PRISMA Promoting Rural Income through Support for Markets in Agriculture

Kementerian PPN/ Bappenas

Australian Aid

Livelihood Profile

Maize Farmers in Sumenep, Madura Island, East Java

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Contents

Livelihood Profile of Maize Farmers in Sumenep Madura Island, East Java

1. Purpose of Study

The purpose of this study is to build a socio-economic profile of PRISMA's target group for each subsector to better understand their livelihood position. It also aims to understand the context of their poverty and vulnerability so as to determine how they behave and the drivers behind this behaviour. The ultimate goal is to know whether or not there is a difference in the level of adoption between users and non-users of hybrid maize, to what extent and the associated factors at play. Therefore, to understand PRISMA's target group and how and why maize farmers in Sumenep make certain decisions, the main research questions of this study are:

I. What is the socio-economic position of maize farmers?
II. How important is maize to farmers' livelihood?
III. What strategies do farmers adopt to meet basic needs and improve living conditions?
IV. Who and what influences decision making in the cultivation of maize?

This study used both qualitative research methods through focus group discussions (FGDs) and interviews, and a quantitative survey of 55 households. The UK Department for International Development (DFID) Sustainable Livelihood approach and the Progress out of Poverty Index (PPI) were also employed to guide the research methodology in finalising this report.

2. Audience

The target beneficiaries of this study are:

I. PRISMA Intervention teams – to gain more insight into the behaviours of their target groups in order to design smarter interventions and/or make revisions as might be required. For example adjusting targeting or intervention logic
II. PRISMA steering review panel – to use the results of the study to guide the technical thinking of the PRISMA internal teams
III. Department of Foreign Affairs and Trade (DFAT) – to provide a tangible picture of the target group PRISMA teams work with, the characteristics of communities at risk of poverty and what they may look like
IV. Ministry of National Development Planning – to understand PRIMA's work in specific agricultural subsectors and gain an overall picture of its target group and behaviours

The results from this study might be used to compile other case studies and communication materials showcasing PRISMA's work.

3. Introduction and methodology

"You are not Madurese if you are not planting maize" (old saying in Madura).

Maize is the staple in Madura Island and especially important in the district of Sumenep, one of three other districts. "Nasi jagung" - rice mixed with milled maize is a popular meal and the local people remark that they do not feel hungry for long periods after consuming maize. The tradition of consuming the local maize variety is linked to the climatic pre-conditions in Madura not being as suitable for planting paddy – a long dry season and lack of water. According to PRISMA's intervention data, Sumenep has the largest area for Maize cultivation in Indonesia with over 135,000 ha (2013 Indonesia Central Agency on Statistics data) but has the third lowest average productivity in East Java at 2.05 t/ha. The average yield of maize in East Java,

the largest Maize producing province in Indonesia, is 4.8 t/ha. In comparison, Nganjuk in central East Java has the highest productivity at 8 t/ha despite only about 29,000 ha of maize cultivation land.

Because cultivating maize has been a long tradition in Sumenep, most farmers have been planting maize since they inherited the farms from their parents. The main reason for planting maize according to the farmers' sampled is hereditary (85%) and other farmers started planting maize more recently (18% in the last 10 years), reporting household consumption as the main reason for cultivating maize.

Maize is the most important food crop for household consumption in Sumenep according to the Ministry of Agriculture followed by paddy and beans. Usage of maize is 50% for consumption, 45% for sale as a cash crop and 5% is retained as seeds from harvest i.e. the local variety. Generally, local variety seeds can either be purchased or retained from the last harvest whilst the hybrid varieties cannot be retained because they quickly lose productivity or yield. 60% of the farmers in Sumenep still use traditional maize varieties, resulting in low yield and production. Further results from the quantitative survey show that in Kambingan Timur and Campor Barat a larger share of the maize harvest is sold, while in Telaga most of the harvest is used for household consumption. A possible explanation may be that the hybrid variety attracts a higher price because of its yield but the results in Telaga (from table 1) may be better understood if one considers that its farmers cultivate only the local variety (see table 2).

Table 1: Use of maize post-harvest

Use of Maize	Kambingan Timur	Telaga	Campor Barat
Household consumption	34%	67%	32%
Sale as cash crop	65%	30%	62%
Retained Seeds	1%	3%	6%

The Ministry of Agriculture states that increasing the use of hybrid maize can boost productivity by up to 10 times and subsequently increase the income of poor farmer households. The percentage of farmers using hybrid seeds is growing – from 25% to 40% within the last 5 years – and this may be due to a variety of reasons - one being the provision of subsidised hybrid seeds to a number of farmer groups by the government, emphasising their interest in this sector. Irrespective of this, some farmers revert to planting traditional varieties as soon as they stop receiving government subsidised seeds.

Table 2.Types of maize seeds planted in 3 villages sampled

Villages			
Maize Seeds	Kambingan Timur	Telaga	Campor Barat
	Hybrid only	Local only	Both (mixed)

Results from the quantitative survey show that in Kambingan Timur farmers only cultivate the hybrid variety, and in 2009 when the government introduced hybrid maize seeds via a five year subsidies program, local farmers continued cultivating only the hybrid variety even after subsidies ceased. In Telaga, farmers cultivate only the local variety and although they have equally received government subsidies, they reverted to planting the local variety when that support ended. In Campor Barat, farmers plant both varieties, and despite also being in receipt of government subsidies since 2001, just two farmer groups continue to use these subsidised seeds at present. According to the qualitative study, the primary reason for not cultivating hybrid maize in Campor Barat is because of higher water requirements; which is lower for the local variety. However, the quantitative data reveals a wider range of reasons which will be explored in later sections. According to the PRISMA growth strategy report, the biggest factor driving demand for maize in general is a rapidly expanding poultry market for poultry feed and some is utilised by the cattle market.

3.1. Intervention selection

Promotion of the use of hybrid seeds is the chosen intervention by the PRISMA team with a focus on the three Madura districts of Sampang, Sumenep and Pamekasan, because:

I. productivity is low while the potential exists to significantly increase yields,
II. there are substantial business opportunities for input suppliers to provide improved quality hybrid, as current usage is also low, and
III. the intervention will support the local government's plan to make Madura self-sufficient in Maize by 2018.

Other factors that influenced the intervention selection may be found in PRISMA's internal sector brief, intervention plan and growth strategy documents.

3.2. Map and demographics

Kambingan Timur (marked with the red pin below) is close to the city of Sumenep and easy to reach. Campor Barat (yellow) lies on the Northern coast of Sumenep about 3 km from the main road and the coast, which can be accessed by a small asphalt road. Telaga (green) lies in the hills in the central part of Sumenep district. Although the access road is in a good condition, it is the most remote village of the three. Some parts of the village, especially the highlands, are more difficult to access

Figure 1: Map of Madura region

Telaga is the largest of the villages, while Kambingan Timur is the closest to the regency capital Sumenep. Campor Barat is the most isolated village.

Table 3. Overview of all three villages sampled

VILLAGE OVERVIEW	Kambingan Timur	Telaga	Campor Barat
Sub-district	Saronggi	Ganding	Ambunten
Sub-district Population (2010 Census)	34,282	35,671	37,702
No of maize farmer households	189	617	488
No of female headed households	8	No data	No data
Average household size	4	3	4
Distance to Central District	16km	22km	27km
Distance to Central Sub-District	4km	7km	3km

3.3. Sampling

This study is restricted to only the Sumenep district. A shortlist of target farmers was developed by PT AHSTI, a local PRISMA partner that provides hybrid maize varieties to poor farmers. From its shortlist, three villages in Sumenep - Kambingan Timur, Campor Barat and Telaga were randomly selected for sampling.

Household selection was also randomly done with support from village heads. For this study, the total sample size was 55 households across all three villages and of these 45% use hybrid maize seeds or 25 households' (users), and 55% use local varieties or 30 households (non-users). All respondents are therefore maize farmers. The data collection exercise was conducted and concluded in September 2015.

The sample used for the purpose of this study should be treated with some caution. This study was always meant to give a "general impression" of how and why people behave in certain ways. It is possible that the average results do not paint a perfect picture of the region or sector and this should be taken into account when reading this report. This study is data led and the results from surveys conducted have been consolidated with qualitative interviews from key respondents such as religious leaders, village heads, farmer group heads and focus groups to arrive at reasonable conclusions.

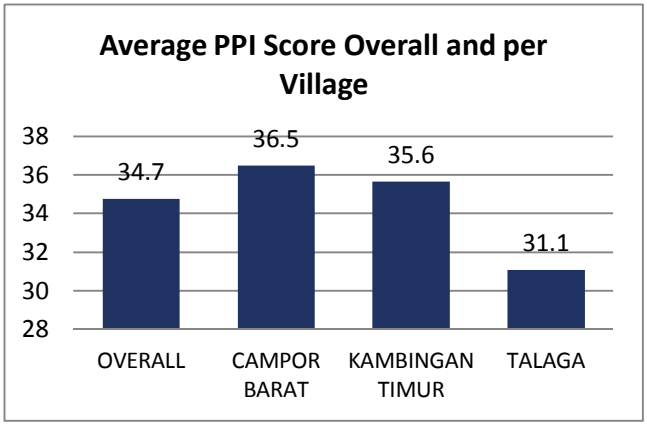
3.4. Progress out of Poverty (PPI) Index

PRISMA's goals are tied to improving the incomes of poor rural households, and the programme uses the Progress Out of Poverty Index (PPI) that helps distinguish different poverty levels and vulnerability amongst different household groups. The PPI questionnaire is a set of 10 easy-to-answer questions answered by household members so the programme can make a quick determination of poverty levels. The resulting questionnaire produces a PPI score, which is converted to give a percentile or likelihood that a household falls below a set of poverty lines. For the purpose of this study, four quadrants were developed to compare PPI scores. This includes the poorest (<p25), poor (p25-p49), middle income (p50-p75) and better-off groups (>p75). Each quadrant contains roughly the same number of households in order to compare differences across PPI groups.

Table 4 displays the likelihood of each quadrant falling below the 150% Indonesian national poverty line (USD 2) and the USD 2.50 2005 poverty line.

Table 4. PPI Scores and likelihood of households below the poverty line

Quadrant PPI Score	Likelihood below Indonesian 150% (USD 2) poverty line	Likelihood below USD 2.50 poverty line
Poorest <p25	76.2% and higher	95.2% and higher
Poor p25-p49	17.4% to 65.5%	54.7% to 91.5%
Middle p50-p75	0.9% to 9.9%	6.9% to 40.1%
Better Off >p75	0.4% and less	3.7% and less



The average PPI score for the sample size overall falls within the poor range at p34.7. Campor Barat and Kambingan Timor both score p36.5 and p35.6 respectively. These two villages and the overall sample are therefore 40.7% likely to fall below the 150% national poverty line, and 79.7% likely to fall under the USD 2.50 poverty line. Telaga on the other hand has the lowest average PPI score at p31 amongst the 3 villages sampled, and residents in this village are 54% and 87.7% likely to fall below the 150% national and USD 2.50 poverty lines respectively. The implication of this result is that the PRISMA team appears to be successfully targeting poor Maize farmers but not farmers within the poorest group. The team may use the data in this report to locate and reach the poorest among farmers in the intervention, and understand their livelihood patterns and drivers that influence decision making.

4. Livelihood assets[1]

This chapter aims at giving a broad picture of the socio-economic position of the target households in Sumenep, based on DFID's Sustainable Livelihood approach which incorporates 5 asset categories. Assessing these assets is the basis for understanding and evaluating constraints and opportunities that impact the livelihood strategies and subsequent decision making of the target households. The approach also helps conceptualize and understand ways households allocate and use resources to make a living given their specific socio-economic and natural environment. The 5 different asset types are analysed and explained below.

