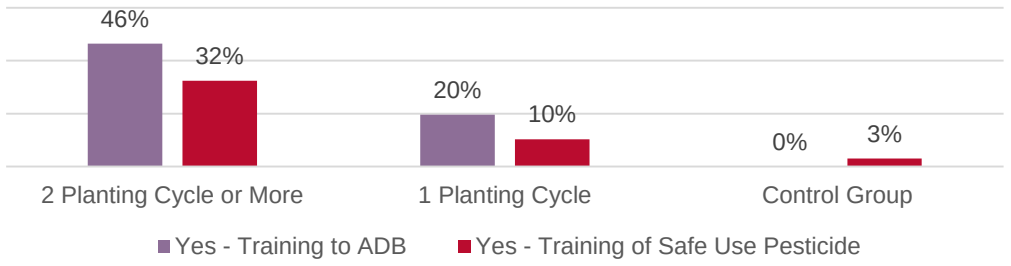
Respondents with corn planting area of ≤2 hectare under the PISAgro program (PISAgro farmers) and ≤ 2 hectare total corn planting area (control group) were selected for interview.

Corn Planting Cycle / Year



Only 1% of the total respondents plant corn in 2 planting cycles per year. Opportunity to create value.

Growing Protocol & Safe Use Pesticide Training



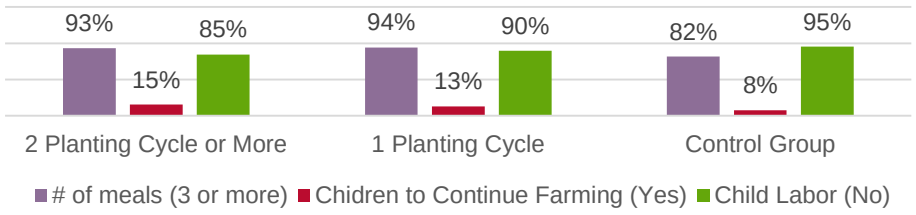
Low rates of training participation is problematic. Possibly, it is something to do with the organizational model, or the effectiveness of lead farmers and demo plots.

Summary of Findings

Key Highlights

Social

of Meals, Farmer Optimism, Child Labor

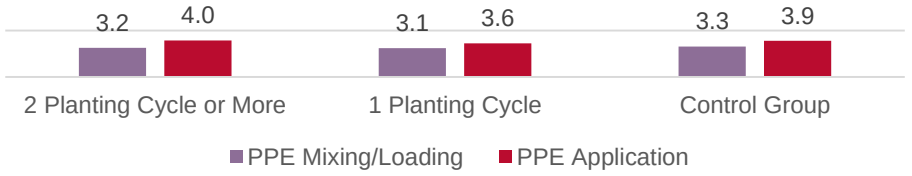


Likelihood to Live Under the Poverty Line	76%	70%	70%
	2 Planting Cycle or More	1 Planting Cycle	Control Group

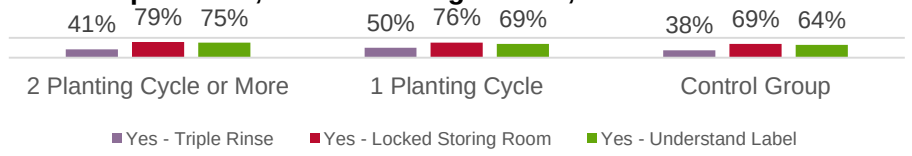
Out of the 3 key social indicators, PISAgro farmers perform better on 2 (# of meals, optimism), The PPI score results were inconclusive.

Safe Use Training Impact

PPE Used



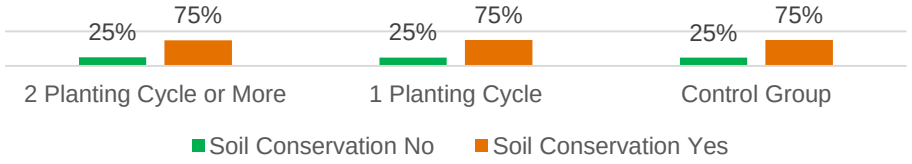
Triple Rinse, Locked Storage Room, Understand Label



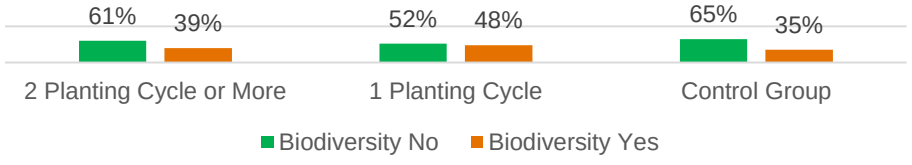
The number of PPEs used were similar between PISAgro and control farmers but PISAgro farmers tend to perform better on the other safe use indicators

Environmental

Soil Conservation



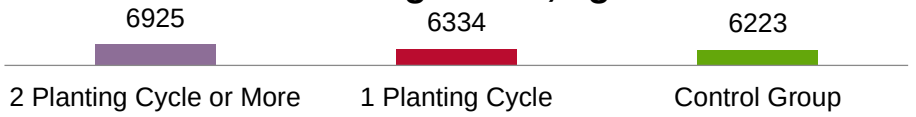
Biodiversity



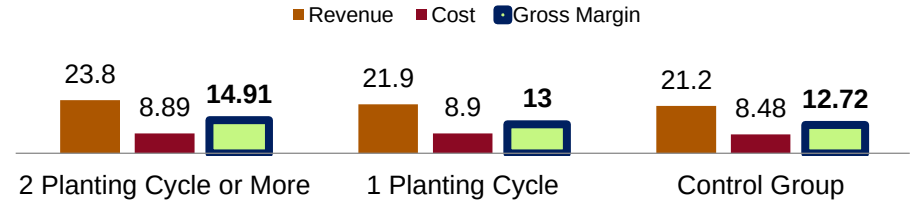
No difference in number of PISAgro farmers and control in practicing soil conservation. On the other hand, PISAgro farmers perform better in biodiversity compared to control group farmers.

Economic

Average Yield, kg



Gross Margin, Revenue & Cost



PISAgro Farmers have a slightly higher productivity then control, production cost is also slightly higher giving an overall average gross margin that is marginally higher.

Main Findings

04

Main Findings

4.1 Farmer Profile

4.2 Contextual Information

4.3 Business Model

4.4 Social

4.5 Safe Use Training Impact

4.6 Environmental

4.7 Economic

4.8 Progress Out Of Poverty (PPI)

4.9 Gender Equality

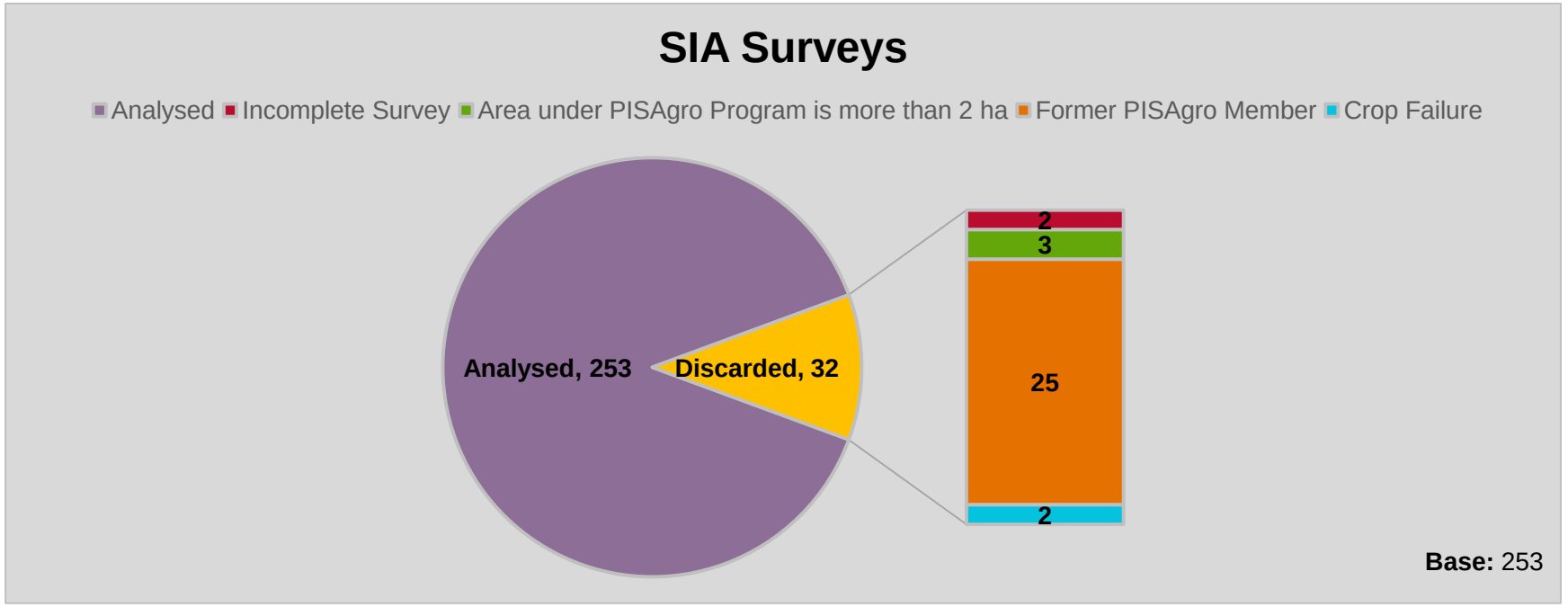
4.10 Systemic Value Creation

"Farming looks mighty easy when your plow is a pencil, and you're a thousand miles from the corn field."

Dwight D. Eisenhower

Farmer Profile

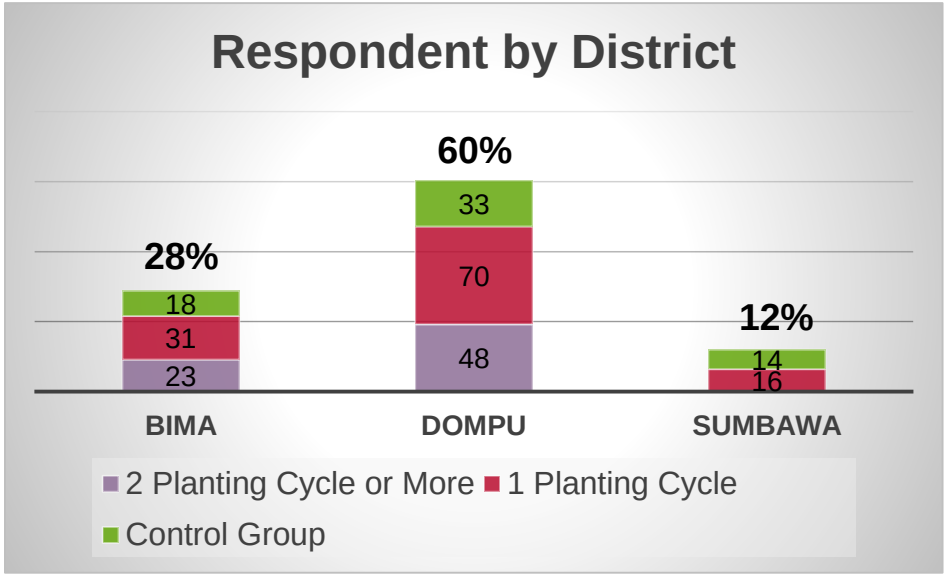
Survey Respondents

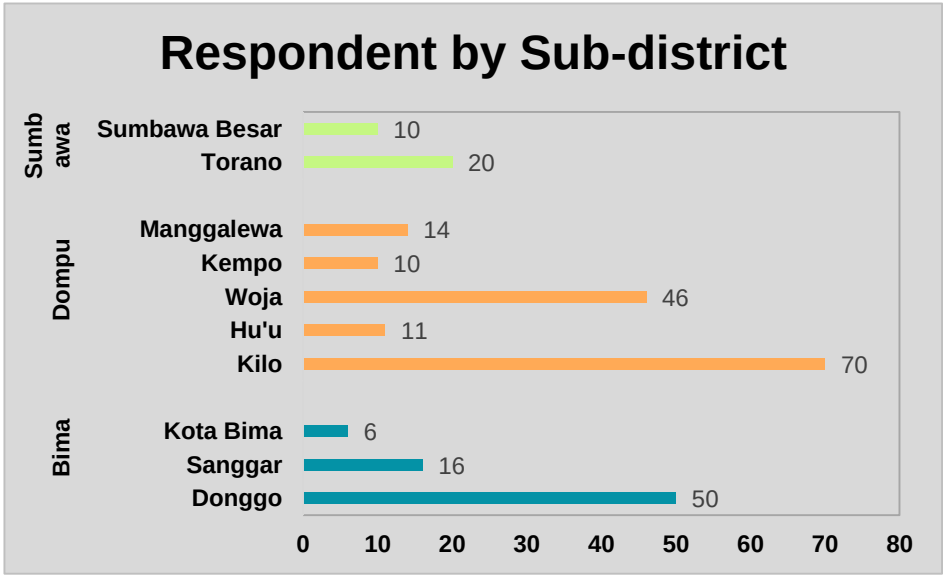


- The total number of respondents interviewed across **3 districts (Bima, Dompu and Sumbawa)** and **10 sub districts** (Donggo, Sanggar, Kota Bima, Woja, Kempo, Kilo, Manggalewa, Hu'u, Tarano, Sumbawa) is **285 respondents**.
- The clean data that is analyzed for the Social Impact Assessment (SIA) is **253 respondents**.
- **32 respondents** were discarded from being analyzed because of the following reasons:
  - Former PISAgro farmer, answered the survey based on their last cycle (non-PISAgro program cycle) – **25 respondents**
  - Farm area in the PISAgro program is more than 2 hectares (survey cut off land size is ≤ 2 hectares) – **3 respondents**
  - Farmer encountered crop failure on the last cycle because of pest and diseases – **2 respondents**
  - Incomplete survey, lots of missing answers – **2 respondents**

Farmer Profile

District & Sub-districts

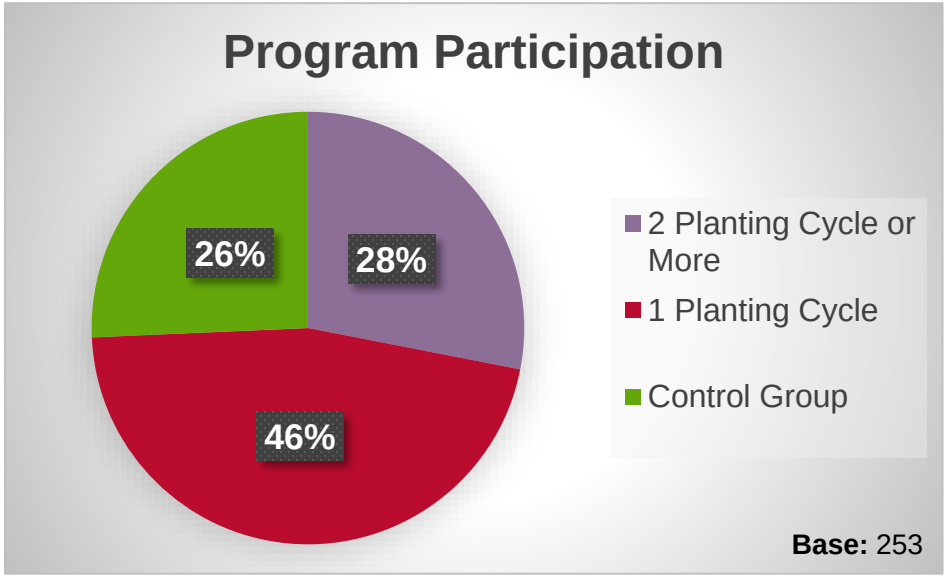


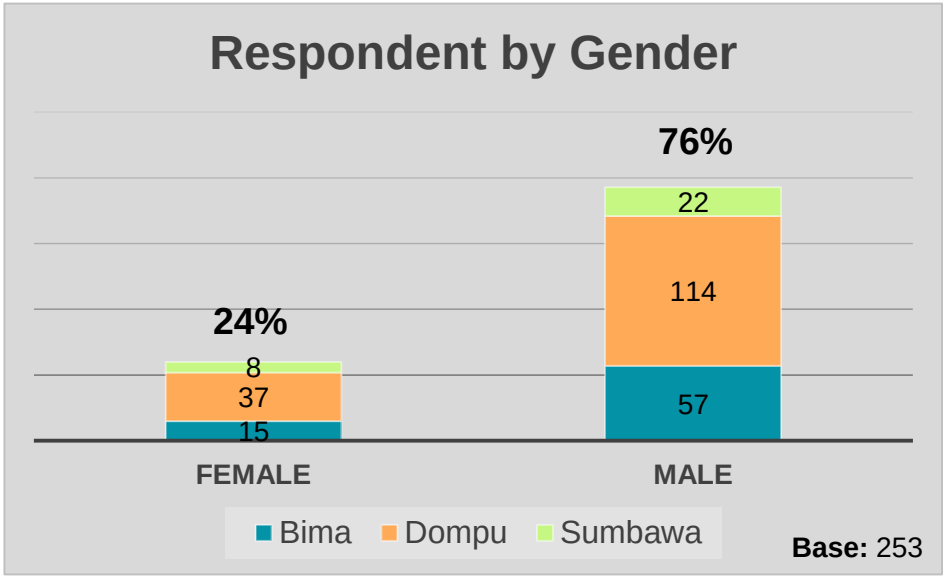


- The target respondents per district was based on the current number of PISAgro Farmers in each sub-district.
- Dompu has the highest number of PISAgro farmer members and the highest amount of respondents (60%).
- Sumbawa has the lowest number of PISAgro farmer member as Sumbawa Besar were not able to join again in cycle 3 due to the delay in processing the loan.
- Sub-district Kilo (Dompu) has the highest number of respondents with **70** surveys analyzed. Sub-district Kota Bima (Bima) have the lowest respondent number with **6 surveys** being analyzed.

Farmer Profile

Program Participation & Gender





Program Participation	Target	Actual
2 Planting Cycle or More	30%	28%
1 Planting Cycle	50%	46%
Control Group	20%	26%

- The target respondents per program participation was based on the current number of available farmers in each of the PISAgro Member groups (≥ 2 planting cycle & 1 planting cycle) and an approximate number of control group farmers to give a reasonable comparison.
- Majority of the respondents (46%) come from the 1 planting cycle group while the 2 planting cycle of more and control group have similar percentages (28% and 26%).

Gender	Target	Actual
Female	25%	24%
Male	75%	76%

- The target respondents per gender was based on the number male and female farmers in the PISAgro member community.
- 76% of the total respondents are male while 24% are females.

Main Findings

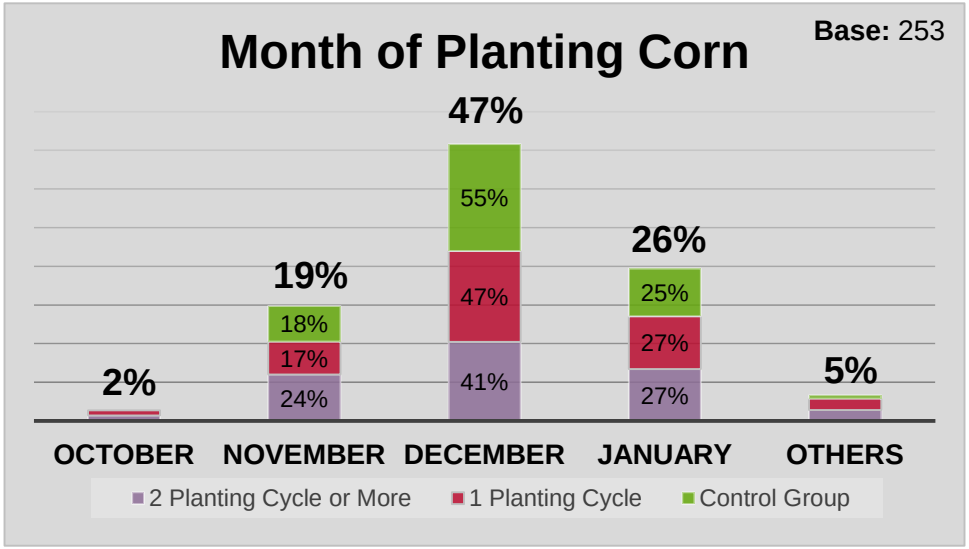
"I know my corn plants intimately, and I find it a great pleasure to know them."

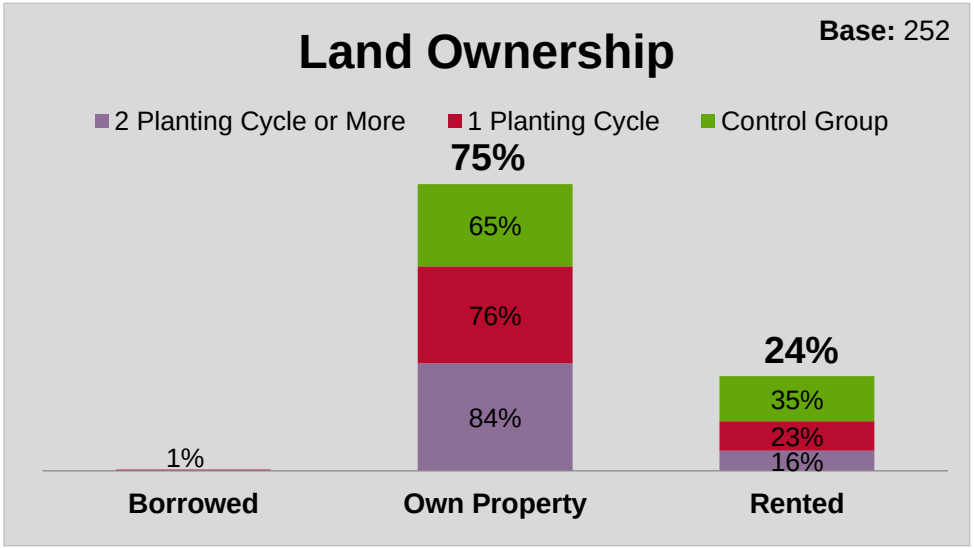
Barbara McClintock

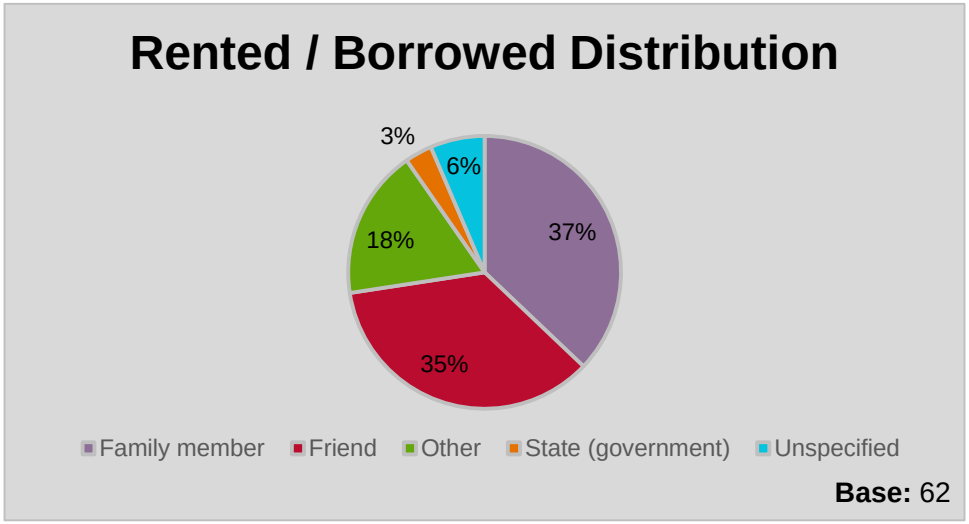
Contextual Information

Month of Planting & Land Ownership

This section examines the most common month for planting corn and the land ownership status





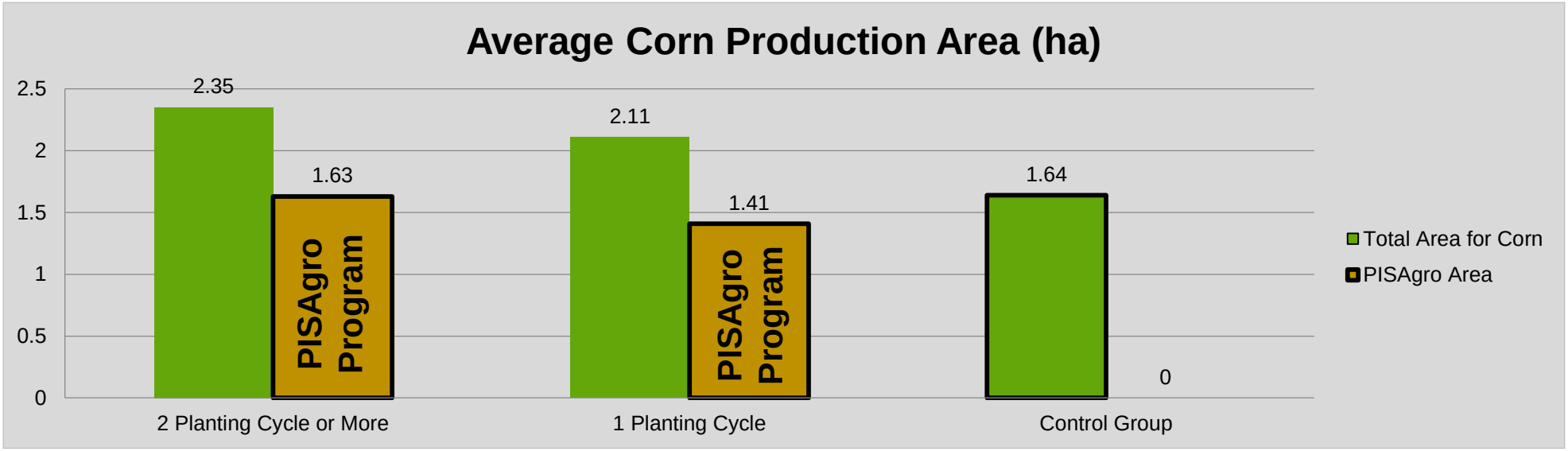


- 47% of the total respondents say that they started planting corn in December for their last planting cycle. A significant percentage of farmers (26%) start planting in January mainly because of the lack of capital to buy inputs,
- 75% of the total respondents say that they own their property. The farmers in the 2 planting cycle or more have a considerably higher percentage of farmers that own their property (84%).
- For the farmers who do not own their property, almost all of them (24% of total respondents) are renting mainly from Family Members (37% of the farmers who rent/borrow their property) and Friends (35% of the farmers who rent/borrow their property).

Contextual Information

Land Production Area

This section shows the average corn production area and average PISAgro program area of all the respondents

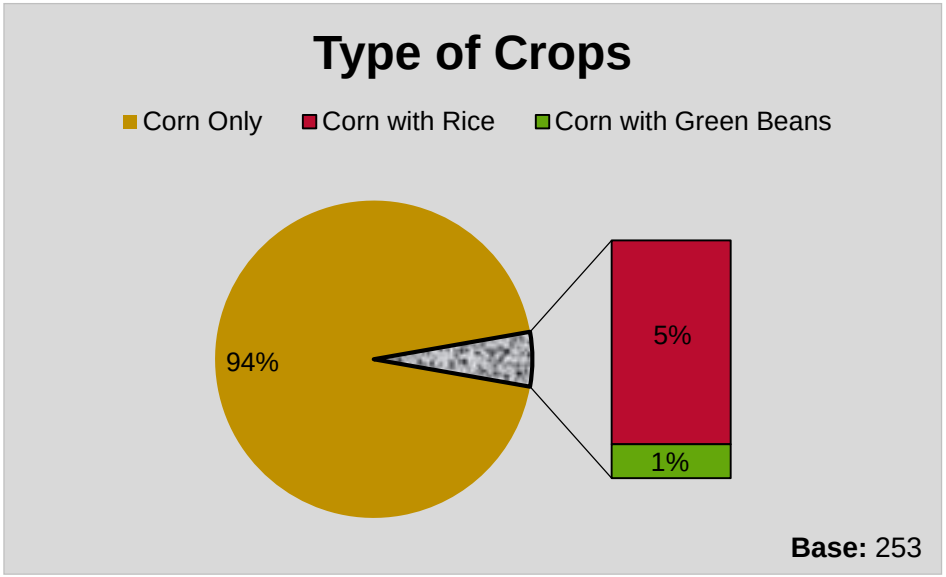


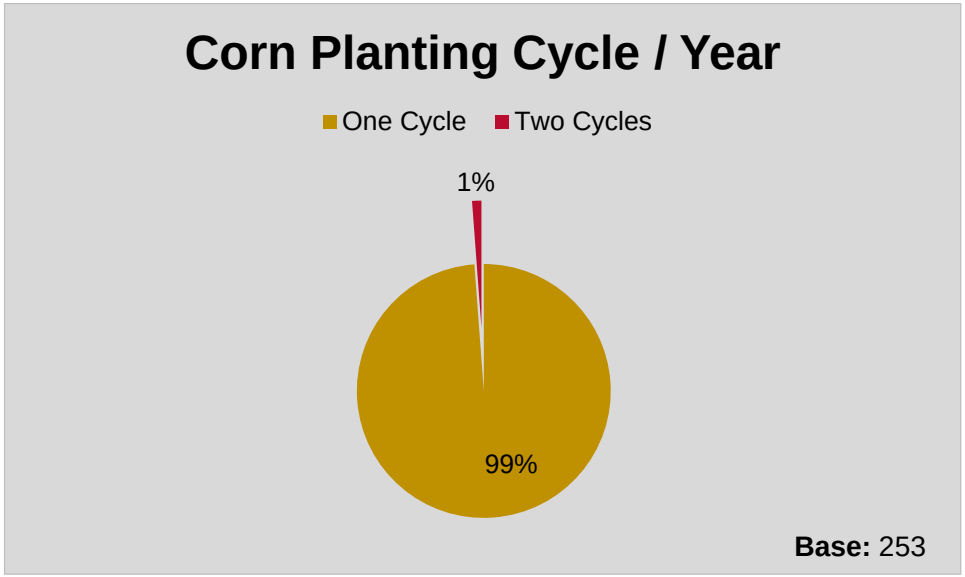
- In order to maintain a fair comparison, the cut-off corn production area for farmers in the PISAgro program is ≤ 2 hectares (area in the PISAgro program) and the cut-off for the control group farmers is their total corn planting area being ≤ 2 hectares .
- The average total land production area for corn of our respondents varies across the 3 program participation groups. The average corn production area is the highest among the 2 planting cycle farmers or more (2.35 ha) followed by 1 planting cycle farmers (2.11 ha) and the control group farmers (1.64 ha).
- The land area allocated to the PISAgro program by the farmer member is slightly higher for farmers in the 2 planting cycle or more (1.63 ha) than the 1 planting cycle farmers (1.41 ha).

Contextual Information

Type of Crops and Planting Cycle

This section shows the type of crops other than corn that the respondents grow and the corn planting cycle per year





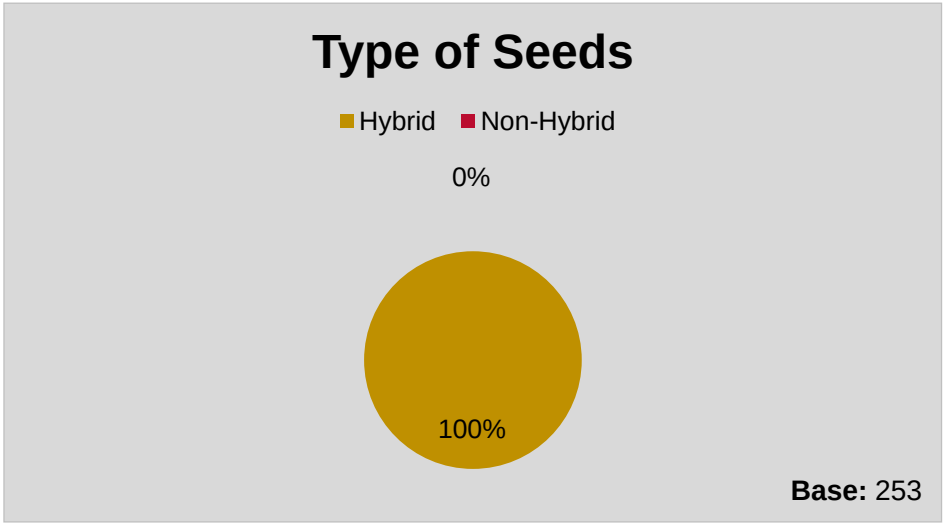
- Only 6% out of the total respondents actually grow other crops or practice crop rotation.
- A big percentage (5%) of other crops is rice with majority of farmers who plant them do so for their self-consumption and in small plots (~0.1 ha).
- The other crop that farmers plant is Green Beans (1%).

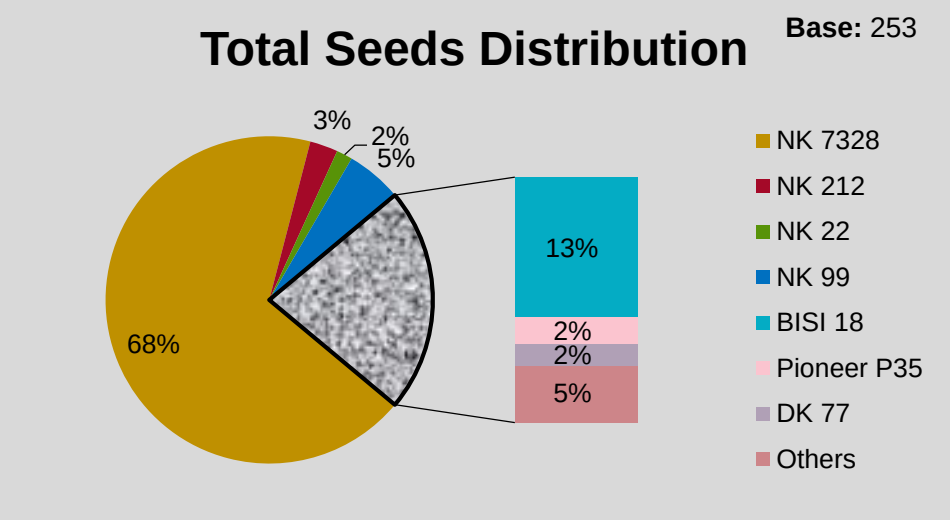
- Almost all (99%) of the respondents do one cycle of corn planting per year.
- Only 1% of the total respondents plant corn twice a year. This shows that almost all the farmers in Bima, Dompu, Sumbawa only plant corn in 1 cycle per year.
- The 3 farmers that does 2 planting cycles per year are all from Dompu (Woja, Manggalewa).
- There is an opportunity to create more value if the farmers plant more than once per year.

