

# Evaluation Report

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## Indonesia Rural Economic Development Project (IRED)

**Project and evaluation funded by the Australian  
Government Department of Foreign Affairs and Trade  
ANCP**

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**Independent Evaluation completed by:**

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Commissioned by World Vision Australia and World Vision Indonesia

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# Executive Summary

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## Indonesia Rural Economic Development (IRED) Project

### East Sumba, Indonesia

Funded by Australian Department of Foreign Affairs and Trade under its ANCP Grant, and private donations from the people of Australia

## Introduction and context

Despite experiencing strengthened macroeconomic achievements and democratisation, Indonesia is still haunted by the problem of systemic poverty. One of the pockets of poverty in Indonesia is in the sub-district of Haharu, East Sumba, East Nusa Tenggara Province. According to the SMERU Research Institute (2018) estimate, in 2015 more than half (54%) of the population of East Nusa Tenggara (54%) and East Sumba (53%) were categorised as poor according to international standards (Purchasing Power Parity – PPP) of USD3.1. The poverty rate in East Nusa Tenggara is the highest in Indonesia. The high level of poverty is due to the very low productivity growth in the agriculture, forestry and fisheries sectors that are the mainstay of 90% of the population of East Nusa Tenggara (Bank Indonesia, 2015). Agricultural productivity only grew by 3.1% per year and therefore home consumption - which is the basis for poverty estimation - grew at a low 3.4% per year). In 2016, the value of consumption per person in Haharu District only reached USD1.90, which is only 65% of the PPP poverty line, meaning that a productivity increase of around 54% was needed for the average person in Haharu to escape poverty. The majority of Haharu residents are ethnic Sumba, have formal education below high school, and are peasant farmers whose income depends on small livestock, such as chickens, goats and pigs, and seasonal food crops, such as corn and peanuts.

In order to reach a 54% growth in agricultural yields from an average of 3.1% per year, a positive shock is needed to the existing farming system. Generally, the agricultural system in Haharu depends on rainfall, even though the number of rainy days is deficient, with only about 68 days a year. High dependence on rainfall has resulted in low farm productivity. The low yields combined with adverse economic shocks because continuous high spending for death and marriage festivals strengthens the grip of the poverty trap. To combat this poverty trap, positive technological shocks are needed to boost agricultural productivity and continuously increase farmers' incomes until poverty is alleviated.

## Project Design

World Vision's Indonesia Rural Economic Development Program (IRED) has been designed to increase sustainable economic development of Sumba island through a combination of Farmer Managed Natural Regeneration (FMNR) and local value chain development (LVCD) for seven villages in Haharu, East Sumba. Funded by the Australian Government through the Australian NGO Cooperative Program (ANCP), the project aimed to expand the successfully trialled, Farmer Managed Natural Regeneration (FMNR) and other agroforestry systems to help farmers regenerate degraded farmlands, increase crop yields, improve product quality, enhance market access and boost incomes.

The program commenced as a one-year pilot in 2015-16 and was then extended to a five-year scaled-up program. This builds on the successes and lessons of the ANCP-funded 'Increase Food Security

Within the Community through Sustainable Livelihood and Natural Resource Management System' (INFOCUS) program, and World Vision Australia's Feasibility Study on the 'Commercialisation of FMNR', focussing on East Sumba, Nusa Tenggara Timur.

The key project outcomes were:

Outcome 1: Rehabilitation of landscape and natural resources

Outcome 2: Increased community's sustainable income

Outcome 3: Increased capacity of community (including children) to conduct environmental engagement

Outcome 4: Strengthened good governance to endorse FMNR+ and LVCD

## The Evaluation

The purpose of the Evaluation is to *assess project performance, changes, and impact on the improvement of landscape, livelihood, and welfare of target households and community*. This assessment includes measurement of key indicators for comparison with baseline information to measure change, as well as extensive qualitative data collection to provide insights into how change was achieved and barriers faced. The results are used to measure project results against its design objectives and inform future project designs in this sector.

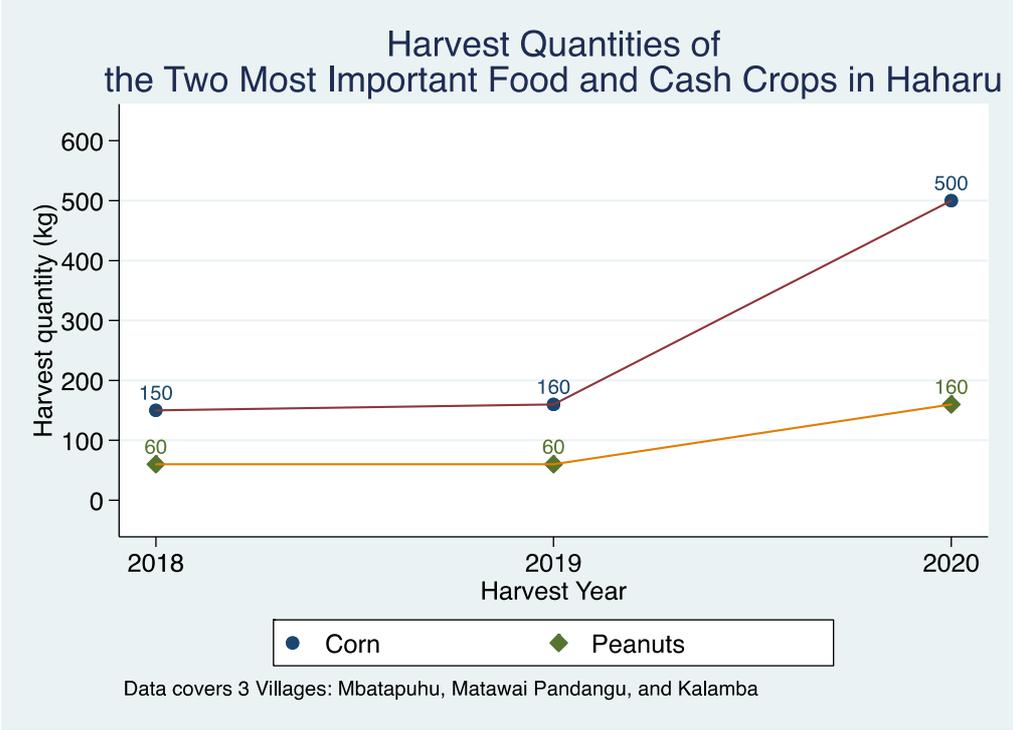
The Evaluation used a mixed-methods approach. The quantitative method used panel data analysis of 277 households, whilst the qualitative method used content analysis of data collected through key informant interviews and focus group discussions. Fieldwork was completed during the second to fourth weeks of March 2020.