4.1. Human Assets

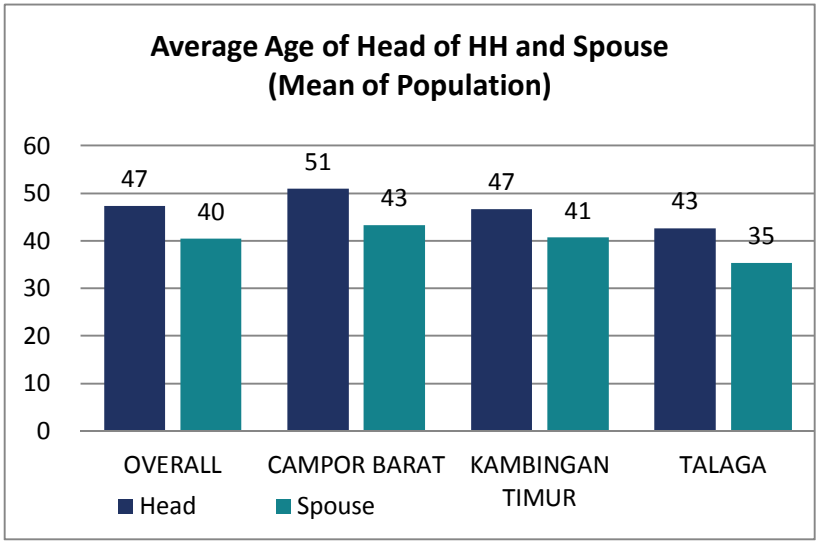
At the household level, the human assets refer to the quantity and quality of labour available and this varies according to household size, education and skill levels, culture, leadership potential and health. It is therefore necessary, though not on its own sufficient, for the achievement of positive livelihood outcomes.

[1] The Livelihood Approach is based on the belief that people require a range of assets to achieve positive livelihood outcomes. The assets which people need can be categroized into human, natural, physical, financial and social capital. (Livelihood Strategies: Tomson)

4.1.1. Household Size and Culture

In general all three villages report a similar household average size of 4, (from 75% of households) with the number of children between 1 and 2. Campor Barat has the largest number of households with one child. Overall, 95%of household heads are married with just 3 reporting being divorced, and in Campor Barat all heads of household are married.

The average age of the household head overall is 47 years, whilst the average age of a spouse is 40 years. Telaga has a lower average age for both heads of households and spouses when compared to Campor Barat and Kambingan Timur.

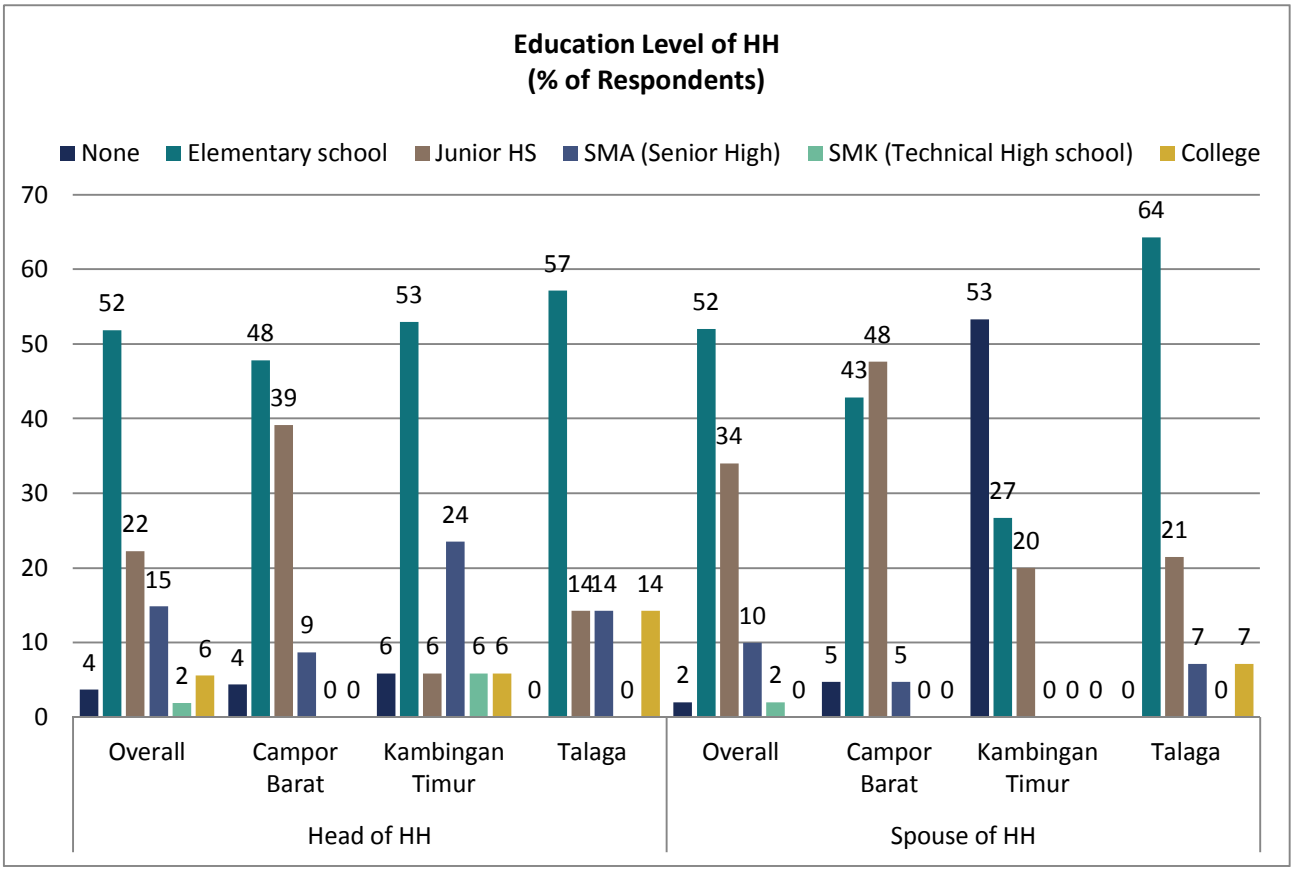


95% of all households in the sample are headed by men with 3 reported female heads of household (5%) in Kambingan Timur and Telaga. According to the Ministry of Agriculture, the figure for households headed by females in Sumenep is almost double (9.6%).

Campor Barat reports zero emigration rates and 90% of all sample households' in all three villages have not experienced any temporary emigration over the last 12 months. Of the 9 people that have emigrated (one being female), over half was due to work elsewhere whilst the rest either went to study or sought job opportunities. All members of the household are Muslim and almost all (98%) speak Madurese and belong to the Madura ethnicity.

4.1.2. Education

In the sample villages, all the heads of households are literate in Bahasa, and the highest literate age group is between ages of 30-49. The few members that are not literate in the sample are over 50 years. This may explain why almost 95% of household members aged 16 or over, identify as having gone to school, and those who did not (usually above 50 years old) stated helping on the farms, a lack of money and marriage troubles as reasons for not going to school. Overall more males have completed senior high school and above when compared to women.



Half of the heads of households have completed only elementary school with 22% completing junior high school and 15% finishing senior high school. Spouses have lower education levels compared to heads of households, although not significantly. Campor Barat is the least educated village with heads of households reaching only senior high school whilst the other two villages have household members who have attained university degrees.

According to the qualitative data, all children are enrolled at elementary school level and go on to complete senior high in Kambingan Timur and Telaga; with around 10% going further to University and this is validated by the results from the survey. Most of the public schools in all villages are Islamic where often the main focus is teaching the Koran. In Campor Barat, 5% (mostly girls) drop out before completing high school due to financial hardship. Even though attending public schools at elementary and high school levels do not attract a fee, higher education cost can be a major burden for poor households as the cost of books, transportation and clothing constitute significant expenditure. One mother from the focus group discussions exclaimed "I am required to pay IDR 1,000,000 to enrol my son in college, IDR15, 000 per day for costs such as transportation, food and the cost of books. Because of these high costs, my family can only afford to have one child".

Further analysis on expenditure patterns and how this is distinguished between users and non-users of hybrid maize is discussed in detail in section 6.2.

4.1.3. Health

Working days lost due to health was an indicator used to determine how health may affect farmer incomes in the study. The emerging result showed no significant difference in the number of periods respondents did not work due to illness amongst different PPI groups. However, those who are more likely to be poor took less days off (1 day) than those higher on the PPI scale (up to 10 days) in the past 12 months. This consequence should not be taken on its own as indication of poor health; but rather that those more likely

to be poor perhaps work through any illness because they cannot afford lost working days and income. On the flip side those higher on the PPI scale may have more contingent resources to fall back on.

4.2. Physical Assets

Physical assets comprise of basic infrastructure and goods required to meet basic needs and productivity, which includes assets such as affordable transport, adequate water supply, clean affordable energy, access to information and secure shelter and buildings.

4.2.1. Shelter and Housing

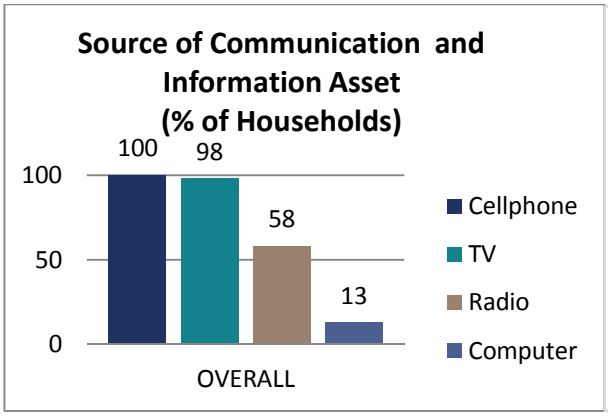
On average all households own their homes (with no additinal homes) and there is no significant difference between each village. There is almost an even split between those with an ownership certificate and those without. However looking more closely, more households in Campor Barat and Kambingan Timur have ownership certificates than Telaga.

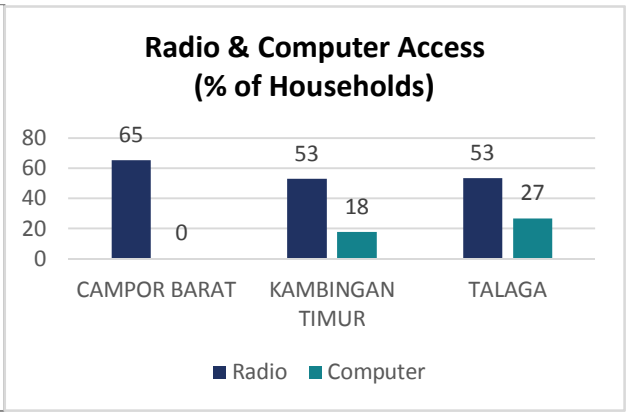
According to qualitative data, all households in the sample have access to electricity and the main source of cooking fuel is firewood. Gas is mainly used to prepare snacks (like fried banana) or if guests are expected. Many women are sceptical about the dangers associated with cooking with gas and perhaps the reason why it's used infrequently.

The qualitative data also reveals that the toilet facilities differ across the sample villages. For example in Kambingan Timur, 100% of the households have toilets with septic tanks whilst in Telaga the result is 20%. In Campor Barat 40% of households' have flush toilets, 40% use the river and 10% use moorland. In 2005 a government program provided toilet facilities support but despite this, just 10% of the households could access it (i.e. only those friendly with the village staff responsible for its administration[2]).

Further analysis on housing infrastructure and differences among villages and poverty levels are dealt with in section 5.1 to evaluate poverty.