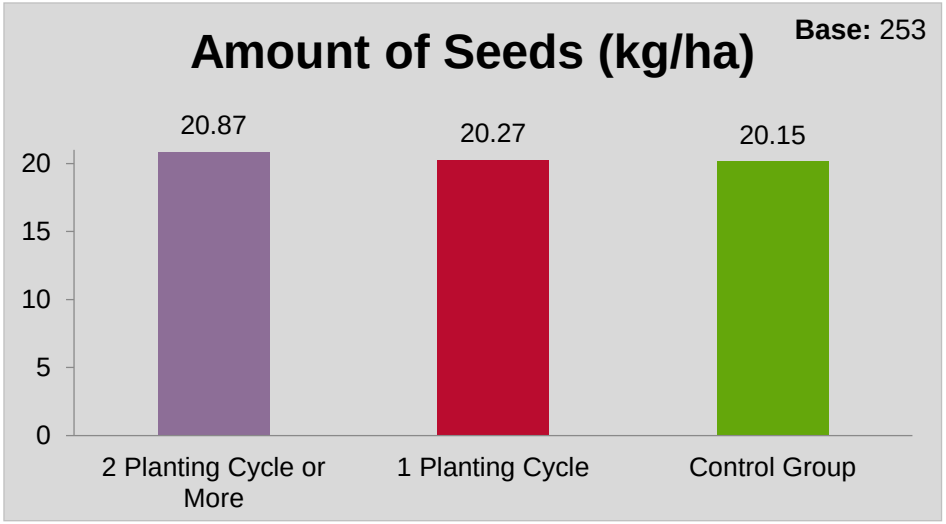
Contextual Information

Seeds

This section shows information about the type of seeds, brand, and the amount of seed used per hectare





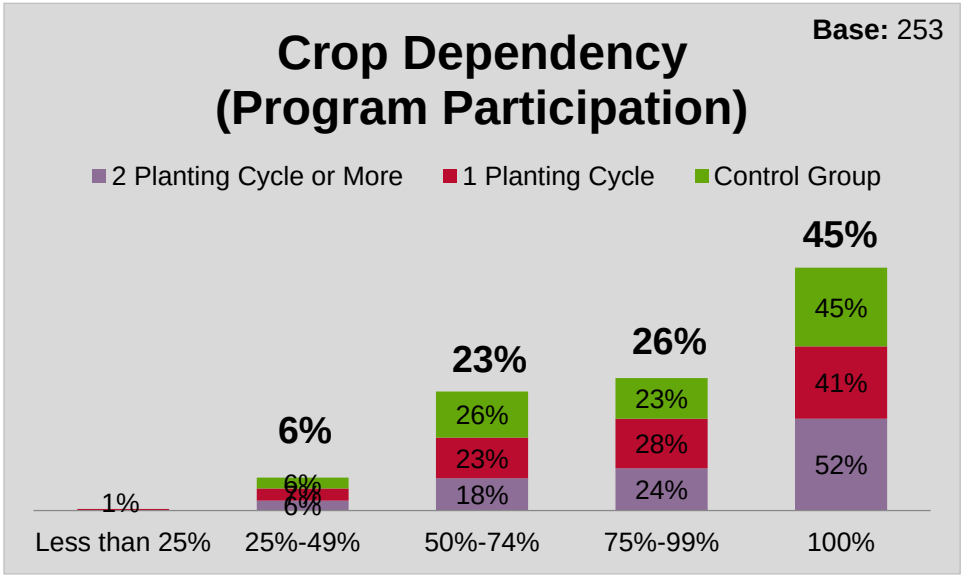


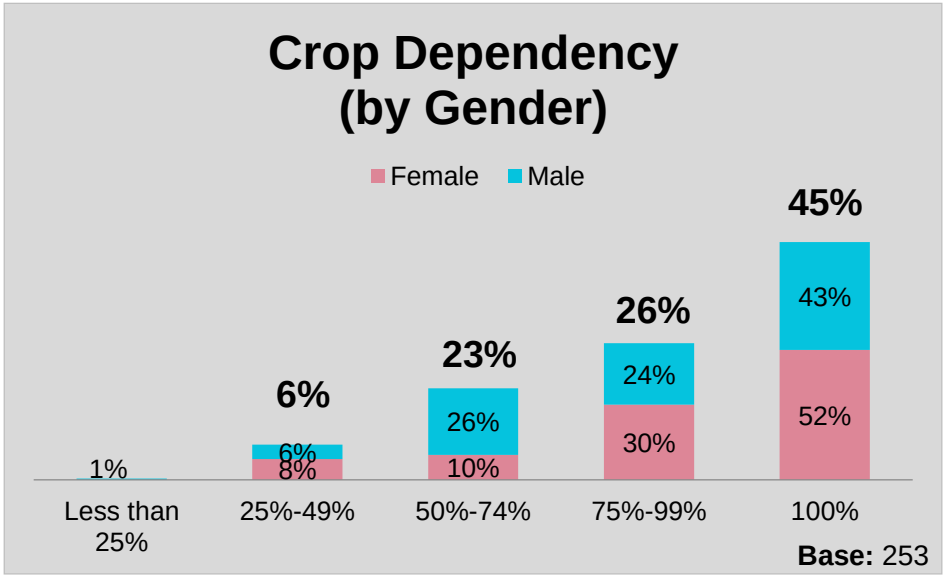
- All of the respondents (100%) use Hybrid Seeds mostly from Syngenta, BISI and Pioneer.
- NK 7328 is the dominant brand for seeds mainly because it is the seed that is used in the last planting cycle of the PISAgro farmers. It is followed by BISI 18, which is commonly used by a lot of the control group farmers.
- Other seeds brand that farmer's use that is not able to be displayed in the chart are: BISI2, DK79, P27, P32.
- The average amount of corn seeds used per hectare is almost the same across the 3 program participation groups around the 20 kg mark.

Contextual Information

Crop Dependency

This section shows crop dependency percentages segmented into the 3 program participation groups and gender





- 45% of the total respondents are 100% dependent on the income from their corn planting outputs while 26% of them are dependent in the 75-99% range.
- Only a very small number of respondents plant corn as a side business as indicated by the low percentage of farmers crop dependency in the 25-49% range (6%) and less than 25% (1%).
- A majority of farmers in each of the program participation categories are 100% dependent on their corn planting outputs.
- More than half (52%) of the female farmers are 100% dependent on their corn planting outputs while only 43% of male is dependent 100% of their corn planting outputs.

Main Findings

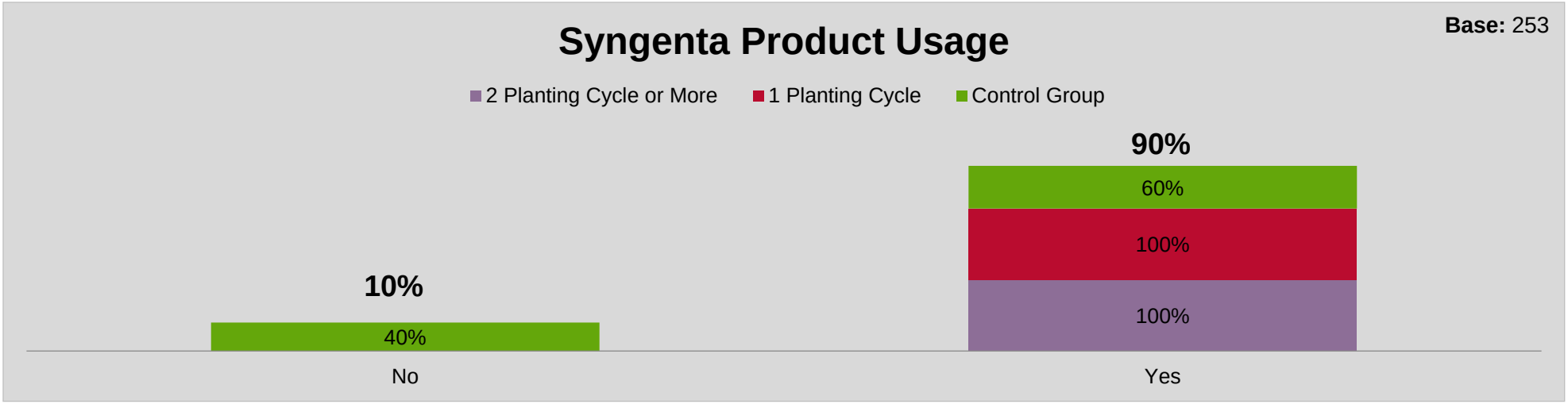
"Corn can add inches in a single day; if you listened, you could hear it grow."

Laura Ruby

Business Model

Syngenta Product Usage

This section examines the percentage of farmers using Syngenta products



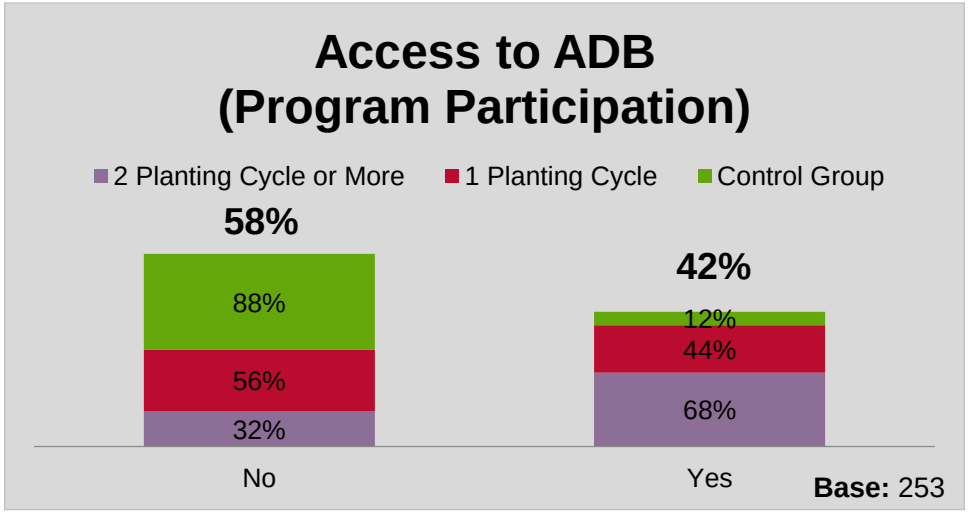
Premise: Farmers who have been in the PISAgro program for more cycles should be using Syngenta Products

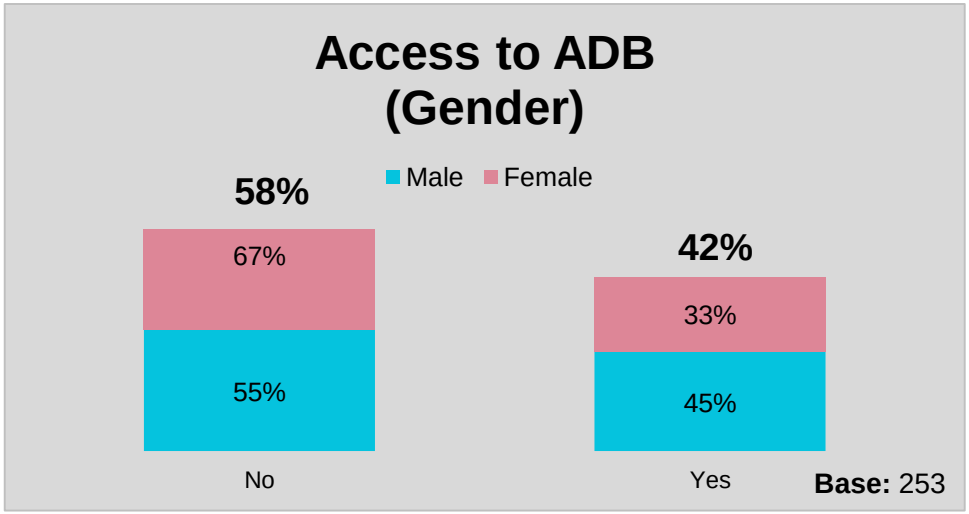
- In this context, a farmer is said to be a Syngenta product user when they are using at least 2 Syngenta products from the following: Gramoxone, Calaris or NK seeds.
- As expected 100% of the PISAgro program farmers (2 planting cycle or more and 1 planting cycle) are using Syngenta Products. Around 60% of the control group farmers are Syngenta Product users.
- The majority of the control group farmers who are Syngenta product users are using Gramoxone and Calaris.

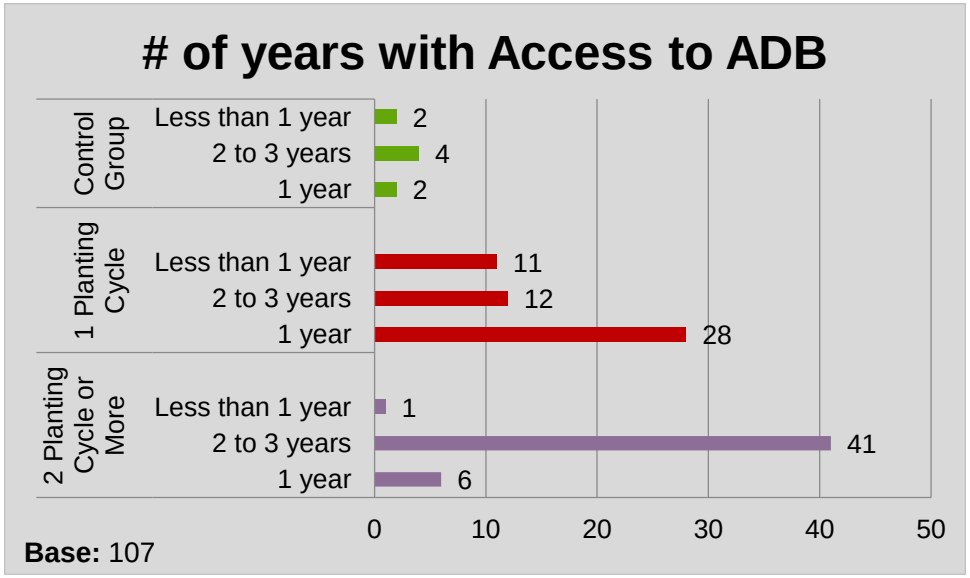
Business Model

Access to Growing Protocol (ADB)

This section examines the percentage of farmers with access to the Awali Dengan Bentar (ADB) growing protocol







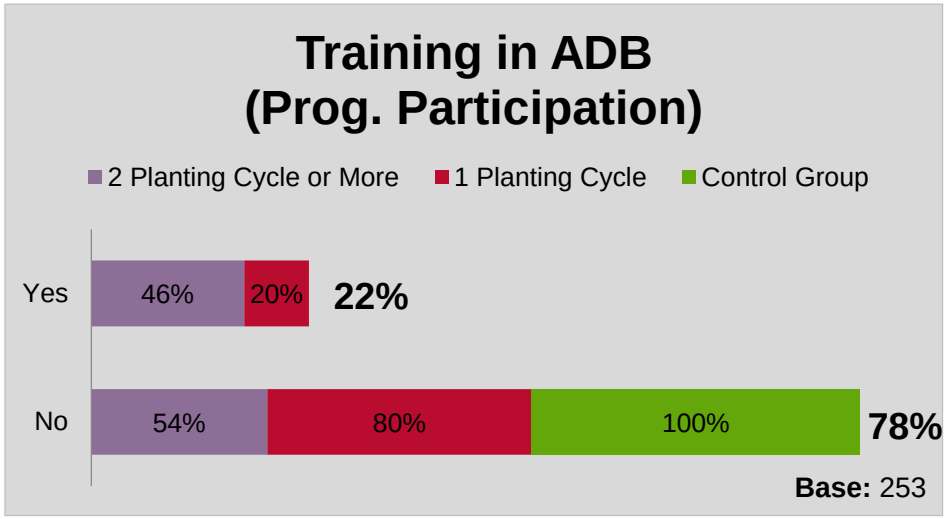
Premise: Farmers who have been in the PISAgro program for more cycles should have access to the growing protocol (Awali Dengan Benar – ADB)

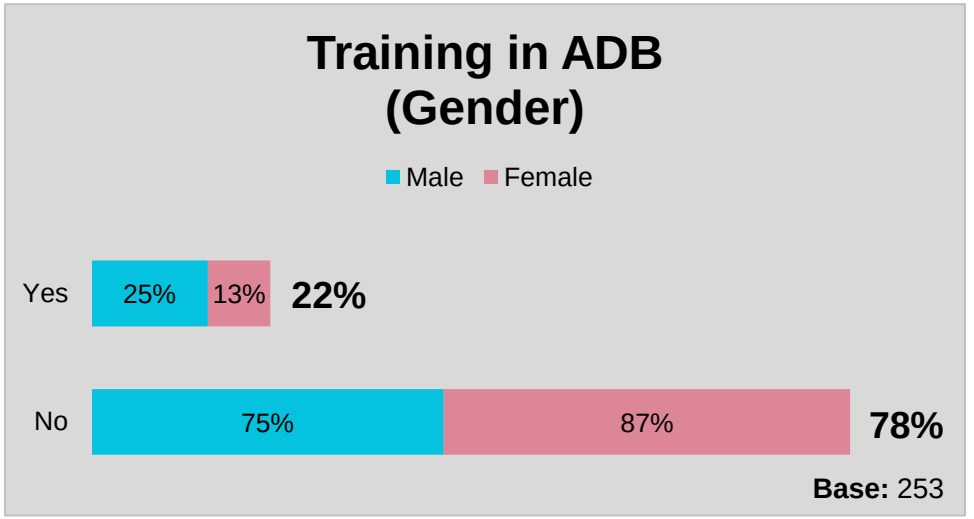
- Only 42% of the total respondents have access to ADB. As expected, the majority of the 2 planting cycle of farmers (68%) have access to ADB followed by the 1 planting cycle (44%). Only 12 % of the control group farmers have access to ADB.
- More male farmers have access to ADB (45%) compared to only 33% of female farmers with access to ADB.
- The majority of the 2 or more planting cycle farmers have had access to ADB for 2 to 3 years while the majority 1 planting cycle farmers have had access for 1 year.

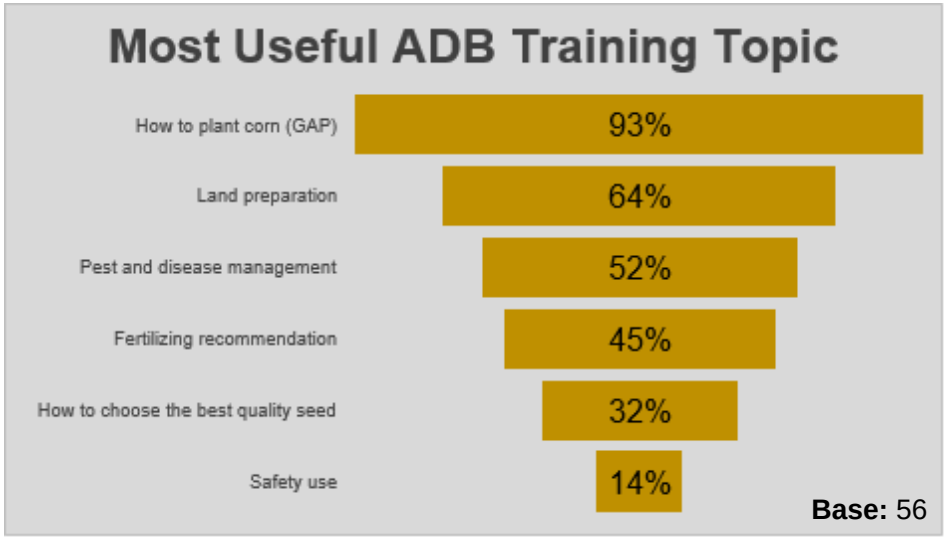
Business Model

Growing Protocol (ADB) Training

This section examines the access to growing protocol training and the most useful training topics







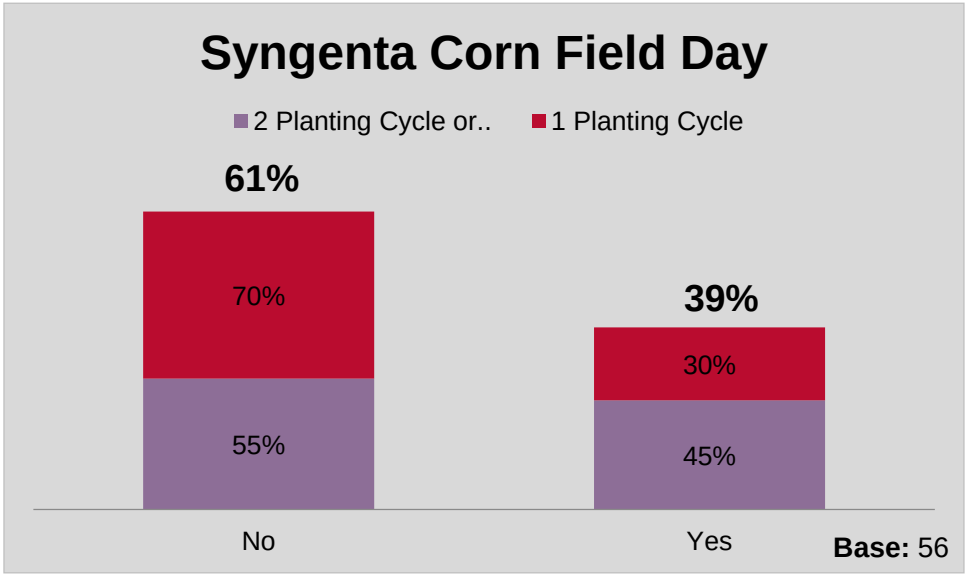
Premise: Farmers who have been in the PISAgro program for more cycles should have access to growing protocol training

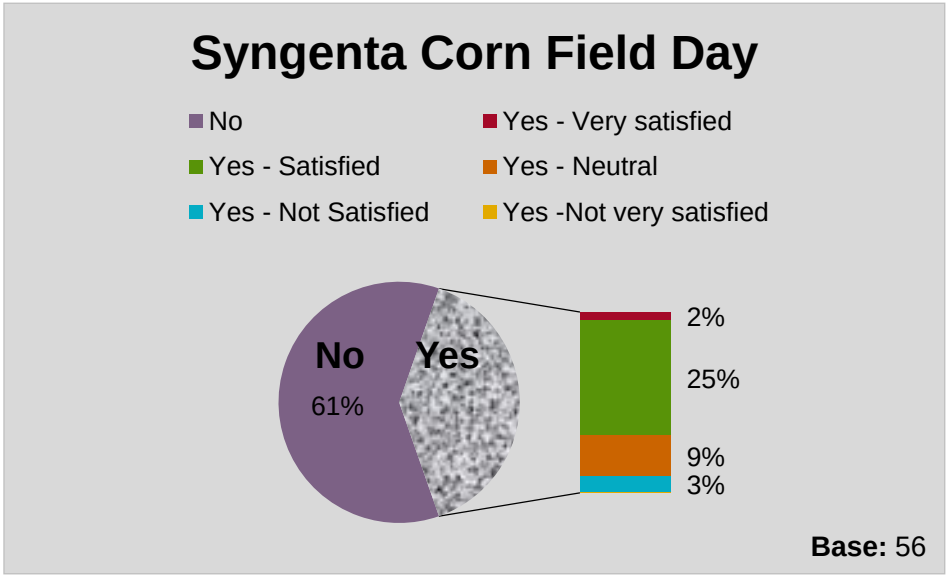
- The majority of the total respondents (78%) have never had a training on the Awali Dengan Benar (ADB) growing protocol.
- 46% of the 2 or more planting cycle farmers have had training on ADB while only 20% of the 1 planting cycle farmers had training on ADB. 0% of control group farmers had training on ADB. This supports the premise but it is still a considerably low number.
- More male farmers have training in ADB (25%) compared to only 13% of female farmers with training in ADB.
- For the respondents who had training on ADB, the top 3 most useful topics are: 'how to plant corn (GAP)' (93%), 'land preparation' (64%), and 'pest and disease management' (52%).

Business Model

Syngenta Corn Field Day

This section examines the farmers who attend Syngenta Corn Field Day and their level of satisfaction





Premise: Farmers who have been in the PISAgro program for more cycles should have a better chance of receiving training on ADB and attending the Syngenta Corn Field day

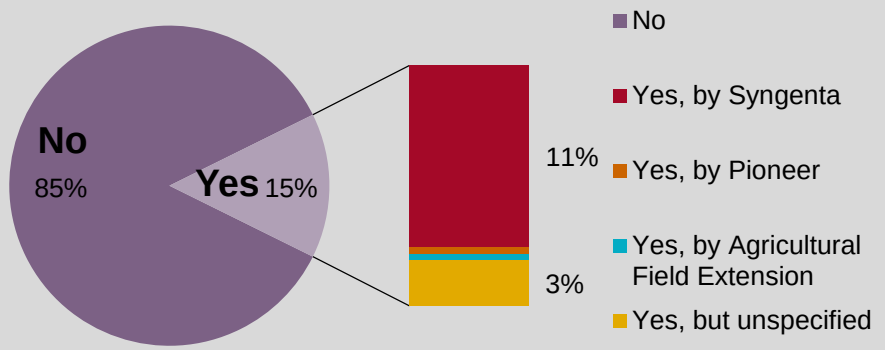
- From the farmers who receive training on ADB, 61% of them did not attend a Syngenta Corn Field Day.
- 45% of the 2 or more planting cycle farmers that received training on ADB attended Syngenta Corn Field day while only 39% of 1 planting cycle farmers attended.
- Out of all the respondents who attended the Syngenta Corn Field day (39%), 25% of the participants are satisfied with the event while 9% of the attendance are neutral.

Business Model

Safe Used Pesticide Training & Managing Crops from Pest/Diseases

This section examines the farmers who attend Safe Used Pesticide training and the way farmers manage crops

Safe Use Pesticide Training

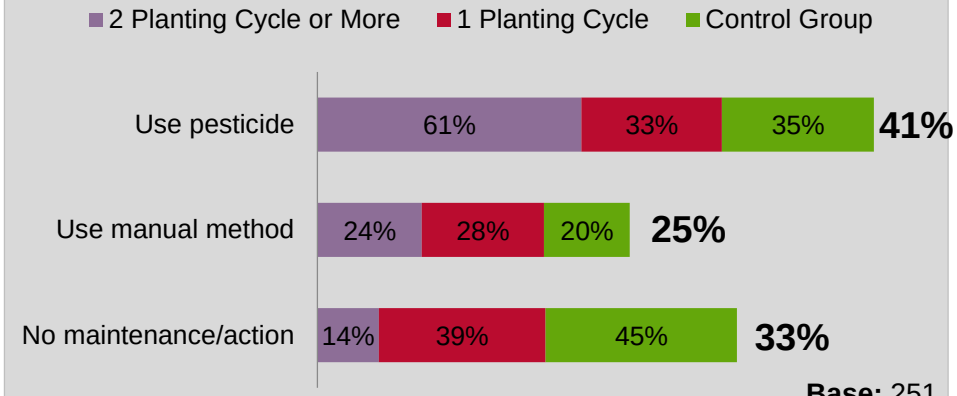


Base: 253

Premise: Farmers who have been in the PISAgro program should have better access to safe used pesticide training.

- The majority of the total respondents (85%) have not attended a safe use pesticide training.
- From the 15% of the total respondents who attended training, 10% attended training conducted by Syngenta.
- The low participation is worrying, it can either mean farmers do not see the importance/value of safety or it could also mean the training coverage is not wide enough.

Managing Crops from Pest/Diseases



Base: 251

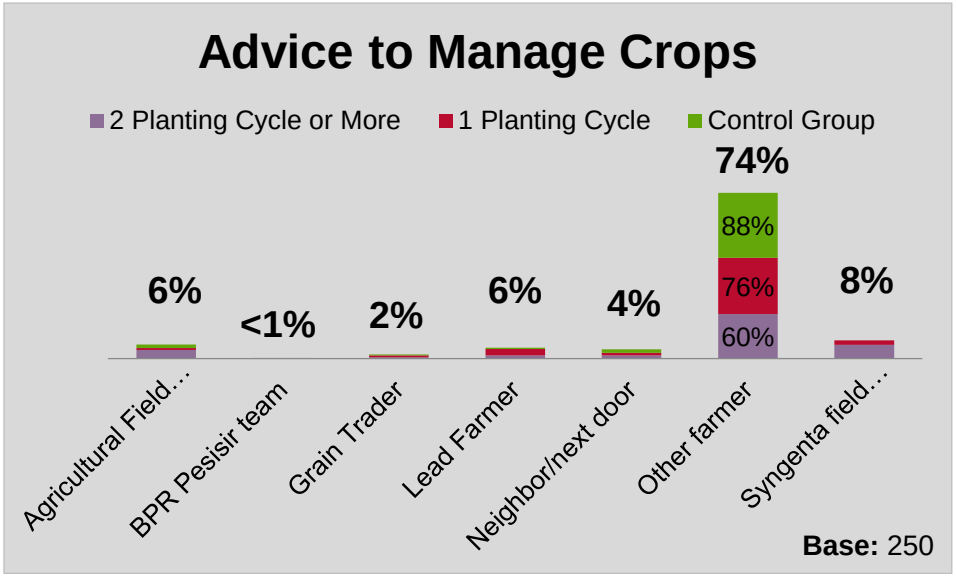
Premise: Farmers who have been in the PISAgro program for more cycles should be using pesticides to manage crops from Pest/Diseases.

- The majority of the respondents 'use pesticide' (41%) to manage crops from pest/diseases followed by 33% who do not do any maintenance or action.
- The majority of the 2 planting cycle or more farmers (61%) use pesticide while the percentage of 1 planting cycle farmers and the control group farmers are very similar (33% & 35% respectively).

Business Model

Advice to Manage Crops

This section examines how farmers seek advice about crop management and their way of contacting advisers



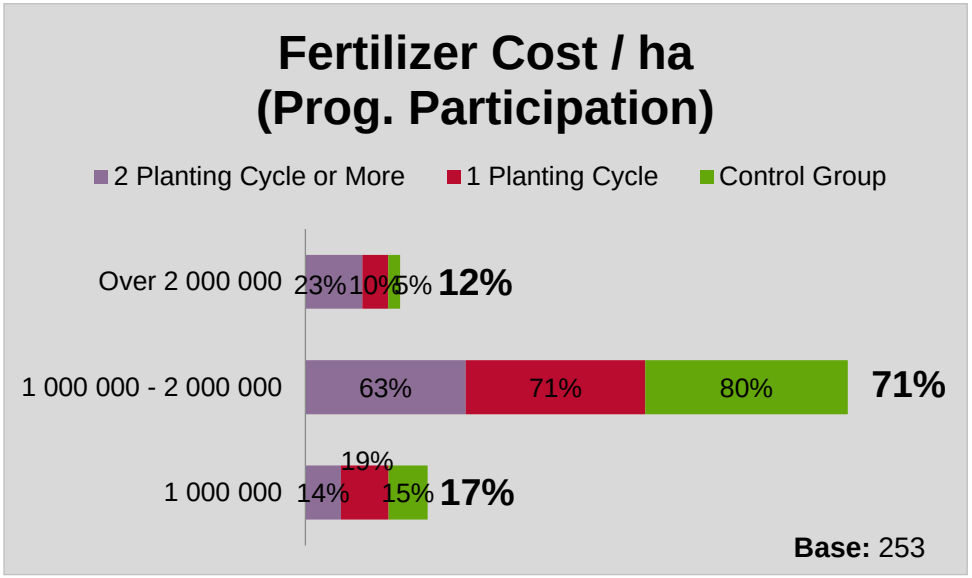
Goal: Analyze who the farmers seek for advice in managing their crops and the way they contact them

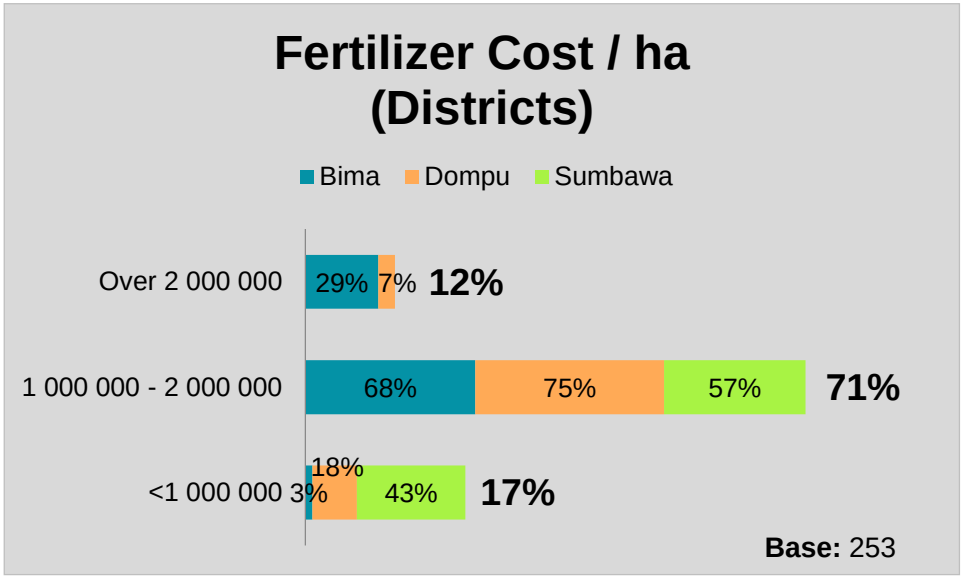
- 74% of the total respondents seek advice from their fellow farmers while 8% of the total respondents seek the Syngenta field team. This means that accessibility to credible and more accurate information is still lacking in these regions.
- About 6% of the total respondents seek advice from their Lead Farmer and Agriculture Field Extensions.
- The way they contact the person to seek advice is mostly by face to face meeting (92%) in the field or visiting each other's house.

Business Model

Fertilizers

This section examines the cost of fertilizers segmented by the program participation and districts





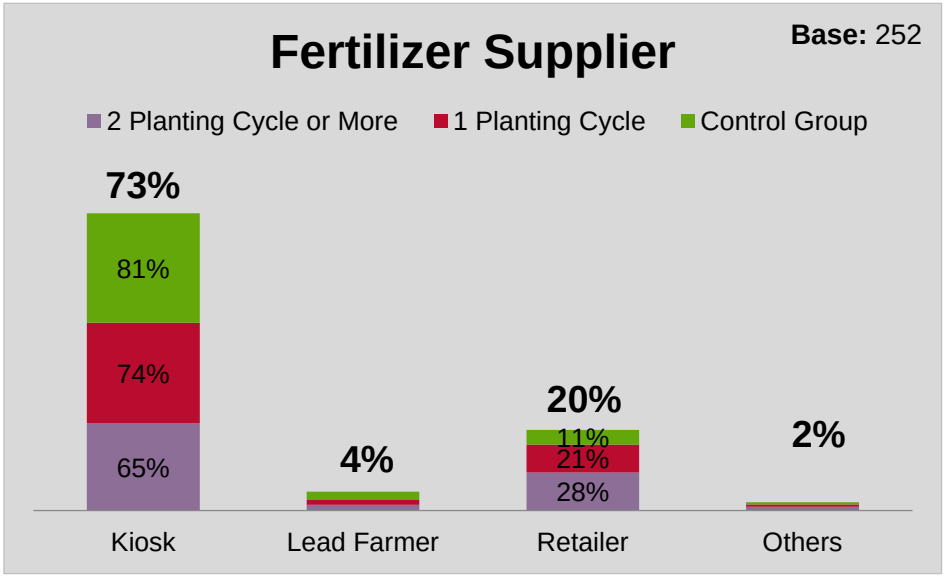
Goal: Understand the cost of fertilizers across the different program participations and districts.

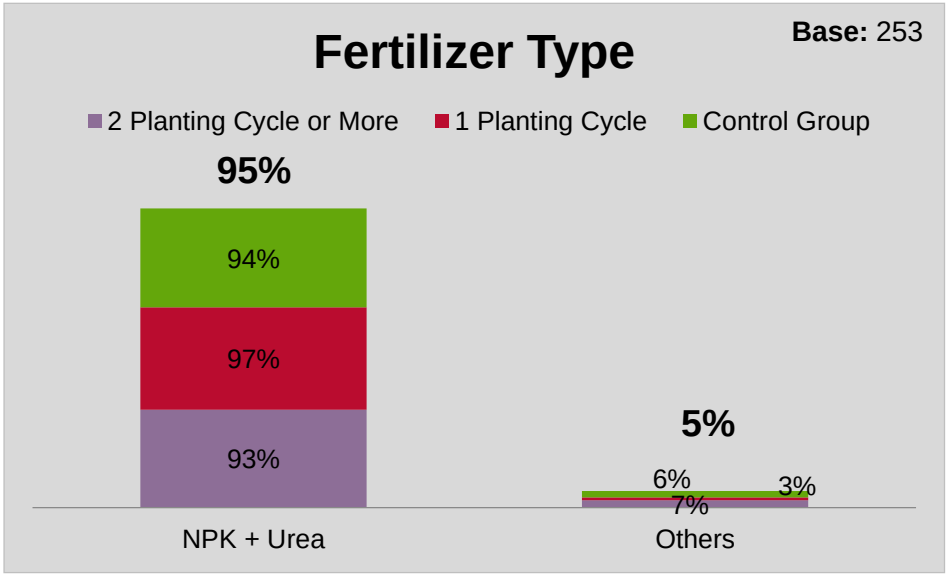
- The majority of the total respondents (71%) say that their total fertilizer cost is between 1 million to 2 million IDR.
- 17% of the total respondents say that they spend less than 1 million IDR on fertilizers while 12% of the total respondents spend over 2 million IDR.
- A considerably higher percentage of 2 or more planting cycle farmers (23%) spend over 2 million IDR on fertilizers compared to the percentage of 1 planting cycle farmers (10%) and control group farmers (5%).
- The majority of fertilizer cost in all three districts (Bima, Dompu, Sumbawa) is in the 1 million to 2 million IDR range.
- However, 29% respondents from Bima said that they spent over 2 million IDR in fertilizers while 43% of farmers in Sumbawa spend less than 1 million IDR. There is a tendency for Bima farmers to spend more on fertilizers. The availability of fertilizers in Sumbawa region might have an effect to this figure.

Business Model

Fertilizers

This section examines the fertilizer suppliers and the type of fertilizers that farmers use





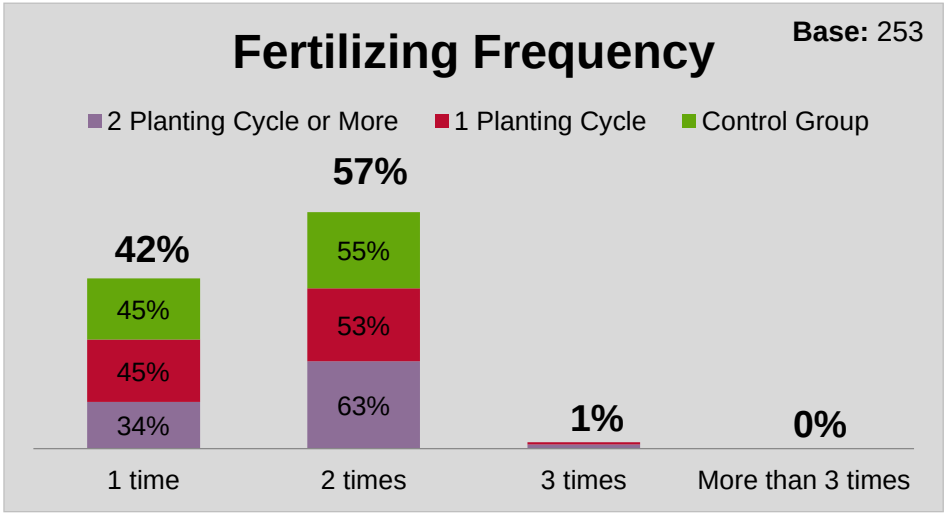
Goal: Analyze where farmers obtain their fertilizers and the type of fertilizers that they use.