The Evaluation was carried by six researchers from CREDOS Institute with mixed training and experience in economics, agroindustry, agronomy, forestry, regional development, and communication studies.

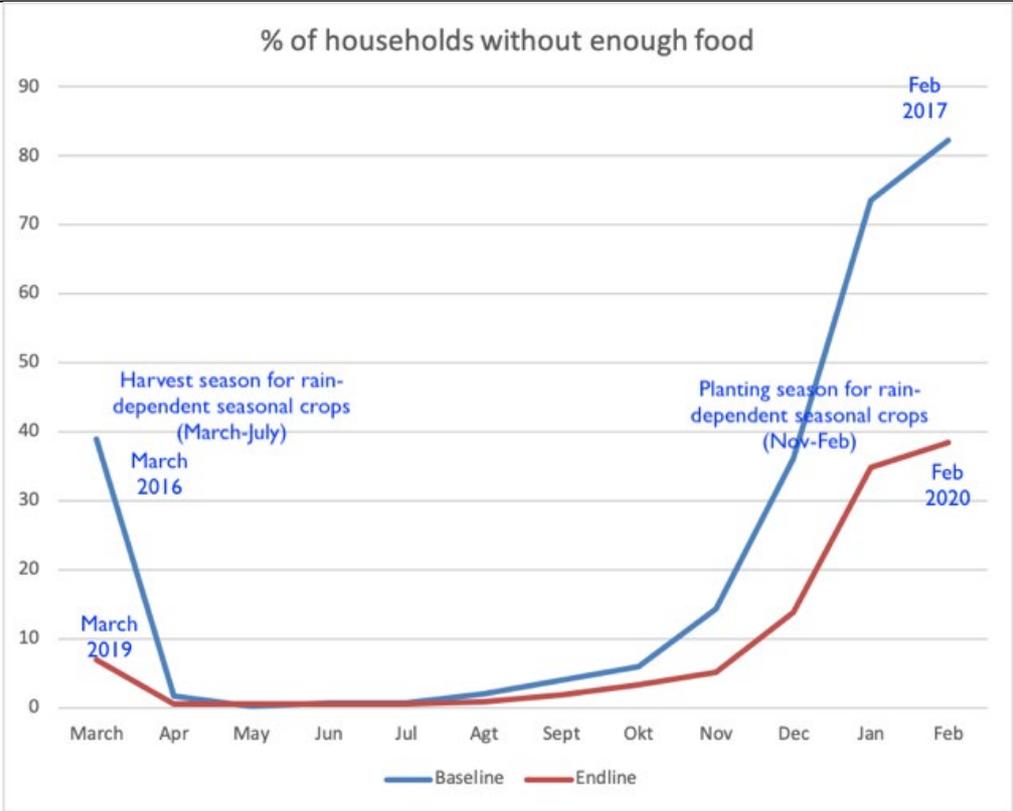
## Main Findings

**Goal: to increase sustainable economic development for 6,565 community members in economically deprived and land-degraded areas of Sumba Island through FMNR+ and LVCD**

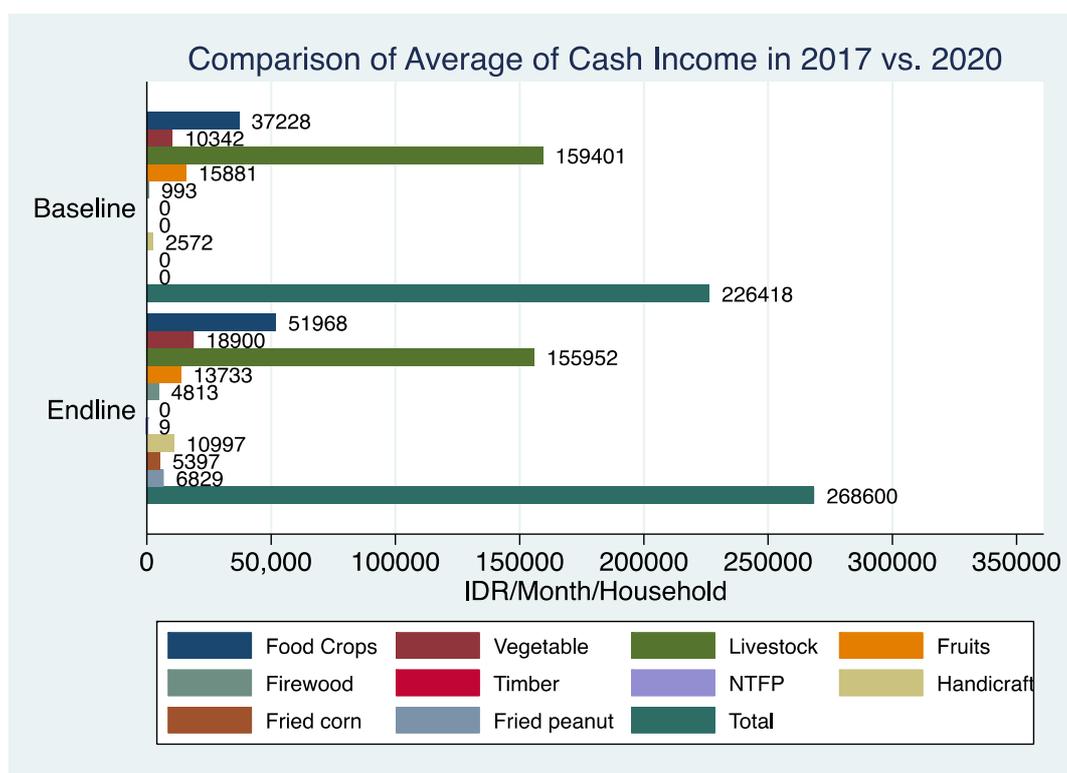
After four years of planning and implementation, the project achieved its goal of improving the community's cash and non-cash income in a pro-poor and gender-inclusive manner. A significant majority (72.5%) of households experience the increased value of their tree plots, and some made financial savings because they used medium-sized timber to build decent houses. Moreover, there has been a sharp increase in the harvest quantities of the two most important crops: corn and peanuts. Compared to the 2018 harvest, in 2020, corn and peanut harvests increased by 181.6% and 143.9% respectively. Therefore, although an increase in cash income from FMNR+ and LVCD is still small relative to the poverty line, the non-cash income from the increased productivity is big enough to cause a drastic drop in food insecurity in the region.