4.2.2. Household Assets

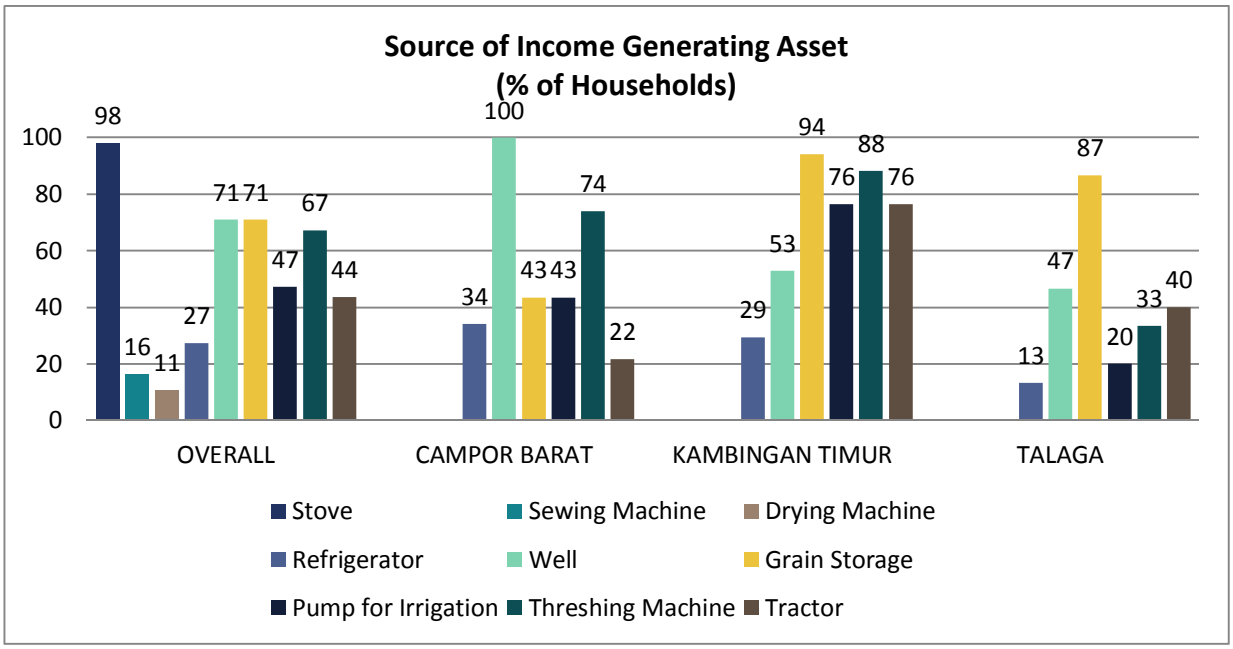




Survey results confirm that overall, households do not have fixed telephone lines in Sumenep. However nearly all households own or have access to mobile phones and televisions and these could be employed by the PRISMA internal teams as a primary means of communicating with households in the region. The results for all villages are slightly different with radio and computers recording 58% and 13% respectively. Comparing the villages, Campor Barat does not have access to computers perhaps compensated by greater radio access which is higher than in other villages.

[2] According to the head of sub-village

As for transportation, the majority of households own or have access to bicycles (87%) and motorbikes (93%), while nearly 60% of households' do not own or have access to a car.



Drying machines, sewing machines and refrigerators are the most lacking income generating assets whilst stoves, wells and grain storage units are the most owned or accessible in the region. On a village level, Campor Barat has the highest number of households with access to a fridge and Telaga the lowest. This is similar for sewing machines with over 80% of households not owning or having access. Stoves on the other hand tell a different story with nearly all households having access, which means this is capable of providing additional income to households in this region.

An in-depth look into agricultural assets used suggests that overall, more households (over 70%) have access to storage facilities and the split is even between those who have and do not have access to a water pump. Only about 10% of households have access to a drying machine, while threshing machines are accessible to almost 70% of households. Could this have implications for the PRISMA drying intervention?

Almost 45% of household either own or have access to a tractor which may suggest a possible opportunity for wealth creation within this region especially Kambingan Timur where having access to a tractor is more prevalent with over 75% alone.

So in general, what might this mean for the PRISMA team? They may wish consider interventions which capitalise on assets that are readily available or accessible to households rather than those which are not.

4.3. Natural Assets

Natural assets are natural resource stocks including public goods (e.g. the atmosphere) or divisible assets used directly for production (e.g. trees and land). Natural assets are very important to those who derive all or part of their livelihoods from resource-based activities such as farming, fishing, forests and mineral extraction. Natural assets tend to also greatly influence other assets important to livelihood. For example, farmers' production directly depends on the quality of soil, and when soil is polluted both farmers' health and crop quality suffer as a result.

4.3.1. Access to Land

Survey data confirms the average cultivated land size among the three villages is almost half a hectare (0.48 ha) and this is close to the figure obtained in focused group discussions. According to qualitative data, the average cultivated land size in all villages is about 0.40 ha per household[3] and no public land is used for agriculture.

In reality, Campor Barat uses more agricultural land than any of the other villages. It also has the highest standard deviation, which means that households from this village use their land for more varied purposes. Overall land use varies from village to village and amongst PPI scores. For example, on average, the poorest income group (<p25) has greater land use than the middle income group (p50-p75), but the better-off group (>p75) has the highest land use overall. On a village level, the poorest group in Kambingan Timur and Telaga have the highest land use compared to poorest group in Campor Barat.

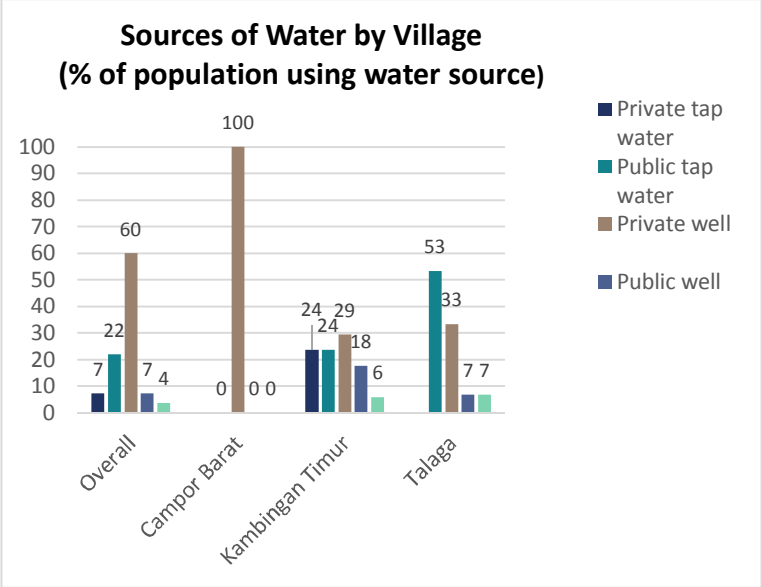
The amount of uncultivated land per household is reasonably high at 0.66 hectares, mostly in Kambingan Timur. This represents 45% of unused land. This could be an opportunity for the PRISMA team to consider when designing or revising interventions. For example, what other uses or alternative crops might be suitable for this unused portion of land capable of benefitting their intended target farmers and improve their livelihood; especially because the data confirms those with unused land are more likely to be poor? Do they just not have the capital to utilise the land productively? It may also be possible that the bulk of unused land is located in karst terrain which is a common geographic feature in Madura. Whatever the reasons or outcome, the PRISMA team might want to investigate further and come up with practical and realistic options capable of encouraging farmers to utilise any unused land to improve their livelihood position, with minimal investment requirements.

In the quantitative interviews, 85% of households own their land (mostly men) inherited from their parents. The remainder are rented and this is consistent across all the villages. Of those who own their land, more than 50% have a government certificate of ownership while 25% have the “traditional certificate”. This is consistent across all PPI groups and may suggest that having proof of land ownership is quite important to the people of Sumenep irrespective of poverty levels.

In the qualitative study, the head of the farmer group stated that in Kambinan Timur 98% of farmers have their own land and 2% rent land; for cultivating paddy or tobacco. Rent is paid in cash or by ‘system garap’, a leasing system that involves paying with crops from the harvest. In Telaga, a few people rent land for paddy cultivation, 70% own land while 30% of the villagers work on other people’s fields as farm labour. However in Campor Barat, landowners make up 60% of the village population. The other 40% of the villagers only raise livestock.

[3] According to the head of village and head of farmer group. In Campor Barat however, 90% of the participants of the focus group discussions (ca. 40 women) have only 0,25 ha, 10% have more land.

4.3.2. Access to Water

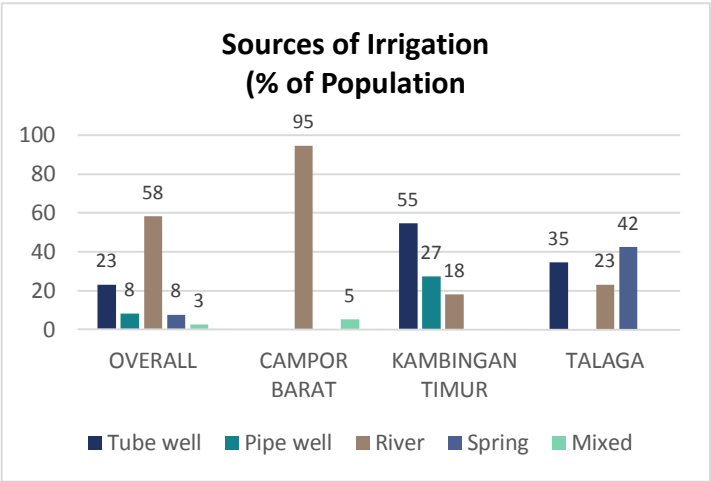


Overall, 60% of all sampled households use private wells, with results skewed by Campor Barat, and just over 20% use public taps all year round and irrespective of seasons; making these two sources the most important. Specific to Campor Barat, 100% of households' surveyed use only water from a private well and apparently do not have alternative sources of drinking water.

The survey findings suggest that Kambigan Timur has the most diverse access to water, with respondents using multiple sources.

The top 3 sources of irrigation mentioned by respondents are rivers (58%), tube wells (23%) and pipe wells and springs at 8% each. However at the village level, there are different dominant sources. According to the qualitative data, water shortages are a challenge for farmers in Sumenep, particularly in the North Eastern region (including Campor Barat).

Kambingan Timor, the closet village to the regency capital, shows the most diverse water and irrigation sources. Campor Barat and Telaga, both more rural and further from an urban centre, reflect a more disadvantaged position in the above results and suggest a greater need for a possible intervention in irrigation and water.



4.3.3. Other natural resources

In all 3 villages firewood is collected from the trees around the houses mainly for own consumption and never for sale. For big events, households purchase firewood, timber wood and bamboo.

The distance to the sea from Campor Barat is 3 km resulting in some of the villagers working as fishermen; catching fish for household consumption and sale.

4.4. Social Assets

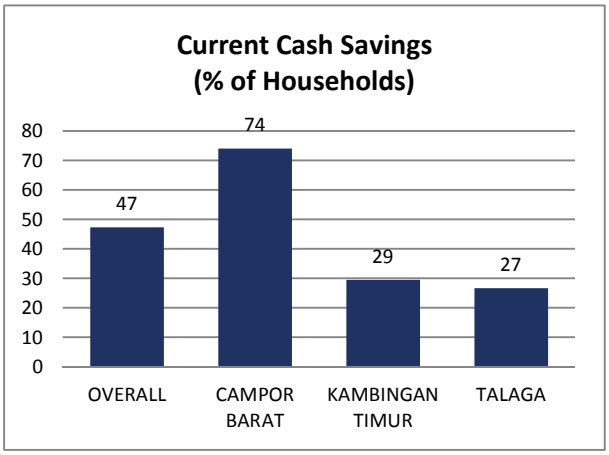
Social assets are resources upon which people draw in pursuit of their livelihood objectives. These are developed through networks, communities, shared interests, group memberships and relationships which facilitate innovation, development of knowledge and sharing of that knowledge.

Madurese may be regarded by some as tenacious, proud of their heritage, hardworking and even cautious towards foreigners and external perceptions may be influenced by the traditional machete fights still practiced to handle conflicts. In Madura, there are common beliefs which reflect the social character and way of life of its people about sanctity and respect. Among them are Islam, women and honour; all closely intertwined and disregard for any can bring forth reprisal, popularly known as carok.[4]

Family ties are important to the Madurese people and social cohesion within the villages very strong. Social life and everyday activities are strongly influenced by Islam. The religious leader is commonly the most important figure in a village (chosen by 68% of respondents) and his influence goes beyond religious matters. Even when deliberating and subsequently deciding a name for a newly founded farmer group, villagers consult their religious leader[5] and his level of importance is followed by the head of the village, chosen by 23% of the respondents.