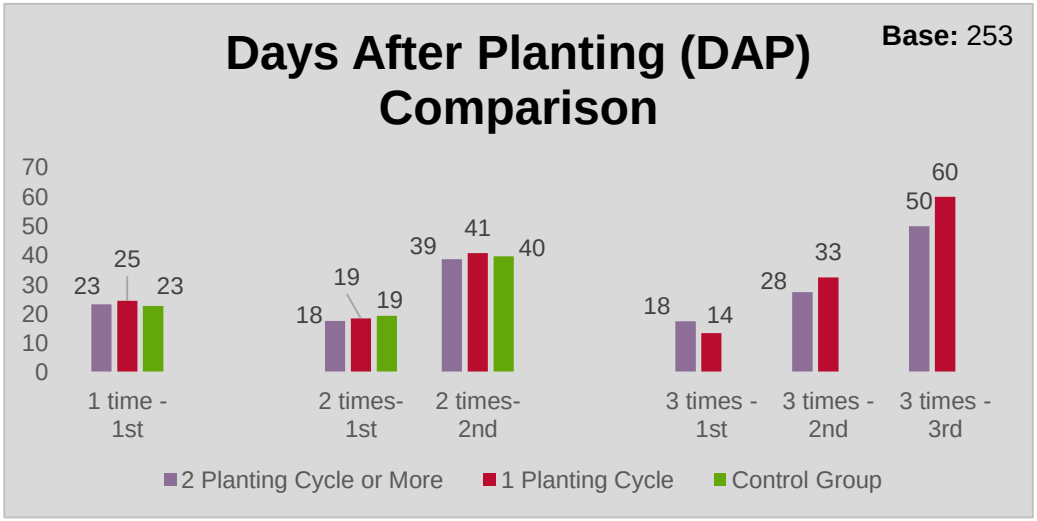
- Majority of the total respondents (73%) acquire their fertilizer from the Kiosk. 20% of the total respondents acquire their fertilizers from the retailers.
- Kiosk in this case is an official retail space to sell fertilizers in the area that has a store with a sign, while retailers are unofficial fertilizer sellers and do not have a store. Example of retailers in this case are collectors, grain traders that provide loans in the form of fertilizers to farmers in return for the harvested crops.
- A significantly bigger percentage of 2 planting cycle or more farmers (28%) and 1 planting cycle farmers (21%) obtain their fertilizers from retailers instead of kiosk. This number is high compared to the percentage of control group farmers (11%).
- Almost all of the total respondents use a combination of NPK + Urea as their choice of fertilizers. Other examples of fertilizer used by a small percentage of farmers include: NPK only, Urea only, NPK+ZA, Poska, etc.

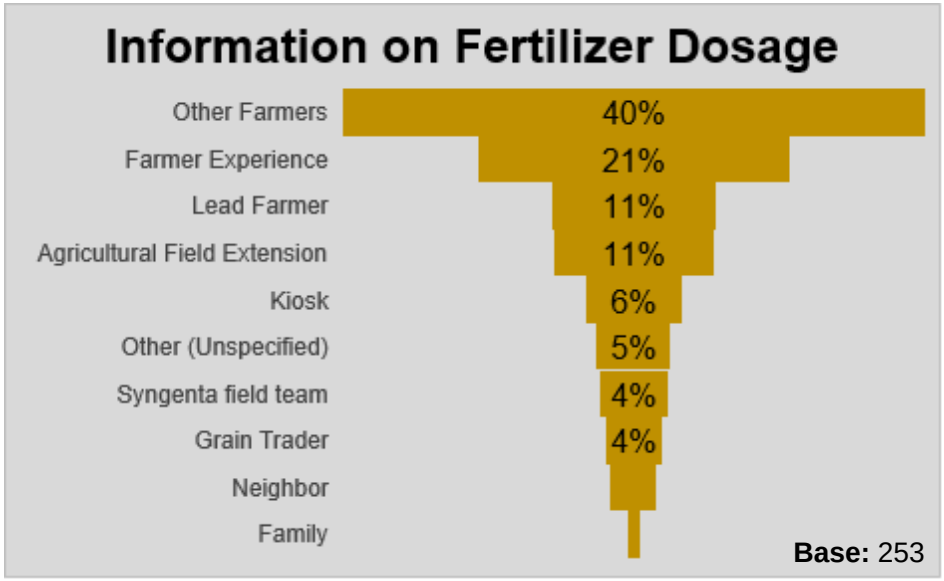
Business Model

Fertilizers

This section examines the fertilizer frequency, days after planting comparison and fertilizer dosage information source







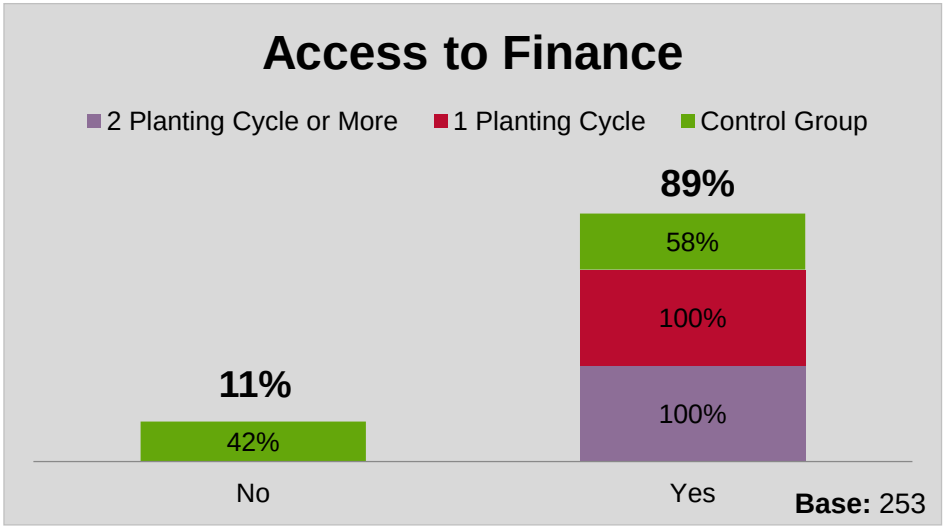
Goal: Analyze the frequency of fertilizing, days after planting (DAP) and where farmers seek information on fertilizer dosage

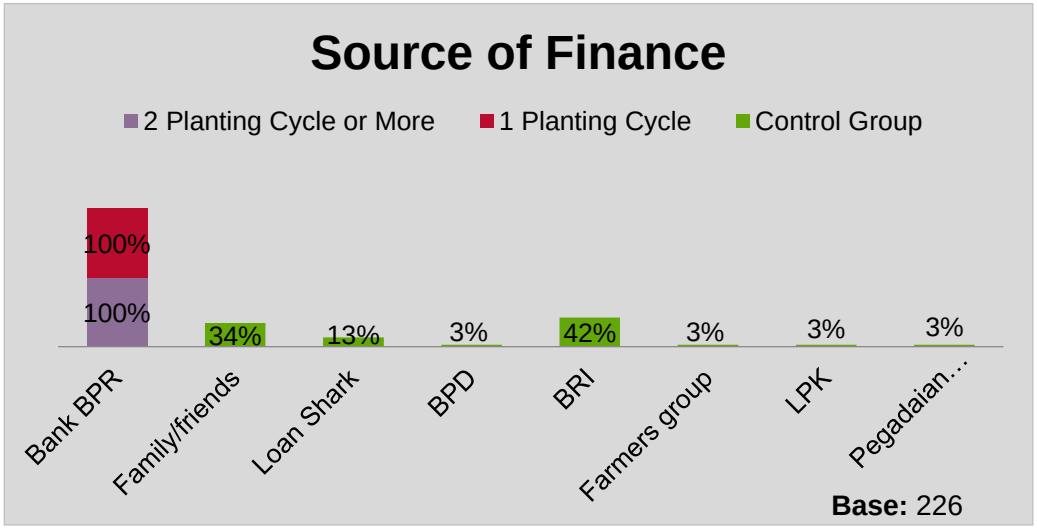
- More than half (57%) of the total respondents fertilize their plot twice in a planting season while 42% of the total respondents fertilize their plot once. Only a very small number of farmers (1%) fertilize their plot 3 times in a planting season.
- The average days after planting for farmers across program participation is very similar between the three program participations.
- For farmers who only fertilize once, the average day after planting (DAP) of fertilizer application is between 23-25 days. For farmers who fertilize twice the average DAP is 18-19 (1st) and 39-41 (2nd).
- Majority of farmers seek information about fertilizer dosage from other farmers (40%) followed by their own experience (21%)

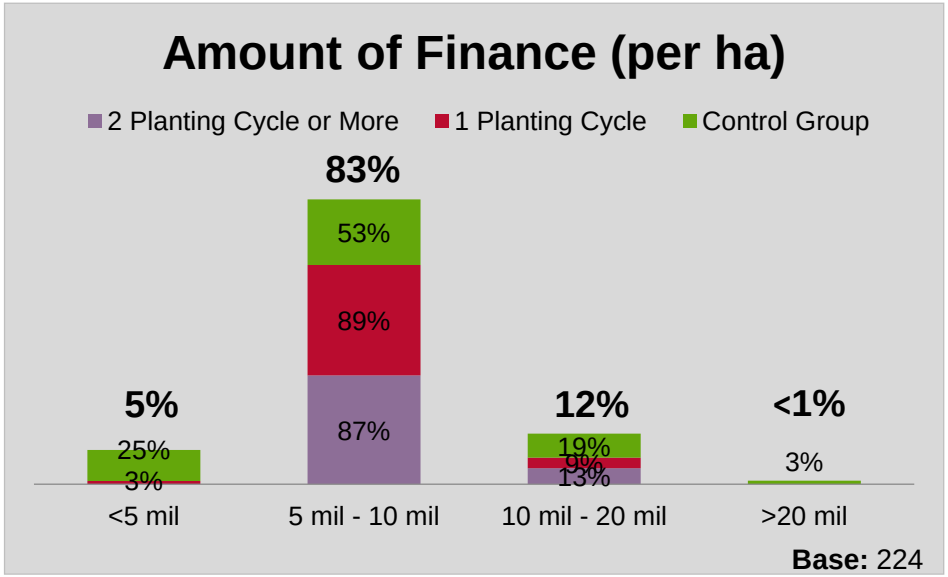
Business Model

Access to Finance

This section examines the percentage of farmers who have access to finance, the source and the amount of finance







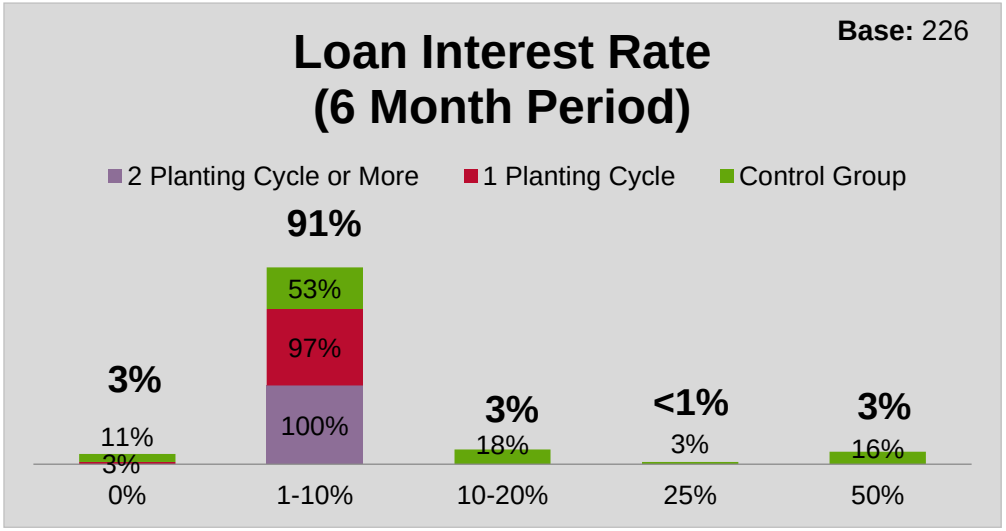
Goal: Analyze the farmers accessibility to finance, the source and the amount of finance that they receive

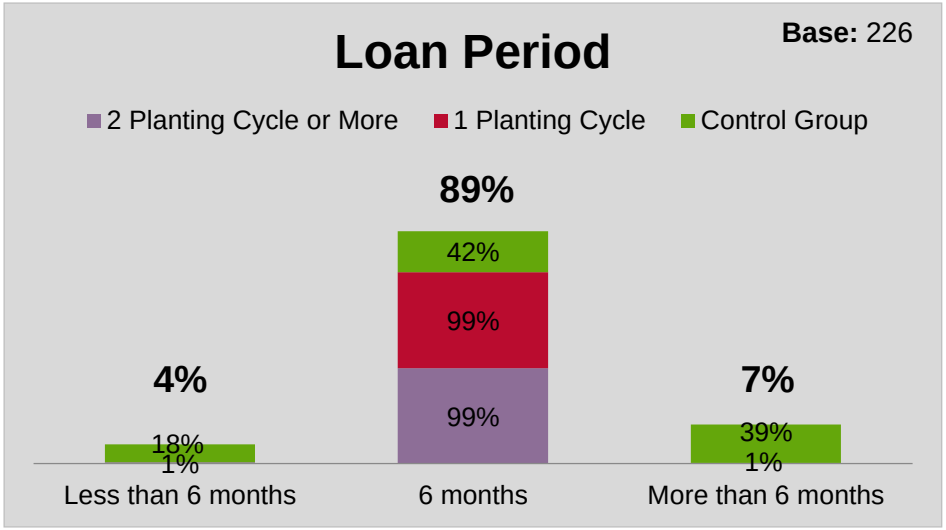
- 89% of the total respondents have access to finance.
- PISAgro farmers (2 or more planting cycle and 1 planting cycle) should all have access to finance through Bank BPR at the value of 8 million IDR. The PISAgro farmers that claimed to receive a loan between 10-20 million IDR/ha might have answered based on their total loan amount not the amount per hectare.
- About 58% of the control group farmers have access to finance.
- 42% of the control group farmers receive their loan from BRI while 34% of them receive it from family/friends with varying loan amount.

Business Model

Access to Finance

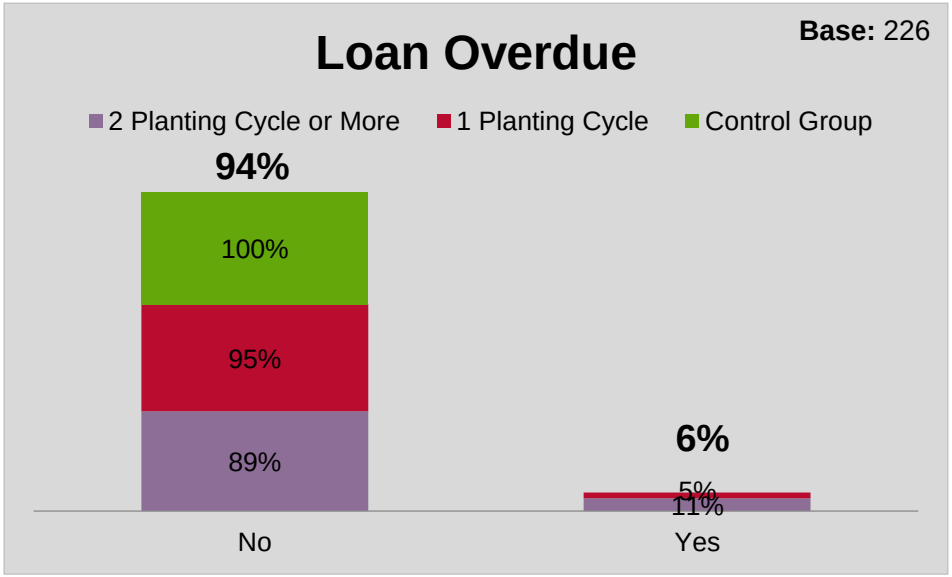
This section examines the loan interest rate, loan period and the percentage of farmers with loan overdue





Goal: Analyze the loan interest rate, loan period and the percentage of farmers who have overdue loans.

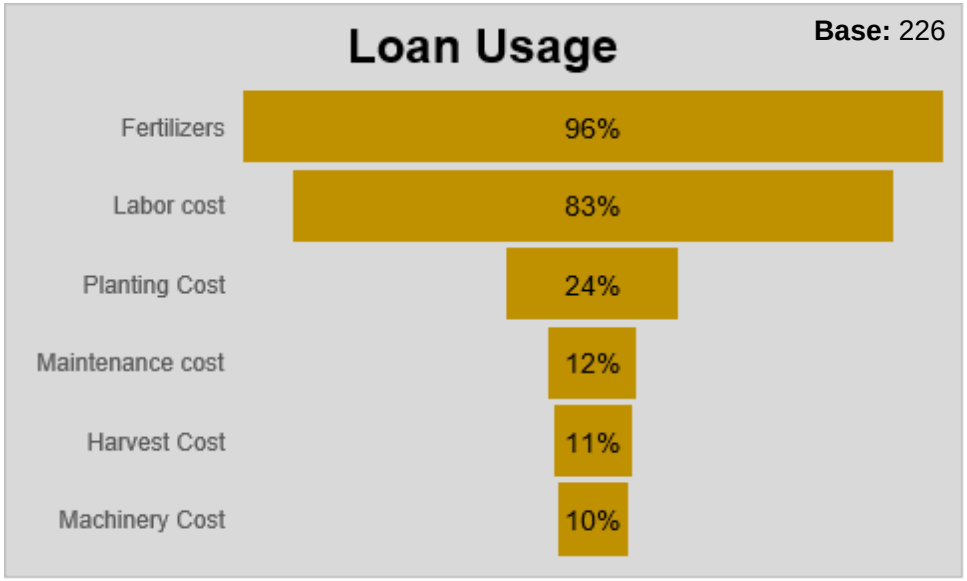
- 91% of the total respondents with access to finance say that their loan interest rate for a 6 month period is between 1-10%.
- PISAgro farmers (2 or more planting cycle and 1 planting cycle) would all have a loan interest rate between 1-10% with a 6 month loan period.
- Majority of the control group farmers (53%) also have a loan interest rate between 1-10%, but some have higher interest rates (~34%) and longer loan period of more than 6 months (39%).
- 89% of the total respondents say that the loan period is 6 month and 94% of the total respondents return their loan on time.
- An interesting finding is a small number of PISAgro farmers have loan overdue compared to the control group whose farmers all return their loan on time.

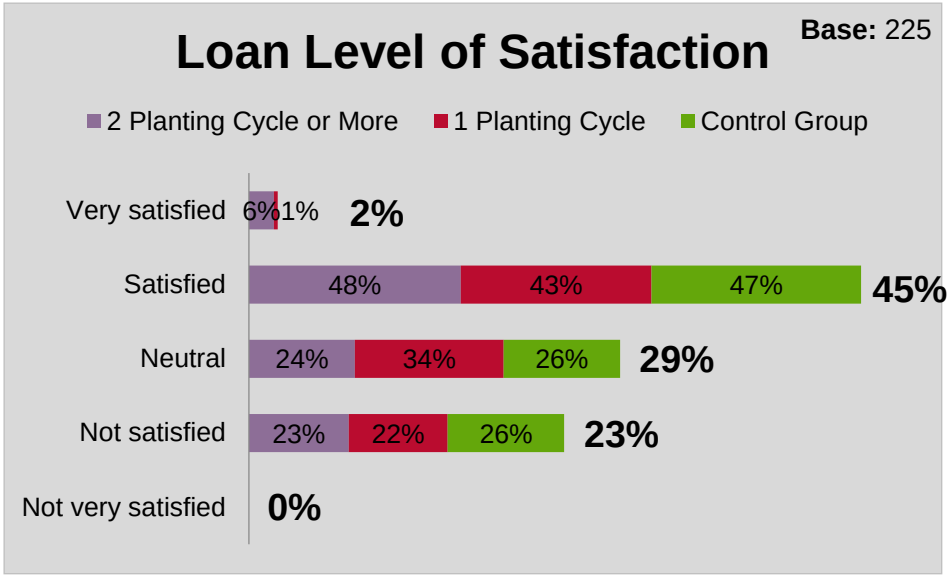


Business Model

Access to Finance

This section examines the loan usage and the loan level of satisfaction





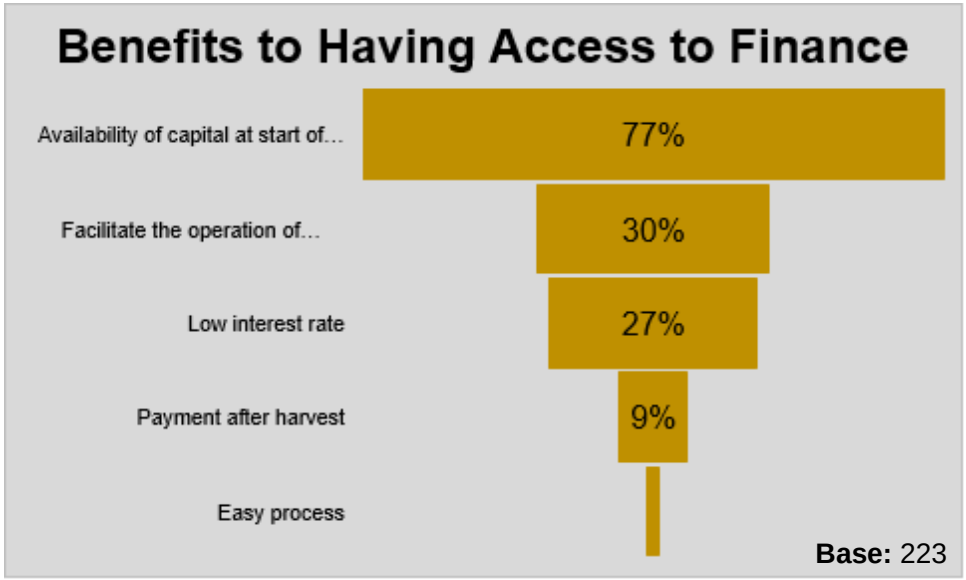
Goal: Analyze the most common loan usage and the farmer's loan level satisfaction across the 3 different program participation groups.

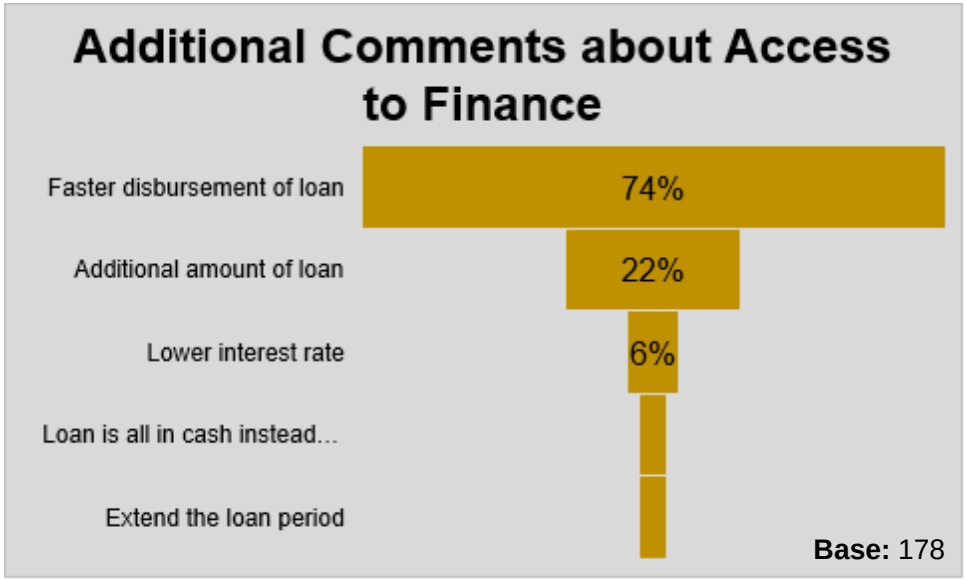
- 96% of the farmers say that they use the loan to buy fertilizers followed by 83% who said that they use it to pay their labor cost. Majority of the respondents are PISAgro farmers who would have received vouchers to buy the other farming inputs (seeds, pesticides) which is why the percentage for planting cost (24%) and maintenance cost (12%) loan usage is much lower.
- 45% of the total respondents are satisfied with their loan details followed by 29% who are neutral. The percentage of farmer's level of satisfaction is similar across the 3 program participation groups.

Business Model

Access to Finance

This section examines the benefits of having access to finance and any additional comments about it.





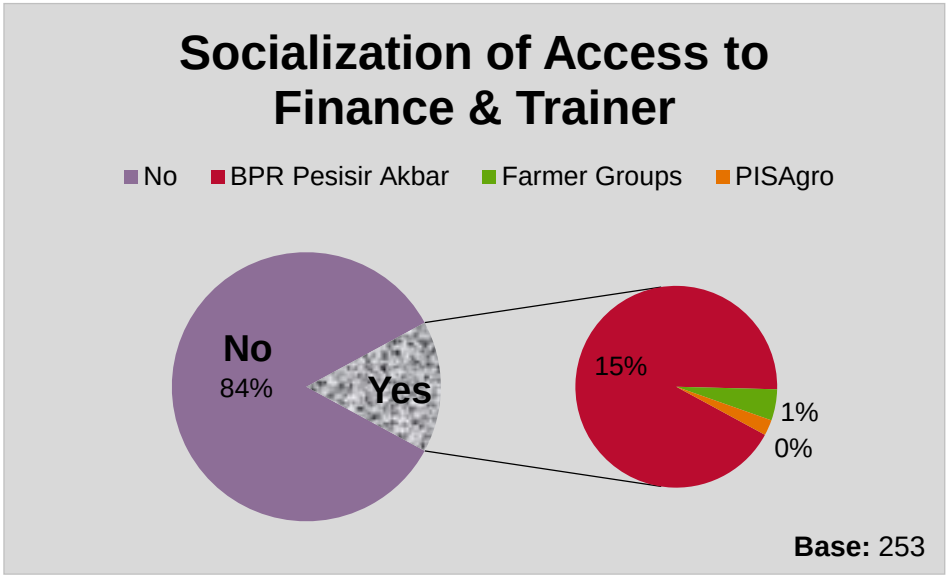
Goal: Analyze farmer's thoughts about the benefits of having access to finance and capture their additional comments

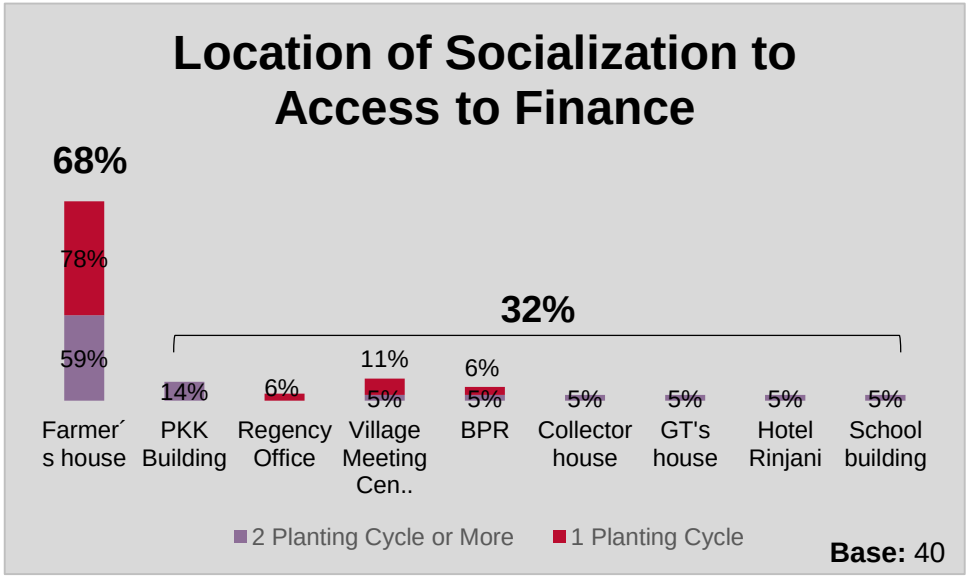
- The majority of the farmers (77%) who receive finance say that the '**availability of capital at the start of a planting season**' is crucial followed by the ability to **'facilitate their agriculture operation'** (30%). 27% of the respondents say that the it has a **'lower interest rate'** compared to other access to finance. 9% of the total respondents said that '**payment after harvest**' is one of the benefits and 2% said '**easy processing of loan**' as a benefit.
- In terms of additional comments, majority of the farmers (74%) said that they would like to see **'faster disbursement of loan'**, preferably before the planting season starts so they can start the planting season on time by buying the necessary inputs. A significant number of farmers (22%) want to see **'additional amount being made available'.** Many PISAgro farmers would like the loan to be increased to IDR 10 million per hectare. 6% of the total respondents want a **'lower interest rate'** while 3% of the respondents want the **'loan to be all in cash instead of partly in vouchers'.** At the moment half of the loan from the PISAgro program is in the form of vouchers to buy seeds and crop protection products. Lastly, 3% want the **'loan period to be extended'** from the standard 6-month period.

Business Model

Socialization of Access to Finance

This section examines the socialization of access to finance penetration, trainer and location.





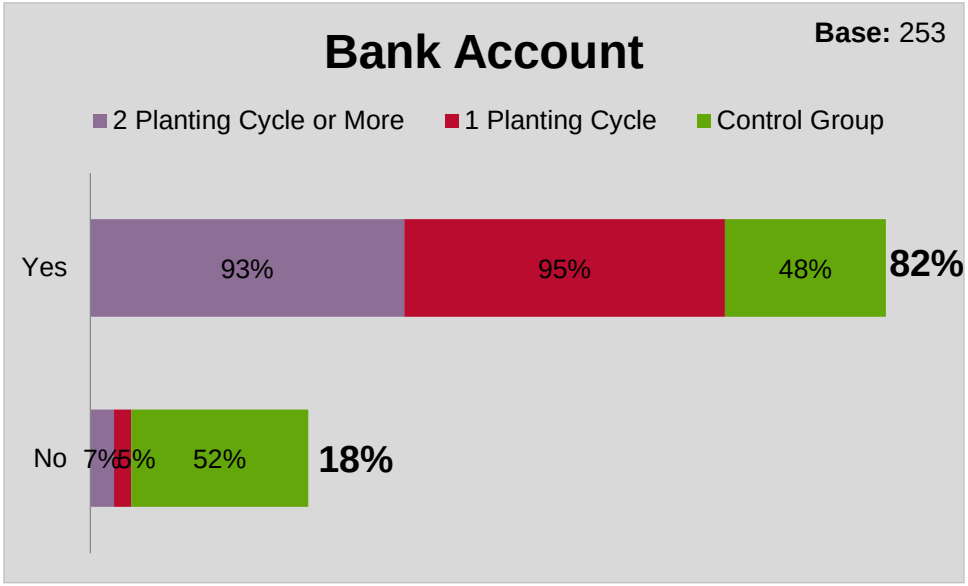
Goal: Analyze the percentage of farmers that have been to access to finance socialization, the trainer and the location

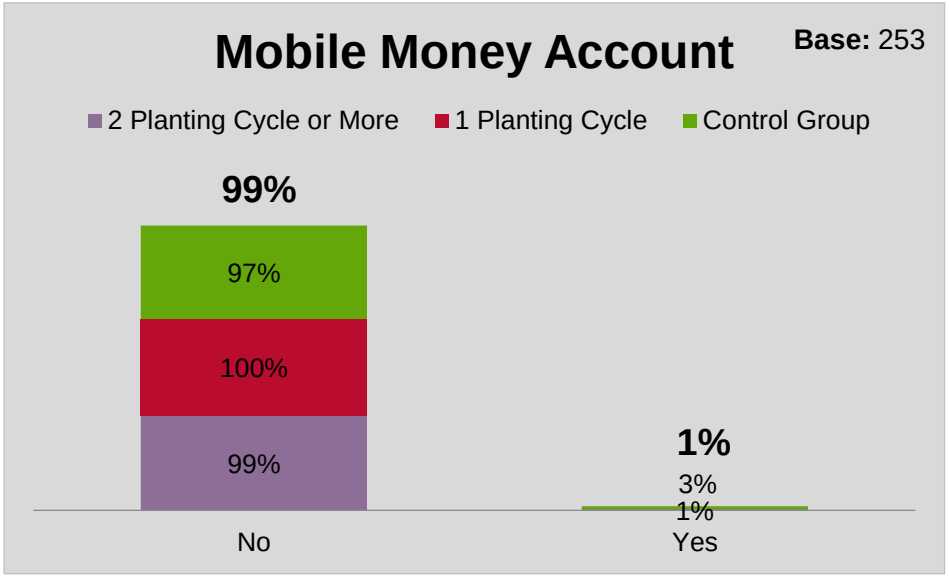
- Only 16% of the total respondents attended the socialization of access to finance. Of them,15%, nearly all, attended the socialization that was facilitated by Bank BPR Pesisir Akbar.
- 68% of the farmers who attended socialization of access to finance said the training was held in farmer's house while 11% said the training was held in village meeting centers.
- No control group farmers have attended a socialization of access to finance in all three districts.

Business Model

Bank Account and Mobile Money Account

This section examines the farmer's access to bank and mobile money accounts.





Goal: Analyze the percentage of farmer's who have bank and mobile money accounts across the 3 program participation groups

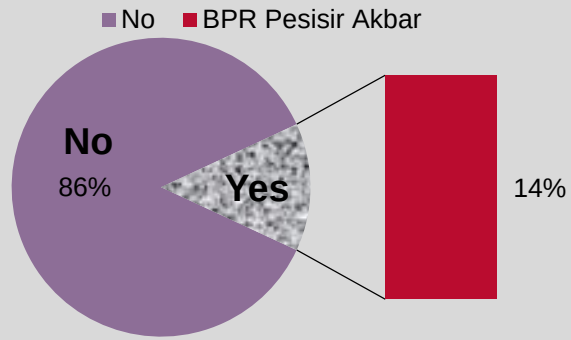
- 82% of the total respondents have a bank account. Out of the PISAgro farmer members, almost all of them (93% and 95%) said that they have a bank account while a small percentage of them said that they don't have one. All PISAgro farmer members would have a Bank account in BPR as part of the requirement to retrieve the loan. This shows that some of the PISAgro farmers are not aware of having a bank account.
- From the control group farmers the split is pretty even between those who have a bank account (48%) and those who don't (52%).

Business Model

Financial Literacy

This section examines the financial literacy training penetration, trainer, location and the benefits of training

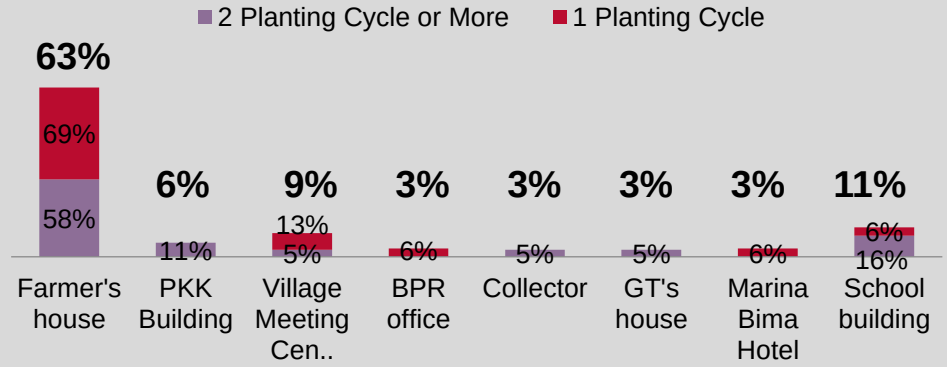
Financial Literacy Training & Trainer



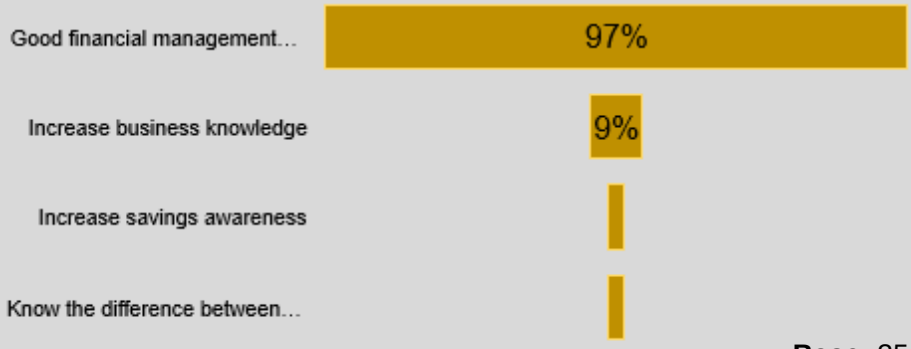
Base: 253

Financial Literacy Training Location

Base: 35



Benefits of Financial Literacy Training



Base: 35

Goal: Analyze the percentage of farmers that have been to financial literacy training, the trainer and the location and benefits

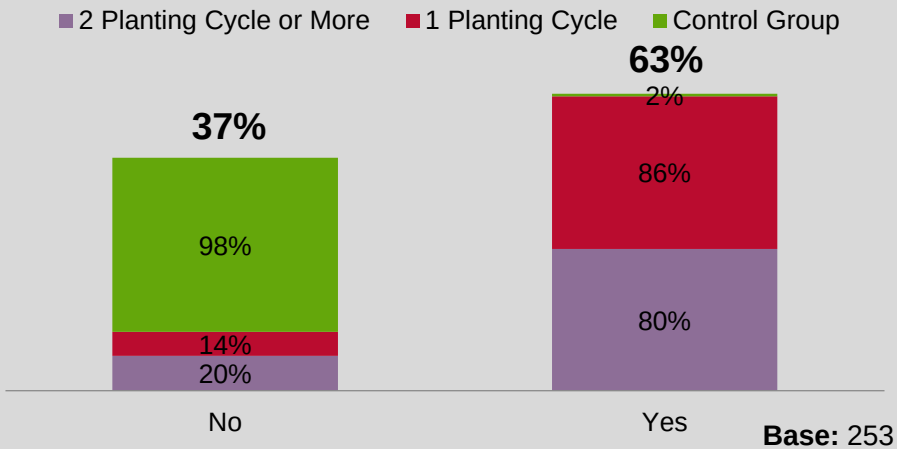
- Only 14% of the total respondents have access to financial literacy training and all of them said that training was conducted by Bank BPR Pesisir Akbar.
- The most popular location to conduct the financial literacy training is at the farmer's house (63%) followed by school building (11%) and village meeting center (9%).
- No control group farmers have attended a financial literacy meeting.
- Almost all of the respondents (97%) said that the main benefit of the training is in obtaining good financial management information.