**Sharp Increases in Yield of the Two Most Important Crops**



**Drastic Decrease in Food Insecurity**



**Small Increase in Cash Income per Household per Month**

### Outcome 1: Rehabilitation of landscape and natural resources

The primary sources of cash income in Haharu are the sale of small livestock such as chickens, goats, and pigs, as well as crops such as beans, corn, shallots, cashews, and fruit. The productivity of these crops and livestock is primarily driven by the adoption of good practices in land rehabilitation through FMNR+, village agriculture extension workers, and investment from IRED in water infrastructure. The Palotang (FMNR) adoption rate of 95% and the adoption water management adoption rate of 50% both met the targets set at the beginning of the project. However, the adoption rate of overall good practices for land rehabilitation reached only 25.3%, which is below its 50% target. Nevertheless, the IRED project has successfully expanded the land area for FMNR+ up to 412.5 hectares, buffer zone, and grazing zone for cattle up to 2881.6 ha, and good agriculture practices up to 1637.4 hectares. All in all, the IRED project covers 4931.5 hectares of land, just short of the 5000-hectare target. Therefore, the 5000-hectare target is essentially achieved (98.4%) but with only 9.8% in FMNR+ area.

The low adoption rate for overall improved practices in land and landscape rehabilitation is partly due to a shortage of labour supply. As the formal education of the youth improves, they have a tendency to move away from the village for blue- or white-collar occupations. Moreover, for those who remain, there are competing interest between implementing FMNR+ and other agendas, including working as daily labourers in a nearby sugarcane plantation.

### Outcome 2: Increased community's sustainable income

On the LVCD element, the IRED project has been successful in establishing women producer groups that produce processed food such as a variety of fried corn, fried peanuts, and chili sauce. The corn

and peanut-based products have a comparative advantage due to the relatively low price of primary materials. Still, the chili sauce is not profitable because primary materials are not produced in sufficient quantities in Haharu. The remaining challenge for the producer groups is in boosting both on-farm and post-harvest production scale to an economy of scale level. To do so, they need to be more selective in plants and businesses and reinvest their incomes back into the farming and processing system. Moreover, an innovative strategy such as group selling that helps boost prices is on the way, but its realisation needs to wait until the end of this year's corn and peanut harvests.

There is local wisdom in managing a more stable cash income from FMNR+ in dryland in Haharu. That is, planting areca trees near the riverbank and palm trees in a dry field. The harvest of areca nuts, palm leaves, palm-sap, and processed sugar provides farmers with stable cash income throughout the year thanks to the shortage of these commodities in the local market.

The importance of livestock as the primary source of income has only been intervened from the aspect of its feed through planting lantoro (*Leucaena*) and other green forages. The overall elements of livestock technology and its LVCD have not been managed in the IRED project.

### **Outcome 3: Increased capacity of community (including children) to conduct environmental engagement**

The project fully achieved its target on increased community and children's capacity to conduct environmental engagement through the provision of reference books for local content in elementary schools with FMNR+ essence, and children's camps. The District Education Office plans to use the books as a reference for teachers in East Sumba District so there is a chance for sustainability.

### **Outcome 4: Strengthened good governance to endorse FMNR+ and LVCD**

The project achieved most of the outcome target indicators on strengthened good governance to endorse FMNR and LVCD. Our observation indicates that the project efforts into engaging more the institutions in the village, such as the village government, local churches, BUMDES, and schools is the right strategy. In turn, the village government is the most influential endorsers of FMNR and LVCD mechanisms, and, to some extent, fund FMNR and LVCD activities. The village government, village agroforestry extension workers, and the local churches are the three powerhouses that have shown motivation and ability to continue leading the community in the adoption of FMNR+ and LVCD in the post-IRED era. Support from district governments for funding and in-kind assistance is there if the producer and farmer groups can align their activity with the district government programs.

### **Gender Inclusion**

There appears to be a gender balance in the decision-making process and real work on land rehabilitation and farming for many households. This situation is contributed to by gender equality training, design of activity of in-situ training and in-house training and works that require the attendance of couples (husband and wife), and the presence of women groups. Households where decision-making features equal participation of men and women have a positive and strong correlation to high income from FMNR and LVCD because of more optimal use of complementing talent and skills of both men and women when they work together.

## Disability Inclusion

Community members with light to severe sensory and mental disabilities (such as sight, hearing, memory and self-care) are more likely to be prevented from participating in the IRED project and excluded from participating in any project compared to those without disabilities. The differences are statistically significant. Meanwhile, those who have mobility disabilities felt they are not hindered from participating in the IRED project but feel excluded compared to those without disabilities. The hilly terrain of the region poses a challenge to the inclusion of the community members with physical mobility problems due to age or disabilities. Their families prefer that those with disabilities stay home to reduce the risk of having an accident in steep terrain.

## Recommendations

### General

1. Future programming should consider using **multiple indicators or indexes on cash income, non-cash income, and valuation of the remaining trees** to comprehensively capture the notion of sustainable income from the FMNR+ and LVCD intervention.
2. Future programming should **explicitly set targets for achievement per actor (household or farmer group or producer group) per project phase** so that the process of rapid self-assessment and monitoring communication can be carried out effectively and comfortably between the project management and the farmers. For example, the big target on the land area for FMNR+ intervention should be broken down to targets per household so that each participating household is aware of the goal and can make an objective assessment of his or her progress.
3. Cognitive, motor, and psychomotor skills on agroforestry and good practices are critical determinants of a successful implementation of an FMNR+ intervention. However, it isn't easy to measure the skill because it was not readily observable at the time of the survey. Future programming should consider using a **more operational or results-based definition for skills** to supplement the current cognitive pre- and post-training test for FMNR+ related skills.
4. Future programming should **consider the use of farmer friendly paper-based mapping** of the progress of land area being intervened so that it is easy for the farmers to assess their progress. The project can use the current computer-based one for consolidated reporting,

### Outcome 1: Rehabilitation of landscape and natural resources

5. **Given the still high dependency of the harvest of food and cash crops on rainfall, adoption of FMNR+ and especially water harvesting need to be expanded.** There is evidence that water harvesting improves long-run soil fertility and enable farmers to cultivate food and cash crops at least twice a year and boost overall agroforestry productivity.
6. **More training and advocacy to decrease cases of cattle invasion** in the FMNR+ and agroforestry plots need to be done. There is evidence of trees dying due to cattle damage in Kadahang and Praibakul villages.
7. The **use of local wisdom on choice of species in FMNR+ and agroforestry plots** that simultaneously provide farmers with stable income throughout the year need to be advocated. For example, the choice of planting areca trees in place with high water availability and palm trees

in places with low water availability. The products of these trees have strong market demand and can provide farmers with sustainable income.