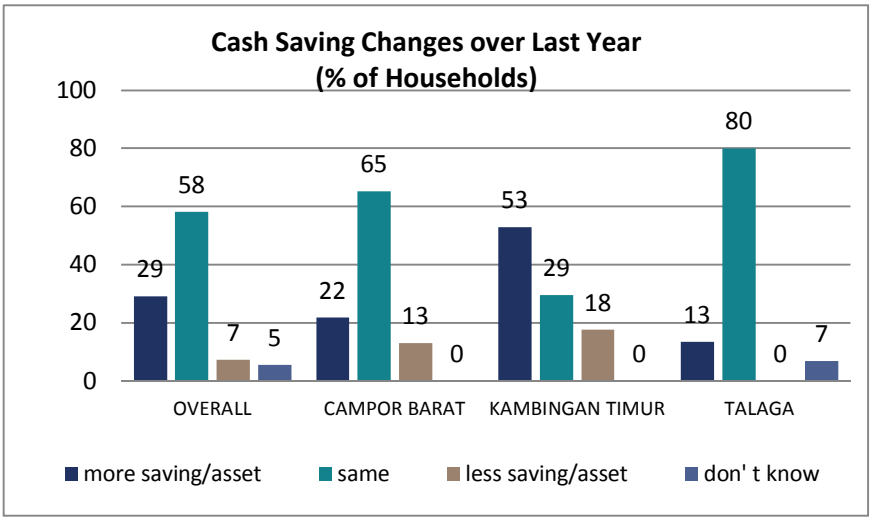
4.5. Financial Assets

Financial assets refer to the availability of cash, near cash or its equivalent which enables people to adopt different livelihood strategies. There are two main sources of financial assets – first, available stocks; such as savings - which usually do not have liabilities attached to them or entail reliance on others, and second, regular inflow of money (i.e. excluding earned income) - usually pensions or transfers from the state and remittances with the key being regularity of the inflow.



In terms of government support, 61% of households overall get rice subsidies followed by 34% receiving a health fee waiver (Jamkesmas) and 30% cash transfers (BLT). However, there is still a proportion of middle to better-off income families benefitting from these programs when in fact it should be going to the poor and very poor people in the community; especially because it was designed for them.

53% of households sampled have no cash savings, particularly in Kambinga Timur and Telaga and those who do prefer to keep savings at home with only a few operating bank accounts It is therefore not surprising that 98% do not operate any bank accounts. Absence of savings is likely to increase vulnerability.



Campor Barat reports the most households with cash savings at 74%. But if these results are further analysed along PPI groups, households lower on the PPI scale have more savings than those higher on

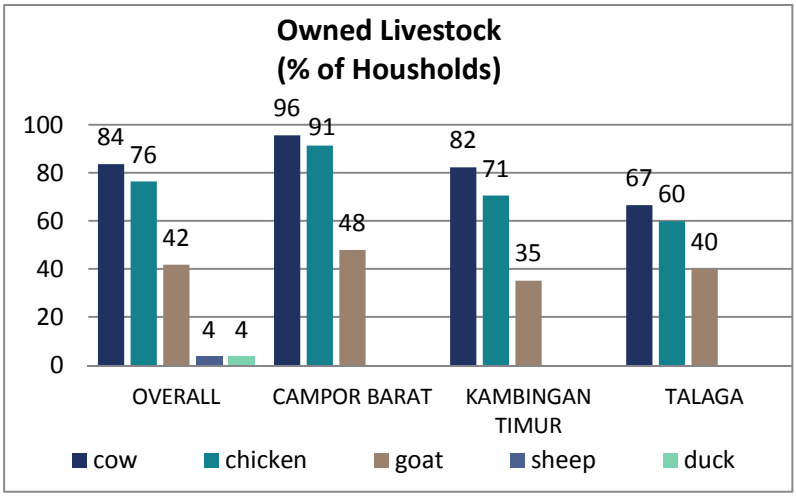
[4] Carok is a Madurese problem solving mechanism which might lead to unkind consequences (Jakarta Post, 7.2.2003)

[5] Information from PRISMA maize team

the scale. This could suggest that the better the income level, the less need for savings, but more research specifically in this area would be required in order to verify and investigate the causes behind this phenomenon.

Over the past year the status of cash savings in households in general has remained the same. Only Kambingan Timur has a significant percentage of households with more savings over the past year, while households in Campor Barat and Telaga have not improved or worsened their savings status.

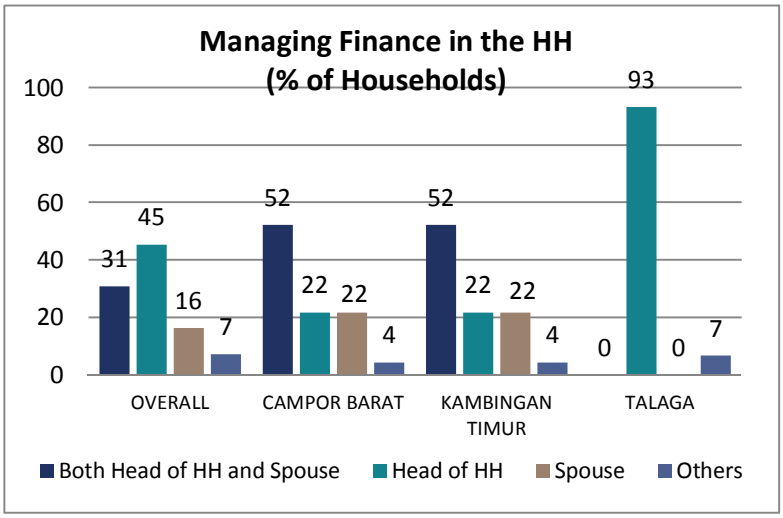
As poor farmers' expenditures are relatively small amounts, keeping cash at home appears simpler because they can avoid going to the bank every time a household member needs to pay for a good or service. Those with bank accounts usually have permanent employment e.g. government officers.



According to qualitative information, only a few households own jewellery. However, the data led survey shows that 84% of households own jewellery and there may be greater trust in this form of financial asset rather than cash savings.

Livestock is an important form of saving and according to the head of a farmer group in Kambingan Timur all farmers have livestock. Whenever farmers sell their cattle they almost immediately buy another after settling all other debts. This is validated from the survey results which confirms that irrespective of PPI levels, most households own some type livestock (95%).

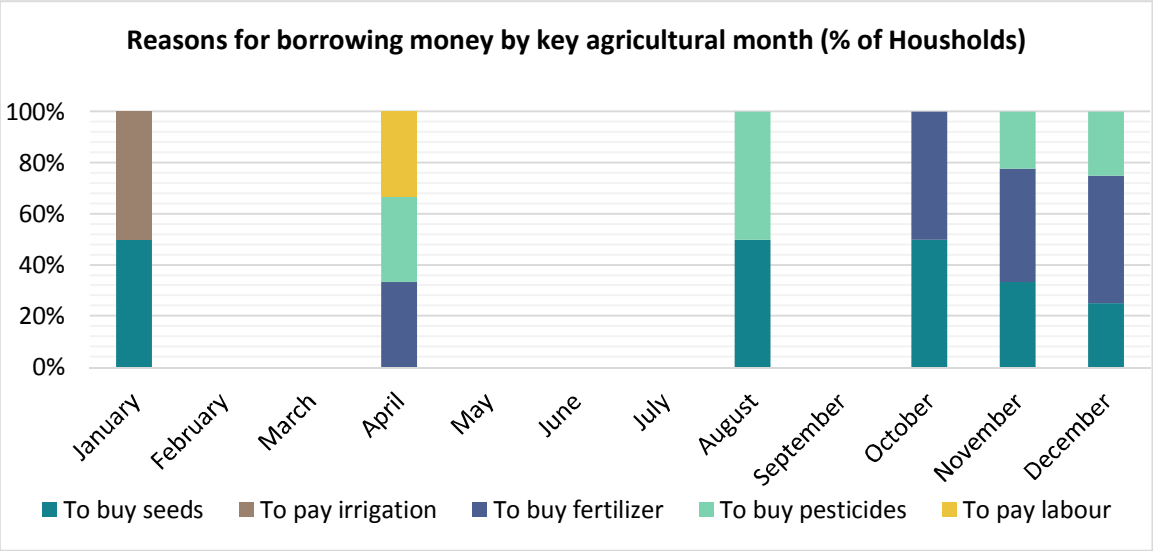
The three most common forms of livestock owned are cows, chickens and goats. The average number of cows owned is two per household. On average, one cow is sold every five years in comparison to four chicken sold every year and three goats sold every two years. Often men raise cows and goats while both women and men raise chickens.



According to qualitative interviews, women are in charge of managing the household budget in all three villages. However, the survey results shows that management of the household finances are either done by the male head of household alone or together with their spouse. Telaga, the most isolated village, is striking in that almost all household finances are managed by the household head (with all but 1 being male). Perhaps this result is influenced by the majority of respondents being male. In any case, the majority of households do not record finances and expenditures, and there is also no correlation between education levels and the recording of financial transactions as one may have hoped.

Another important form of savings is the crop stock. A part of the harvest is sold to repay debts and other immediate obligations whilst the rest is stored and thereafter sold when farmers need cash. Less than 30% of households have access to any loan or credit facility which corresponds to the data of households not operating a bank account. Those who do in fact get loans use it to open a business and repay debts and the most likely source of borrowing overall is from friends and family at 75%, except in Kambingan Timor where 42% of households borrow from a cooperative. Qualitative respondents mirror the quantitative survey results, stating that farmers in Kambingan Timor and Campor Barat borrow money from neighbours and family whilst in Telaga and Campor Barat, farmer groups have a saving-borrowing system which members and non-members can access; but members are prioritized. They also confirmed a cooperative in Telaga that gives loans to farmers.

27% of the households' surveyed report borrowing money for maize cultivation and usually before the main planting season (October and November) to purchase inputs. This is consistent with the results from both the qualitative and quantitative data. The primary reason for borrowing money for maize cultivation is to purchase inputs (seeds, fertilizer and pesticides). Others reasons mentioned include paying for irrigation and farm labour.



Overall agriculture and livestock are extremely important to villages in Sumenep as a form of savings and livelihood support. Therefore, all crops and livestock should be carefully analysed by the PRISMA team to determine income and livelihood enhancement potential. In addition, the opportunity costs associated with choosing one crop/livestock over another should be carefully considered as it may have significant impact on livelihood position of this community.

5. Poverty and Vulnerability

The vulnerability context is that part of the livelihood framework outside people's control. In the short to medium term, not much can be done to alter it. In essence, people's livelihoods are affected by trends, shocks and seasonality which could have significant effects on households, especially the poor. Shocks could be natural, economic, crop or human and seasonality may include changes in prices, production or even employment opportunities. Trends on the other hand are more predictable and not always negative. For example new technologies may be beneficial to poor people. Shocks can destroy assets and even force people to dispose of other assets as a coping strategy. This section will discuss the vulnerability context of the households in Sumenep and their coping strategies, especially for the poorest households (p0-p49).

5.1. Poverty Assessment

In addition to assessing the likelihood of poverty per household, qualitative data on poverty perception was collected by asking village heads to describe their view of a poor, middle-income and better-off household per village and the assets associated with each socio-economic position. The comparison of perceptions is shown in table 5 below.

Table 5: Perception of poverty by village heads:

Kambingan Timur	Telaga	Campor Barat
Poor household: • Unsuitable house for living, e.g. built only with bamboo • No motorcycle and required to walk any distance	**Poor household:** • Income not enough to cover daily needs • No electricity • No motorcycle • House is not habitable	**Poor household:** • No land owned • Lots of children • House not good, not painted and leaking roofs • Electric meter (share meter with someone else) • Have TV < or equal to 14 Inches[6]
Middle income: • Motorcycle • House built with stone • Enough money for daily needs	**Middle income:** • Own land • Harvest big enough to cover the daily needs • Surplus of crops that can be sold • Enough money to lend to others • Own cattle livestock (below 10) • Own jewellery	**Middle income:** • Own land • Terrace of house appears luxurious from the outside (i.e. tiles) • TV 30 inches • Small enterprise (e.g. Warung) • No problem accessing loans
Better-off: • Own a car	**Better-off:** • Own a car • Savings in bank • Lots of money but also philanthropic • Own cattle livestock (10-20)	**Better-off:** • Own a car • Savings in the bank/deposits • Have ownership letter for motorcycle [7]
Percentage: 70% are classified as middle income, while the rest are majority low income.	**Percentage:** According to the head of village, 80% of villagers are poor, 15% fall into middle income bracket and 5% (4-5 of households) are better-off.	**Percentage:** According to the head of village and head of sub-village, 40% of households are poor, 35% people fall into the middle income bracket and 25% in this village are better-off

Each village reveals differing perceptions of poor, middle-income, and better-off, but common perceptions of poverty are a lack of mobility and sub-standard housing.