Business Model

Crop Insurance

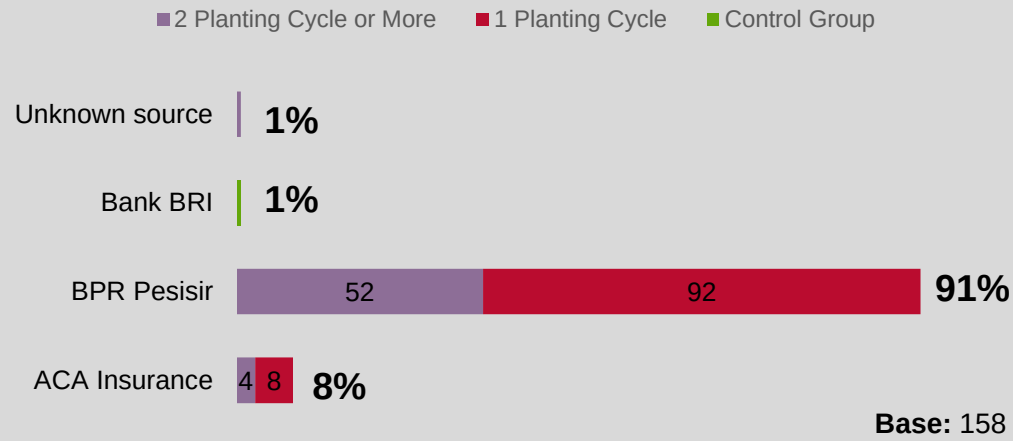
This section examines the farmer's access to crop insurance, source of crop insurance and crop insurance premium

Access to Crop Insurance



Base: 253

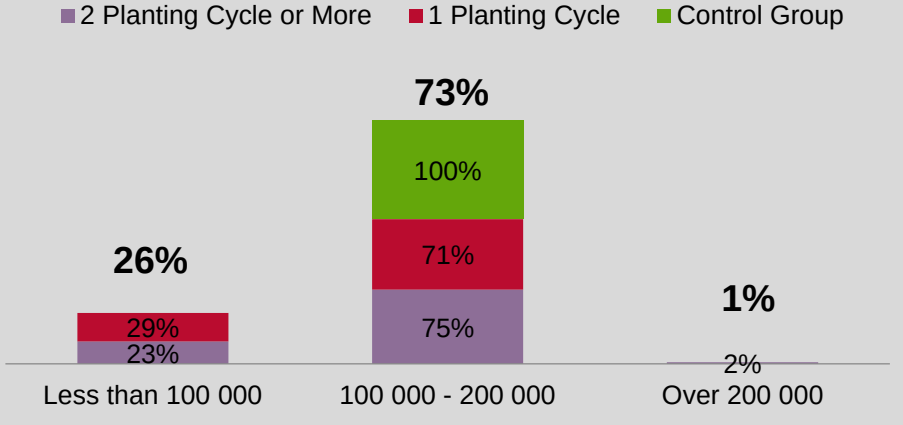
Source of Crop Insurance



Base: 158

Crop Insurance Premium

Base: 159



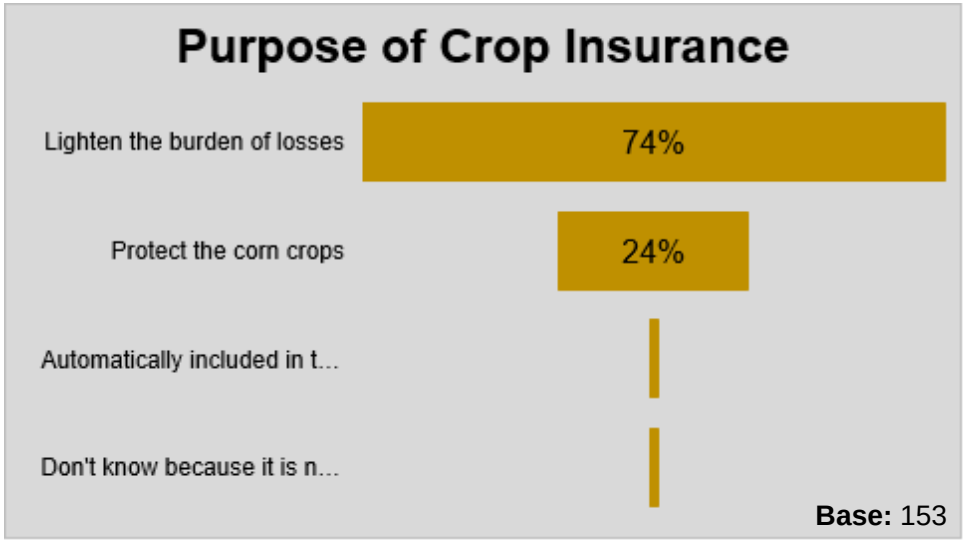
Goal: Analyze the percentage of farmers who have access to crop insurance, the source and the premium that they are paying

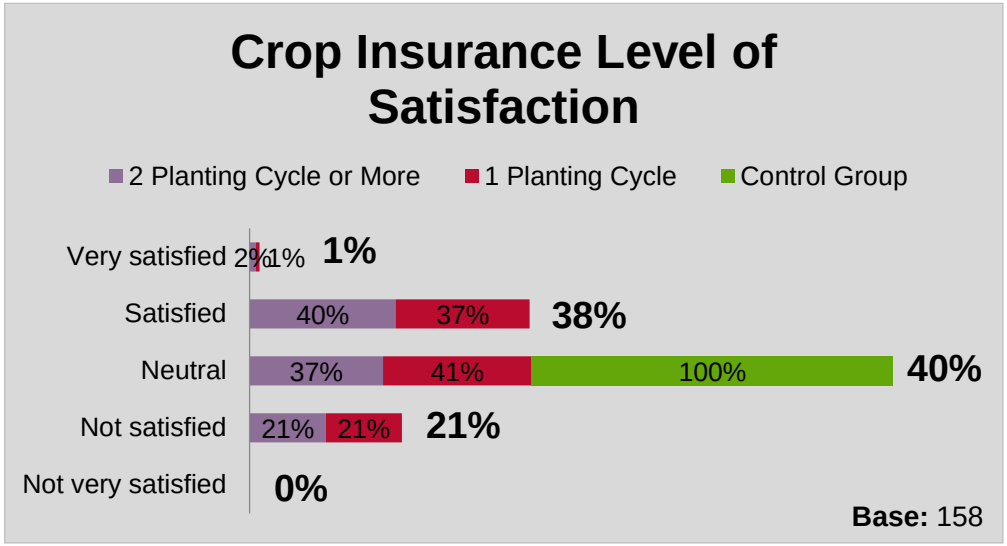
- 63% of the total respondents have access to crop insurance. Only 2 percent of the control group farmers have access to crop insurance.
- The majority of the PISAgro farmers (2 planting cycle or more and 1 planting cycle) have access to crop insurance. The percentage is not 100% as crop insurance was not available in the earlier planting cycles and some farmers are not aware that some of their loan is used to pay crop insurance.
- The majority of the PISAgro farmers (~91%) said that the source of insurance is BPR Pesisir while only ~8% said that they obtained it from the actual issuer, ACA Insurance.
- 73% of farmers paid around 100 to 200 thousand IDR for their insurance.

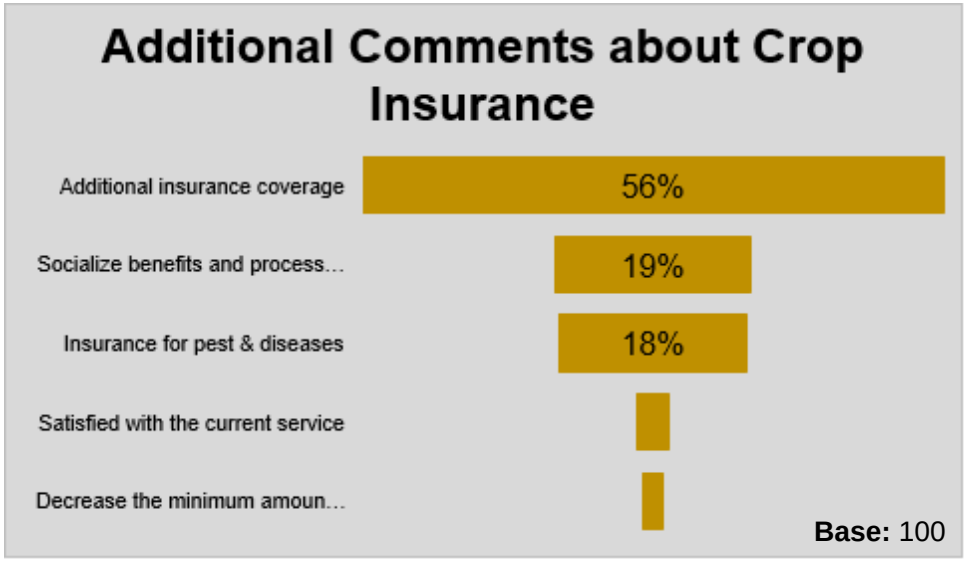
Business Model

Crop Insurance

This section examines the farmer's purpose for buying crop insurance, level of satisfaction and additional comments







Goal: Analyze the farmer's purpose for obtaining crop insurance, their level of satisfaction and to gather additional feedback

- The majority of the total farmers who have access to crop insurance say the purpose of buying it is to lighten the burden of losses (74%) followed by protecting their corn crops (24%).
- The majority of these farmers (40%) have a neutral level of satisfaction followed by 38% who are satisfied with the crop insurance.
- Some of the most common feedback gathered from the farmers include wanting additional insurance coverage (56%), more than the current coverage provided by ACA. 19% of farmers want socialization of the benefits and processes to claim while 18% want insurance for pest and diseases.

Main Findings

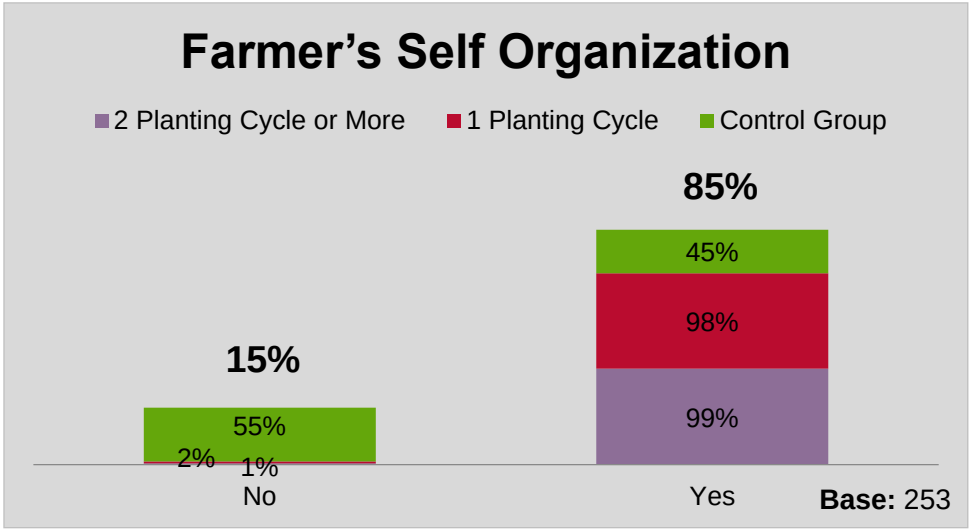
"Farming is a profession of hope"

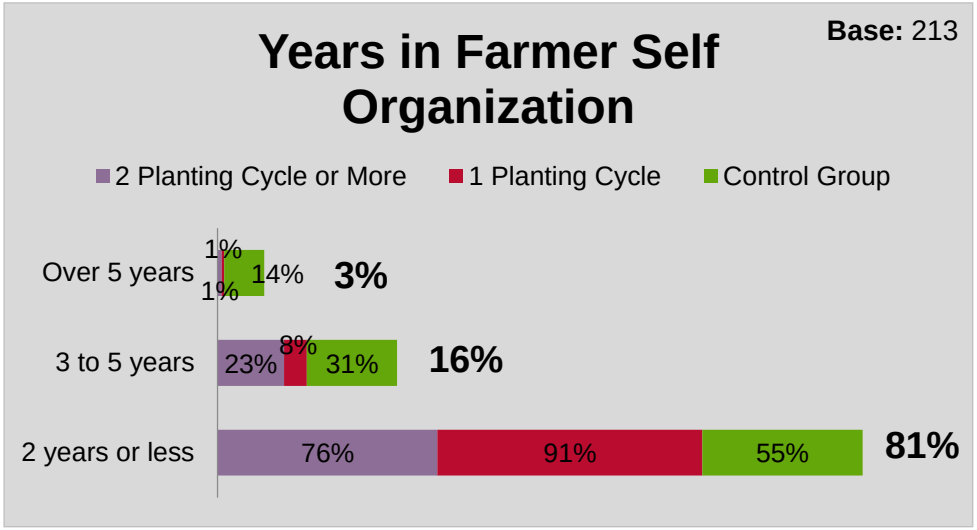
Brian Brett

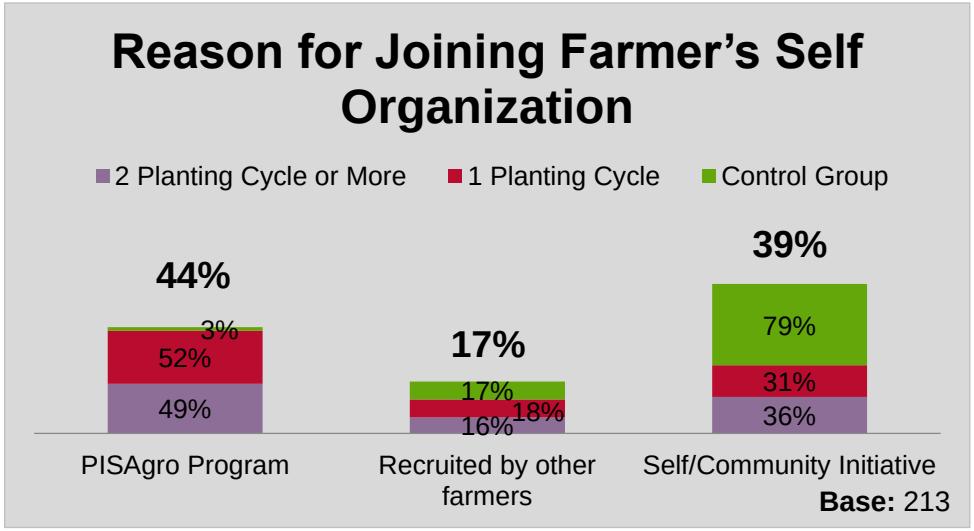
Social

Farmer's Self Organization

This section shows information about the percentage of farmer respondents in farmer groups, as well as the number of years and the reasons for joining





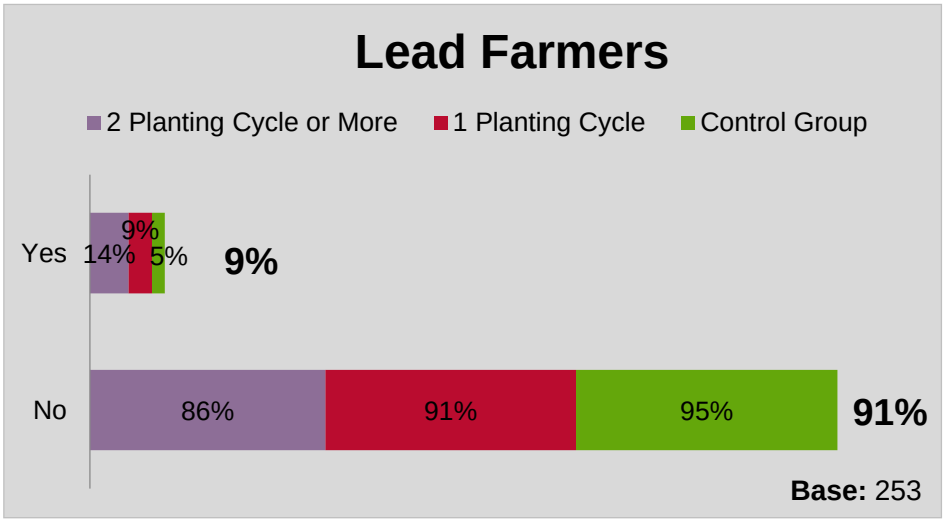


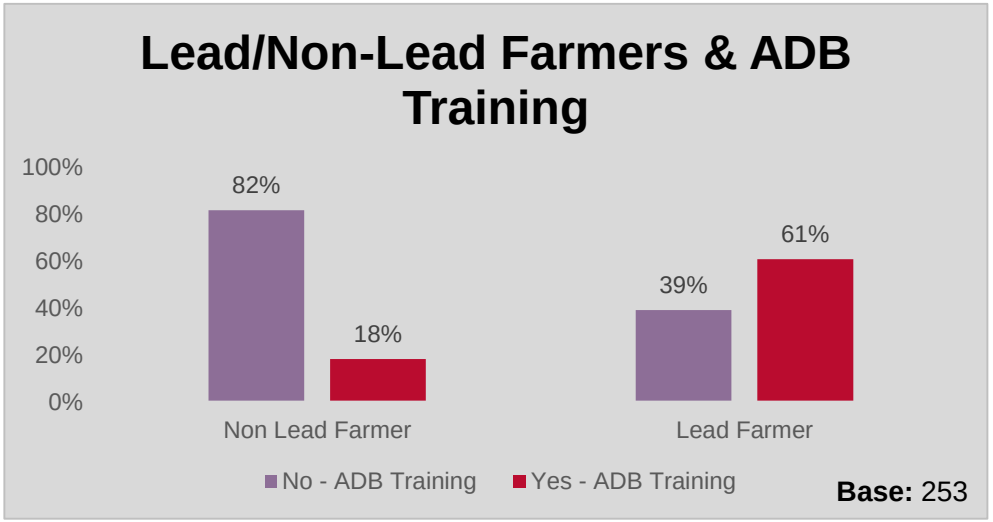
- 85% of the total respondents belong to a farmer's self organization. This is mainly due to a majority of the respondents are PISAgro farmers (≥2 or 1 planting cycle)
- Only 45% of the control group farmers belong to a farmer self organization. All PISAgro farmers are supposed to be in farmer self organization groups, however there are a very small number of them who do not claim to be in one (<2%).
- Majority of farmer's in self organization have been in for 2 years or less (81%).
- The most popular reason for joining a farmer's self organization is because of the PISAgro program (44%), it is closely followed by self/community initiative (39%). About half of the PISAgro farmers joined because of the program and a majority (79%) of the control group joined because of their own initiative.

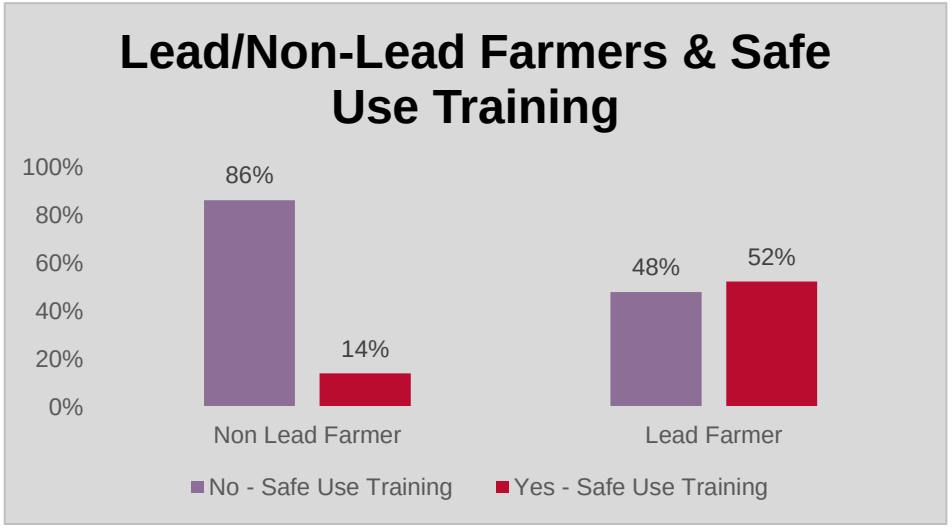
Social

Lead Farmers

This section shows the percentage of lead farmers and the comparison of lead an non-lead farmers with access to ADB training and Safe Used Pesticide training.







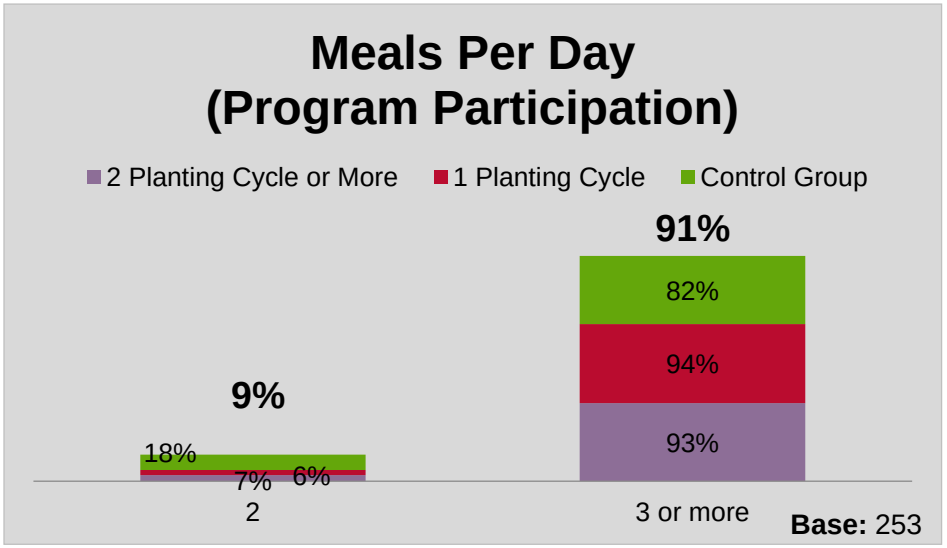
Premise: All PISAgro farmers should have access to ADB and Safe Used Pesticide training.

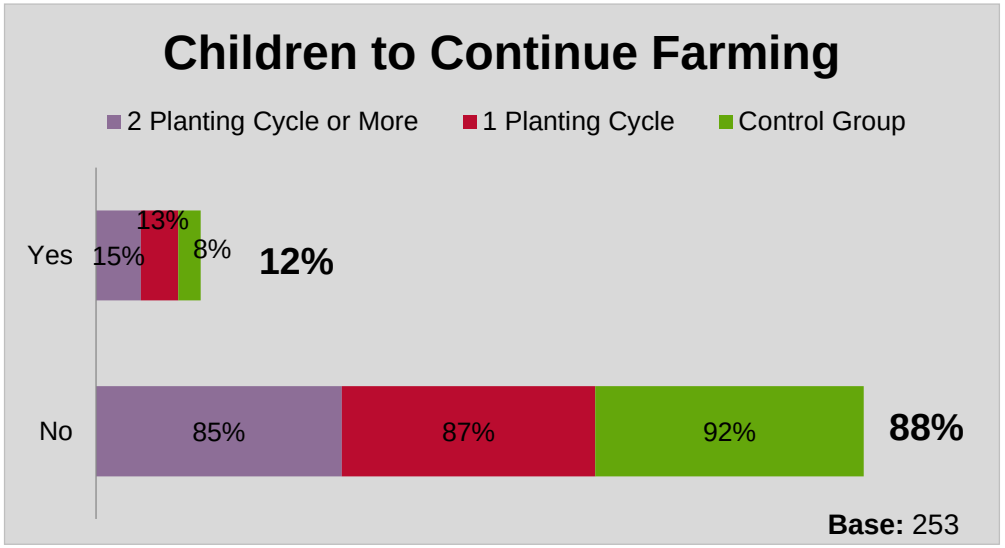
- 91% of the respondents are not lead farmers.
- A big percentage of lead farmers (61%) have had access to ADB training while only 18% of non-lead farmers have access to ADB training. This shows that the ADB training penetration is still very low for the non-lead farmers. Lead farmers do not train their farmer members and it is also an impossible task for Syngenta or other partners to train every single farmer.
- This is also the case for safe use training as more than half of the lead farmers (52%) have access to it while only 14% of the non-lead farmers have access to it.

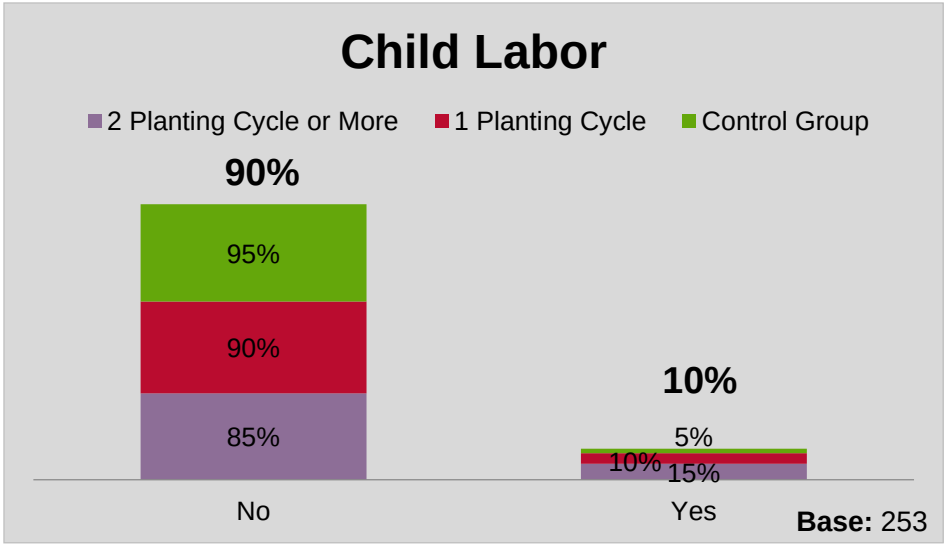
Social

Number of Meals, Optimism, and Child Labor

This section examines the social component of the farmers that relates to their food security and children







Premise: Farmers who have been in the PISAgro program for more cycles should have more access to good inputs, training, finance should lead to higher income, lower % of children handling pesticides & higher optimism to see their children continue farming.

- Almost all of the respondents (91%) say that they consume 3 meals/day. PISAgro farmers are 10% more likely to have 3 meals a day compared to non-programme members.
- Almost all of the respondents (88%) say that they do not want their children to continue farming. However, 2 or more planting cycle farmers are twice as likely to expect their children will continue farming, compared to the control group farmers.
- Majority of the respondents do not conduct child labor (90%). 2 or more planting cycle farmers are 3 times as likely to conduct child labor as from the control group.

Main Findings

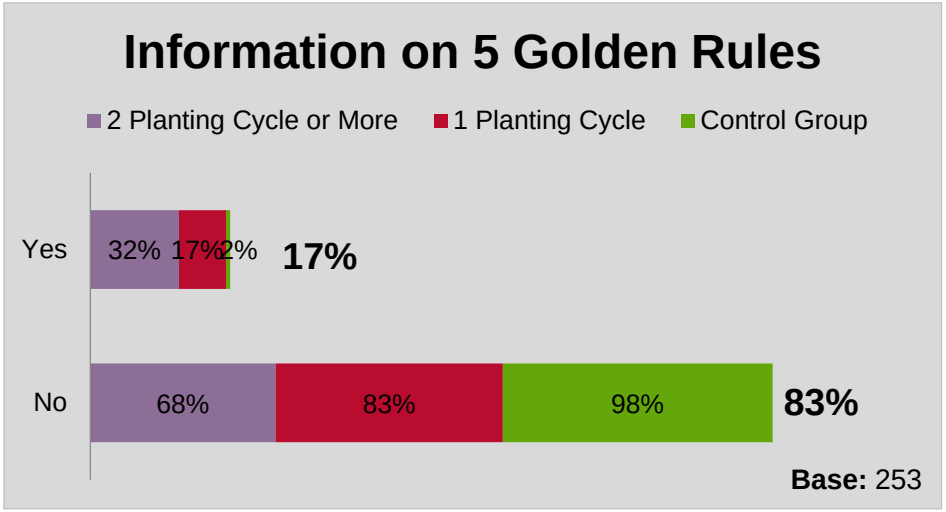
"At the end of the day, the goals are simple: safety and security."

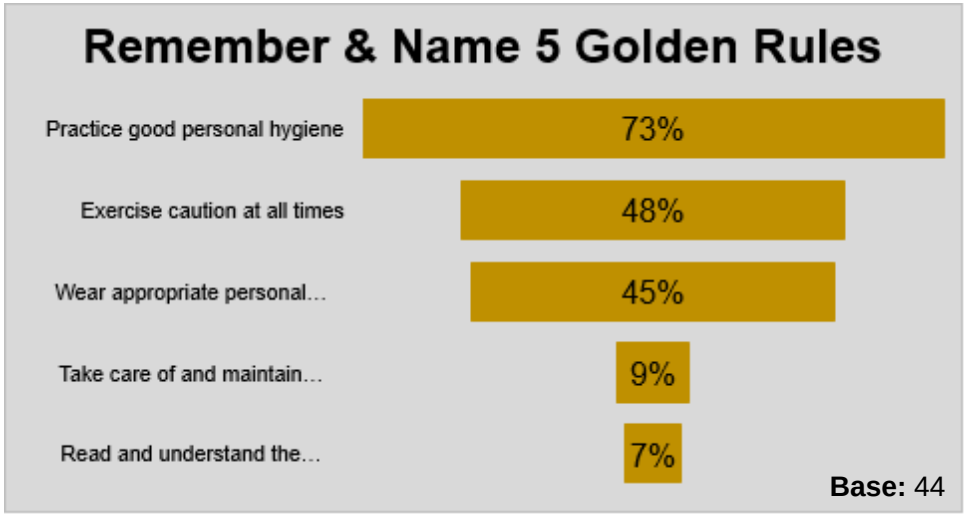
Jodi Rell

Safe use training impact

5 Golden Rules

This section examines the percentage of farmers who receive information about the 5 golden rules





Premise: Farmers who have been in the PISAgro program for more cycles should know and remember the 5 golden rules.

- The majority of the total respondents (83%) do not know the 5 golden rules.
- 32% of the 2 or more planting cycle farmers know or have been informed about the 5 golden rules while only 17% of the 1 planting cycle farmers know or have been informed about the 5 golden rules.
- As expected, only 2% of the control group farmers know or have been informed about the 5 golden rules.
- For those who know or have been informed about the 5 golden rules, the top 3 rules that they remember the most are '**practice good personal hygiene**' (73%), '**exercise caution at all times**' (48%), and '**wear appropriate PPE**' (45%).

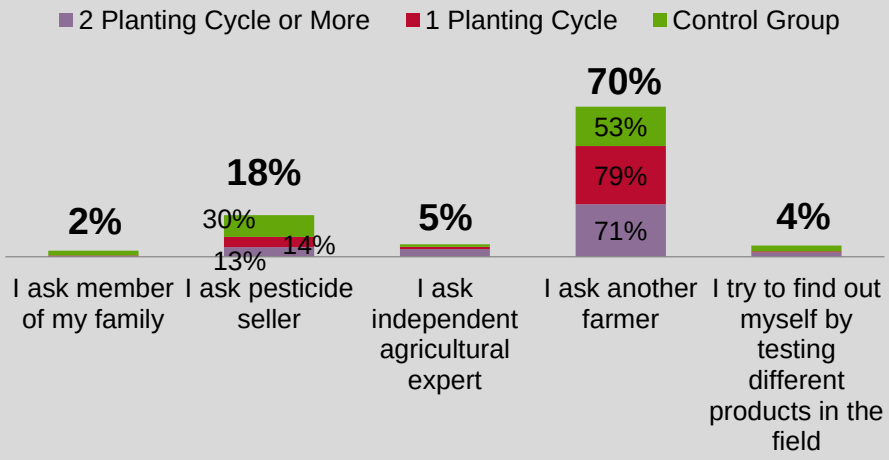
Safe use training impact

Crop Protection Purchase & Transporting Pesticides

This section examines the choices of farmers in seeking advice to acquire new pesticides & in transporting pesticides

Choosing a NEW Pesticide

Base: 249

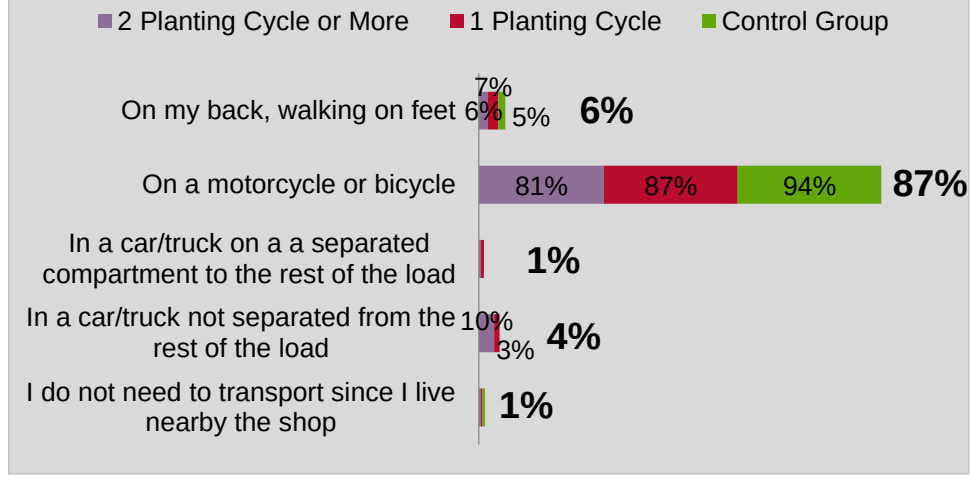


Premise: Farmers who have been in the PISAgro program for more cycles should have better accessibility to new knowledge and the further away the source of information from the farmer, the easier to reach them for technical training.

- The majority of the total respondents (70%) seek advice to choose a new pesticide from another farmer.
- Around ~75% of PISAgro Farmers (2 or more and 1 planting cycle) ask another farmer while a significant number of control group farmers (30%) seek advice from pesticide sellers.

Transporting Pesticides

Base: 250



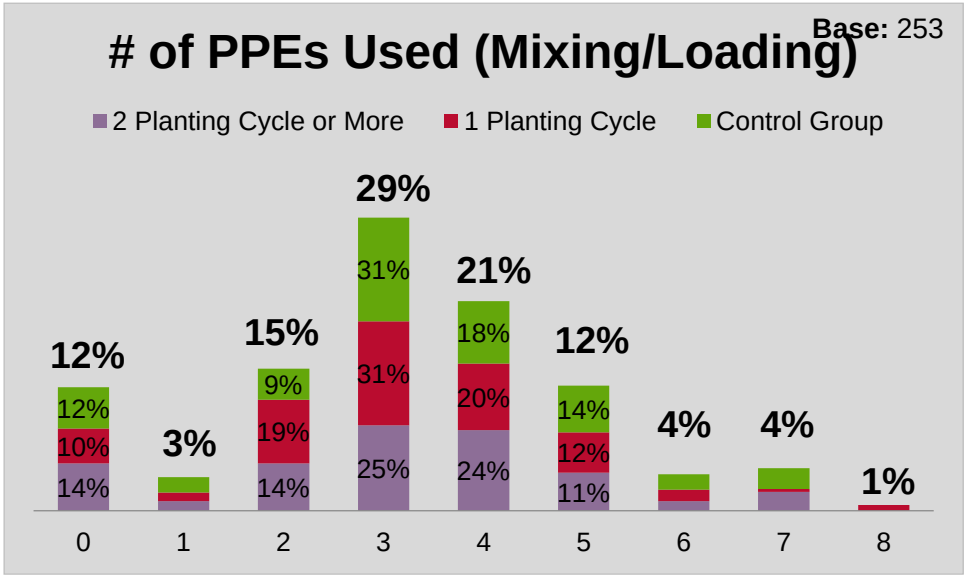
Premise: Farmers who have been in the PISAgro program for more cycles should have a better knowledge in safer transport of CP products.