## **Outcome 2: Increased community's sustainable income**

8. Market failure due to the remoteness of the region and small-scale farming is visible in the shortage of quality farm inputs (such as seeds, fertilisers, and machines) and the lack of access to big output markets. The local government needs to intervene to relax this constraint through the **provision of an agriculture micro-finance institution (MFI) that enables farmers to borrow from the MFI and pay their debt using the harvest of cash crops**. One possibility is to train BUMDES to perform the MFI role to become the focal-point role in LVCD profitably and sustainably, as well as strengthen the supply chain of high-quality farm inputs, providing access to farmers. Alternatively, provide an incentive for private MFI such as KSP Swastisari, who has played the agriculture MFI role in (former) WVI's project in southwest Sumba successfully, to distribute government credit for smallholders in Haharu region.
9. The sale of livestock is consistently the primary source of cash income for most households. Future interventions should also **cover comprehensive livestock technology (such as breeding technology, fattening system, and disease prevention technology) and its LVCD, especially on provision of calves through credit**.
10. **Training on business feasibility and market needs to be intensified** so that farmer and producer groups know which commodities can give them a comparative and competitive advantage and at what scale of production. Currently, peanut farming and processed corn and peanuts have shown a profit but other businesses, such as corn farming and chili sauce continue to be done despite their business loss.
11. **Better farmer organisation and cohesion need to be promoted** if the group's power through delayed sales and group selling is to be materialised.

## **Outcome 3: Increased capacity of community (including children) to conduct environmental engagement**

12. The **Muru la Humba (Sumba Green) module for the Green School program can be introduced to children via a fellowship of pastors** so that they can use it as a reference for teaching children under the Green Church theme. Children can learn the topic during Sunday School or other children's meetings organised by local churches (19) in Haharu. This strategy will help the dissemination of the idea and natural resource management knowledge to children outside the school environment in a culturally appropriate way. Sunday Schools are not tied to government regulations on a heavy-burdened curriculum so they have more flexibility in teaching environmental awareness to children.

## **Outcome 4: Strengthened good governance to endorse FMNR+ and LVCD**

13. The village government, church leaders and farmer champions have shown motivation and abilities to organise implementation of FMNR+ successfully. **However, they need to acquire skills on planning activities, and designing and performing effective project monitoring in the post-IREDD era**. As the project will cease to exist in June 2020, it is essential to train the village

government and farmers champion to perform monitoring post-project so that they can evaluate the progress of their FMNR, timber, and GAP plots, and make necessary adjustments.

14. The village governments have provided BUMDES with a Rp60 Million seed fund per year for the BUMDES operation and require BUMDES to contribute to locally generated funds. **BUMDES need to acquire skills to perform LVCD analysis for the input and output market for overall valuable commodities** so that they can build their business plan that place them at the centre of the LVCD web in input and output markets for FMNR+ related commodities in the Haharu region.

## Conclusion and achievement of outcomes

The IRED project has been successful in engaging the farmers, government, and private stakeholders in Haharu to implement land and natural resources rehabilitation that boost farm productivity and sustainable income through the FMNR+ and LVCD mechanisms. The intervention is also pro-poor and expands opportunities for participation of women in decision making and work. With the presence of farmer champions and village governments who fund the agroforestry extension workers, the IRED project will have a continuing legacy on FMNR+ and LVCD.

Below is the summary of the assessment of achievements for each Outcome.

Outcome 1: Rehabilitation of landscape and natural resources	Partially Achieved: While the project has achieved the target for the area of land rehabilitated through FMNR+, the proportion of households implementing improved practices in landscape and natural resources management as of March 2020 is 50% below target.
Outcome 2: Increased community's sustainable income	Achieved: The project achieved all indicators on sustainable income accompanied by a substantial increase in the corn and peanut harvests in 2020.
Outcome 3: Increased capacity of community (including children) to conduct environmental engagement	Achieved: The project successfully reached all the essential stakeholders that need to be exposed to FMNR+ and LVCD
Outcome 4: Strengthened good governance to endorse FMNR+ and LVCD	Achieved: The project has successfully influenced the local policy-making and setup of institutional support that endorses FMNR+ and LVCD sustainably.

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## Report Approval

Once the report has been completed, it should be approved by the National Office or Country Office PQ Manager, and forwarded to the WVA Grant Project Manager for final approval.

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We also thank the enumerators for the household survey in 7 villages, survey respondents, key informants, and focus group discussion participants who had facilitated and acted as resource persons during the data collection process.

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Shortcomings, errors, and omission in this report are of the CREDOS Institute.

CREDOS Institute  
Kupang, July 2020

## Affirmation

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Except as mentioned in the reference, all narration and analysis results in this document are the work of the authors in collaboration with Wahana Visi Indonesia and World Vision Australia. The work is intended to strengthen the quality of the design and monitoring and evaluation learning systems at Wahana Visi Indonesia and inform future FMNR and livelihoods programming.

Mitra Tira R Tobing

Ministry Quality and Impact Director, World Vision Indonesia

27/08/2020

## Acronyms

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The following acronyms are used in this report:

ANCP	Australian NGO Cooperative Program
ASF	Asian Swine Flu
BUMDES	Village Owned Enterprises
DFAT	Australian Government Department of Foreign Affairs and Trade
FGD	Focus Group Discussion
FMNR	Farmer Managed Natural Regeneration
GAP	Good Agricultural Practices
ICRAF	International Centre for Research in Agroforestry
IREC	Indonesia Rural Economic Development Project
KII	Key Informant Interview
LVCD	Local Value Chain Development
PPP	Purchasing Power Parity (International Poverty Line)
Monev	Monitoring and Evaluation
NRM	Natural Resources Management
NTFP	Non-timber Forest Products
NVS	Natural Vegetative Strips (terracing)
WVA	World Vision Australia
WVI	World Vision Indonesia

# I. Project Background and Context

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World Vision's Indonesia Rural Economic Development Program (IRED) has been designed to increase the sustainable economic development of Sumba island through a combination of Farmer Managed Natural Regeneration (FMNR) and local value chain development (LVCD) for seven villages in Haharu, East Sumba. Funded by the Australian Government through the Australian NGO Cooperative Program (ANCP), the project aimed to expand the successfully trialled, Farmer Managed Natural Regeneration (FMNR) and other agroforestry systems to help farmers regenerate degraded farmlands, increase crop yields, improve product quality, enhance market access and boost incomes.