Changes experienced across all three villages over the past 10 years varies considerably. Kambingan Timur has experienced the most significant development in road connectivity and perhaps due to its close proximity to the regency capital Sumenep. According to qualitative data, its poverty position improved

[6] In the past, many households had no TV and their children visited neighbours that had. Such families were forced to buy a TV to encourage children to stay at home.

[7] People in Campor Barat buy motorcycles for around IDR2, 000,000 without complete documents, because they are much cheaper.

significantly over the past 10 years and there was a noticeable increase in welfare and income such that houses are being transformed from bamboo to bricks with concrete flooring. There is also a tobacco factory in a neighbouring village, where many women from Kambingan Timor are working, providing additional employment opportunities.

In Campor Barat the situation has changed only slightly with a few additional modern homes. Despite improving the main access road in 2009, which increases mobility and connectivity to the market, the overall poverty position hasn't changed much. In Telaga, no positive changes are reported with the living standard staying the same and opportunities for income generation and employment remaining few. As a consequence, village leaders advise young people to seek employment opportunities elsewhere.

The quantitative data validates the finding above as 58% of sample households believe their standard of living and assets have not changed over the past 10 years (especially in Campor Barat and Telaga) whilst 30% believe there is some improvement (especially in Kambingan Timur).

5.2. Vulnerability, Shocks and Food Security

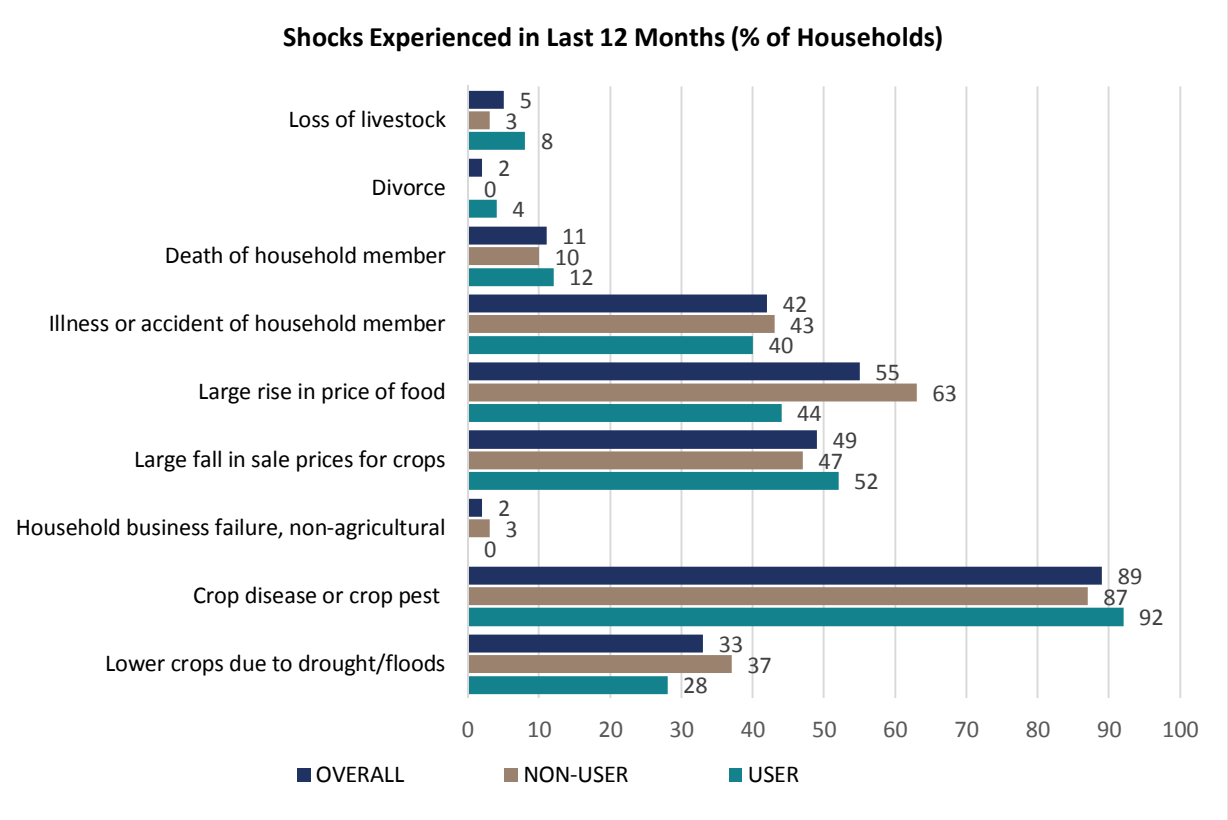
In assessing the nutritional habits of households within the three villages, households typically eat around 4 types of high nutrition food per week on average, ranging from, vegetables, fruit and meat; in addition to staples like rice and maize. Non-users of hybrid maize eat less than 4 types of food per week, which may indicate their increased vulnerability due to less food variety in their diet. At the village level, Campor Barat and Telaga are more vulnerable with less nutrition sources than the overall average whilst Kambingan Timur is higher in nutrition source variety than the overall average.

Survey respondents reported that their most difficult months for livelihood shocks are in January, February and December, but this contrasts with the period households have less than enough food - which is June and October. The data does not reveal the reasons behind June and October being difficult months for food, which could be an area for closer study in the future. To cope with more difficult months for food, it appears households are inclined to rely on food aid from the government first and alternative foods before ultimately reducing food intake. This scenario is the same for both users and non-users of hybrid maize across the villages.

Even though the survey does not explain why certain months are more difficult than others, it does reveal the most frequent reason(s) for difficult months to be lack of money (71%) followed by limited access to water (32%), with the latter being mentioned more frequently by non-users of hybrid maize. The implications of this for the PRISMA team wanting to design a new or revise an existing intervention could be, for example, to develop activities which don't require any financial outlays during these difficult months such as organising demonstration plots. The goal should be a general awareness of these months and intervene at the appropriate time of the calendar year and well ahead so that people are prepared and receptive. In order to cater for those who are vulnerable and rely on government aid, the PRISMA team might also want to consider partnering with the government to provide aid or subsidies in a more efficient way that ensures it gets to those who need it the most. This may clash with the principle of making markets work for the poor (M4P) but from a livelihood standpoint, it achieves the desired result.

The graph below lists the number of shocks experienced in the past 12 months by households. Each household was asked to rank the top three shock experienced, and the table counts the number of times a particular shock was mentioned in the top three. The survey results show that *crop disease or crop pests* present the biggest challenge for maize farmers. Overall, almost 90% of all households report having experienced crop disease and pests with varying levels of impact on household livelihood. According to qualitative data, 40% of farmers also categorised crop disease or pest as an extreme severe shock; 40% as severe and 20% as less severe. Further qualitative findings report *Bulai (maize downy mildew)* to be

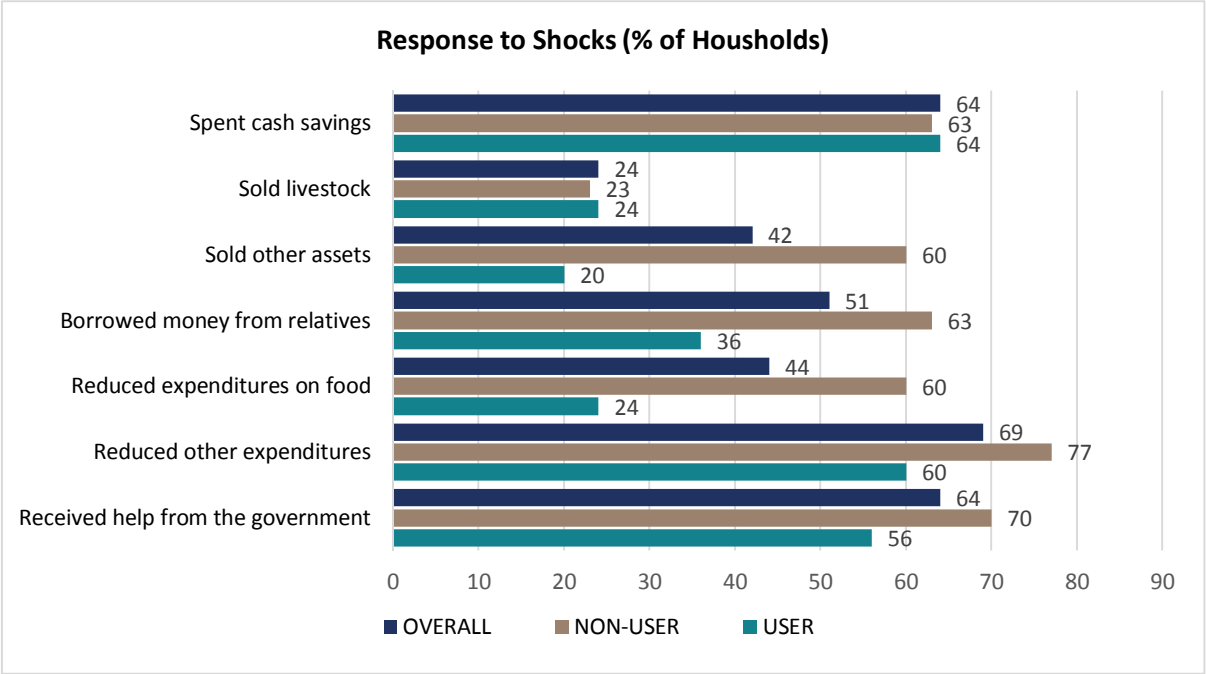
the most common disease facing maize farmers as well as a fly pest capable of destroying an entire harvest by attacking maize seeds.



55% of sample households believe that a large rise in food prices have negatively and severely affected them whilst 49% of households also believe that a large fall in sale prices of crops has affected their livelihood position. The end result is income loss which is regarded as the biggest impact affecting their livelihood and this is equally true for both users and non-users of hybrid maize. Illness of a family member is also a challenge for farmer households and causes a decline in income levels. Dengue fever is prevalent in Sumenep. A pertinent issue is a reduced farm workforce rather than the cost associated with treatment as most farmers can access Jemkesmas, a free government program to cover health expenditures for poor people.

Users of hybrid maize in general experience less shocks than non-users. However, crop sales and crop diseases/pests are experienced slightly more by users, and this suggests that the use of hybrid maize or farmer agricultural practices are not sufficient enough to avoid these shocks. The percentage of household respondents reporting droughts as a major shock in Sumenep is 33%, which reflects one of the reasons for having difficult months being limited access to water. Surprisingly, users experience slightly less shocks from droughts than non-users, despite hybrid maize requiring more water. Could it be because they are better off and put in place contingencies?

The most common strategies adopted and reported by farmers to cope with or overcome these shocks are (in order of importance) reducing other expenditures , spending their cash savings, receiving help from the government, borrowing money from relatives and reducing expenditure on food.



The largest gap between the ways user and non-user farmers respond to shocks are selling other assets, borrowing money from relatives, reducing expenditures on food, reducing other expenditures, and receiving help from the government. Non-users resort to these methods significantly more than users.

Non-users and users both are equal at responding to shocks by spending cash savings and selling livestock. Overall users do not resort to as many options to overcome shocks as non-users, suggesting that the latter are either more dependent on outside help or more vulnerable.

The qualitative findings show that seasonality strongly influences farmers' livelihood patterns and their vulnerability pattern in all three villages sampled. The end of the dry season (August through October) is considered tough and farming is limited to fewer crops such as tobacco and beans. To cope, some farmers leave their fields idle whilst others with access to irrigation cultivate more crops. Farmers who do not cultivate any crops during the dry months search for additional income sources as a common coping strategy. For example, they work as farm labourers during the harvest in other farms or emigrate to other places to work, even as far as Malaysia or Kalimantan.

6. Choices and Livelihood Strategies[8]

Further to understanding the assets farmers have access to and the vulnerability context, this section aims at discuss how farmers use and combine their assets to make a living. The drivers behind farmer behaviour given the asset available to them may be to:

- meet basic needs
- protect assets i.e. minimize exposure to risk or increase coping capacity
- increase assets/income
- increase consumption.