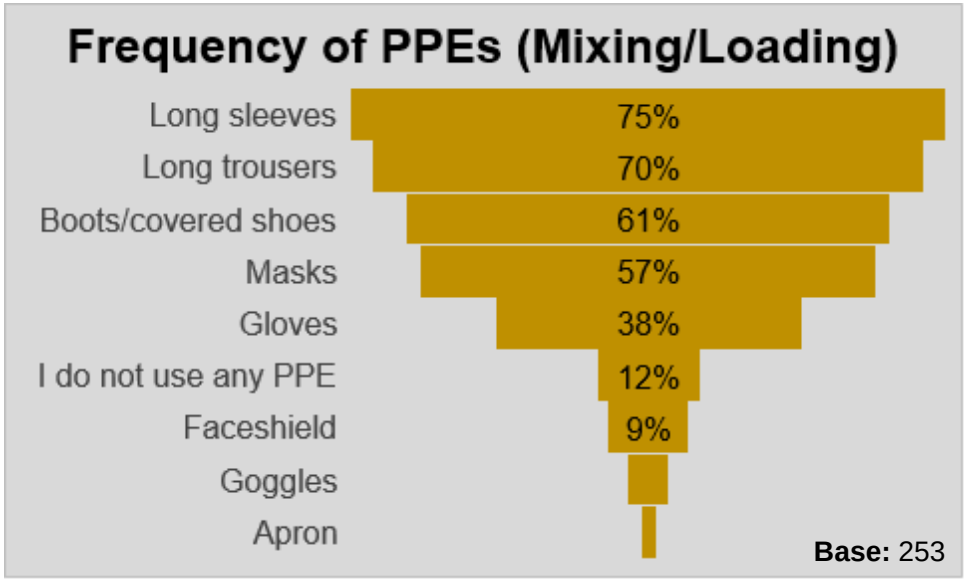
- The majority of the total respondents (87%) transport their CP products by motorcycle and bicycle. This can also be due to the most common means of available transportation .
- About 10% of 2 or more planting cycle farmers transport their CP using a car/truck but not separated from the rest of the load. This is considered a safer method than the motorcycle, however not many farmers have access to cars/trucks.

Safe use training impact

PPE (Mixing/Loading)

This section examines the number and type of PPEs used by farmers during mixing/loading of pesticides





Premise: Farmers who have been in the PISAgro program for more cycles would have been exposed to training by Syngenta or other partners should lead to an appropriate use of Personal Protective Equipment (PPE) during mixing/loading CP products.

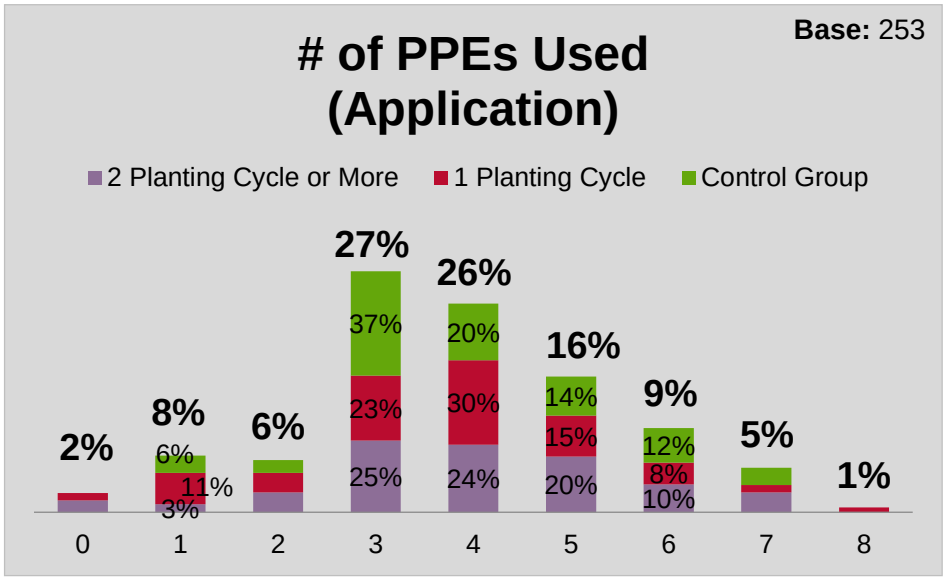
- The majority of the total respondents (29%) use 3 PPEs during Mixing and Loading. 21% of the total respondents use 4 PPEs during mixing and loading.
- There is no significant difference in the number of PPE used during mixing/loading across the 3 different program participations.

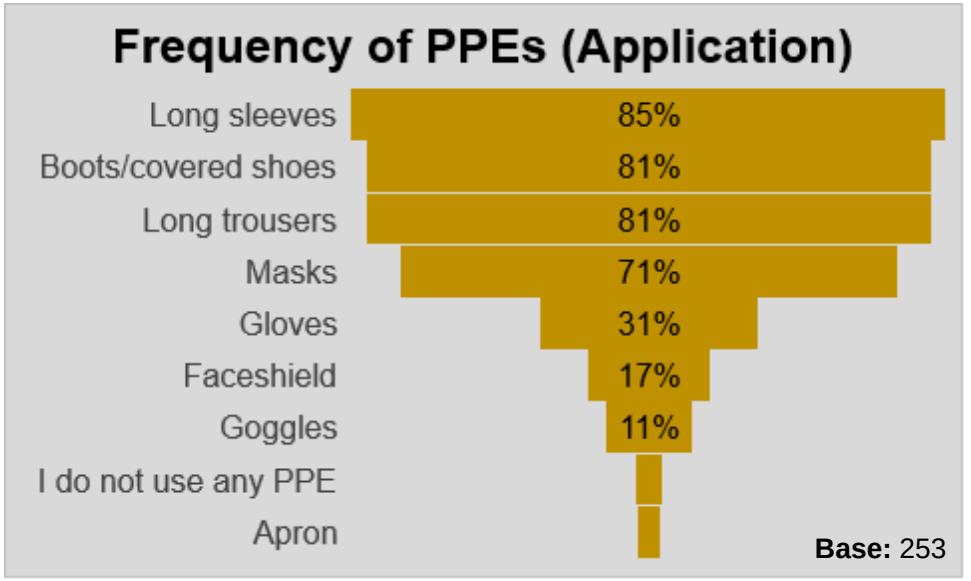
- The top 5 most common PPEs used for mixing and loading are ‘long sleeves’ (75%), ‘long trousers’ (70%), ‘boots/covered shoes’ (61%), ‘masks’ (57%), and ‘gloves’ (38%).
- Only a small number of respondents use ‘face shields’ (9%) and ‘goggles’ (4%).
- Aprons (1%) are very rarely used by farmers during mixing and loading.

Safe use training impact

PPE (Application)

This section examines the number and type of PPEs used by farmers during application of pesticides





Premise: Farmers who have been in the PISAgro program for more cycles would have been exposed to training by Syngenta or other partners should lead to an appropriate use of Personal Protective Equipment (PPE) during CP products application.

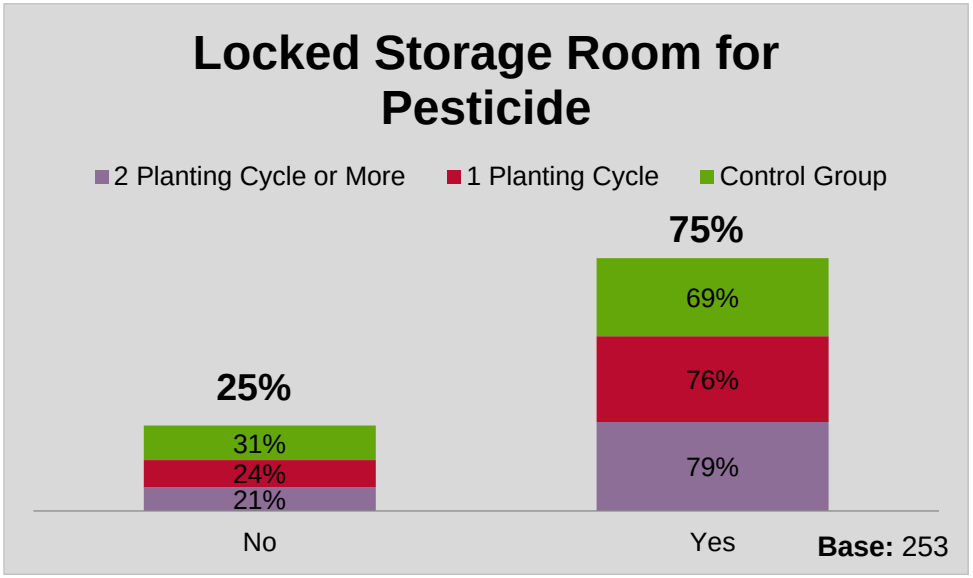
- The majority of the total respondents (27%) use 3 PPEs during application. This number is just slightly ahead of the respondents who use 4 PPEs (26%).
- There is no significant difference in the number of PPE used during application across the 3 different program participations.

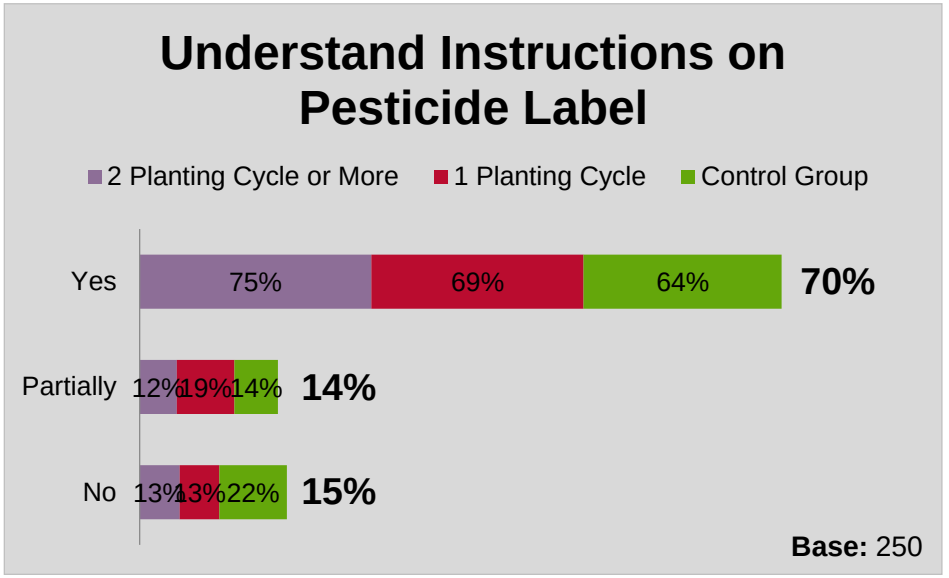
- The top 5 most common PPEs used for application are 'long sleeves' (85%), 'boots/covered shoes' (81%), 'long trousers' (81%), 'masks' (71%), and 'gloves' (31%).
- Only a small number of respondents use 'face shields' (17%) and 'goggles' (11%).
- Aprons (2%) are very rarely used by farmers during application.

Safe use training impact

Pesticide Storage & Understanding Instructions on Labels

This section examines the usage of a locked storage room for pesticides and the understanding of pesticide labels





Premise: Farmers who have been in the PISAgro program for more cycles should have access to training that lead to use of an appropriate CP product storage.

Premise: Farmers who have been in the PISAgro program for more cycles should have access to training that lead to better understanding of instructions in pesticide labels.

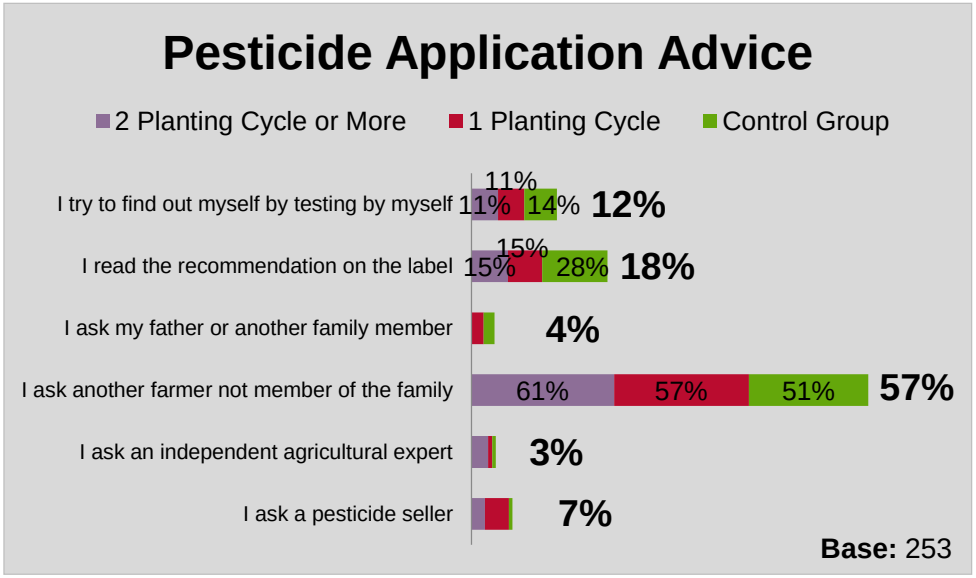
- The majority of the total respondents (75%) have a locked storing room for their pesticide.
- A higher percentage of 2 or more planting cycle farmers (79%) have a locked storage room pesticides compared to 1 planting cycle farmers (76%) and control group (69%).

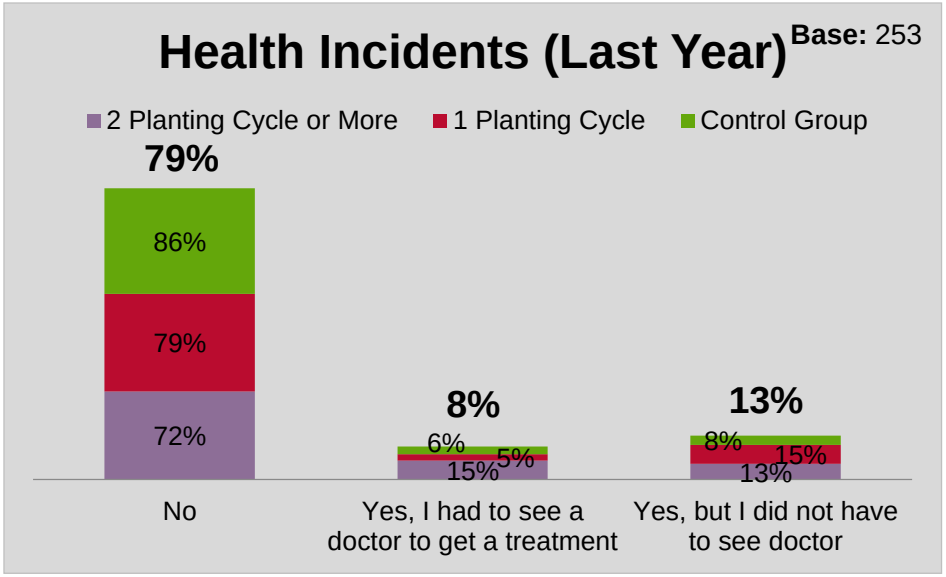
- The majority of the total respondents (70%) understand the instructions on the pesticide label.
- A higher percentage of ≥ 2 planting cycle farmers (75%) understands the instructions on pesticide labels. compared to 1 planting cycle farmers (69%) and control group (64%).

Safe use training impact

Pesticide Advice & Health Incidents

This section examines where farmers seek pesticide application advice and the number of health incidents





Premise: Farmers who have been in the PISAgro program for more cycles should have a better source of pesticide application advice which makes it easier to reach them through technical training

- More than half of the total respondents (57%) say that they seek pesticide application advice from another farmer that is not a member of the family.
- The second most popular practice is reading the recommendation in the pesticide label (18%) which is the recommended action. 28% of the control group conducts this.

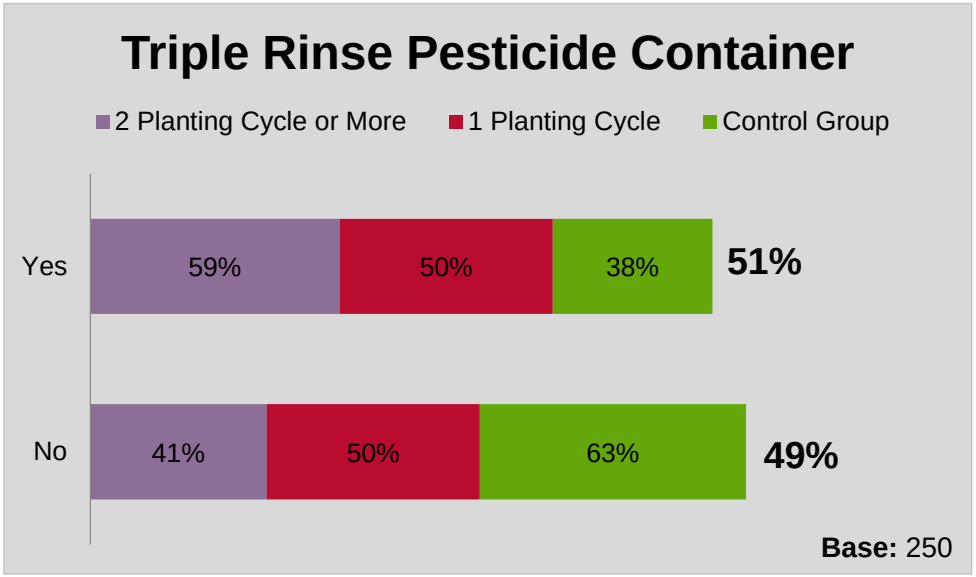
Premise: Farmers who have been in the PISAgro program for more cycles should obtain better access to training/information in handling pesticides to avoid health incidents due to inappropriate use.

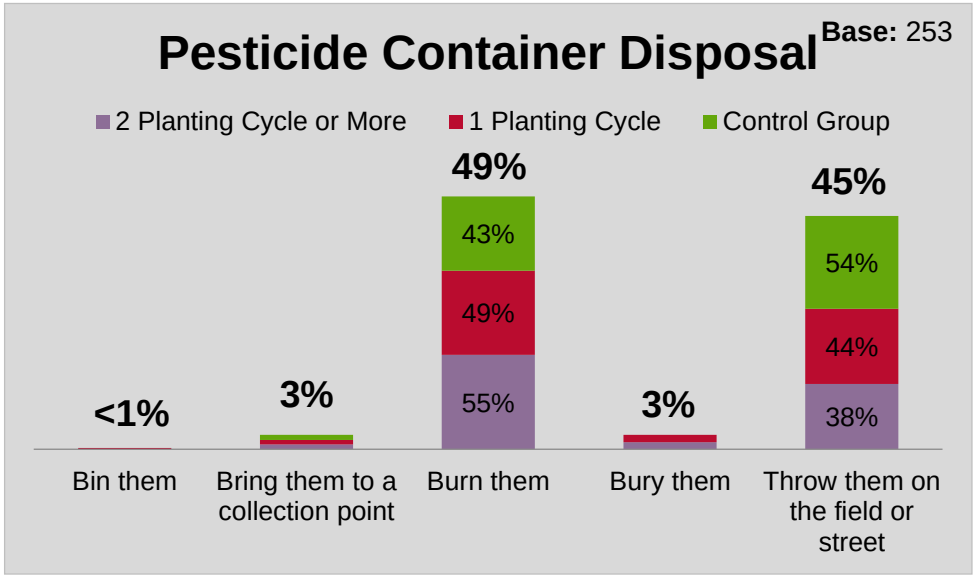
- The majority of the total respondents (79%) do not have any health incidents in the last 12 months. A small percentage of respondents (8%) had health incidents and had to see a doctor to get treatment.
- More control group farmers (86%) didn't encounter any health incidents in the last 12 months compared to the ≥ 2 planting cycle (72%) and 1 planting cycle (79%). This goes against the premise.

Safe use training impact

Triple Rinse Pesticide Container & Disposal

This section examines how farmers deal with their empty pesticide containers





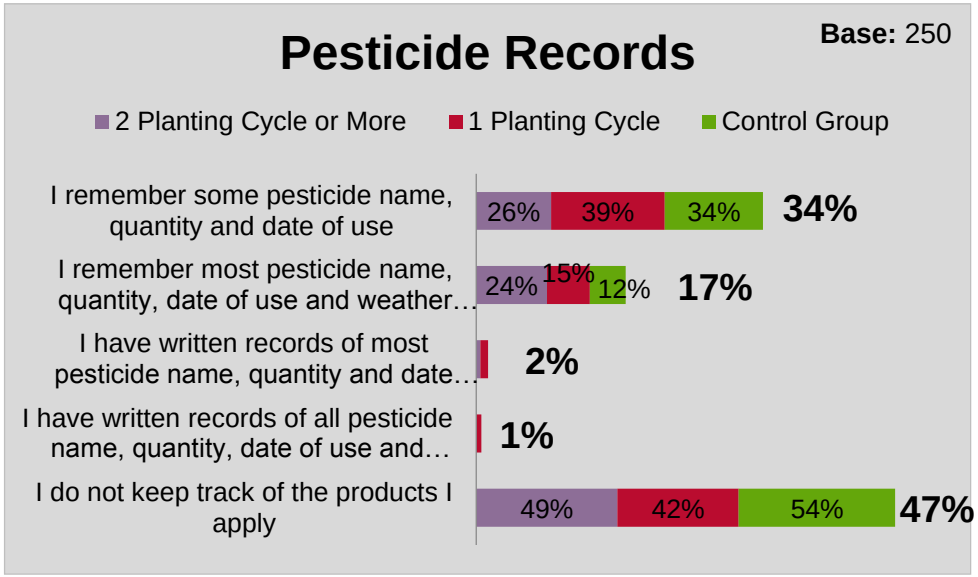
Premise: Farmers who have been in the PISAgro program for more cycles should have a better access to training and should lead to an appropriate pesticide waste management practice.

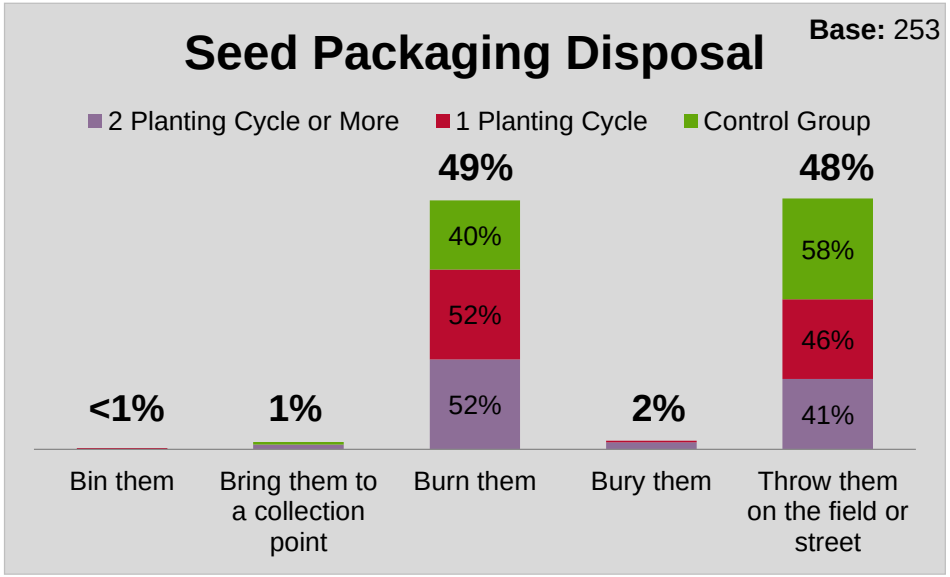
- The total respondents who triple rinse their pesticide container is almost equal, 51% say that they do triple rinse and 49% say that they do not conduct triple rinse.
- The ≥ 2 planting cycle farmers have the highest percentage of farmers who conduct triple rinsing (59%) followed by 1 planting cycle farmers (50%) and control group farmers (38%). This supports the premise.
- The majority of total respondents dispose their pesticide containers through burning them (49%) and throwing them on the field/street (45%). These two disposal options are considered the worst ways to dispose pesticide containers. The majority of control group farmers tend to throw them on the street/field (54%) while most PISAgro farmers tend to burn them (55% and 49%).

Safe use training impact

Pesticide Records & Seed Packaging Disposal

This section examines how farmers keep pesticide records and how they dispose of seed packaging





Premise: Farmers who have been in the PISAgro program for more cycles should have a better knowledge and guidance to keep a more detailed pesticide record.

- The majority of the total respondents (47%) do not keep track of the products they apply while about 34% of the respondents remember some pesticide name, quantity and date of use.
- A slightly higher percentage of control group farmers (54%) do not keep track of the products they apply compared to the PISAgro program farmers.

Premise: Farmers who have been in the PISAgro program for more cycles should have a better access to training and should lead to an appropriate seed packaging waste management.

- Almost all of the total respondents dispose their seed packaging through burning them (49%) and throwing them on the field/street (48%). These two disposal options are considered the worst ways to dispose of seed packaging.
- The majority of control group farmers tend to throw them on the street/field (58%) while most PISAgro farmers tend to burn them (52%).

Main Findings

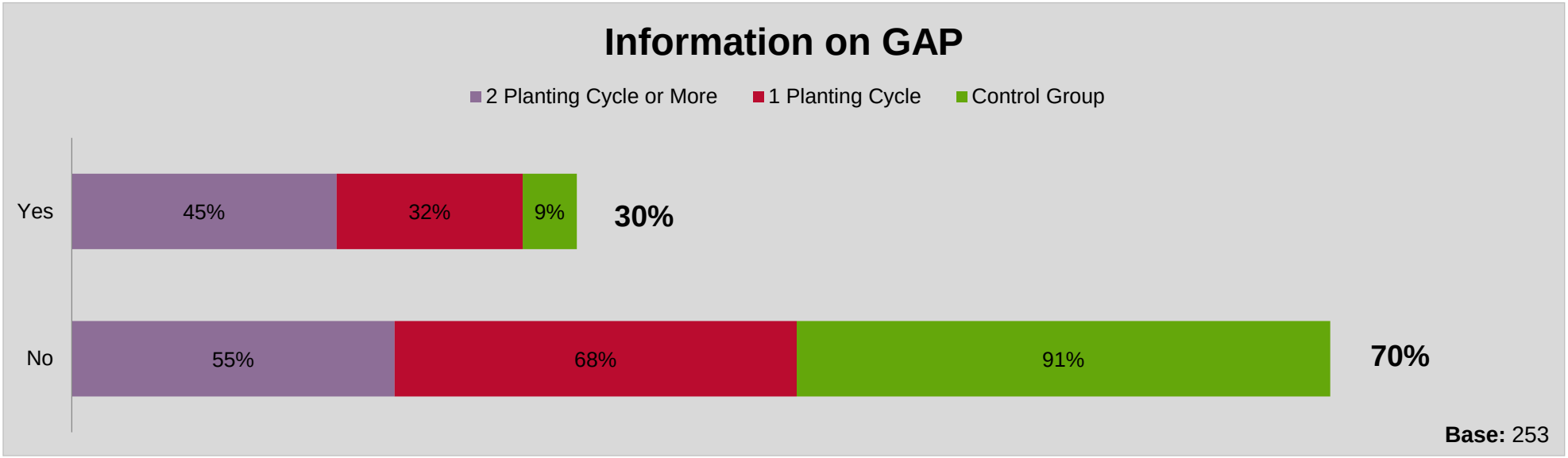
"If you're too lazy to plow, don't expect to harvest."

Proverbs 20:4

Environmental

Information on Good Agriculture Practices (GAP)

This section examines if farmers received information on Good Agriculture Practices (GAP)



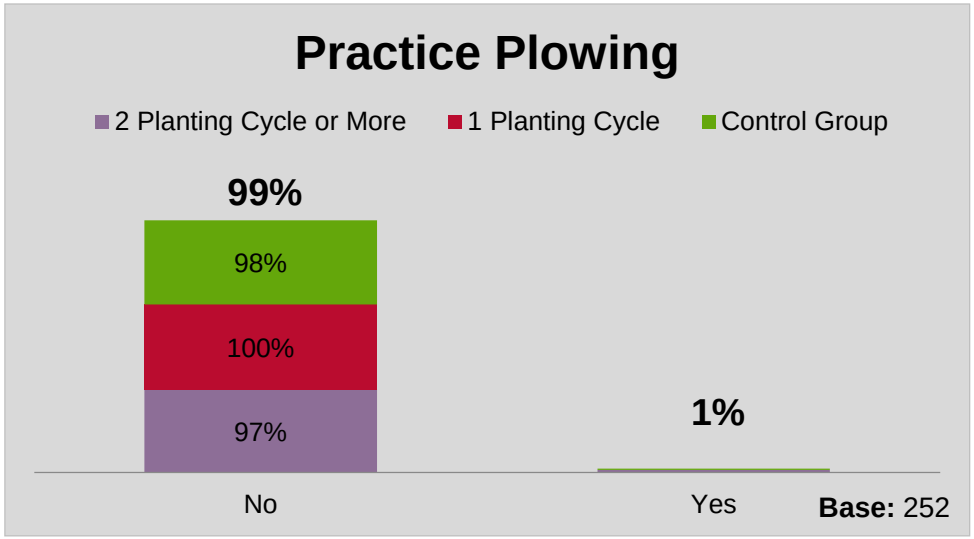
Premise: Farmers who have been in the PISAgro program for more cycles would have a higher chance of obtaining information on GAP. The training provided by Syngenta or other partners in GAP and Environmental protection should lead to farmers adopting soil conservation and biodiversity practices.

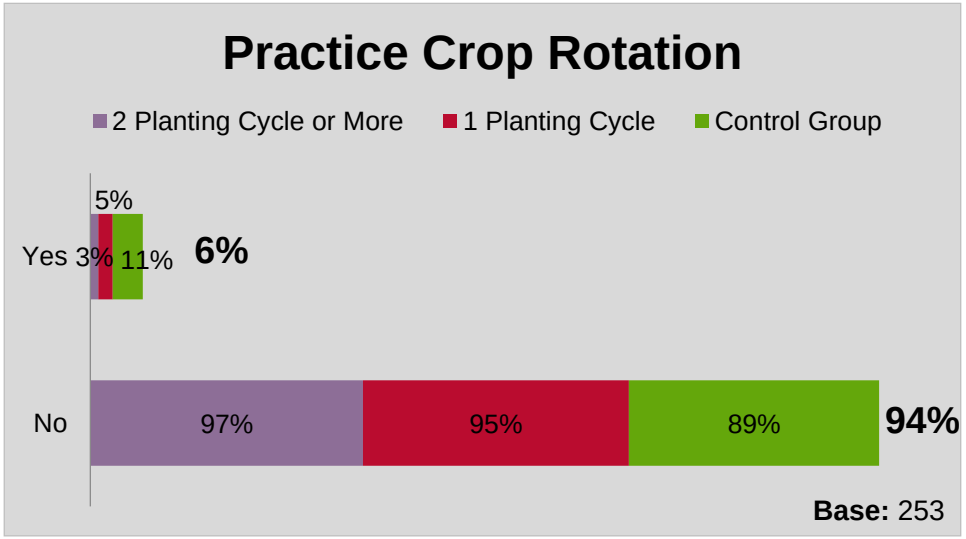
- Only 30% of the total analyzed respondents said that they received information on GAP.
- 45% of ≥ 2 planting cycle or more farmers received information on GAP followed by 32% of the 1 planting cycle farmers. Only 9% of the control group received information on GAP.
- This confirms that farmers that has been involved in the PISAgro program for more cycles would have a higher chance of obtaining information on GAP.

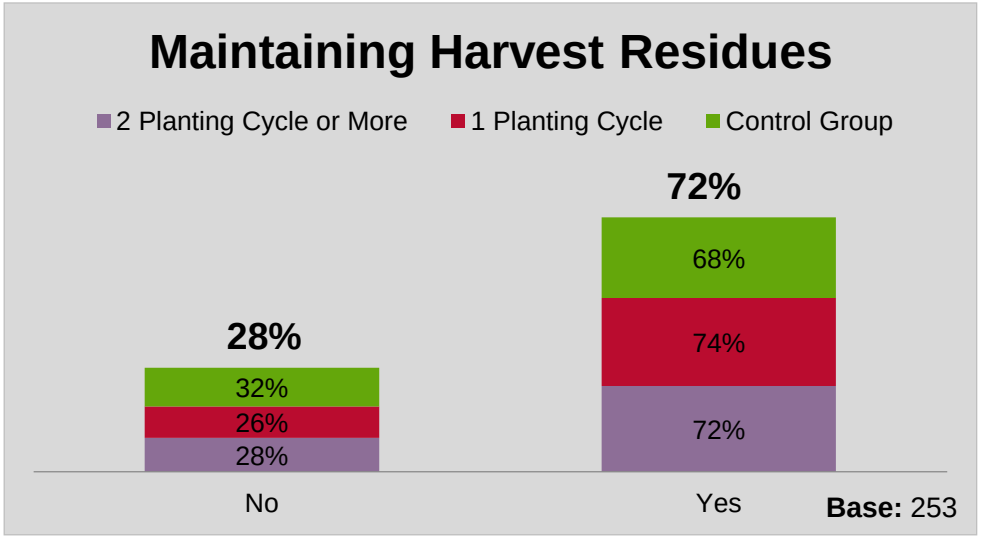
Environmental

Soil Conservation

This section examines if farmers conduct individual soil conservation practices







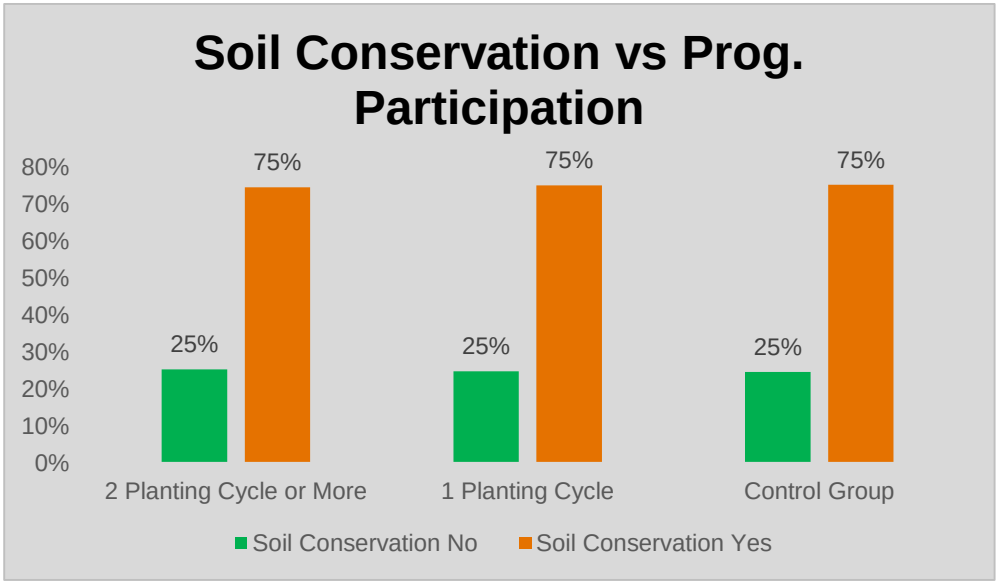
Premise: Farmers who have been in the PISAgro program for more cycles would have a higher chance of receiving information on GAP and adopting soil conservation.

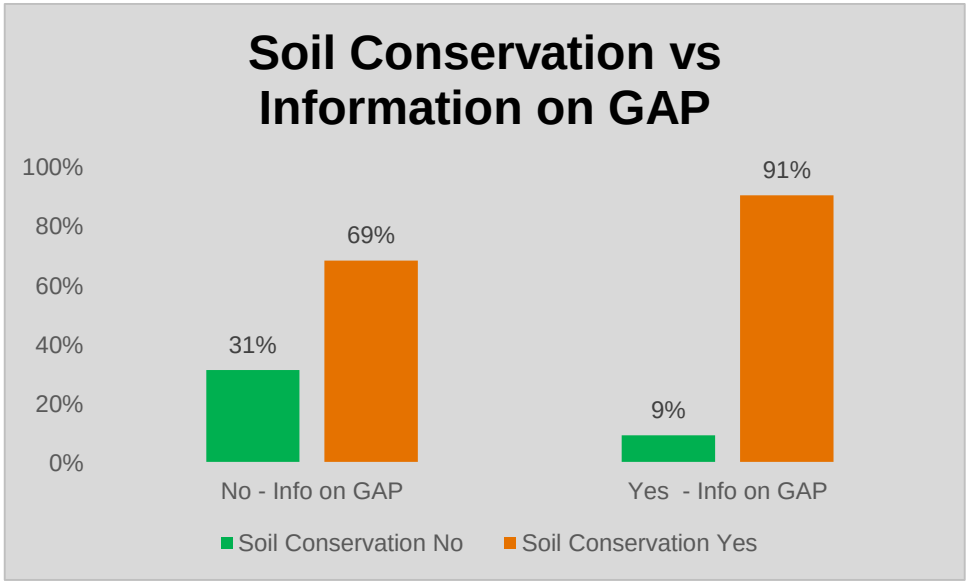
- Almost all respondents (99%) do not practice plowing.
- Almost all of the respondents (94%) say that they do not practice crop rotation. Bigger percentage of control group farmers (11%) adopt crop rotation compared to the ≥ 2 planting cycle farmers (3%) and 1 planting cycle (5%). This contradicts the premise.
- The majority of respondents (72%) maintain their harvest residues on the field. The percentage of farmers in each of their program participation that do leave harvest residues in the field are around the same range 28-32%.

Environmental

Soil Conservation

This section examines if farmers conduct soil conservation relative to their program participation & receiving GAP training





Premise: Farmers who have been in the PISAgro program for more cycles would have a higher chance of receiving GAP information and adopt soil conservation practices. Farmers that conduct one of plowing, crop rotation and keeping harvest residues on the field are considered adopting soil conservation.