The program commenced as a one-year pilot in 2015-16 and was then extended to a five-year scaled-up program. This builds on the successes and learning of the ANCP-funded 'Increase Food Security Within the Community through Sustainable Livelihood and Natural Resource Management System' (INFOCUS) program, and World Vision Australia's Feasibility Study on the 'Commercialisation of FMNR', focussing on East Sumba, Nusa Tenggara Timur.

The goal of the Indonesia Rural Economic Development (IRED) project was to increase sustainable economic development for 6,565 community members in economically deprived and land-degraded areas of Sumba Island through Farmer Managed Natural Regeneration (FMNR) and Local Value Chain Development (LVCD) approaches. The key project outcomes were:

Outcome 1: Rehabilitation of landscape and natural resources

Outcome 2: Increased community's sustainable income

Outcome 3: Increased capacity of community (including children) to conduct environmental engagement

Outcome 4: Strengthened good governance to endorse FMNR+ and LVCD

The following description of the Theory of Change (Appendix D) and project outcomes is taken directly from excerpts of the Project Design Document 2018-2020 (pages 11-15).

The project theory of change is as follows. The IRED project seeks to increase the economic development of Sumba Island sustainably through implementing FMNR+ and LVCD. A sub-goal is to improve household incomes in East Sumba.

Outcome 1: Rehabilitation of landscape and natural resources

Land degradation is a significant issue for Haharu, with poor and eroded soils, insufficient water resources, and widespread deforestation. Outcome 1 seeks to redress this through the uptake of FMNR, additional planting of high-value tree species, and improved water management and utilisation. Farmer training will be implemented to increase knowledge and skills in FMNR and agroforestry techniques. Water infrastructure will be provided through the project for the FMNR and agroforestry plots (Demplots) to increase water availability, with Water Management Committees established to manage these. The increased tree cover and water availability will contribute to the rehabilitation of the landscape and natural resources.

Outcome 2: Increase the community's sustainable income

There is little existing economic development in Haharu. Outcome 2 will address this through the development of local value chains. Productive and marketable crops will be identified and documented

through a value chain analysis process, and training provided to farmers in Good Agricultural Practices (GAP). Plants will be selected with the dry conditions in mind, meeting household consumption needs (food security), and providing income. Farmers' understanding of post-harvest management will also be improved through the introduction of Good Handling and Processing Practices (GHPP). Marketing skills are another crucial development aspect of the program, and implementation will occur via the producer groups. There will be an additional focus on women's economic development through the establishment of a small business start-up focussing on the processing of trees and agricultural products.

Outcome 3: Increase the capacity of community and children to conduct environmental management

The IRED project will take a 'whole of community' approach to improving environmental management, connecting through farmers (men and women), community leaders, churches, women's groups, and schools to increase awareness, knowledge, and skills for managing natural resources. A learning package will be developed and piloted, with a particular focus on women and children. Incorporating local wisdom is also important, with specific activities to capture and document this.

Outcome 4: Strengthen good governance to endorse FMNR+ and LVCD

Community cooperation is required to ensure that the benefits of farmers and others, implementing improved natural resource management are achieved. Land use mapping for each village will provide an agreed understanding of existing land, natural and cultural resources, and allow for documented land-use changes. The project will collaborate with village leadership committees to seek agreement and adherence to land allocation for Demonstration plots (Demplots) and FMNR. Moreover, the project will document and create awareness of fire and livestock regulations to reduce the incidence of wildfire and free grazing and establish village fire brigades as an additional measure to reduce wildfires and land burning. The project will also be supported by a Governance Group, representing key program partners.

Because it works as one system, simultaneously, the accomplishment of one outcome will have a reinforcing effect on the accomplishment of another outcome.

Within the project design, there was one further enabling Outcome (5) which functioned to ensure project quality in compliance with the design, monitoring and evaluation system. The project will include an extensive and detailed M&E plan to ensure project quality and the measurement of impact. The Theory of Change is presented in Appendix D.

The IRED project was implemented in the Haharu sub-district of East Sumba in 2016-2020 by World Vision Indonesia (2016-2020) with ICRAF (2016-2017), Lutheran World Relief (2016-2017), and Injiwatu Foundation (2019-2020). The FMNR mechanism had previously been introduced to the community via World Vision's INFOCUS project (2011-2015) that resulted in, among others, the rehabilitation of approximately 105.2 hectares of marginal land to community forest and agroforestry plots at 26.3 hectares per year conversion rate. This achievement functioned as a stepping-stone for IRED activities as many of the initial IRED's FMNR+<sup>1</sup> activities occur in or around the INFOCUS plots.

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<sup>1</sup> For the IRED project FMNR+ includes all farmer managed NRM practices, including agroforestry. FMNR is considered the technical practice pruning and protecting existing trees in the landscape.

## 2. Purpose and Scope of the Evaluation

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The purpose of the Evaluation is to assess project performance, changes, and impact on the improvement of landscape, livelihood, and welfare of target households and community. This assessment includes measurement of key indicators for comparison with baseline information to measure change, as well as extensive qualitative data collection to provide insights into how change was achieved, as well as the barriers faced.

The results are used to measure project results against its design objectives and inform future project designs in this sector.

## 3. Evaluation Objectives and Questions

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The principal objectives of the Evaluation are:

1. Verify that the project has **achieved** the stated **outputs** and **outcomes** among disaggregated stakeholder groups, including gender and disability.
2. Evaluate the relevance of the intervention and appropriateness of implementation approaches used.
3. Document promising practices, key lessons learned and recommendations to inform **future project design**.
4. Identify weaknesses in the project design, implementation or operating environment that constrained optimal project effectiveness.
5. Provide on-the-job **learning** and **training** to World Vision and Partner staff in evaluation methods.