These priorities can be discussed broadly under income sources and expenditures with an emphasis on evaluating the behaviours of both users and non-users of hybrid maize. Do they behave differently? If so, what might the reasons be?

[8] The term livelihood strategy is used to describe the range and combination of activities and choices that people make in order to achieve their livelihood goals (Livelihood Strategies, Thomason Kalinda and Augustine Langyintuo, 2014)

6.1. Income Sources

According to the Ministry of Agriculture, almost 70% of the population in Sumenep are farmers. Despite the prevalence of farming, other sources of income have become vital in Madura because the soil is not well suited for all agricultural crops. Cattle breading for example is both an important source of income and an essential part of Madurese culture which manifests itself in the famous Madurese bull race. Based on the qualitative study, tough environmental conditions and low yield have caused some emigration of the Madurese people and even today, migrant work remains one strategy to earn a living. Within some households, at least one person temporarily works abroad. Emigration was specifically mentioned in the qualitative data in Telaga, where young people are more inclined to leave the villages to find work in Malaysia, Surabaya and Ambon because of the lack of employment opportunities.

According to the quantitative data, income sources are the same for users and non-users of hybrid maize. As the sample includes households engaging in maize farming, all households derive income from agriculture with an average of 3 people from each household participating in this sector. Nearly 10% of households have members with permanent jobs, 20% casual jobs and 20% household enterprises. Within the community in general, the qualitative focus groups overall revealed that farming (food and cash crops) accounts for the largest share of total household income. In Kambingan Timor and Telaga, 90% of the population are farmers whilst in Campor Barat the figure is 70%. Other sources of income mentioned in the overall community are farm labour (in all villages), sailor (Kambingan Timor), fishermen (Campor Barat), government officer and teacher, raising livestock (Telaga, Campor Barat) and small shops or warung (mentioned in the women focus groups in Campor Barat). In Campor Barat, 70% of all households breed livestock in order to realise additional income.

Apart from maize which is the main cultivated crop in the region, the alternatives are limited. Most of the arable land in Sumenep is dry with minimal rainfall. Therefore, in districts without irrigation, maize is usually planted during the rainy season. During the second half of dry season (MK2), farmers typically plant tobacco. However, given the falling price of tobacco and small margins, some farmers prefer not to cultivate anything at all and leave their land idle. For this reason the government has encouraged the production of vegetables as a substitute to tobacco over the past five years.

Table 6: Planting seasons for different crops based on land types [9]

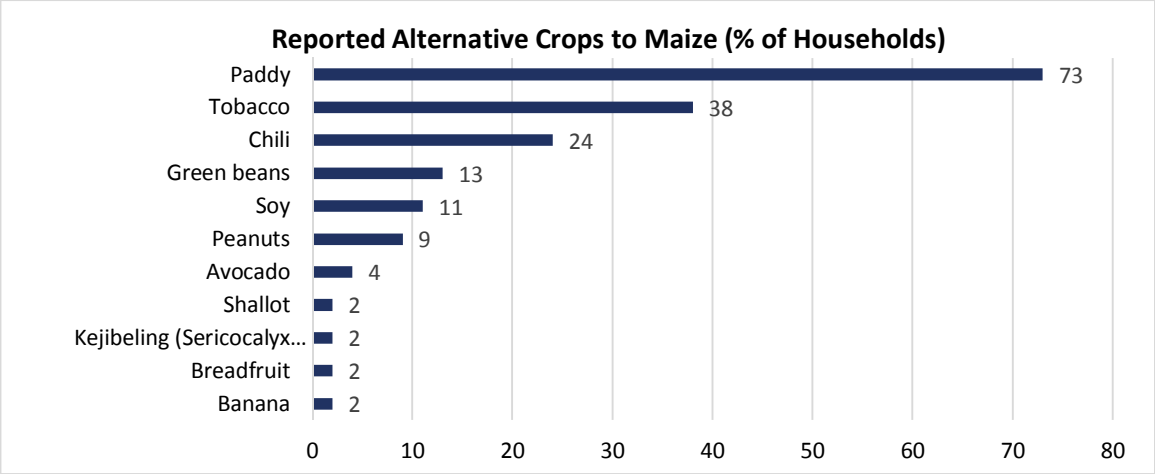
Land type	Sept - Dec	Jan – April	May - Aug
Wetland	Paddy	Paddy	Tobacco/Beans*
Dry land	Maize	Maize	Tobacco / Beans*
Irrigated wetland	Paddy	Paddy	Tobacco / Beans*
Irrigated dry land	Paddy	Maize	Tobacco / Beans*

*The split between tobacco and beans is approximately 60/40. Beans includes soybean and mungbean.

There are three main planting seasons overall and the crops cultivated are generally dependent on the season as shown in the table above. However some farmers plant a combination of local maize and beans

[9] Information from the PRISMA team and validated through qualitative data

between the 2nd and 3rd planting seasons, thus having four planting seasons in total. This depends on the type of maize or mix the farmer uses. For example, local varieties of maize generally require 70 – 80 days before harvest is ready, while hybrid maize variety require around 95 – 115 days.



Alternative crops have and always will be important to farmers, especially as it will have some impact on their livelihood. The most frequently mentioned alternative crop to maize are paddy and tobacco (despite falling prices). Only 25% of the agricultural land in Sumenep is suitable for paddy (wetland) making it an impractical alternative to maize for many. Paddy inputs (seeds and fertilizer) are expensive for farmers and other related expenses for paddy cultivation are financed from the prior harvest returns (i.e. farmers sell tobacco to buy inputs for paddy).

Tobacco demands the most investment in terms of time and finances from farmers. The largest cost associated with cultivating tobacco is farm labour wages as the crop requires a considerable work force, especially during the harvest.

In terms of income or financial return, tobacco is perceived as the most important crop in Sumenep, followed by paddy and maize. Tobacco is high in the ranking because it is (wrongly) perceived by farmers in the region to bring about bulk, one-off cash rewards as opposed to regular inflows from other crops spread over a longer space of time. According to the Ministry of Agriculture, tobacco is the most important crop for profit. Tobacco can be considered a high risk crop because of the significant investment required for its cultivation and the volatility of its market price. Nevertheless farmers continue to cultivate it despite the falling selling prices over the past few years. In reality, farmers have been experiencing losses, and qualitative study suggests two main reasons for continuing to invest in tobacco: first, farmers have been planting tobacco for a long time and tradition plays a pivotal role in decision making. Second, farmers perceive their successes and failures based on other community members. Thus, losses in tobacco cultivation are not considered "real losses" or failures so long as all other farmers within the community experience the same[10]. The "distorted" perception of risk might be a consequence of the strong social cohesion in within the community.

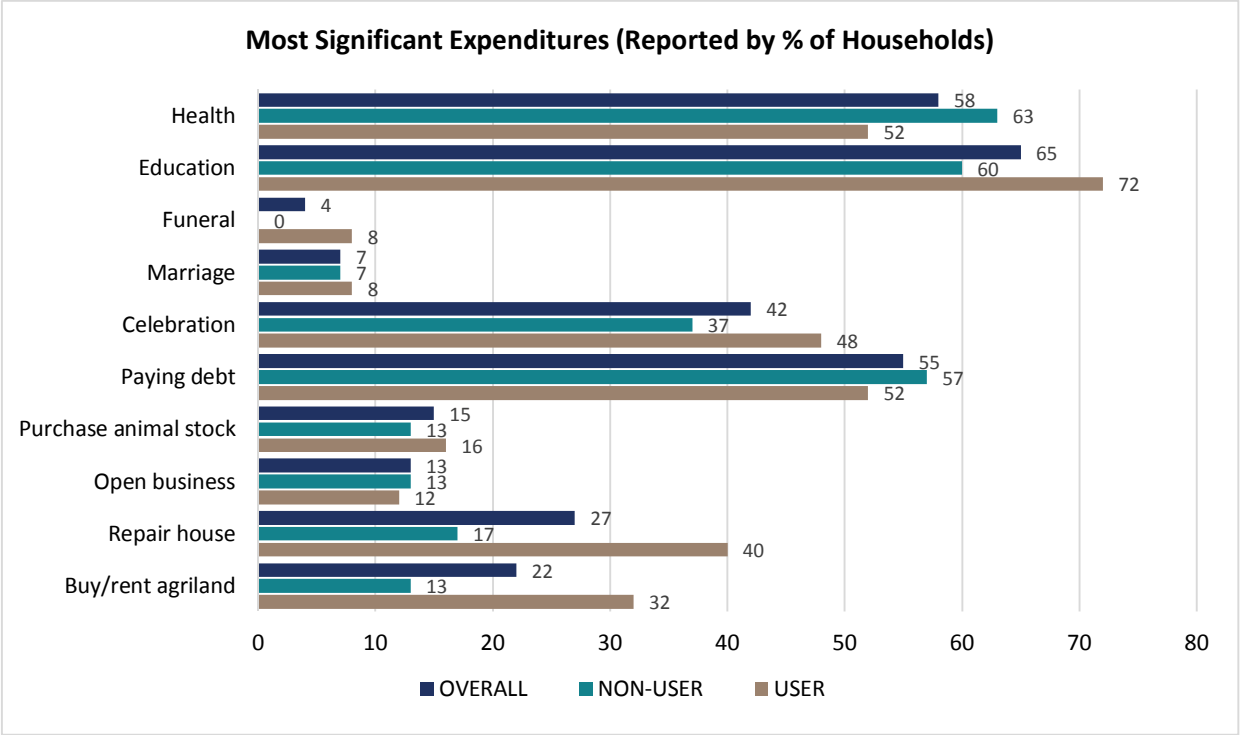
Since agriculture is predominant in this region, any intervention supporting further agricultural development will be met with little resistance. This means, in many ways, that PRISMA chose the right sector. Secondly, as maize is a food and crop for farmers in this region, promoting activities that increase its potential can only subsequently increase their income. Thirdly, since paddy and tobacco are alternative crops to maize but considered expensive to cultivate, there is an opportunity for the PRISMA team to consider investing

[10] According to the PRISMA team

in maize-related support (especially the local variety) or consider other types of support that reduce the costs associated with cultivating paddy and tobacco.

6.2. Expenditures

The main household expenditure items recorded from the qualitative data are education (school fees, uniform, books, and transportation) and crop inputs. Education is a priority for farmer households and finances are managed in a way that ensures this is always covered; whenever possible. Although none of the qualitative respondents mentioned home renovation as an important expenditure item, significant improvements in house quality when given the opportunity (primarily in Kambingan Timur) may suggest this to be of importance to farmers.



The data from the survey supports the above qualitative results because the most significant expenditure recorded and in order of importance are education, health, paying debts, celebrations and home repair and these results are the same across all villages and across different PPI groups. Non-users of hybrid maize experience more expenditure with regards to paying debts than users, perhaps suggesting an income boost in hybrid maize farmers. Expenditure related to house reconstruction and buying or renting agricultural land is higher amongst users of hybrid maize than non-users, also implying a better income level of hybrid maize farmers.

According to qualitative data, education and health are financed through cash from savings whilst repaying debts come from selling assets and this behaviour is consistent across all villages. But this slightly contradicts other qualitative findings that suggest households have limited cash savings. As the expenditure pattern is the same across different PPI groups the PRISMA team may consider focusing on improving the overall income levels of farmers. This may give them (farmers) the liberty to shift focus from prioritised areas of expenditure (education and health) to other expenditures, such as investing in more agricultural and non-agricultural income generating assets, which in the long run could lead to improved standard of living and greater economic positon. On the flip side, continual household investment or expenditure in education may lead to increased emigration of the younger generation in search of better opportunities, potentially farm labour. Therefore an informed balance of possible outcomes should be considered.