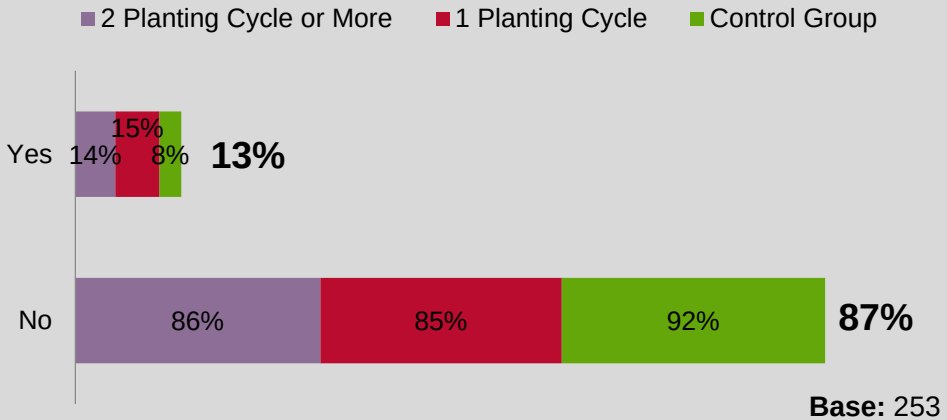
- Farmers are considered conducting soil conservation if they practice one of plowing, crop rotation or keeping harvest residues on the field.
- All three program participation group have the same percentage of farmers who conduct soil conservation. 75% of farmers in all three program participation groups do not conduct soil conservation while 25% of farmers from all three program participation groups do.
- For the farmers who have received information on GAP through various means, the percentage of farmers who practice soil conservation is 91%. This is significantly higher than the percentage of farmers who do not receive information about GAP (69%).

Environmental

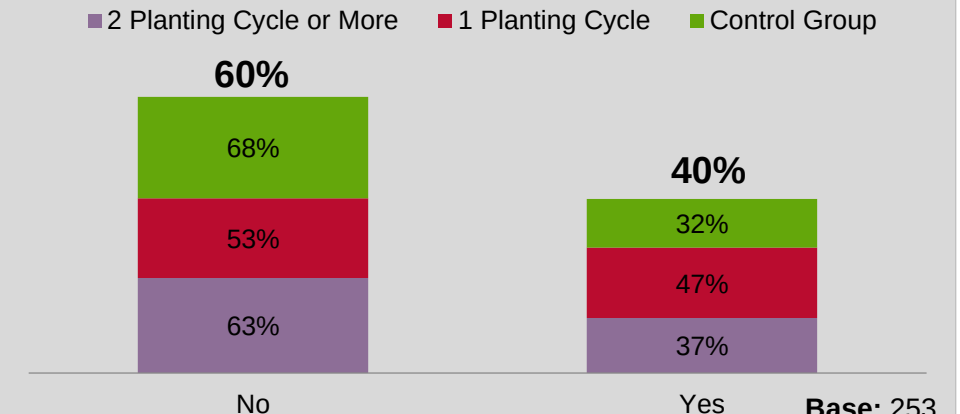
Biodiversity

This section examines if farmers conduct individual biodiversity practices

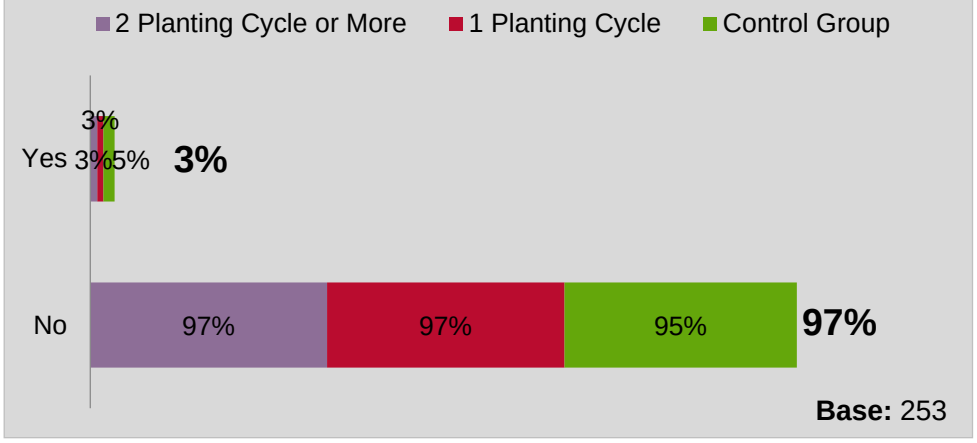
Plant Trees Near Water



Practice Agroforestry



Practice Intercropping



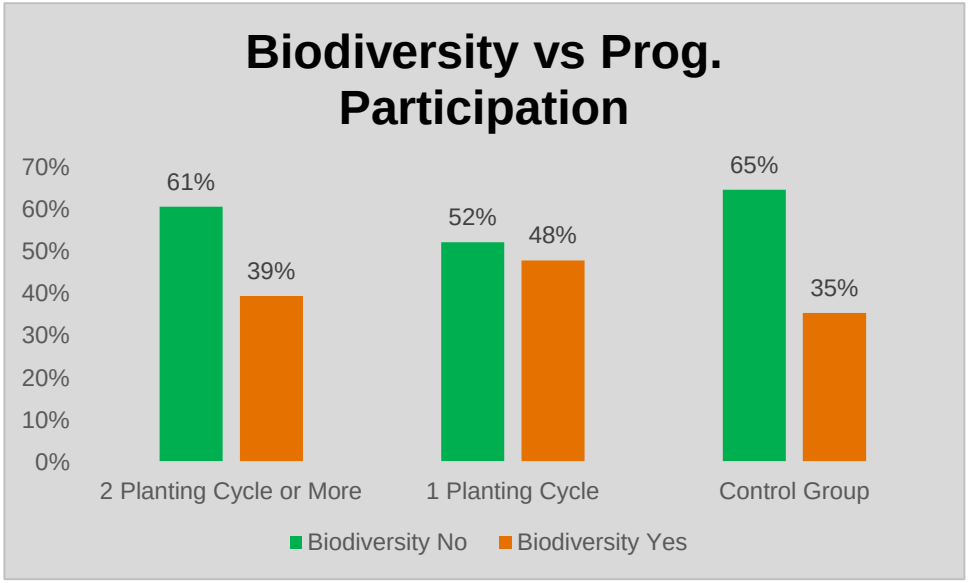
Premise: Farmers who have been in the PISAgro program for more cycles would have a higher chance of receiving information on GAP and adopting biodiversity practices.

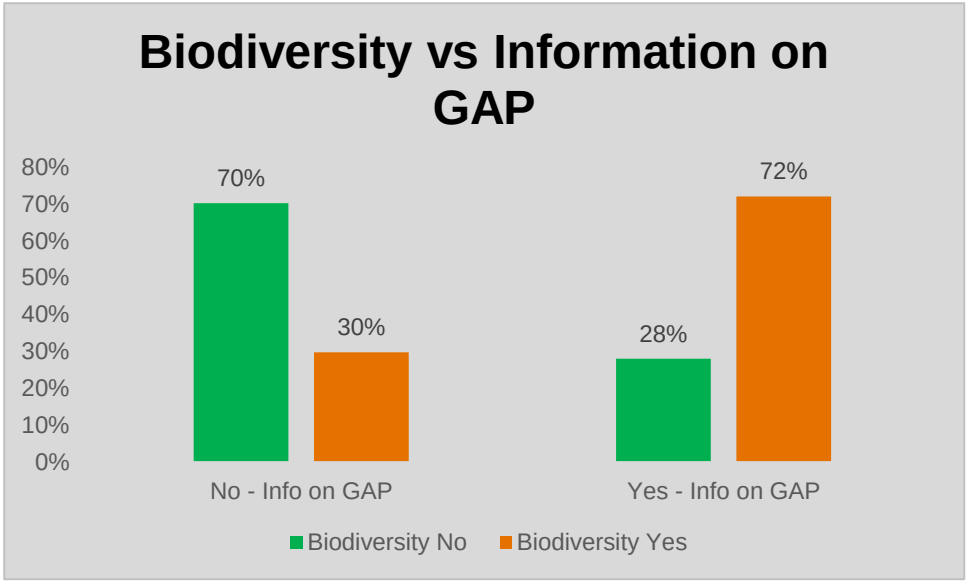
- The majority of respondents (87%) say that they do not plant trees near the water. Around 14-15% of the PISAgro Farmers (≥ 2 and 1 planting cycle) answered 'Yes' to planting trees near the water compared to only 8% of the control group farmers.
- The majority of respondents (60%) do not practice agroforestry. However, a good number of them do (40%) compared to the other biodiversity practices. Close to half (47%) of the 1 planting cycle farmers practice agroforestry.
- Almost all of the respondents (97%) say that they do not practice intercropping.

Environmental

Biodiversity

This section examines if farmers conduct biodiversity relative to their program participation & receiving GAP training





Premise: Farmers who have been in the PISAgro program for more cycles would have a higher percentage of farmers adopting biodiversity practices. Farmers that conduct one of planting trees near to water bodies, agroforestry and intercropping are considered adopting biodiversity.

- Farmers are considered conducting biodiversity practices if they practice one of planting trees near to water bodies, agroforestry or intercropping.
- 39% farmers in the 2-planting cycle or more group practice biodiversity. 49% farmers in the 1 planting cycle group practice biodiversity. These two figures are slightly higher than the percentage of farmers in the control group who practices biodiversity (35%).
- For the farmers that have not received information about GAP, only 30 % of them practice diversity. On the other hand, 72% of farmers who receive info on GAP practice biodiversity.

Main Findings

4.1 Farmer Profile

4.2 Contextual Information

4.3 Business Model

4.4 Social

4.5 Safe Use Training Impact

4.6 Environmental

4.7 Economic

4.8 Progress Out Of Poverty (PPI)

4.9 Gender Equality

4.10 Systemic Value Creation

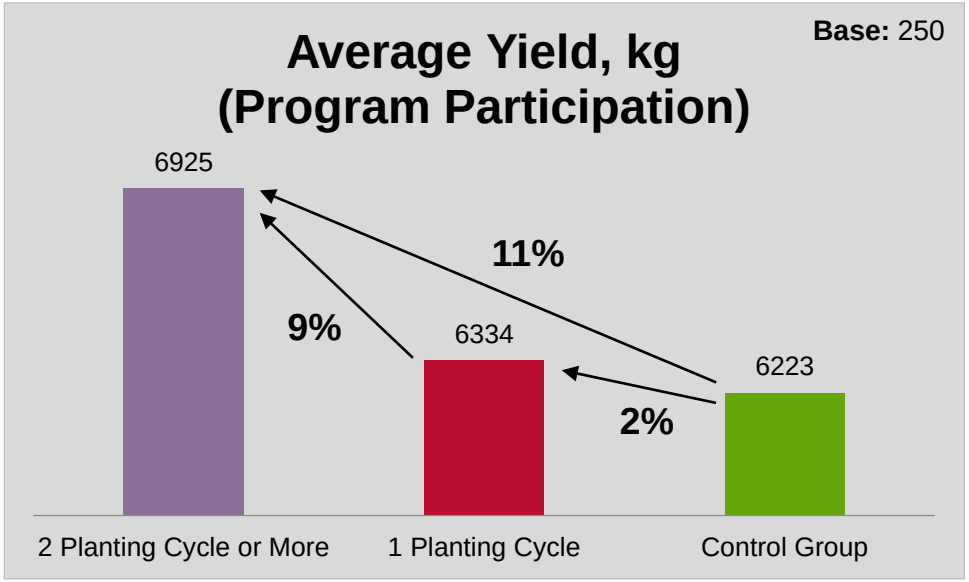
"Farmers facing lower prices have only one option if they want to be able to maintain their standard of living, pay their bills, and service their debt, and that is to produce more [corn]"

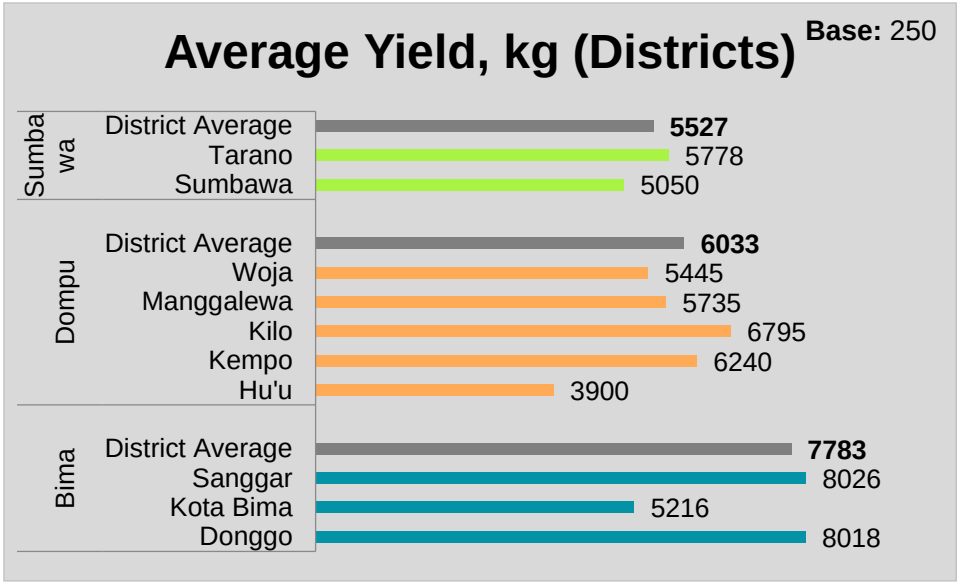
Michael Pollan

Economic

Yield

This section examines the average yield segmented by program participation and districts





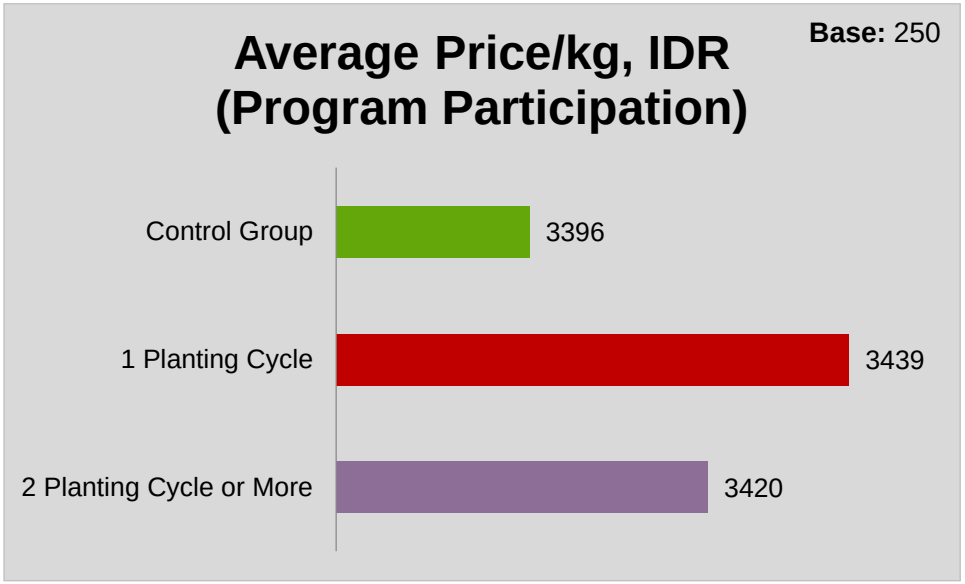
Premise: Farmers who have been in the PISAgro program for more cycles would have access to good crop protection products and the services (access to finance, insurance, training, growing protocol, farmer groups, etc.) Syngenta and the partners provide to lead to an improvement in crop productivity.

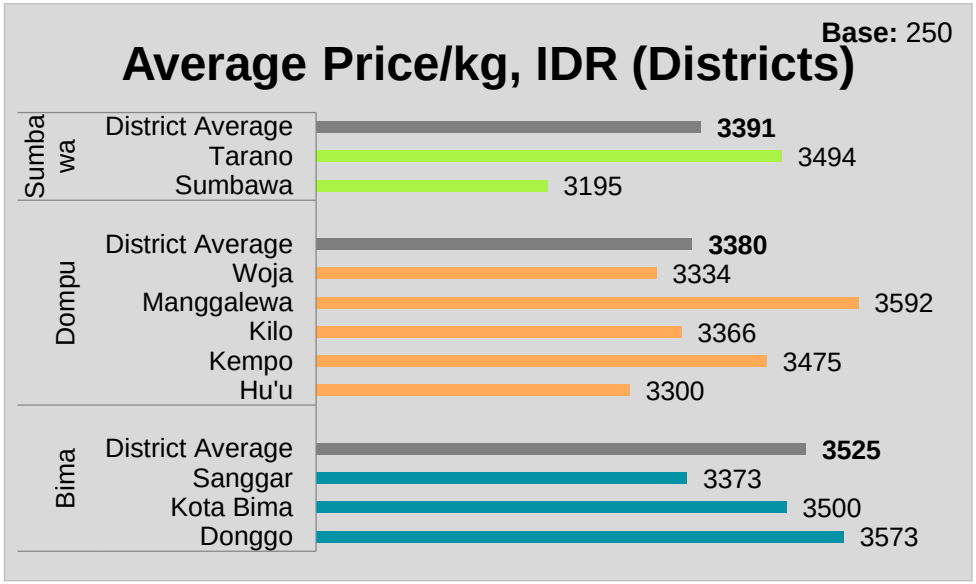
- The ≥ 2 planting cycle farmers have the highest average yield (6,925 kg) followed by the 1 planting cycle farmers (6,334 kg). The control group farmers has a slightly lower yield per hectare (6,223 kg).
- Overall, the district that has the highest average yield is Bima (7,783 kg) mainly because two of their sub-districts, Sanggar and Donggo, have the highest average yield with 8,026 kg and 8,018 kg respectively.
- The District Sumbawa have the lowest average yield (5,527 kg) among the districts and the sub-district Sumbawa have the lowest average yield (5,050 kg) among the other sub-districts.

Economic

Price of Crops

This section examines the average price of crops segmented by program participation and district





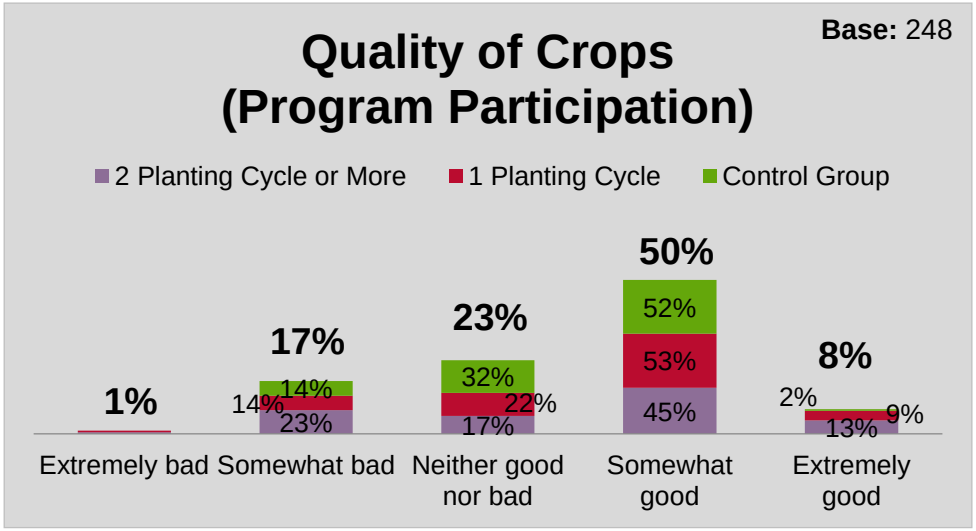
Premise: Farmers who have been in the PISAgro program for more cycles would have access to good crop protection products and the services (access to finance, insurance, training, growing protocol, farmer groups, etc.) Syngenta and the partners provide to lead to an improvement in crop quality and price.

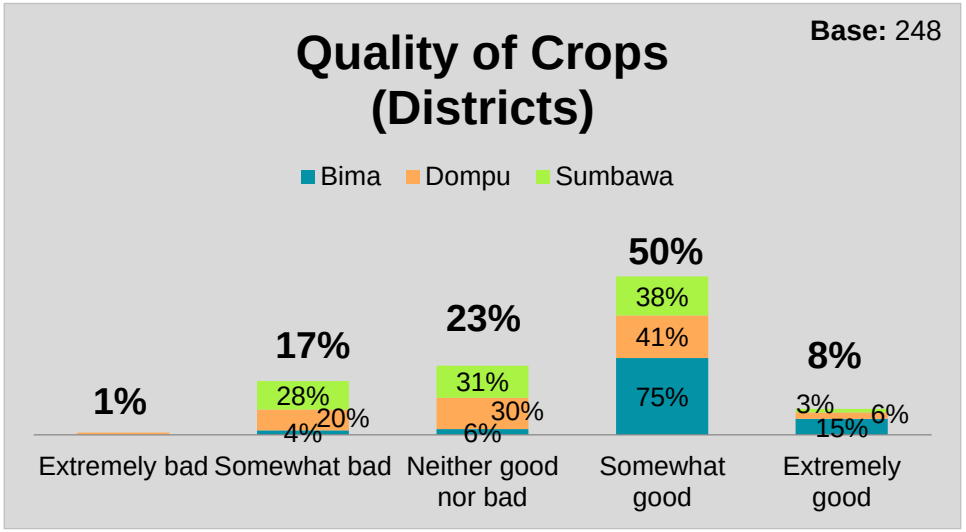
- The 1 planting cycle farmers have the highest average price of crops with IDR 3,439/kg followed by the ≥ 2 planting cycle farmers with IDR 3,420/kg. Control group farmers have an average price of IDR 3,396/kg.
- Bima have the highest district average price (IDR 3,525) compared to Sumbawa (IDR 3,391) and Dompu (IDR 3,380).
- Manggalewa (Dompu) has the highest average price of crop (IDR 3,592) closely followed by Donggo (Bima) with IDR 3,573.
- Sub-district Sumbawa (Sumbawa) has the lowest average price (IDR 3,195) among all the sub-districts.

Economic

Quality of Crops

This section examines quality of the crops produced segmented by the program participation and districts





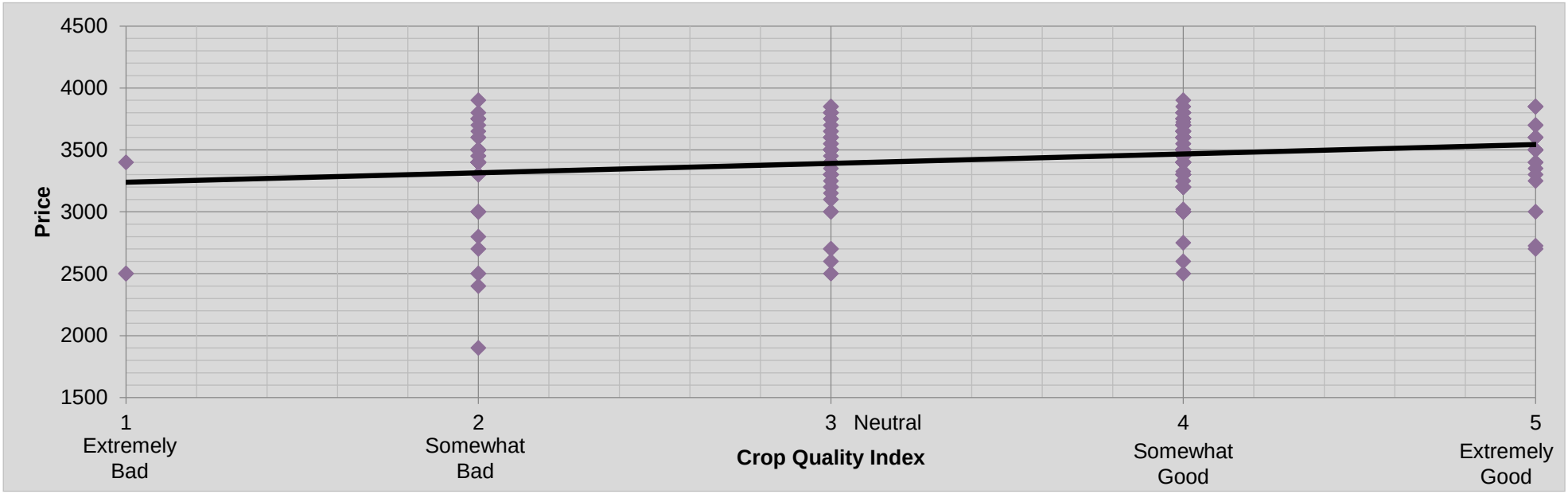
Premise: Farmers who have been in the PISAgro program for more cycles would have access to good crop protection products and the services (access to finance, insurance, training, growing protocol, farmer groups, etc.) Syngenta and the partners provide lead to an improvement in crop quality.

- The quality of the crops was based on individual farmer judgement in a scale of 1 to 5, 1 being extremely bad and 5 being extremely good. Therefore, the response might not be precise with their actual quality of the crops.
- 50% of the total respondents say that they are somewhat satisfied (‘somewhat good’) with their quality of the crops while 23% of the respondents are neutral (‘neither good nor bad’).
- The spread of responses when comparing the quality of the crops across the program participations are relatively similar while the spread across the different districts clearly shows that Bima farmers rate their crops higher with 75% saying ‘somewhat good’ and 15% saying ‘Extremely Good’.

Economic

Quality of Crops vs Price

This section plots the crop quality index with the price



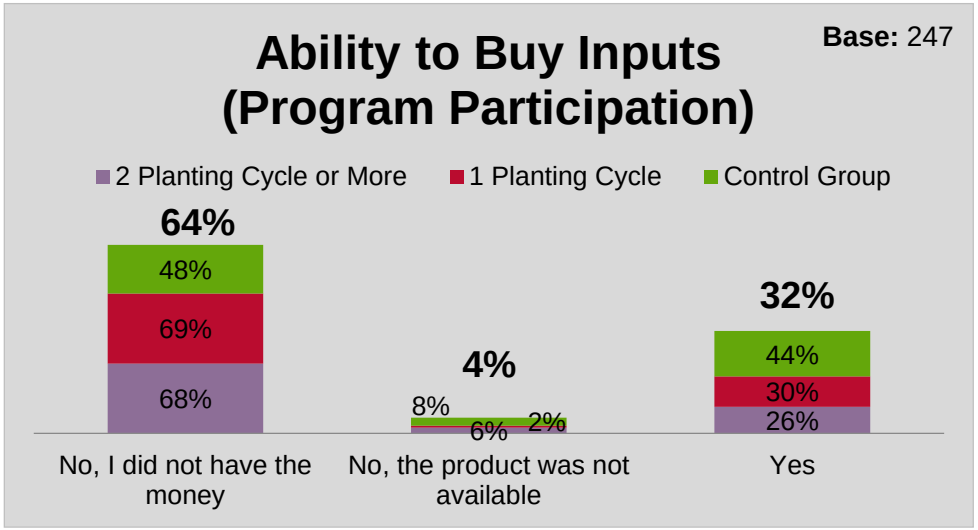
Goal: Examine the correlation between the crop quality index and the price of crops

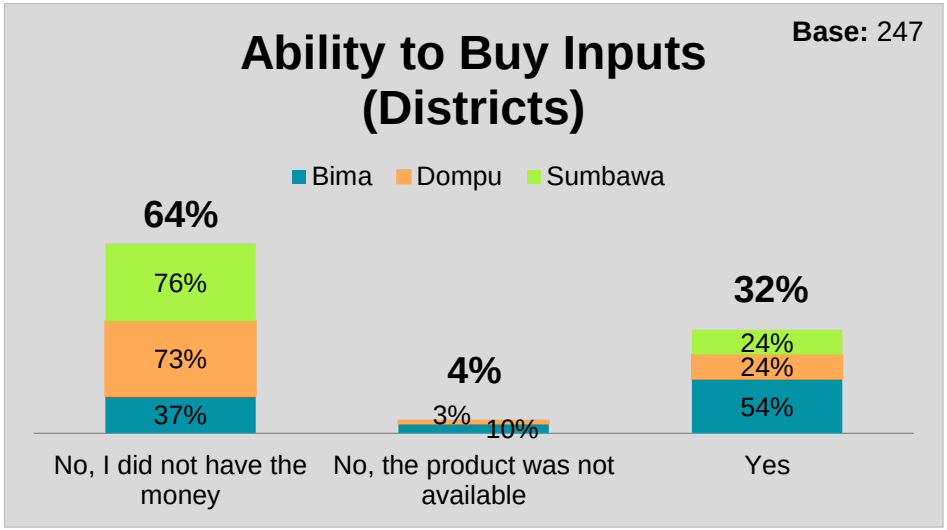
- The graph plots the crop quality index with the price of crops of all of the respondents.
- We can see the correlation as the higher the crop quality index the higher the price of crop as seen on the trend line going through the plot.
- However, the price difference between the ‘bad’ and ‘good’ quality of corn is very small. This shows that farmers are getting only a slight for ‘extremely good’ quality corn, compared to ‘extremely bad’.

Economic

Ability to Buy Inputs

This section examines the farmer's availability to buy inputs segmented by program participation and district





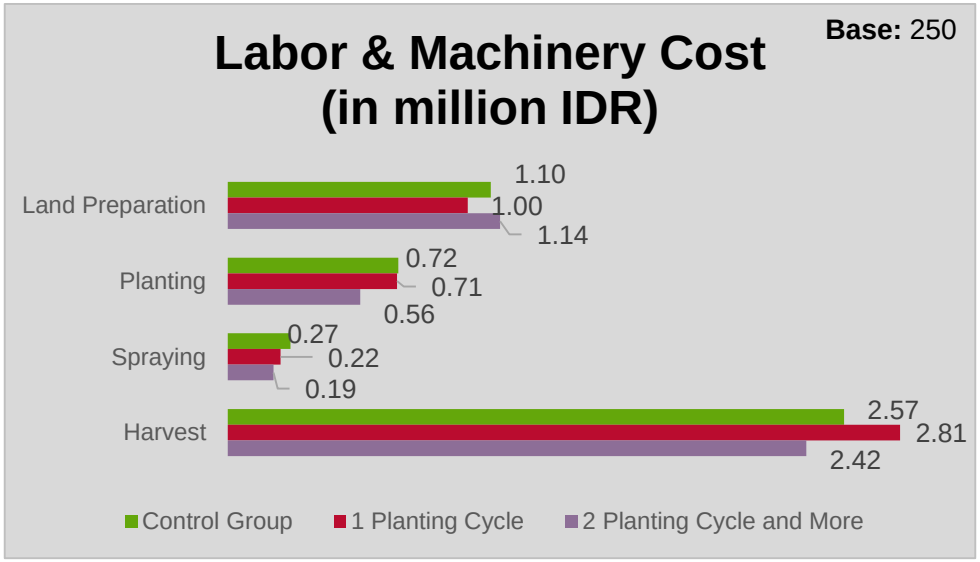
Premise: Farmers who have been in the PISAgro program for more cycles would have access to good crop protection products and the services (access to finance, insurance, training, growing protocol, farmer groups, etc.) Syngenta and the partners provide lead to an improvement in crop productivity and quality giving more ability to buy inputs.

- 64% of the total respondents said that they do not have the money to buy inputs while 32% of the respondents said that they are able to buy inputs. Only 4% of the respondents said that the products are not available. This may refer greatly to the availability of fertilizers in the area.
- PISAgro Farmers (≥ 2 planting cycle and 1 planting cycle) has a higher percentage of farmers (68-69%) that were not able to buy inputs because the money is not available while only 48% of the control group said so. This fact goes against our premise but there is a chance that it might be misinterpreted by the PISAgro farmers as the reason to join the program in the first place.
- More than half of farmers in Bima (54%) were able to buy inputs compared Dompu (24%) and Sumbawa (24%).

Economic

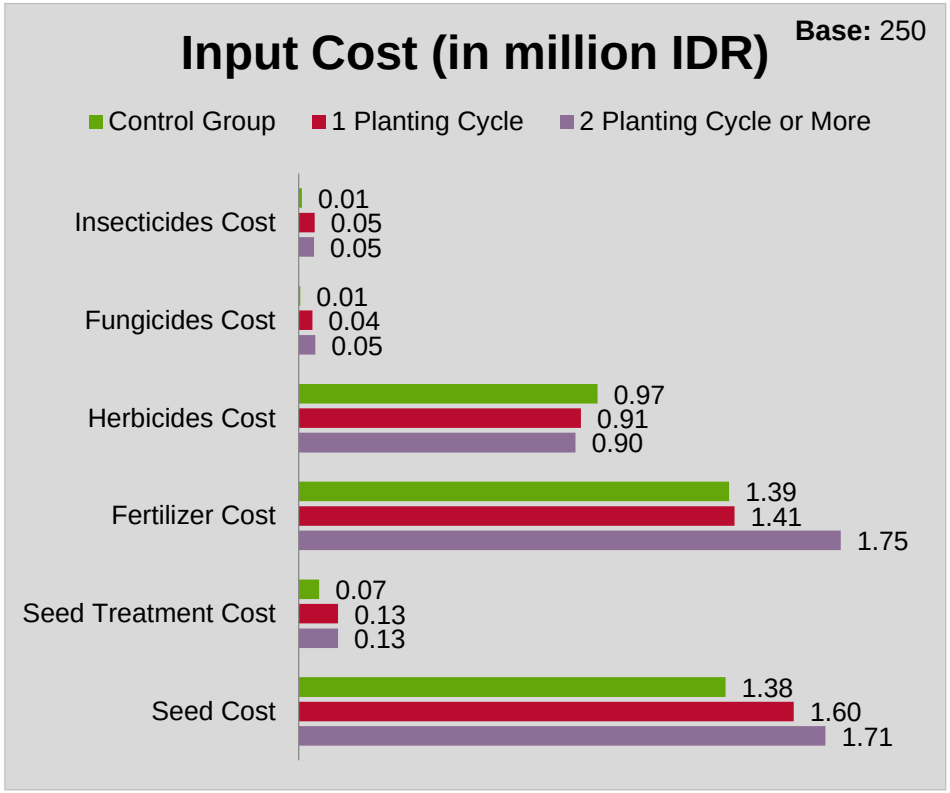
Production Cost

This section examines the average labor & input cost segmented by program participation



Goal: Examine the average labor cost across the program participations and segmenting it by the 4 phases of planting.

- PISAgro Farmers (≥ 2 planting cycle and 1 planting cycle) have similar labor and machinery costs across the 4 planting phases.
- The labor & machinery cost to harvest is the highest followed by the cost of land preparation. The harvest cost is high partly because of the number of manpower and the cost of the shelling machines.



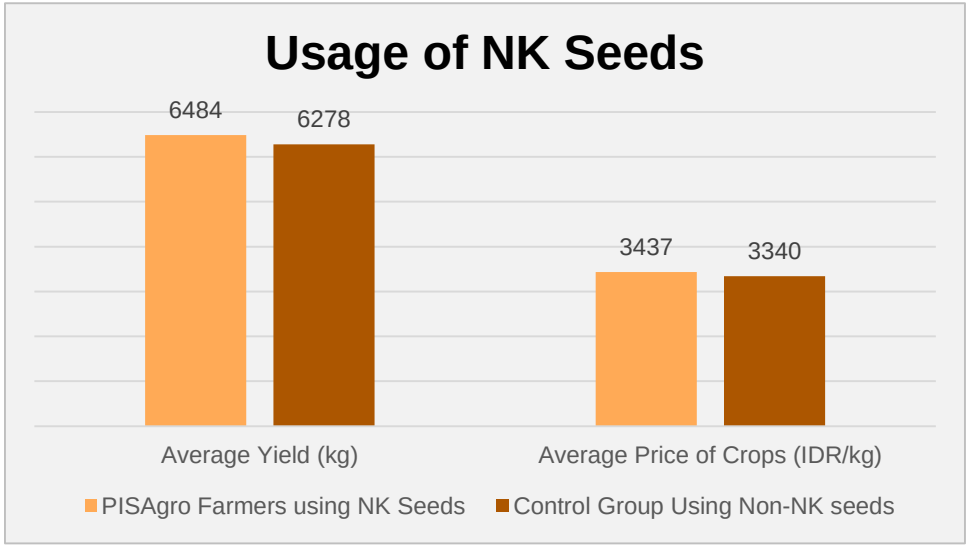
Goal: Examine the average input cost across the program participations and segmenting it by the different type of inputs.

- PISAgro Farmers (≥ 2 planting cycle and 1 planting cycle) generally have a higher input cost across all the types of inputs. Fertilizer and Seed cost is among the highest cost compared to other inputs.