The key evaluation questions are as follow:

1. To what extent did the IRED project increase sustainable economic development for households within the program communities using FMNR+ and LVCD? (Goal - Impact)
2. What changes have occurred in natural resource management, and what has been the result of these changes? (Outcome 1)
3. Has the project contributed to increased incomes for project participants (women and men) and their families? (Outcome 2) What has been the result of these changes?
4. Has the engagement and capacity of community and children to sustainably manage the environment increased? (Outcome 3)
5. How effective have the mechanisms for sustainable land management been, and has this sustained community engagement with the project? (Outcome 4)
6. What elements (practices, innovations, processes, and approaches) were factors in achieving/impeding project outcomes and why? (Effectiveness)

7. In what ways did the project contribute to the sustainability of project outcomes? (Sustainability)

The cross-cutting themes of gender and disability were considered.

## 4. Methodology

The final evaluation employed a mixed methods approach to data collection. A panel data study approach was implemented, with household survey data compared from baseline (March 2017) to endline (March 2020). This was supplemented by additional qualitative data collected through key informant interviews and focus group discussions.

The baseline survey of households follows proportional hamlet and village representation, with households randomly selected. To enable proper comparison between baseline and endline data, the endline survey revisited the baseline households. The survey asked questions on multidimensional poverty status, land management practices, crop selection and sales, decision making, child well-being and household demographics including gender and disability. The baseline survey covers 310 households, and the endline survey includes 305 households, of which 277 households or 89.4% of baseline households are matched into panel households for analysis. The distribution of the sample in baseline and endline is presented in Table 1.

**Table 1. Distribution of household surveys across time and village/hamlet**

Village	The population of households in 2017	Number of households surveyed		
		March 2017 (Baseline)	March 2020 (Endline)	Matched Households
Praibakul	218	45	43	37
Rembangaru	356	74	76	67
Mbatapuhu	232	48	48	44
Kadahang	217	44	42	41
Wunga	178	37	37	34
Napu	216	45	43	38
Kalamba	85	17	16	16
<b>Total</b>	1502	310	305	277

Note: village demarcation uses 2017 definition

Changes in the performance of outcome indicators and its elements between baseline and endline are tested using the mean-difference test at a 90% confidence level. Meanwhile, population projections use a survey weight of 5, equating to 1502 people per 277 households (rounded). The working sample in baseline and endline are quite similar in household size, composition of occupation, and multidimensional poverty status. There are slight differences in educational composition of the main

female in the families. Households in the endline have fewer females with elementary school but more families without a female head or female spouse. The descriptive statistics are presented in Appendix C.

The qualitative explanation for the change, or the lack of it, is constructed using content analysis from the interviews and focus group discussions. The sample for KIs and FGDs includes farmers (with observation), traditional leaders, church leaders, village government, sub-district government, government officers from the District Office of Education, and District Office of Environmental Agencies, and the IRED project management, technical specialists and community facilitators.

Focus group discussions were held with multi-hamlet or multi-village groups with mixed stakeholders in 5 villages (Rambangaru, Kalamba, Matawai Pandangu, Wunga, and Kadahang) and with women groups in Wunga. For FGD participants, the overall gender composition is quite similar. Meanwhile for KIs, there are more males than females interviewed. This composition reflects, in part, the higher proportion of male leaders than female leaders in public leadership. The detailed gender composition of the key informants is presented in Appendix B.

A review of relevant project documentation was conducted to inform the development of quantitative and qualitative tools before data collection. Among others, we reviewed the following documents:

- a. IRED Annual Report 2015-2016
- b. IRED Annual Report 2016-2017
- c. IRED Mid-term Review 2017
- d. IRED Participative Mapping for Land Function Planning as a Village Development Guide 2017
- e. IRED Annual Report 2017-2018
- f. IRED Annual Report 2018-2019
- g. IRED Project Design Document 2018
- h. IRED Mapping of Land Restoration in Haharu 2018
- i. IRED Baseline tools from March 2017 survey
- j. IRED Indicator Tracking Tables

### **Limitations of the Evaluation**

The baseline data used in this evaluation contains some results from initial intervention. The data is from March 2017, taken after one year of implementation of the IRED project. Also, there is no control group in this evaluation, so we do not know what is the counterfactual in the absence of the IRED project. Because of these conditions, the quantitative change presented should be read as association or correlation and interpreted with caution.

The households surveyed do not keep a record of inputs, harvest, and sales of marketable crops and livestock. They can easily remember single big transactions but not the small and repeated transactions. Therefore, the information on harvest and sales in the last 12 months is an approximation only. For triangulation, we supplemented the estimates with related, albeit limited, qualitative information.

This survey was conducted in March 2020 and preceded the main harvest season in the final year of the IRED project (April-June 2020). At that time farmers had not harvested corn, peanuts, and other food crops. Subsequently, the answers given by farmers do not fully reflect the accumulation of results of farmer training and investment in the last year.

Another limitation is the limited timeframe for conducting fieldwork because as the survey and interviews had only just begun, positive cases of Covid-19 started to be detected in East Nusa Tenggara Province. As the Covid-19 incident unfolded, the government limited physical mobility. Also, during the fieldwork, there were three death events in Praibakul / Rambangaru, Mbatapuhu, and Kalambar Cunna. Male family members were more difficult to meet for survey purposes. Because of these two obstacles, the household survey was stopped after the 305th respondent.

## 5. Ethical and Child Protection Considerations

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### **Ethics Declaration**

To the best of our knowledge, the household survey and interview tools we used were neutral on gender, disability status, and social class of the respondents, FGD participants, and interviewees.

An FGD that involved children as participants was undertaken under the supervision of adult members of the community.

### **Declaration of Conflicts of Interest**

The evaluation team declares that there are no conflicts of interest with the IRED project, World Vision Indonesia, and World Vision Australia.

## 6. Findings

### Project Goal – Increase sustainable economic development of Sumba Island utilising FMNR+ and LVCD

The summary of the achievements of the goal indicators is presented in Table 2.

Because the farming system is partially a subsistence economy and the trees are not all harvested and sold yet, we have calculated the proportion of households with increased income using an average of three sub-indicators that represents current and future cash and non-cash income. These sub-indicators are:

1. Increased food security, i.e. reducing the number of months without enough food. 71.4% of households experience this benefit,
2. Increased cash income from sales of commodities. 50.5% of households experience this benefit, and
3. Increased value of trees. 72.5% of households experience this benefit. The trees are not yet harvested and sold, so their value reflect potential future stable income.