7. Determinants and Mechanisms for Decision Making

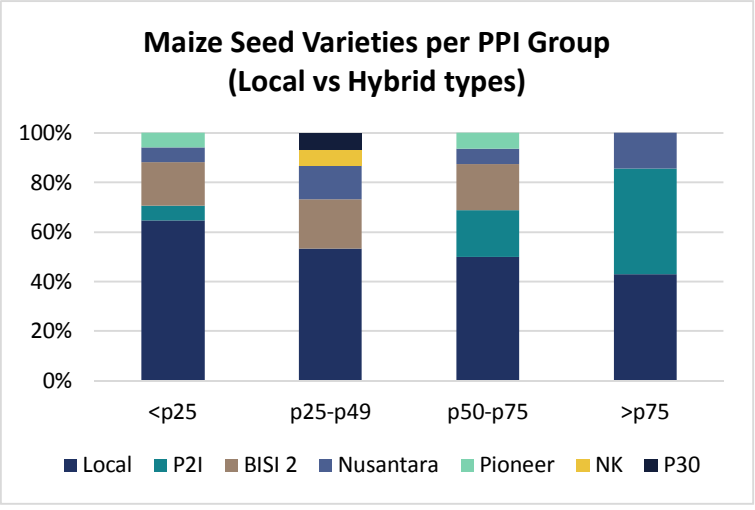
This section aims to understand the rationale and mechanisms for decision-making in relation to the livelihood assets, strategies and priorities already discussed – with a focus on maize-related decisions. If livelihood decisions made are based on assets available and the perceived costs and benefits required, this section proposes to identify assets required for planting hybrid maize and discuss farmers' perception of cost, benefit and risk. Vital assets required for cultivation of hybrid maize mentioned by farmers include access to water for irrigation purposes and access to finance required to cover additional input costs. Some others are access to information about farming practice and a sizeable workforce.

7.1. Hybrid maize versus local maize

Of the reasons given for cultivating maize, tradition/hereditary (85%) comes first and the availability of a new variety is given in only 2% of the responses. Could more effort be made on "selling" the benefits of any improved new variety? Some possible channels for doing this may be via religious leaders and farmer groups who are trusted within the region.

20% of all farmers in the sample have experienced increase in yield, and of these, 36% stated the reason for any increase was because of a new seed variety. But some farmers have experienced a decline because of climate change. Despite this farmers never consider opting out of cultivating maize as an option.

The most frequent reason for using the local maize variety is due to its storability and consumption quality or taste. On the other hand, the reasons for using the hybrid variety is mainly because of higher growth and better production quality. There is the additional benefit of getting better selling prices and this is true across all PPI groups.



Since storage of local variety (for non-users) and the cost of the hybrid seed (for users) are recurring issues, especially amongst the poorest groups, the PRISMA team may wish to investigate and consider options capable of supporting farmers to tackle these problems. Targeting both of these issues may ultimately lead to more poor households having better livelihood positions regardless of whether they choose the local or hybrid variety. Collaborating with farm shops as input providers should be seriously considered, as over 70% of hybrid users surveyed stated their preference of purchasing seeds from them. Farm shops are one of the most trusted source of inputs for both users and non-users, as are their neighbours, with the reason given as proximity to their homes. The main sources of input information in general for users and non-users are farmer groups first and then extension workers, before relatives and neighbours. This is the same for getting information about market prices. Interestingly some households consider traders as an important source of input information even though they also express mistrust of them.

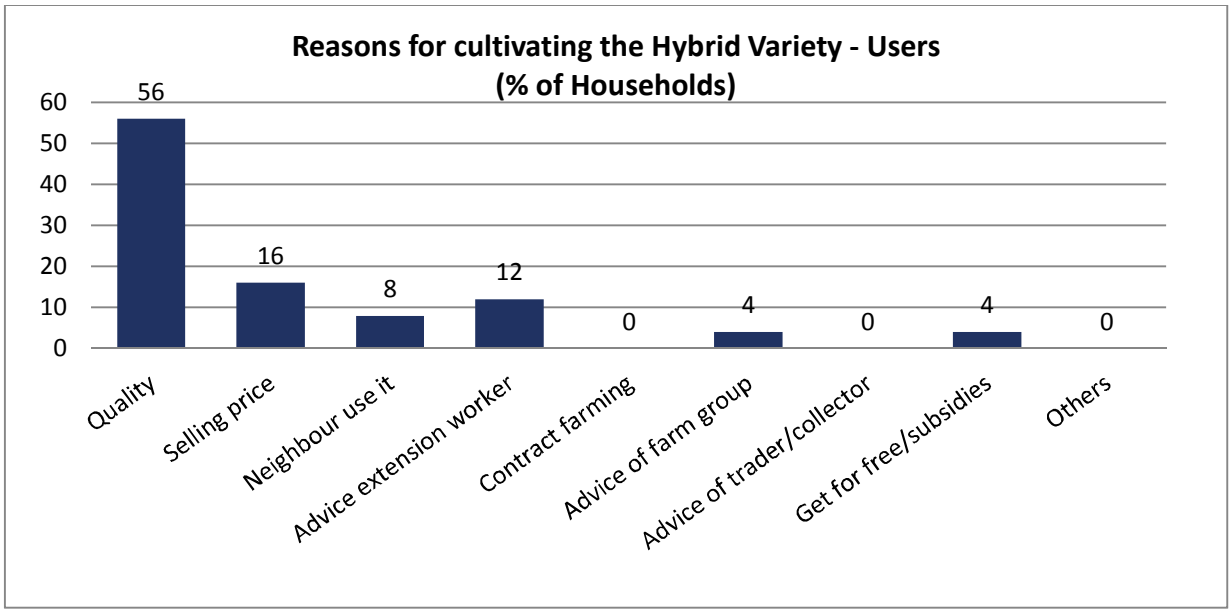
Results from the qualitative findings support those from the quantitative studies. If one considers the distribution of maize varieties per PPI group, it suggests farmers more likely to be poor primarily cultivate the local variety while farmers more likely to be better-off cultivate hybrid maize. Most farmers report to getting their seeds at the Agro Input Shop (over 70% of users and over 20% of non-users). Farmers group is also a trusted source with 22% of the users and 6% of the non-users getting their seeds from this source. Another source mentioned is 'neighbours and family' (15% of non-users and 3% of users). 56% of non-users retain the seeds from the previous harvest.

Looking at the differences across PPI groups, farmers more likely to be better-off buy at the shop while farmers likely to be poor retain their seeds from previous harvests or get from neighbours, family or farmers groups. Getting seeds from neighbours or family does not mean that they are acquired without any cost, but rather that farmers ask neighbours or family to buy for them when going to the shop and make the appropriate payment.

7.2. Users and Non-users of Hybrid Maize

On average farmers have been cultivating the hybrid variety for 4.5 years and non-users of the hybrid variety actively seek advice on agricultural practises more than users do. In both Kambingan Timur and Campor Barat the first use of hybrid seeds was 9 years ago (2006). Since then and according to qualitative studies, the number of users have continuously increased with a peak in 2010, when the biggest number of new users was reported. According to the Ministry of Agriculture, the reasons farmers' prefer the local variety include:

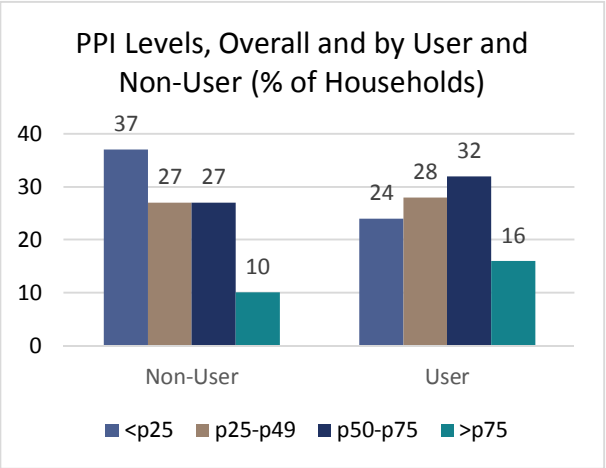
- Reduced cultivation time i.e. 60-70 days. Farmer are able to plant two times during rainy season. On the other hand, hybrid seeds need 90-100 days cultivation time and one planting season during the rainy season.
- Lower post-harvest vulnerability. Farmers can store local maize throughout the year and in their houses. Hybrid seeds cannot be stored for a long time.
- Ease of cultivation i.e. it is simple and does not require a lot of work or knowledge. Hybrid maize on the other hand requires more care e.g. mounding.
- Lower investment as farmers can retain seeds from previous harvests. Hybrid seeds are expensive, about 50'000-60'000 IDR per kilogram. For one ha 25kg is usually required. Local seeds do not require any investments because farmers can retain seeds from the last harvest.
- Taste



The survey findings show 50% of non-users state that durability (storage life of seeds) as the main reason for not using hybrid varieties. The higher price of seeds is also viewed as a significant reason to not plant

hybrid. Some respondents (17%) also indicate not preferring the taste of hybrid maize, suggesting that there is a perceptive taste difference between the local variety and hybrid.

For hybrid users, the survey findings show various reasons for cultivating hybrid variety with higher quality being by far the most important reason, followed by a higher selling price.



Referring to table 4 to compare PPI among the sampled farmers, about 64% of non-users fall within the poorest and poor quadrants, compared to 54% of hybrid maize users. Almost half of users fall in the middle and better off quadrants, while a little over a third of non-users are in these categories. This may suggest that cultivating the hybrid variety potentially increases the income of farmers' and improves their livelihood position more than farmers cultivating the local variety. However, this could also mean that better off farmers with higher PPI scores can afford the higher hybrid seed prices, and more study is needed in order to fully understand differences among PPI in user and non-user households.

8. Decision-Making: Mechanisms

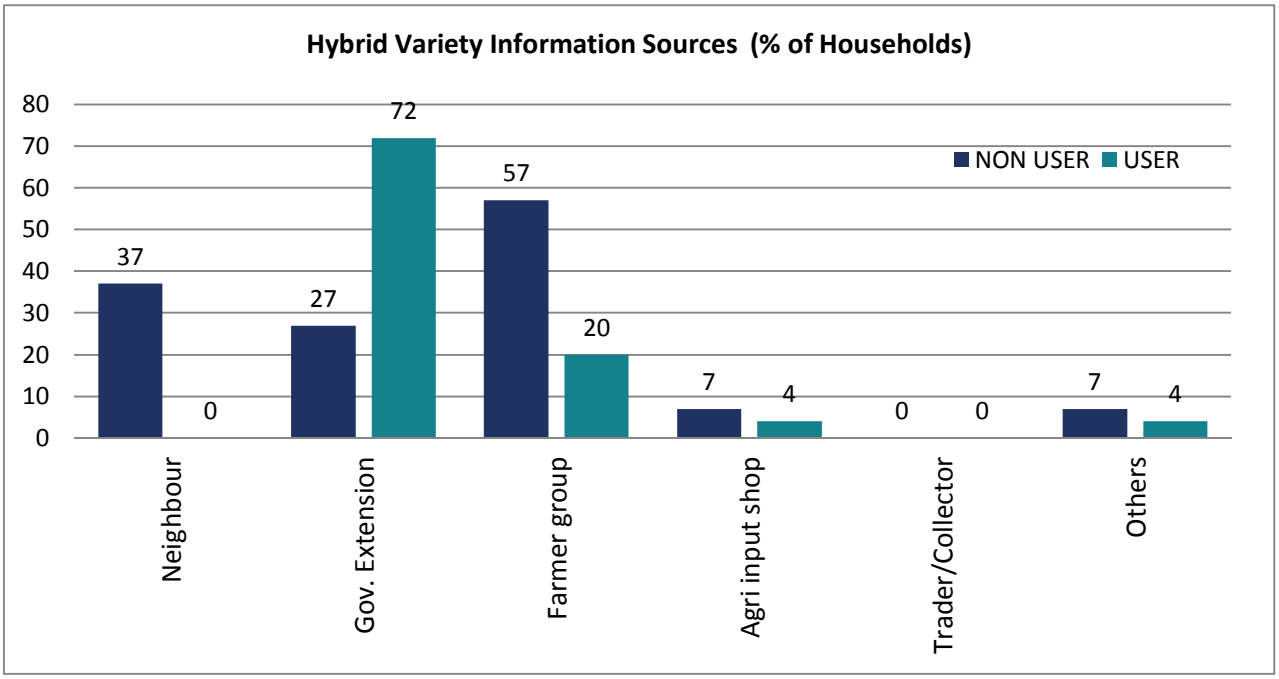
In order to better understand how decisions about maize are made the study focuses on three questions:

- What sources do farmers rely on in order to get information required for making decisions?
- Who in the household is involved in decision-making?
- Who outside of the household is involved in or influences the decision?