Economic

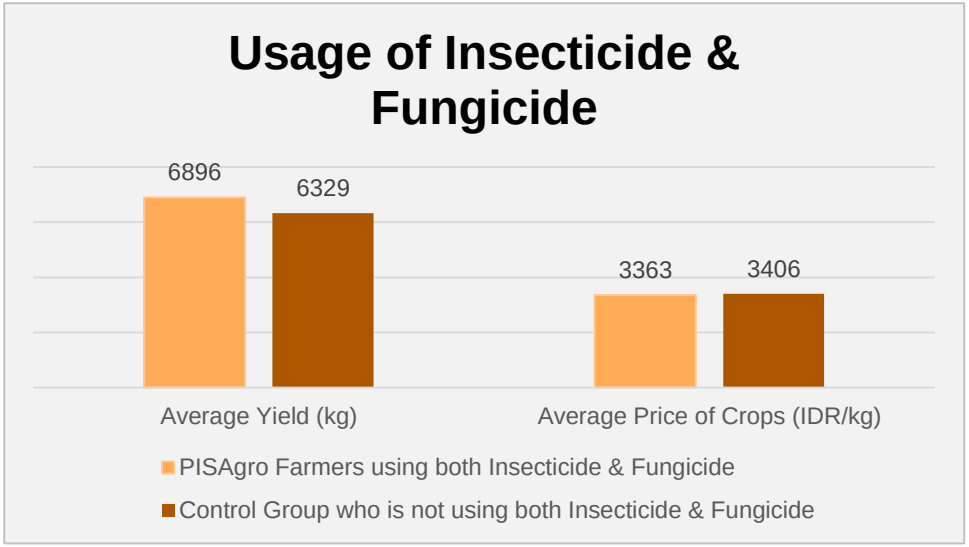
Usage of NK Seeds and Crop Protection Products (Insecticide & Fungicide)

This section shows economic indicator comparisons between PISAgro farmers using Syngenta's NK seeds and CPPs (Insecticides & Fungicides) with Control Group farmers who do not use NK seeds and do not use CPPs



Goal: Examine the impact of the usage of NK seeds on the key economic indicators

- There are 176 PISAgro Farmers from the total respondents that are using NK seeds and 45 control group famers who are using non-NK seeds.
- PISAgro Farmers using NK seeds have a slightly higher average yield per ha (6484 kg/ha) compared to control group farmers using non-NK seeds (6278 kg/ha).
- PISAgro Farmers using NK seeds also have a slightly higher average price of crops (IDR 3,437/kg) compared to control group farmers using non-NK seeds (IDR 3,340/kg).



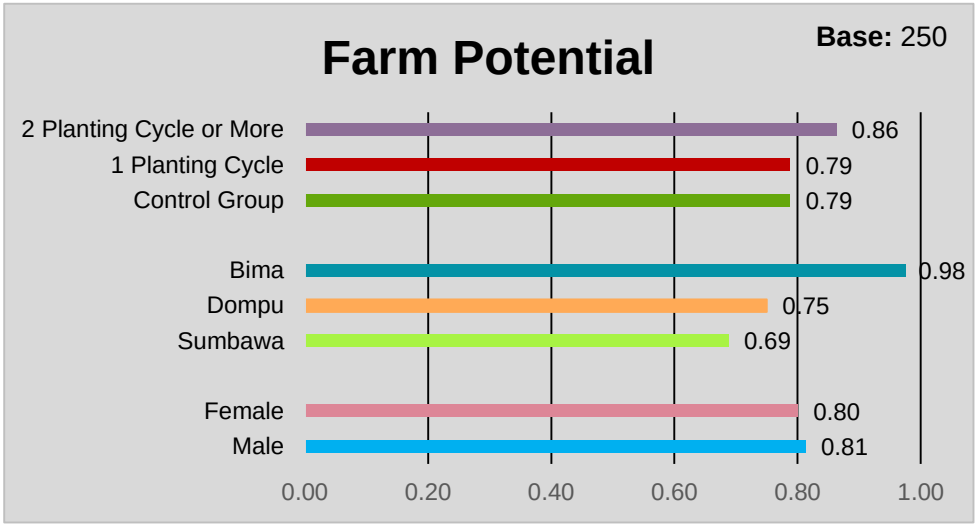
Goal: Examine the impact of the usage of insecticide & fungicide on the key economic indicators

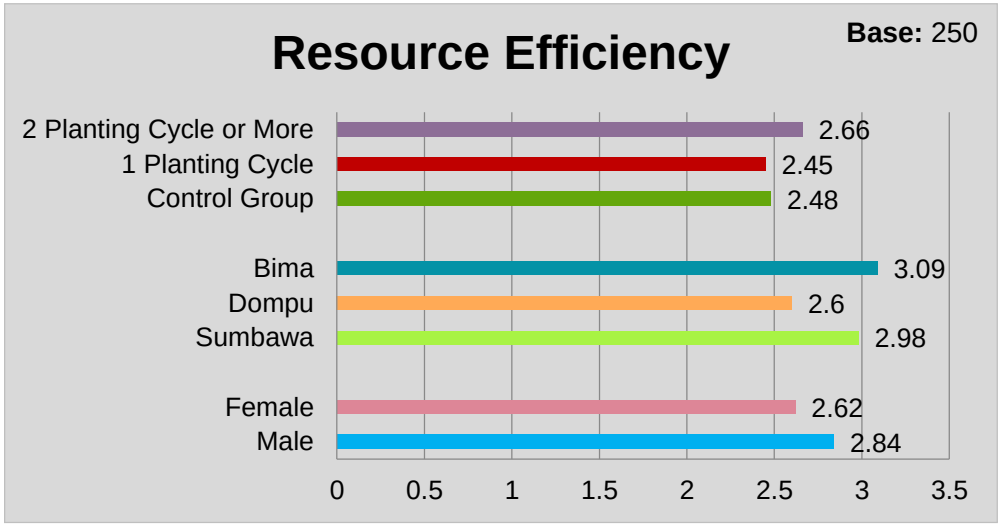
- There are 28 PISAgro Farmers who are using both Insecticide and Fungicide from the total respondents and 55 control group who are not using Insecticide and Fungicide.
- For the PISAgro farmers who use Insecticide and Fungicide, all of them used Alika and Amistar Top as provided in the program.
- PISAgro farmers who use Alika and Amistar Top have a significantly higher average yield per ha. However, they have a slightly lower average price of crops compared to control group who are not using Insecticide and Fungicide.

Economic

Farm Potential & Resource Efficiency

This section examines the farm potential and resource efficiency segmented by program participation, district and gender





Premise: Farmers who have been in the PISAgro program for more cycles would have a higher farming potential ratio.

- Farm potential achievement is the level of productivity (yield) of the farmer divided by the maximum yield per hectare.
- In this case, the maximum yield per hectare for last planting cycle was set at 8 tons/ha.
- The ≥ 2 planting cycle farmers have the highest farming potential (0.86).
- Bima have the highest farming potential (0.98) followed by Dompu (0.75) and Sumbawa (0.69).
- Male have a slightly higher farming potential (0.81) than Women (0.80).

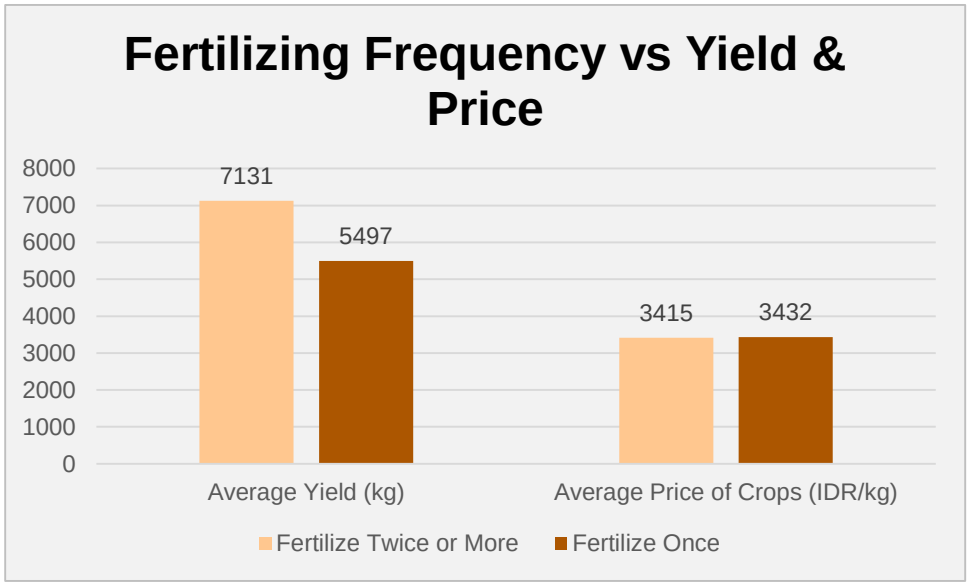
Premise: Farmers who have been in the PISAgro program for more cycles would have a higher resource efficiency ratio.

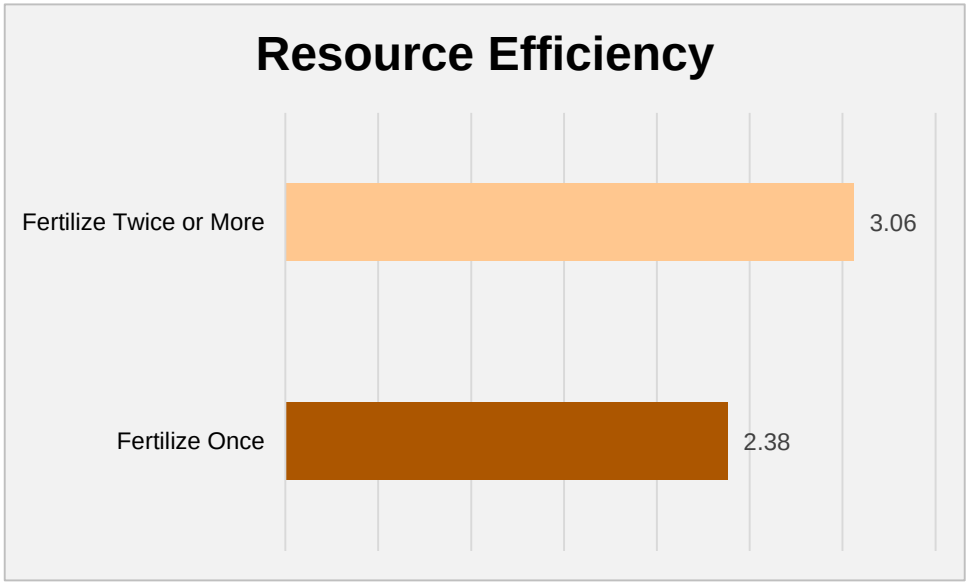
- Farm resource efficiency is the ratio of income earned (revenue) divided by the investment costs on the farm.
- The higher the resource efficiency ratio, the more efficient the farmers.
- ≥ 2 planting cycle farmers have the highest efficiency ratio (2.66) The 1 planting cycle farmers (2.45) and control group farmers (2.48) have very similar values.
- Bima have the highest resource efficiency ratio with (3.09) followed by Sumbawa (2.98) and Dompu (2.6).
- Males have a higher resource efficiency ratio (2.84) compared to Women (2.62).

Economic

Fertilizer Application Frequency Impact

This section shows the impact of frequency of fertilizer application on the key economic Indicators





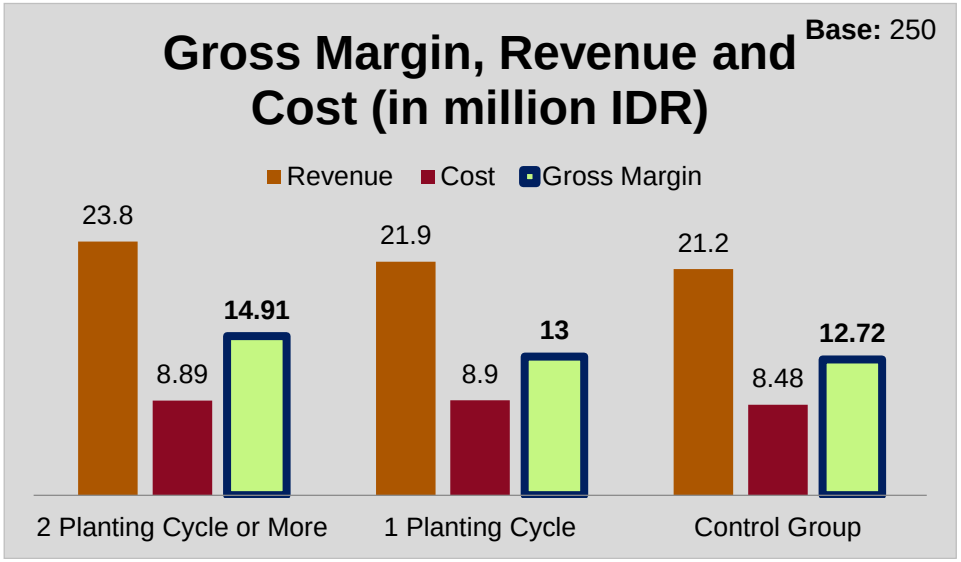
Goal: Examine the impact of fertilizing frequency to the yield, price and resource efficiency

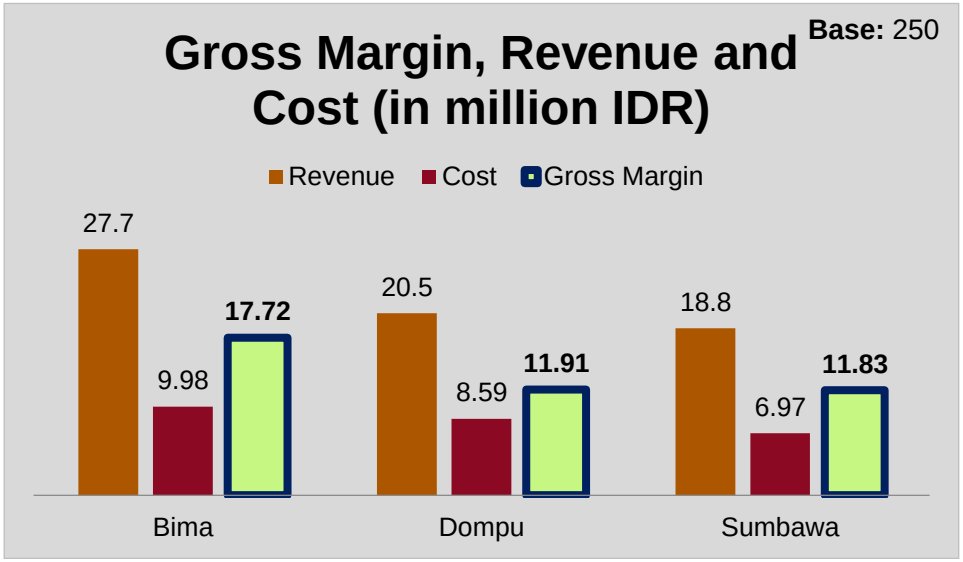
- Out of the 253 respondents, 142 respondents fertilize 2 or more times while 107 respondents fertilize once. 1 respondent did not specify his fertilizing frequency while 3 respondents were discarded (outliers) to maintain consistency on all the economic analysis.
- The average yield of farmers who fertilize twice or more (7,131 kg) is significantly higher than the ones who only fertilize once (5,497 kg).
- However, the price of crops between the two groups are very similar. The farmers who fertilized twice or more have an average price of crops of IDR 3,415/kg while the ones who fertilize once have an average price of crops of IDR 3,432/kg.
- In terms of resource efficiency, the farmers who fertilize twice or more have a significantly higher resource efficiency compared to farmers who only fertilize once. The contributing factor is the significantly higher average yield figure as the average price of crops are similar between the two groups.

Economic

Gross Margin

This section examines the gross margin, revenue and total cost segmented by program participation and district





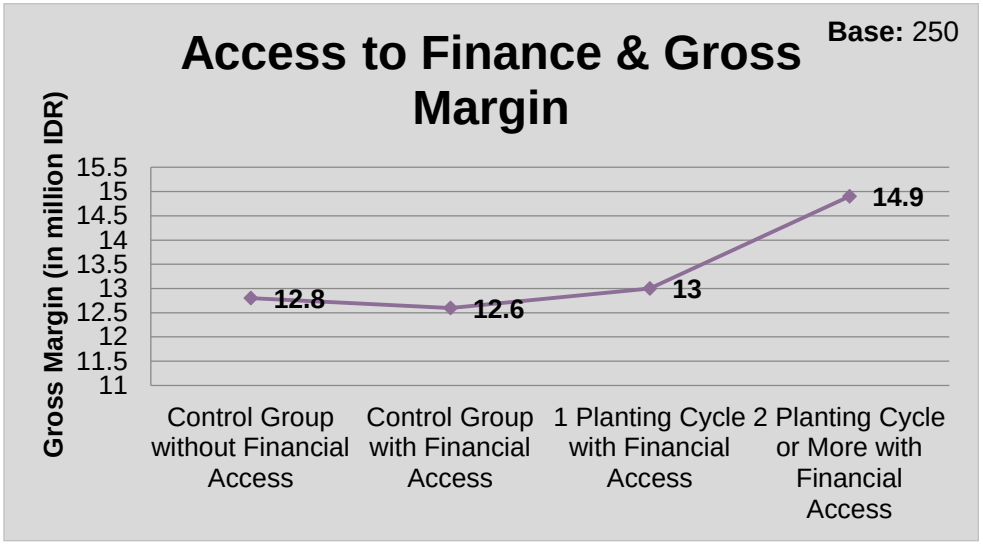
Premise: Farmers who have been in the PISAgro program for more cycles would have access to good crop protection products and the services (access to finance, insurance, training, growing protocol, farmer groups, etc.) Syngenta and the partners provide to lead to an improvement in gross margins.

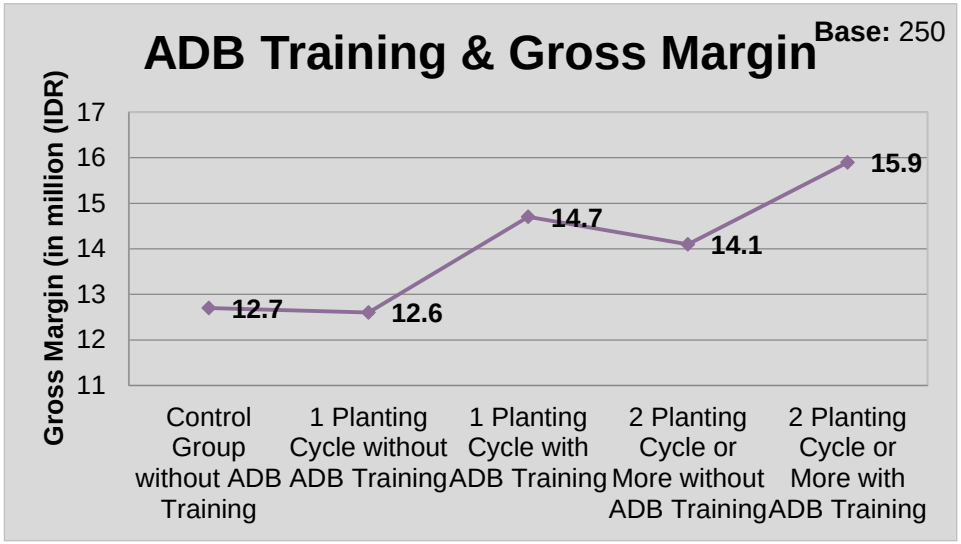
- The revenue was calculated by multiplying the average yield and price across the different program participation groups and districts while the cost was calculated by adding the input cost and labor cost.
- The gross margin was calculated by subtracting the revenue with the total production cost.
- As seen from the graph above, the ≥ 2 planting cycle farmers have the highest average gross margin with IDR 14.91 million followed by the 1 planting cycle farmers with IDR 13 million and the control group farmers with IDR 12.72 million.
- Bima has the highest average gross margin with IDR 17.72 million followed by Dompu with IDR 11.91 million and Sumbawa with IDR 11.83 million.

Economic

Access to Finance, ADB Training with Gross Margin

This section examines the effect of having access to finance and ADB training with the Gross Margin of farmers





Premise: Farmers who have been in the PISAgro program for more cycles would have access to good crop protection products and the services (access to finance, insurance, training, growing protocol, farmer groups, etc.) Syngenta and the partners provide to lead to an improvement in gross margins.

- The effect of having access to finance does not really effect the gross margin of the control group as the control group farmers with financial access have a slightly lower gross margin (IDR 12.6 million) compared to the control group without financial access (IDR 12.8 million).
- However, PISAgro farmers (all with access to finance) have a higher gross margin with the 1 planting cycle farmers getting an average of IDR 13 million and the ≥ 2 planting cycle farmers with IDR 14,9 million. The access of finance of PISAgro members are all from Bank BPR Pesisir. The access to finance of the control group member needs to be further analyzed to determine the reason for not having an impact to the gross margin.
- The access to ADB training creates a big impact to the gross margin of the farmers as seen on the chart with 1 planting cycle with ADB training earning an average of around IDR 2,1 million more compared to the 1 planting cycle without ADB training.

Main Findings

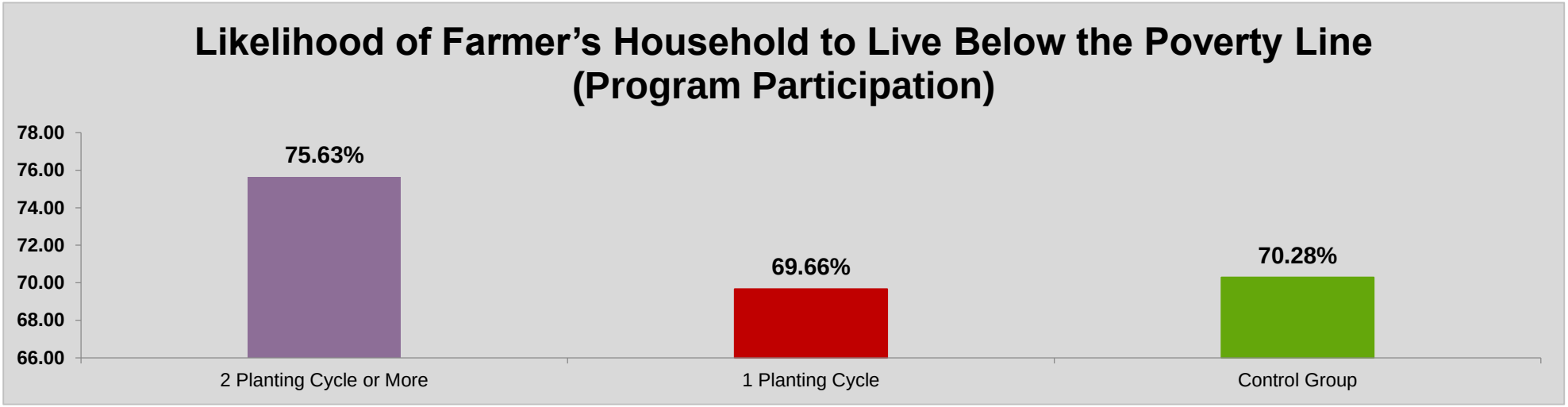
"The test of our progress is not whether we add more to the abundance of those who have much; it is whether we provide enough for those who have too little."

Franklin D. Roosevelt

Progress out of Poverty Index® (PPI®)

Segmented by Program Participation

This section utilizes a poverty measurement tool with questions relating to household characteristics and asset ownership.



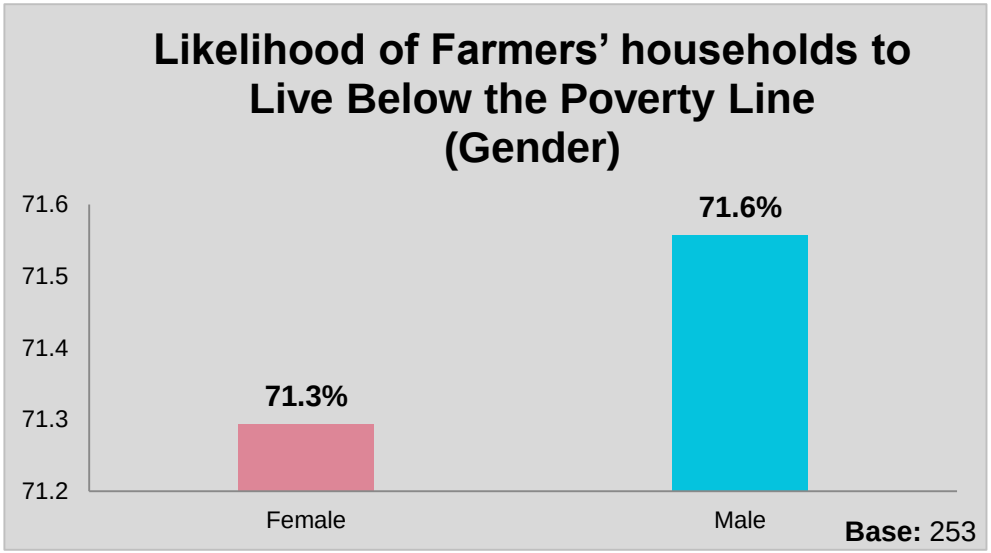
Premise: Farmers who have been in the program for ≥ 2 planting cycles should have lower percentage likelihood of farmers living below the pre-determined poverty line

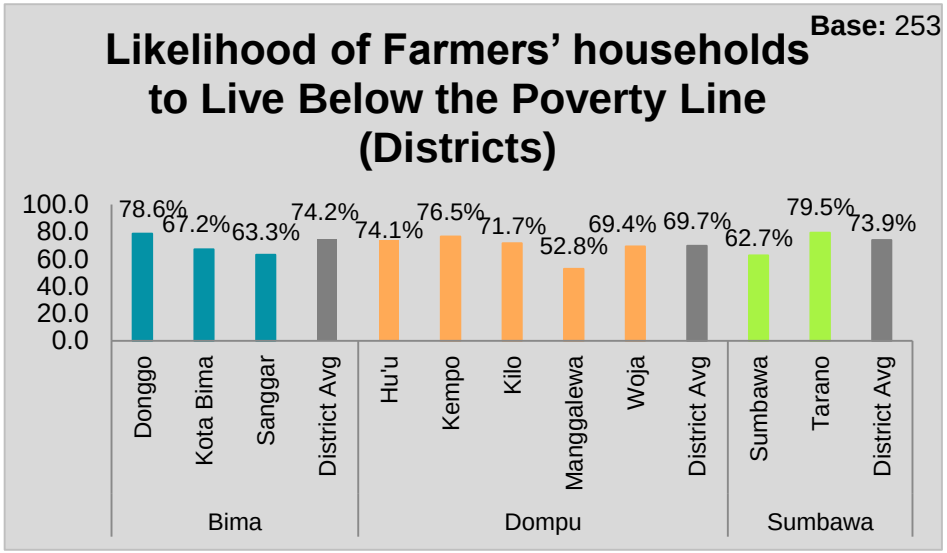
- The average likelihood rate is calculated by dividing sum of all likelihood value of household surveyed with the number of household surveyed.
- The likelihood values were retrieved from the **"$2.50 2005 PPP"** look up table.
- The Indonesia PPI questions are very limited in scope as it only covers household conditions and education levels of the respondents. However, key components such as access to medical facilities (primary care/hospitals, government health insurance/social security, etc.) and purchasing power (ability to buy goods, clothes, etc.) were not considered.
- Therefore, this indicator can't be solely used to evaluate how the PISAgro program have impacted the farmer's livelihood (progress out of poverty).
- The average likelihood rate of the ≥ 2 Planting Cycle (75.63%) is considerably higher then the 1 planting cycle (69.66%) & control group (70.28%). This goes against the premise.

Progress out of Poverty Index® (PPI®)

Segmented by Gender, and Districts

This section utilizes a poverty measurement tool with questions relating to household characteristics and asset ownership.





Goal: Evaluate the percentage likelihood of living below the poverty line across genders and districts in Bima, Dompu and Sumbawa

- The average likelihood rate is calculated by dividing sum of all likelihood value of household surveyed with the number of household surveyed.
- The likelihood values were retrieved from the **"$2.50 2005 PPP"** look up table.
- Male farmers (71,6%) have a slightly higher likelihood rate than female farmers (71.3%).
- Bima have a considerably higher likelihood rate (74.2%) compared to Dompu (69,7%) and Sumbawa (73.9%).
- Tarano (Sumbawa) and Donggo (Bima) are the two sub-districts with the highest likelihood percentage with 79.5% and 78.6% respectively.

Main Findings

4.1 Farmer Profile

4.2 Contextual Information

4.3 Business Model

4.4 Social

4.5 Safe Use Training Impact

4.6 Environmental

4.7 Economic

4.8 Progress Out Of Poverty (PPI)

4.9 Gender Equality

4.10 Systemic Value Creation

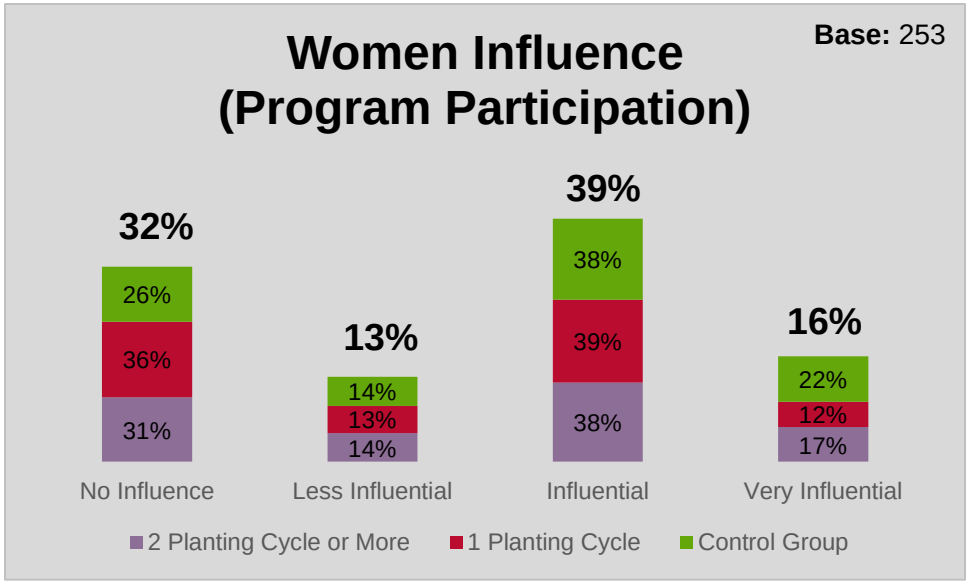
"Absolute equality not possible . what is possible, we can honor the qualities in each person, that would reduce this gap"

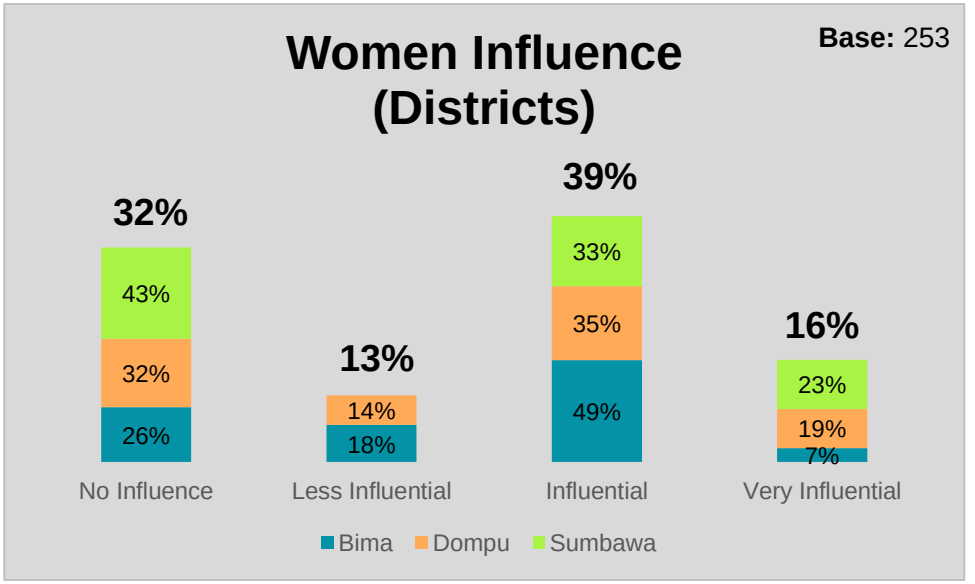
Litymunshi

Gender Equality

Women Influence Level

This section examines the influence level of women in group/community discussions and decision making.





Goal: Observe the influence of women across the different program participations and across the 3 different districts.

- Out of the 253 total respondents, majority (39%) said that women are influential in community discussions and decision making. However, many respondents (32%) said that they do not have any influence.
- The women influence when compared to the 3 program participations are fairly equal across the 4 level of influence.
- However, there is an alarming percentage of respondents in Sumbawa (43%) who said that women have no influence in community discussions and decision making. This number is considerably higher than the respondents from Dompu (32%) and Bima (26%).

Gender Equality

Equal Treatment

This section examines if both genders have equal rights in obtaining government extensions & other external support

Quotes about the equal treatment between genders:

Goal: Understand the role of women in the farmer’s household

100% of a total of **253 respondents** say that **women** have **equal rights** in the community with **no special treatment** in getting access to government extensions and other support.

Gender Equality

Role of Women

This section examines the role of women in their respective household

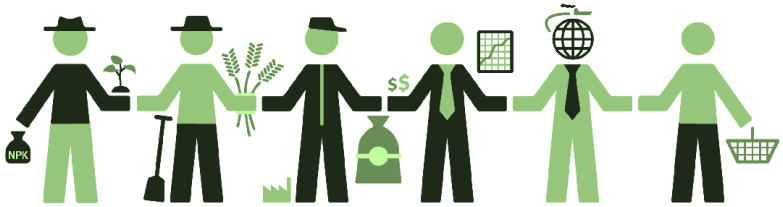
Quotes about the Role of Women in their Household:

Goal: Understand the role of women in the farmer's household

98% of a total of **253 respondents** say that **women manages the priorities** and **financials** of the household

Main Findings

4.10 Systemic Value Creation



"The goal of any farmer, after producing enough to feed his own family, has always been to find the best place to sell the year's crop."

Sonny Perdue

Systemic Value Creation

List of Interviewees

In addition to the smallholder farmers, we also interviewed other actors in the corn value chain to assess **Systemic Value Created** in the corn market system in Sumbawa and how Syngenta can generate and capture additional value in it:

#	Name	Company / Role	Location
1	Chandra	CV. Mega Ria / Retailer	Bima, NTB
2	Sri Rahayu	Dua Putra / Retailer	Bima, NTB
3	Amrin	UD Barokah / Retailer	Bima, NTB
4	Agustina	Grain Trader	Dompu, NTB
5	Muhammad	Grain Trader	Dompu, NTB
6	Lukman	Grain Trader	Dompu, NTB
7	Saefuddin	Grain Trader	Dompu, NTB
8	Antonius Danurdoro	Bank Andara	Jakarta
9	Haji Zas'ari H. Zainuddin	Bank BPR Pesisir Akbar	Bima, NTB
10	Arifuddin, SH	Wakil Bupati Dompu / PEKMKAB Dompu	Dompu, NTB
11	Ferrix	Seger Agro Nusantara / Warehouse	Dompu, NTB
12	William	CV Cepin / Warehouse	Dompu, NTB
13	Suguanto Winarko	CV Agro Makmur / Retailer	Dompu, NTB
14	Andi Ikhwan	Mercy Corps	Jakarta

Systemic Value Creation

Baseline Equilibrium

Before PISAgro **intervention:**

Low Productivity

Farmers had very low yield because of products that they used, application techniques, disease management, etc.

Low Crop Price

Farmer's receive a very low corn price for their crops.

Lack of Education / Training

Farmers lacked education and training on GAP, Growing Protocol, Safe Use Pesticide, etc.

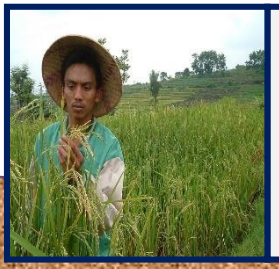
Limited Access to Capital

Most farmers do not have access to financial institutions to obtain farming capital to fund their corn planting season

Post Harvest Opportunities

Farmers have very low bargaining power and limited off takers in their region cause difficulty to sell their crops

Farming Profession



Corn farming is seen as a side job for a lot of farmers and many do not want their kids to become farmers

GOAL

Achieve corn self-sufficiency within two or three years.