The average of these three indicators is 64.8% and is above the 50% goal target.

For MELF 3.101, we define the number of poor women and men with increased incomes as the number of adult members of poor households – using 2017 multidimensional poverty status - who experienced increased income from IRED-related commodities between 2017 and 2020.

**Table 2. Achievement of Goal Indicators on Sustainable and Inclusive Economic Development**

Key performance indicators	Baseline	Endline		Assessment of performance
		Target	Achievement	
<i>1. Proportion of households with increased income by utilising FMNR+ and LVCD mechanisms</i>	NA	50%	64.8%	<i>Achieved</i>
<i>1.a. Increased food security, i.e., reducing the number of months without enough food</i>			71.4%	
<i>1.b. Increased cash income from sales of commodities</i>			50.5%	
<i>1.c. Increased value of trees</i>			72.5%	
<i>MELF 3.102 Number of poor women and men with increased incomes (defined as the number of adult members of poor households – using 2017 multidimensional poverty status - who experienced increased income from IRED-related commodities between 2017 and 2020)</i>	NA	1400	1745 (women 825; men 920)	<i>Achieved</i>

Source: Baseline and Endline household surveys. Note: NA: Not applicable

Four years of implementation of FMNR + and LVCD resulted in an increase in the number of trees in 71% of households and better grazing in 64% of households. These intermediate outputs contributed to the rise in farm productivity in 67% of households. The families use the harvest for their consumption, store it for seeds, and sell it to the market to get cash.

### **I.a. Increased food security,**

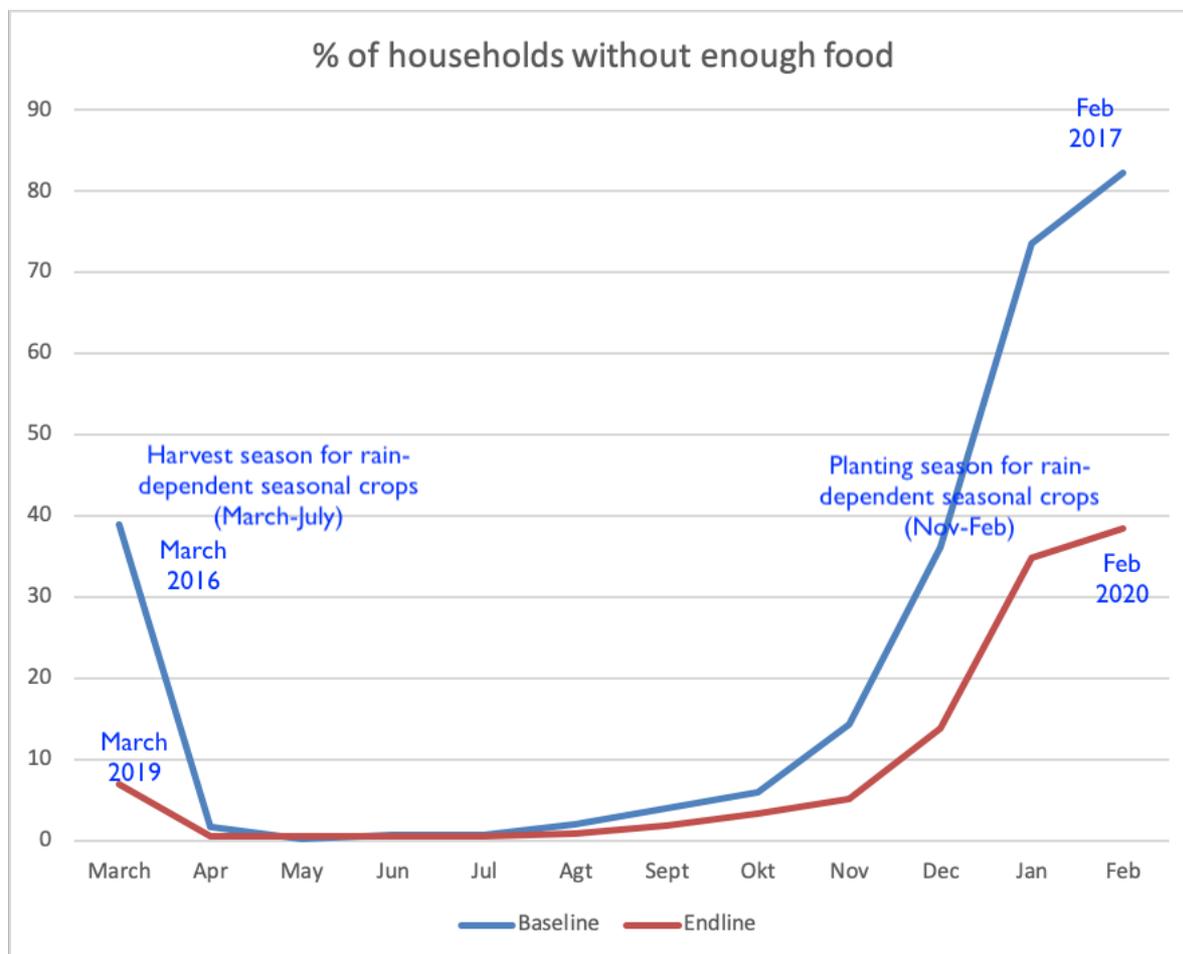
Through increasing farm productivity, the IRED project has contributed to the improvement of food security in Haharu. The staple foods in Haharu are rice or mixed rice and milled corn. Almost all families cultivate corn, peanuts, and vegetables, and some families cultivate areca trees, palm trees, and others, but only a very few households cultivate paddy. Paddy does not grow well in Haharu's dry and hot climate. Farmers consume most of their corn harvest and sell peanuts and yields of other cash crops and livestock to buy rice, foodstuffs, and other items that they do not produce. Therefore, sales of cash crops and other cash commodities enhance food security by enabling farmers to buy foodstuffs that are not produced by the households. This mechanism is demonstrated in the case Kana Milla Iha from Rambangaru:

*I cultivate corn, peanuts, areca trees and some livestock. My corn harvest doubled after applying the correct planting technique and fertiliser. I consider it a taboo to sell corn because we grow it with intention for our consumption and to share it with our relatives. Instead, I sell peanuts directly during the harvest season at IDR16,000 per kilogram. Also, I sell sliced areca nut for IDR5,000 per small bag as needed to buy rice. I have 115 trees of areca - planted in my Palotang field since 2016 near the riverbank - that I can harvest throughout the year. If I can focus on farming, my income is much higher than the government workers.*

(Kana Milla Iha, male, 47 years)

Last year he earned cash income at least IDR23.8 million from sales of peanuts (IDR15.2 million) and areca nuts (IDR8.6 million). The latter is thanks to the knowledge he got from Palotang training. Kana worked as a paid labourer in a sugarcane plant-estate in Haharu for two years but found his income was not sustainable. He then decided to focus on farming with a long-term income perspective. Although peanuts are the primary cash crop at the moment, he thinks that the areca trees will better provide an increasing and sustainable income with less work.