8.1. Sources of Information

The source of information is a precondition for decision-making. In terms of agricultural information, the usual communication line in the sample villages is from the government extension worker to the head of farmer group first and then from the head of the farmer group to its members as a secondary source. Non-members of social groups can access the information from their neighbours. When questions about agriculture and agricultural practises arise, farmers ask the head of a farmer group. If the head has no answer, the farmer will then consult with the extension worker.

With regards crop choices, some farmers ask their religious leaders for advice, for example, would they recommend to planting tobacco in the coming season? Access to information about market prices is mentioned as a challenge and farmers mainly rely on their observations of the local markets.



All respondents of the survey have heard about hybrid maize seeds and the information sources vary depending on users vs non-users. For users, the most common source of information is from government extension workers, followed by farmers groups. For non-users, farmers groups was the primary information source, followed by neighbours and government extension workers. This suggests slightly different intervention strategies when marketing the use of hybrid seeds depending on if the target groups are already users or non-users of hybrid maize.

8.2. Decision-making roles within the Household

The decision-making roles within the household defer between the sample villages. In Campor Barat male dominance with respect to maize-related decision making is strong. Kambingan Timur shows a similar picture but with some female involvement (this may be partly but not only explained by the two women headed household in the sample). In Telaga female involvement in decision-making is highest. A possible conclusion might therefore be that women are more involved in decisions on food crops, which directly concern the household consumption needs. Decisions on cash crops on the other hand are strongly dominated by men. This could imply that shifting habits towards hybrid maize cultivation, if viewed as a cash crop, might diminish women's decision-making power within the household.

Overall, decisions about the production of maize, cultivation and maintenance are mainly made by men, especially as a cash crop. Women are more often involved in decisions on post-harvest activities as well as marketing (when to sell and to whom) and decisions about borrowing money.[11] The table below summarises gender roles in the cultivation of maize.

[11] Detailed information on different decisions along the production and merchandise of maize can be found in the dataset.

Table 7: Gender specific activities related to Maize[12]

ACTIVITY	F	M	DESCRIPTION
Decision on crop and seed variety to be planted	X	X	Decisions about crops and varieties are made by men and women together.
Land Preparation • Ploughing	-	X	Land preparation is 100% a male task.
Planting • Make planting hole • Plant the seed	- X	X -	Both men and women are involved in planting. Usually men dig up the planting hole and women put in the seeds.
Maintenance • Irrigation • Watering • Apply fertilizer • Apply manure • Pest control (spraying) • Piling the land (mounding) • Clean the weed	- X X X - - X	X - - X X X -	Both men and women are involved in the maintenance of the field but have different responsibilities. Irrigation is usually the responsibility of men, but women sometimes help water plants. Applying chemical fertilizer is a female task but applying manure is done by men and women. Men are in charge of spraying pesticides. (Most women actually know how to spray pesticides because they attended a training from the extension worker, but due to the weight of the spray tank, men do it instead). Mounding is a men's task and clearing the weed is a women's task.
Harvesting • Picking corn • Collect the corn • Take the corn to house	X X -	X X X	Both men and women are engaged in harvesting.
Post-harvest • Drying • Peeling (taking of the husk)	X X	- -	Drying the corn is a done by women. Taking of the corn husk, despite being a time consuming activity, is done by women, usually around 10am, when they come back from the fields.
Marketing • Decide where to sell (price survey) • Bargaining price • Selling	X X X	X - -	Corn is normally sold to retailers (kios). Usually women decide where to sell the corn because they know which kios offers the best price. Women are the price negotiators and the actual selling process is undertaken by them. They deliver the corn in becak (1-2 sacks) but if the quantity is large, the men take over the delivery.
Financial Management	X	-	Women typically save the HH income and make decisions on household expenditures for consumption.

8.3. Social dynamics of decision-making within the community

As discussed previously, social networks are exceptionally strong in Sumenep. This social cohesion can potentially have a big impact on decision-making, which can be illustrated when looking at the reasons farmers invest in tobacco cultivation.

The most dominant social groups in Sumenep, in order of ranking, are farmer groups, religious groups, female religious groups and female farmer groups. The importance of social networks is also reflected in the number of group memberships per household. Both qualitative and quantitative findings emphasise the importance of farmer groups as a source of agriculture-related information (see section 8.1) having the highest participation rate; and farmers pay an average annual fee of IDR 66,000. Religious groups charge a higher annual fee of around IDR 97,000 but have a lower participation rate of around 53%. By far, the most significant benefit attributable to joining a farmers group is getting information on good agricultural practises (58%), followed by getting affordable seeds (19%) and inputs (14%). Other functions of farmer groups mentioned include:

[12] Focus Group Discussion with Women Farmer Group in Campor Barat

- Access to subsidised inputs: The farmer group is the main distribution channel for subsidised agro-inputs from the government (mainly seeds and fertilizer). These inputs are distributed to a selection of registered farmer groups by the Ministry of Agriculture and ultimately passed on to its members by the head of farmer group. Because government subsidies are not equally distributed to farmer groups and members, social structures, politics and power structures can significantly affect farmers' livelihoods.
- Access to finance: Some farmer groups have an established savings-borrowing system called "arisan"[13] which is practiced mostly in farmer group meetings, but is not solely affiliated to farmer groups.
- Access to agricultural tools: Most farmer groups have a tractor, provided by the government but it's not clear if it is accessible to all or only specific farmer group members.

It is recommended that the PRISMA team understand the importance of these social groups and identify key allies and potential blockers. Knowing about and understanding the politics at play within the community can have significant impact on the success or failure of any intervention.

9. Conclusions

In summary, the following conclusions are drawn from this study:

The PRISMA Maize team have successfully targeted poor Maize farmers but not the poorest farmers according to the resulting PPI scores. The data in this study can be used as a tool to locate and target the poorest farmers in Madura, and understand their livelihood profile and decision making mechanisms of the poorest groups.

On average, households in the region have around 4 members and are headed by a 47 year old male with a 40 year old spouse. Both have completed elementary school and have one or two children over 16 who have attended junior high school. Heads of households are usually literate in Bahasa.

Farmer households prioritise expenditure on education and health despite the high costs. There are no significant differences between user and non-users of hybrid maize in this regard.

Most households own their homes and many have access to certain household assets such as radios, televisions, bicycles, stoves, storage facilities, threshing machines and tractors. **Farmers do not readily have access to computers, fixed landlines, refrigerators, sewing and drying machines.** PRISMA may wish to consider interventions which capitalise on assets readily available or accessible to households rather than those which are not.

Most farmer households have on average 0.48 hectares of cultivated land inherited from their parents and backed by a government ownership certificate, and 0.66 hectares of uncultivated land. Could this a point for the PRISMA team to consider when designing or revising interventions? For example, what other land uses or additional crops might be recommended to farmers capable of improving their livelihood position?

[13] Arisan is a widespread saving practice in the villages, mostly affiliated with the farmer groups. The Arisan is a form of rotating savings and credit association and can be used as a tool of microfinance. Each member pays a regular deposit. The rotating arisan holder (drawn by lots) receives the payments from all the other members. In the course of the arisan the amount paid to other members will equal the amount received when the Arisan is helped.

Social life and everyday activities are strongly influenced by Islam and the religious leader is commonly the most important figure. Family ties are important to the Madurese people and social cohesion very strong. **The most dominant social groups in order of ranking are farmer groups, religious groups, female religious groups and female farmer groups.**

Farmer perception of risk is strongly related to the community, farmers perceive success and failure relative to the success and failure of others. Therefore, it might be difficult to find innovative-lead farmers ready for change. The PRISMA team may wish to consider options that involve or engage communities as a whole.

Most households have no cash savings and do not operate bank accounts. Those with savings either keep savings at home or invest in crops (maize, paddy and tobacco), livestock (chickens, cattle and goats) or jewellery. When deciding which possible areas to support, all crops and livestock should be carefully analysed by the PRISMA team to determine income and livelihood enhancement potential. Also, the opportunity costs associated with choosing one crop/livestock over another should be carefully considered as it may have significant impact on livelihood position of this community.

Each village reveals differing perceptions of poor, middle-income, and better-off, but **common perceptions of poverty are a lack of mobility and sub-standard housing.** It is clear that communities in close proximity to the urban regions generally experience greater development as is the case in Kambingan Timur.

The most difficult months in which households experience shocks are January, February and December, but this contrasts with the period households have less than enough food - which is June and October. To cope it appears households are inclined to rely on food aid from the government first, then alternative foods before ultimately reducing food intake. This pattern is the same for both users and non-users of hybrid maize. The most frequent reasons for difficult months are a lack of money and limited access to water. The PRISMA team might want to consider activities which do not require any financial outlays during these difficult months. On the other hand, they might want to consider partnering with the government to provide aid in a more efficient way which ensures reaches those most likely to be vulnerable.

Crop disease or crop pests present the biggest challenge for maize farmers in the region. In addition, illness in the family, a large rise in food prices as well as a large fall in sale prices of crops severely affects the livelihood position of both users and non-users of hybrid maize. The most common strategies adopted and reported by farmers to cope with these shocks are (in order of importance) reducing non-food expenditures, spending their cash savings, receiving help from the government, borrowing money from relatives and reducing expenditure on food. In general, non-users of hybrid maize resort to more diverse coping strategies than users.

The most frequently mentioned alternative crop to maize are paddy and tobacco (despite falling prices). Tobacco is high in the ranking because it is (wrongly) perceived to bring about bulk, one-off cash rewards as opposed to regular inflows from other crops spread over a longer space of time. As paddy and tobacco are alternative crops to maize but considered expensive to cultivate, there is an opportunity for the PRISMA team to consider investing in maize-related support (especially the local variety) or consider other types of support that reduce the cost of cultivating paddy and tobacco.

The most significant expenditure for farmers (and in order of importance) are education, health and paying debts. Non-users of hybrid maize experience greater expenditure on these than users, suggesting an income boost in hybrid maize farmers. Education and health are financed through cash from savings whilst repaying debts come from selling assets. As the expenditure pattern is the same

across different PPI groups the PRISMA team may consider focusing on improving the overall income levels of non-user farmers. This may give them the liberty to shift focus from prioritised areas of expenditure to other necessary expenditures, which in the long run could lead to improved standard of living and greater economic positon.

In general, when comparisons are made across different poverty levels, the data from the quantitative study reports a **higher number of households with lower PPI scores amongst non-users of hybrid maize than users.** This could indicate an income boost to farmers using hybrid seed (users with higher PPI), but it could also mean that farmers using hybrid seed already have higher income levels and therefore poised to afford higher seed prices. More specific research is required in order to make any definitive conclusion.

Storage of local variety (for non-users) and the cost of the hybrid seed (for users) are recurring issues, especially amongst the poorest groups. Therefore the PRISMA team may wish to investigate and consider options capable of supporting farmers to tackle these problems.

Access to information about market prices is a constraint reported by farmers in the region and an intervention to overcome this might be considered by the PRISMA team. Agro input/Farm shops as input providers should also be targeted by the PRISMA team as these are the most trusted source of inputs, considering the main source of input information are farmer groups (for both users and non-users of hybrid maize). Government extension workers as well as religious leaders are trusted sources of agriculture-related information. Therefore building good partnerships with these stakeholders and understanding any of the politics at play can only help the positive implementation of any intervention.

Women are more involved in decisions on food crops, which directly concern the household consumption needs whilst decisions on cash crops are dominated by men. This might imply that shifting habits towards hybrid maize cultivation, if viewed as a cash crop, might diminish women's decision-making power within the household. Decisions in general about maize cultivation and maintenance are mainly made by men. Women are more often involved in decisions on post-harvest activities as well as marketing (when to sell and to whom) and decisions about borrowing money.

These conclusions have been discussed broadly with the PRISMA Maize Madura team and they expressed satisfaction with its content. These findings have validated information already known to the team and provides additional insight into opportunities to explore for the future. For example the knowledge about the importance of social groups and frequently used sources of information will increase their chances of success for effectively targeting farmers' in social marketing campaigns.

In addition, the idea of tackling constraints around the local maize variety and making it more available and profitable for farmers is also already underway. This will, in many respects, compliment hybrid maize promotion, thus potentially increasing incomes for both user and non-users.