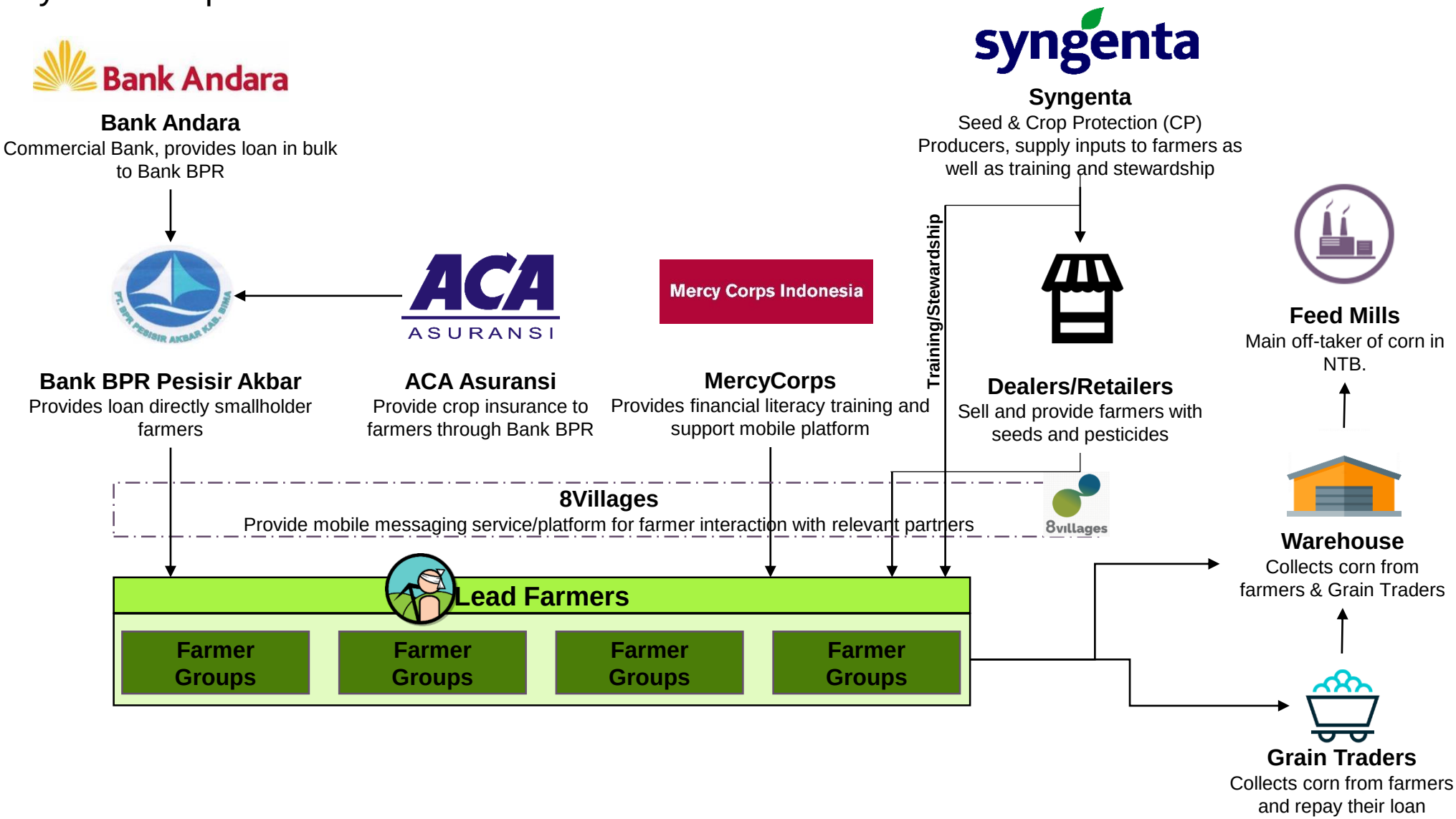
Issues

#1 Corn demand in Indonesia is growing at a pace of **40 percent** per year

#2 Domestic corn production only grows **6 percent** per year.

Systemic Value Creation

Systems Map



Systemic Value Creation

Summary of Observations

Bank Andara
Moving Microbanking Forward

Observations:

- Provides access to affordable, flexible, long-term sources of capital.
- Bank is a critical stakeholder as it is the “blood” of the body. Even if the program has great skills, inputs, off-takers, none of these will matter if there are no funding mechanisms to support them.
- Bank Andara can’t provide direct loans to users (farmers) because of the lack of presence and human resources in the region.
- PISAgro program already has a good and proven ecosystem to mitigate risk by integrating a variety of partners.

Potential / Suggested Value Creation:

- **Credit Approval Process:** more effective and timely approval process of Bank Andara’s credit committee to ensure loan disbursement before the start of planting season.
- **Fluidity of Funds:** ensure a fluid flow of funds by bundling an android phone with the program with an app that can transfer and track money digitally from all parties to be able to smooth the flow of money between the different parties.
- **Transparency:** transparency of the details of the loan to the farmers to build trust with them.
- **Partnerships:** establish partnerships with feed mills and fertilizer companies.
- **Scaling:** to scale up & replicate the program, ecosystem has to be inclusive; invite as many stakeholders as possible within a certain criteria.

Bank Andara ↔ Bank BPR

Observations:

- Bank Andara provides the loan to Bank BPR in bulk based on request in several batches throughout the planting season.
- The request for loan from Bank BPR needs to include the number of farmers, coverage area, planting period, etc.
- The loan provided to BPR is an 8-month loan period.
- Collateral from Bank BPR is in the form of BPR’s invoice to the farmers (non-liquid).

Potential / Suggested Value Creation:

- **Loan Disbursement:** faster disbursement of cash between Bank Andara and Bank BPR will result in farmers having access to capital before the planting season starts.

Systemic Value Creation

Summary of Observations

Bank BPR Pesisir Akbar

Observations:

- Bank BPR Pesisir Akbar currently has 11 branches/cash offices across NTB with around 10,000 savings clients and 5,000 credit clients.
- Bank BPR provides credit to corn farmers, fisherman, business owners, village loan groups, etc.
- Bank BPR provides loans to farmers with a 6-month loan period.
- Grain traders or lead farmers would gather their farmer members to submit a request for loan. Farmers must be in a farmer's group to be eligible for the loan.
- Prospective debtor needs to have a land certificate (can be used up to 3 people) and have a minimum corn planting land size of 1 ha. If they are a first-time member of PISAgro, the maximum land size for loan is 2 ha.
- The farmers don't have to plant in the location of their house.
- The age of farmers can't exceed 60 by the end of the credit cycle in relation to the eligibility of the life insurance component of the program.
- Women farmers are generally better than men because they know how to control money better and know their priorities. Male farmers typically have more temptations than female farmers.
- Farmers are required to open an account in Bank BPR. The minimum amount of money in the account is IDR 20,000.

Potential / Suggested Value Creation:

- **Liquidity of Loan**: all partners/stakeholders (GTs, warehouse, insurance, etc.) should have an account in Bank BPR to ensure faster processing of money between them in addition to being beneficial for Bank BPR.
- **Partnership**: establish partnerships with a fertilizer company to ensure availability & stable supply of fertilizers for farmers.
- **Financial Literacy Improvements:** improve financial literacy training coverage to encourage farmers to do savings and to increase their awareness towards their loan obligations.

Bank BPR ↔ ACA Insurance

Observations:

- Crop insurance is bundled in the program and is mandatory for all farmers. In addition to crop insurance, farmers also have access to life insurance through Prudential.

Potential / Suggested Value Creation:

- **Socialization & Coverage:** improve the coverage of the insurance for the crops (loss amount and crop failure requirement) and improve insurance socialization for the farmers so they can have a better understanding of the insurance benefits.

Systemic Value Creation

Summary of Observations

Mercy Corps Indonesia

Observations:

- Mercy Corps through the AgriFin Mobile project funded by the Swiss Agency for Development and Cooperation is aiming to work with partners to develop sustainable business models that provide bundled financial and agriculture services. The PISAgro program is one of the initiatives.
- The PISAgro program was recently assessed and recommended by OJK (Financial Service Authority of Indonesia).
- The PISAgro program recently explored collaboration with PT Pupuk Kaltim to integrate them into the PISAgro program.
- Mercy Corps is supporting the digital application platforms by 8villages in the form of database (android base) of farmer profiles in coordination with Syngenta and the SMS report application for farmers to report on their planting progress and to ask technical questions.
- The success of this program has sparked the interest of other financial institutions (commercial/non-commercial banks) to implement a system similar to this.
- Bank Andara is now open to work with cooperatives not just rural banks to scale up the program faster.
- Role of Mercy Corps in the PISAgro program is to prepare module/materials for trainings. For financial literacy training, the company provides trainers in the first planting cycle. The financial literacy training on the last planting cycle was done by Bank BPR as trainers assigned by Mercy Corps have gradually trained the BPR officials. Mercy Corps also covers all the operational cost of training.

Potential / Suggested Value Creation:

- **Digital Application Utilization:** improve the utilization and leverage the advantages of having digital application platforms to gather farmer's database, progress and also a platform to transfer knowledge and offer technical advice.
- **Scaling Up by Involving More Rural Banks:** invite more rural banks to join the program to scale the program faster.
- **Integrating Warehouses in the Partnership:** involving the warehouses as official partners to the program to have a more fluid distribution/transfer of funds back to Bank BPR.

Systemic Value Creation

Summary of Observations

Pemerintah Kabupaten Dompu

Observations:

- Kabupaten Dompu has a population of around 200,000.
- The main industries in the area are farming and fisheries with main crops being corn, rice and soybeans. Currently also exploring Sorghum as a potential new crop.
- The corn land size covers around 65,000 ha.
- PEMKAB (Government officials) of Dompu do not have the authority to do land expansion, it has to go through the central government.
- Total production of corn in Dompu is around 6-7 tons/ha, which gives an approximate total of 400,000 tons of corn per planting season in Dompu. The goal is to increase farmer's productivity to 8-9 tons/ha.
- The main sub districts for corn in Kab. Dompu are Manggalewa, Kempo, Woja, Kilo, Hu'u, Pajo, Dompu.
- The number of corn farmers gradually increase every year as farmers start to realize the potential of planting corn.
- Fertilizers availability is a big issue in Dompu, as the process to request subsidized fertilizers is conducted the year before without knowing the total planting area the following year. This causes some shortages in subsidized fertilizers.
- There is no agreement between private companies with the PEMKAB (Government Officials).

Potential / Suggested Value Creation:

- **Private Sector Involvement:** PEMKAB wants to encourage a greater private sector involvement in creating warehouses and feed mills which can result in the creation of jobs, guaranteed off taker and potentially increasing the price of corn at the farm level.

Systemic Value Creation

Summary of Observations

Retailers

Observations:

- PISAgro retailers think that the program has not shown any significant improvement/growth to the corn sector in NTB.
- All retailers always have pesticides available. However, sometimes there is a shortage in in-demand seeds and fertilizers.
- Most popular seeds that are sold in retailers are BISI, Pioneer, DK(Monsanto). No NK7328 seeds is available on the 4 retailers visited.
- Source of pesticides is mostly from big dealers in East Java and other parts of Indonesia (Surya Nusa).
- Input provider companies offer incentives to retailers in the form of cash bonus or presents (electronics, etc.) for good sales performance.
- The distribution of products from R1 retailers are typically 80% for R2 (Kiosk) and 20% directly to farmers.
- The retailers get a 30 day payment period from the dealers.
- The R1 retailers provide R2 (kiosk) a payment period that ranges from 2 weeks to a few months.
- Most R1 retailers only accept direct cash from farmers. However, R2 (Kiosk) retailers provide some credit scheme for farmers in some areas.
- PISAgro official retailers will receive 80% of the input payments when it has successfully been delivered to the farmers and the 20% will come after harvest.

Potential / Suggested Value Creation:

- **Facilitate Dealer (Seeds & Fertilizers) and Retailer relationship:** the pesticide dealer and retailer relationship have been very effective since the dealers that are used in the programs are known dealers. However, for seeds and fertilizers, a better supply/availability of products with certain agreements can help ensure the sustainable supply of seeds and fertilizers to farmers.

Systemic Value Creation

Summary of Observations

Farmers

Observations:

- Farmers who are in the PISAgro program receive seeds and pesticides from the package
- Others, buy the inputs from Retailer/Kiosk. There is no significant difference between retailers and kiosk. Farmer's buy the inputs from the nearest Retailer/Kiosk to reduce transportation cost.
- More than 50% of the farmers are not receiving any support from Syngenta to connect with buyers.
- Most of the farmers sell the crops to GT/Collector because GT/Collector pick-up the harvest directly from the field so the farmers do not have to spend additional cost for transportation.
- Picking + Carrying and Shelling activities are done by Farmer itself, Family, and Labor Workers.
- Drying activities are typically conducted by the Farmer itself and their Family members. Only very few farmers hire labor workers at this stage of post-harvest.
- The farmer store their crops on their field if they do not sell it directly to GTs/Warehouse.
- The moisture level of corn highly effects the price of corn.
- Farmers typically dry the corn thoroughly, protect the crops from pest (rats, monkeys, etc.), and apply enough fertilizer to preserve quality.

Potential / Suggested Value Creation:

- **Access to Trainings:** most of the farmer's interviewed do not have access to training in ADB, GAP and Safe Used Pesticide. Farmers are very keen to get access to these as farmer's who do tend to have better productivity overall.
- **Formal Linkages to Offtakers:** majority of farmers do not have formal linkage to off-takers (GTs and Warehouses). Farmer's would like to sell their crops at a fair market price with proper scales in order to get maximum return.

Systemic Value Creation

Summary of Observations

Grain Traders

Observations:

- There are no official classifications of Grain Traders (GTs). There are only big grain traders who supply the warehouse 5-6 times a week during harvest season, medium traders with 3-4 times/week and small traders who supply the warehouse approximately 1-2 times a week.
- Many grain traders started of as pure corn farmers. Some are still farming in addition to trading corn.
- There is a gradual increase of competition between Grain Traders because of the growing amount in the area.
- GTs provide finance to the farmers in exchange for a guaranteed supply of corn. However, that doesn't always happen. Most farmers will still eventually sell their corn to the highest bidders.
- GTs obtain the corn supply directly from farmers and also from smaller GTs (Pelele).
- GTs mainly give extra attention to the moisture level of the corn, mold condition and type of the corn. They determine this by physically touching it and referring to their own experience without using any equipment.
- The price of corn is typically depending on the market price. However, there is a constant disagreement with farmers in this issue.
- GTs provide transport to carry corn from field (farmers) to the Warehouse.
- GTs have agreements with warehouses in the form of verbal price agreements.
- Incentives are given to Grain Traders and Lead Farmers if all the loan is successfully returned.
- Loan repayment to Bank BPR is the responsibility of individual farmers. GT help collect the loan to return to Bank BPR.
- PISAgro program loan is delivered by Bank BPR at the farmer group's location in the presence of lead farmers and sometimes grain traders. Products (inputs) are given within 1 week of the loan disbursement by Syngenta.
- Challenges for GTs include: trading capital, maintaining good cash flow (farmer's want fast cash), number of competition, gaining farmer's trust.

Potential / Suggested Value Creation:

- **Loan Disbursement:** Faster disbursement of loan to farmers will ensure that they will start their planting season on time, getting maximum yield and return the loan punctually.
- **Availability of Fertilizers:** Subsidized fertilizers are hard to find, ensuring availability of fertilizers by integrating fertilizer companies in the program is a critical component to corn planting.
- **GT Cash Flow Improvement :** Most GTs do not have sufficient capital to maintain good cash flow, possibly explore loan programs for GTs or collaborate with Warehouses to ensure more liquid flow of money.

Systemic Value Creation

Summary of Observations

Warehouses

Observations:

- There are no official classifications between corn warehouses in NTB. Some warehouse has a higher storage and bigger processing capacity.
- The majority corn supply came from Grain Traders, directly from the farmers and also from smaller warehouses.
- GTs have agreements with warehouses in the form of verbal price agreements.
- Almost all corn warehouses in NTB store their supply in the form of shelled corn for the purpose of selling it to feed mills.
- For quality control, warehouses set a minimum moisture level of corn at 17%. They also pay attention to the cleanliness and mold of the corn. These standards will determine the price of the corn accordingly.
- There is no significant difference of corn quality between PISAgro Farmers and Non-PISAgro Farmers.
- GTs and Farmers bring their crops to the warehouse using their own transport. PISAgro farmers can bring their crops directly to the warehouse directly using their Grain Trader's name to obtain their price.
- Additional drying and cleaning of corn is done in the warehouse before selling it to the feed mills around Indonesia.
- Feed mills are concerned about the aflatoxin percentage and moisture level of corn.
- Warehouses provide finance to the farmers in exchange for a guaranteed supply of corn. However, that doesn't always happen. Most farmers will still sell their corn to the highest bidders.
- The buyers from out-of-town (Fuso trucks) will buy the corn without quality segmentation in exchange for a lower crop price.

Potential / Suggested Value Creation:

- **Involvement of Warehouses:** involve warehouses in the PISAgro program to ensure a better flow of loan repayment after harvest.

Warehouse ↔ Feed Mills

Observations:

- Drying and cleaning of corn processes are done in the warehouse before selling it to the feed mills around Indonesia.
- Buyers are major feed mills across Indonesia including: Charoen Pokhpand, Japfa Comfeed, CG, etc.
- Feed Mills are primarily concerned about the aflatoxin percentage and moisture level of corn.

Potential / Suggested Value Creation:

- **Explore Partnership with Feed Mills:** Explore partnerships with feed mills to ensure warehouses have a guaranteed off taker.

Systemic Value Creation

Economic Value Created at the Farm Level

Indicators	Control Group	1 Planting Cycle		2 Planting Cycle of More	
	Figures	Figures	% increase (from control)	Figures	% increase (from control)
Yield per hectare (kg)	6,223	6,334	2%	6,925	11%
Price per kg.	IDR 3,396	IDR 3,439	1%	IDR 3,420	1%
Revenue/ha	IDR 21,133,308	IDR 21,782,626	3%	IDR 23,683,500	12%
Production cost/ha	IDR 8,500,000	IDR 8,900,000	5%	IDR 8,900,000	5%
Gross margin/ha	**IDR 12,633,308**	**IDR 12,882,626**	**2%**	**IDR 14,783,500**	**17%**

- This chart compares the key economic indicators between the three program participation group of farmers that we interviewed: control group, 1 planting cycle and ≥ 2 planting cycle farmers.
- The figures above are calculated from getting the average figures from all the respondents on their respective categories.
- As seen from the table, there is no significant percentage increase between the control group and the 1 planting cycle farmers. 1 planting cycle farmers only produce 2% more yield/ha compared to control group farmers and ultimately only 2% more Gross Margin/ha from the control group farmers.
- The ≥ 2 planting cycle or more farmers have a slightly higher Gross Margin/ha with an average gross margin that is 17% above the control group farmers. This is mainly driven by the significantly higher average yield/ha figure (11% increase from control group farmers). Aside from the yield/ha figure, all the other economic indicators are fairly similar.
- Despite the increase in all the economic indicators, it is very marginal. The program provides value in many ways for the farmers but their change has not been transformational at the farm level.

Systemic Value Creation

Systems Change Summary

Baseline Equilibrium

Baseline conditions before the intervention

- Farmer's have low productivity because of the products they used, application techniques and disease management.
- Farmer's receive a low price of crops because of the quality of crops.
- Farmer's lacked education and training on GAP, Growing Protocol, and Safe Use Pesticide.
- Most farmers do not have access to finance to obtain farming capital.
- Farmers have very low bargaining power in selling their crops.
- Corn farming was seen as a side job for most farmers and many do not want their kids to become farmers.

Syngenta Intervention

Change resulting from implementation of the **PISAgro Corn Working Group** since 2014

- **Economics:** There is marginal grown in the productivity of the farmers and their gross margin.
- **Access to Finance:** Farmers receive loans in the form of cash and input vouchers which enables them to buy inputs, pay for labor and any other planting needs but differentials with control group are small
- **Access to Training:** Lead Farmers are given training by Syngenta and the Partners on the recommended growing protocol, safe use pesticide, etc. However, training penetration rate to the non-lead farmers is low.
- **Access to Insurance:** While farmer's receive crop insurance the coverage of the insurance is very low and the process was not properly socialized.
- **Quality Inputs (Seeds & Pesticides):** Farmer's receive high quality and proven inputs from Syngenta as part of the loan package but this is not resulting in enough of a value differential relative to control group
- **Guaranteed Off-taker:** Selected grain traders are engaged in the program as guaranteed off-taker of the farmer's crops. However, farmer's tend to go directly to the warehouse because the GTs do not offer a competitive price (or enough value in their service)

New System Equilibrium

Opportunities for **Additional Value Creation**

Additional value for existing Farmers (improving the model):

- **Improve technical value proposition** with approaches to achieve at least 2X gross income (higher yield/ha, more ha, double cropping & higher $/kg) .
- **Focus on best lead farmers** to improve adoption of growing protocol, safe use of pesticides and reach more farmers.
- Encourage grain traders & LFs to **invest in improved post-harvest handling & quality.**
- **More timely & transparent handling of loans** linked to crop cycle & cost

Scaling the program more rapidly:

- **Alliance with other partner companies** to reach more farmers with a better technology package while sharing costs & benefits.
- **Digitalize transactions** to ensure fast and efficient processes across the value chain.
- **Integrate best Grain Traders & Lead Farmers** as catalysts for reaching larger numbers of farmers covering more hectares

Recommendations

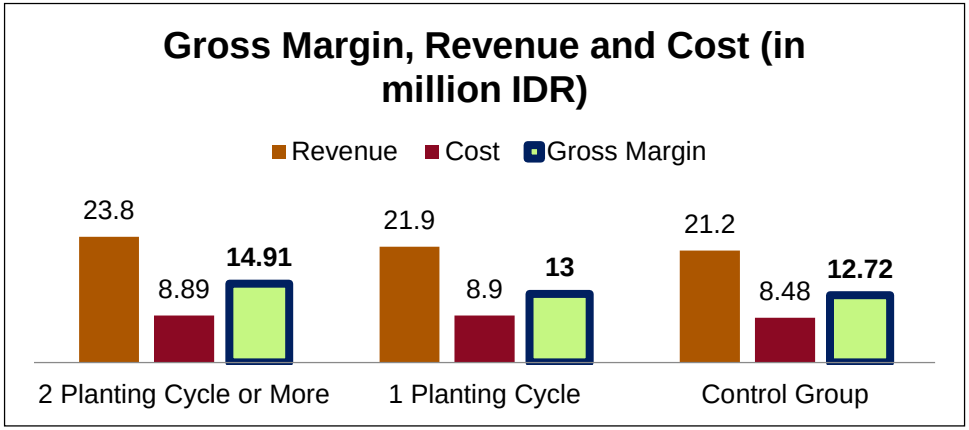
05

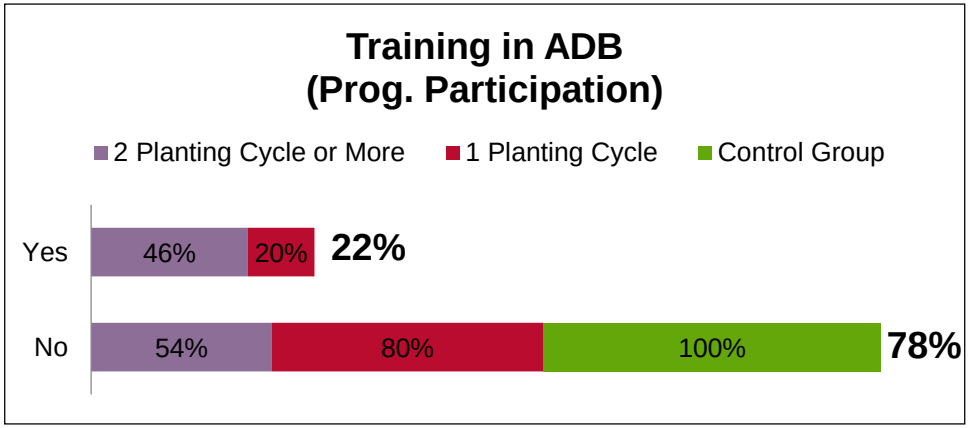
Recommendation #1

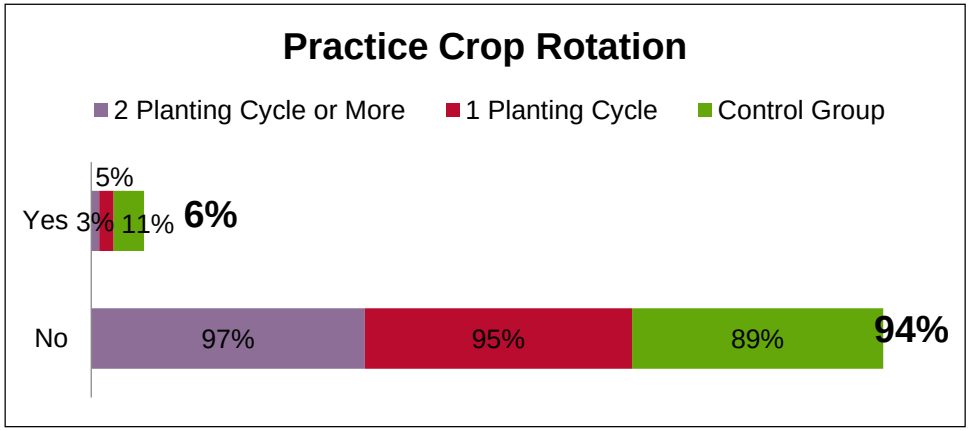
Increase Farm Level Economic Value to at least 2X the baseline level (50%+ yield increase)

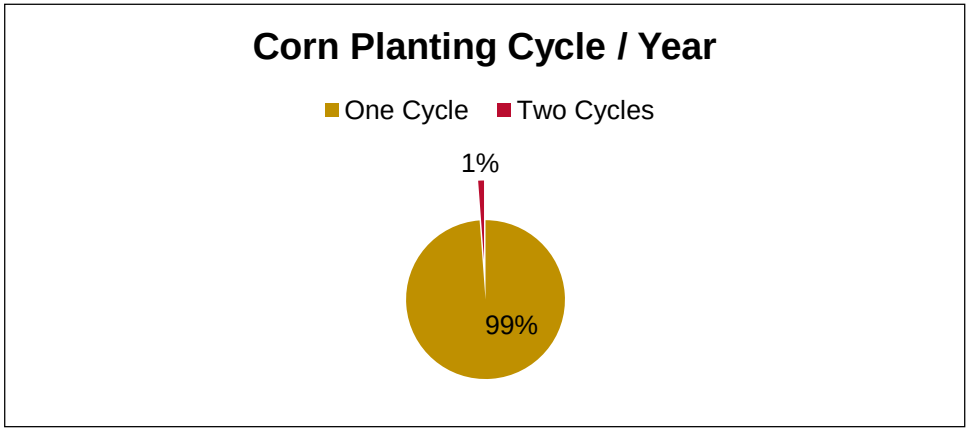
Observations

- Improvements on key economic indicators at the farm level have been very modest. The increase in yields between control and the 2 or more planting cycle farmers is only around 11% while the overall gross margin increase is about 17%.
- Lead farmers are reaching only 22% of respondents with training on growing protocols, and less on safety & other issues.
- Almost all respondents (99%) of respondents plant one crop per year while only 6% practice crop rotation.









Recommendation #1

Increase Farm Level Economic Value to at least 2X the baseline level (50%+ yield increase)

Potential Solution

Improve Value Proposition to Farmers

- Collaborate with other technology firms to demonstrate ways to significantly increase $/ha, MT/ha, & $/kg.
- Possibilities include better use of fertilizers, drip irrigation, crop rotation, low tillage, dryers & moisture meters
- Demonstrate these on demo plots with best lead farmers and post harvest, with progressive grain traders

Formalize Collaborative Business Model

- Establish agreements with input/equipment firms on joint program for training and distributing through selected lead farmers & grain traders
- Ensure that financing supports investment in inputs and equipment, as well as expansion of farm size
- Integrate the main corn warehouses and offtakers in the program to incentivize investments in quality improvements, facilitate financing and a more fluid transfer of money
- Introduce governance that allows all stakeholders to see benefits of program participation, thus encouraging sustainability & more rapid scaling.

Potential Value

- **Farmers** will have a more compelling reason to adopt “technical” package, improving incomes and accelerating dissemination to larger numbers. It will also encourage more efficient resource use.
- **Offtakers** will benefit from higher volumes (more import substitution) and better quality.

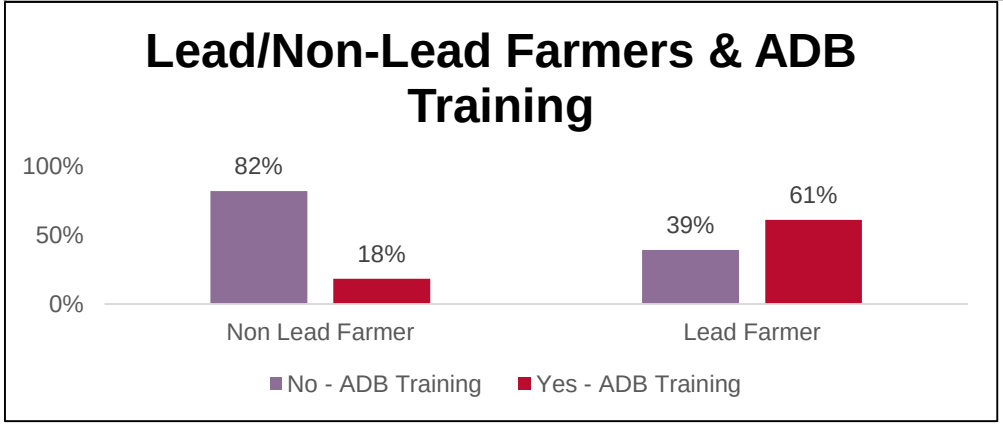
- Syngenta **product sales to grow** along with the **increase in area of corn production & cross-selling input products for other crops.**
- By collaborating with other partners, it **reduces cost of technical/extension services** and facilitates more rapid scaling.

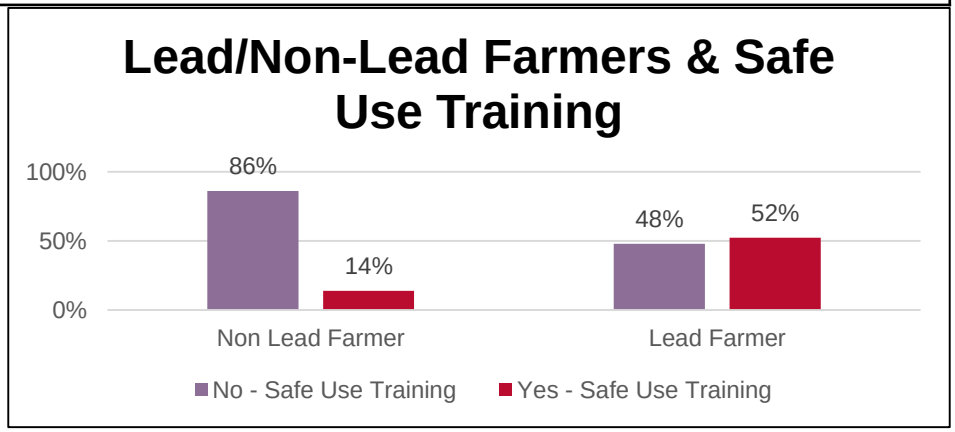
Recommendation #2

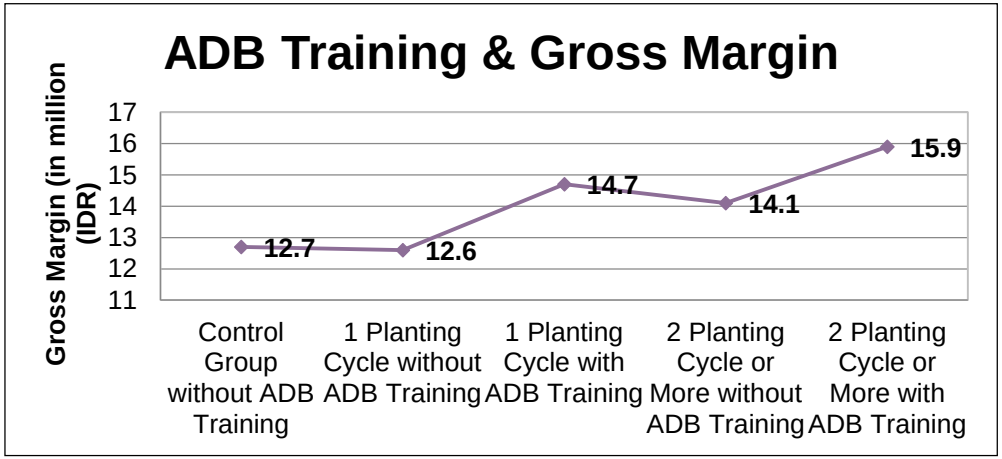
Lead Farmers & Grain Traders can be more Effectively Leveraged as the Catalysts of Change

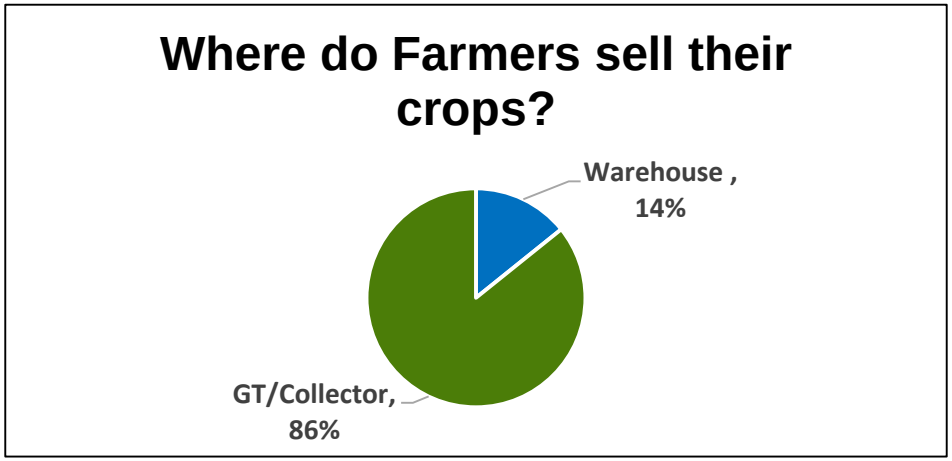
Observations

- Lead farmers are currently local leaders and not necessarily the best and most entrepreneurial farmers. This is reflected in modest adoption of practices by lead farmers and poor transfer of know-how to other farmers.
- Farmers clearly benefit from training and adoption of improved practices and especially as they learn through practice.
- Grain traders are not presently providing enough value in their post harvest services to farmers who often sell directly to warehouses. Around 14% of farmers sell directly to the Warehouse.









Recommendation #2

Lead Farmers & Grain Traders can be more Effectively Leveraged as the Catalysts of Change

Potential Solution

Select Grain Traders / Lead Farmers

- Formalize selection of Grain Traders and Lead Farmers based on those that are most progressive and entrepreneurial and willing to test and then commit to the package of good practices and technologies.
- This network of “technical agents” can be incentivized to provide sales support and training. This could include sales commission from Syngenta & other distributors.
- Work through LFs and partner firms to organize “Farm Excellence Schools” open to all farmers.

Build Technical Package Around GT/LF

- Key is to demonstrate more compelling value proposition. Builds on technical package and demo plots established in Recommendation #1.
- Help grain traders develop market value for graded/ low moisture corn that benefits them and farmers.
- Incentivize LF/GTs not only on the loan repayment success but also on adoption of new practices.
- Triangulate financing with offtakers (based on quality and delivery) and Lead Farmers / Grain Traders.

Potential Value

- Increase the **percentage and number of farmers adopting the growing protocol** technical package, increasing value per farm and total impact.
- Improve post-harvest handling to reduce losses and improve quality, benefitting traders, farmers, offtakers and lenders.

- Increase **Grain Traders** and **Lead Famer’s engagement** in the program creating a **motivated set of field extensions** that can support **Syngenta & other product sales growth.**
- Establish a **sustainable training structure** to more rapidly grow the number of PISAgro farmer members.

Recommendation #3

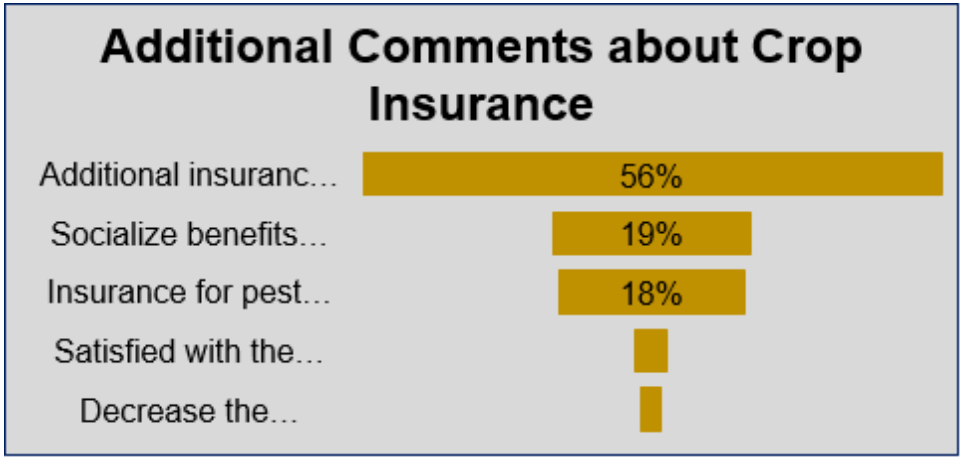
Improve Transparency of the Program to Farmers

Observations

- The breakdown of the loan is not given to farmers causing some farmers to question if they are paying over the market price for certain products in their loan which includes seeds, pesticides, and insurance. The portion of the loan that is allocated to pay the interest rate is also not defined properly.
- Socialization of insurance have been very minimal. Many farmers are not aware of the benefits of having crop insurance and majority don't even know that life insurance is also part of the loan. Farmer's are also not aware of the processes and requirements to submit claims.

"The breakdown of the price of seeds and pesticides are not given, when I calculate the total cost myself, the cost is lower in the free market"

"We don't know how much of the loan is deducted for the interest rate, insurance, administration cost and all the other components"



Potential Solution

Transparency Improvements	▪ Provide a loan breakdown during disbursement of loan, listing all the components of the loan with the associated cost. ▪ Create an info session to socialize the benefits crops and life insurance along with the processes to claim when necessary.

Potential Value

- Potential to **gain farmer's trust** on the program, **increase** their **motivation** and **engagement** to **fulfill their loan obligations**.

- The **benefits of access to insurance** will be well received by farmers as it will be a key factor to **minimize the risks** associated to the program and **attract more partners** to join.

THANK YOU