A comparison of households reporting that they did not have enough food between March 2016 to February 2017 (baseline) and March 2019 to February 2020 (endline) is shown in Figure 1. The endline data mainly reflects results from harvest season in 2019 (March to July) while the baseline reflects results from harvest season in 2016. There has been a drastic reduction in households that do not have enough food for the months of March (early harvest) and November to February (during rainy season that coincide with the first planting season for rain-dependent crops such as corn and peanuts (Figure 1)).

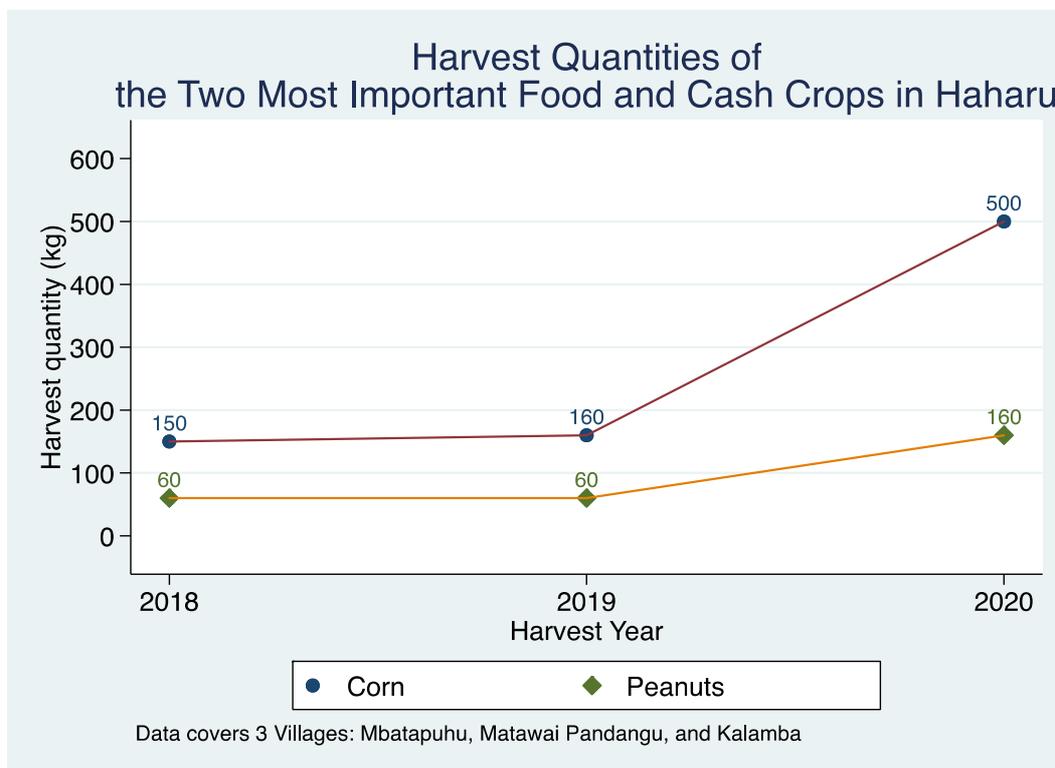


**Figure I. Reduction in Food Insecurity between Baseline and Endline of IRED Project**

Source: Baseline and Endline household surveys

This pattern of improved food security indicates that the harvest in 2019 had better yields that enable households to stock food for a more extended period compared to that in 2016. Moreover, the agriculture system is less dependent on rainfall because 50% of the households implemented better water management. Households who invest in water management can plant and harvest anytime independent of the rainy season. From March 2019 to February 2020, households in Haharu experienced an increase in food availability, on average, for 1.7 months per household (median 2 months; mode 2 months). About 71.4% of households experienced an increase in at least one month of food availability. However, there are still 10% to 40% of households experiencing food shortages from December 2019 to February 2020.

If we take into account the increasing area of land where farmers practice good agriculture practices and Palotang, we can reasonably expect that the harvest from March to July 2020 will be much higher than from March to July 2019. Indeed, harvest monitoring data for mid-2020 show that the harvest quantities has increased for the two most important food and cash crops: corn and peanuts. The average harvest quantities in mid-2020 increased by 173% and 152% for corn and peanuts, respectively, compared to those in 2019. Thus, we expect that the harvest at the end of the IRED project should improve food security for the households in Haharu more significantly.



**Figure 2. Sharp Increases in Harvest Quantities of the Two Most important Food and Cash Crops**

Source: IRED Monitoring. Data for year 2020 is from July 2020

### I.b. Increased cash income from sales of commodities

Cash income through FMNR + and LVCD included in this section is obtained from sales of:

- Food crops excluding vegetable
- Vegetable
- Livestock
- Fruits
- Firewood
- Timber
- Other Forest Products (e.g. honey)
- Handicrafts
- Fried corn and peanuts

Both in 2017 (baseline) and 2020 (endline), the predominant sources of cash income are livestock, staple food crops, and vegetables (Figure 3). These three commodities have the highest percentage of households who earn an income by selling them, although the percentage of households earning cash income from selling livestock reduced by 17% points. This reduction is due to the outbreak of African Swine Flu (ASF) that hit the pigs in the area from mid-2019. Pigs are one of the primary cash livestock types in the region. Nevertheless, the average cash income from selling livestock has increased by IDR66817/month/household (=USD5.1) between 2017 and 2020 (Figure 4) as farmers have been able to boost the sales of other small livestock such as chickens and goats. The former benefits from better corn harvests, while the latter benefits heavily from increases in the available green-feed from Palotang fields.

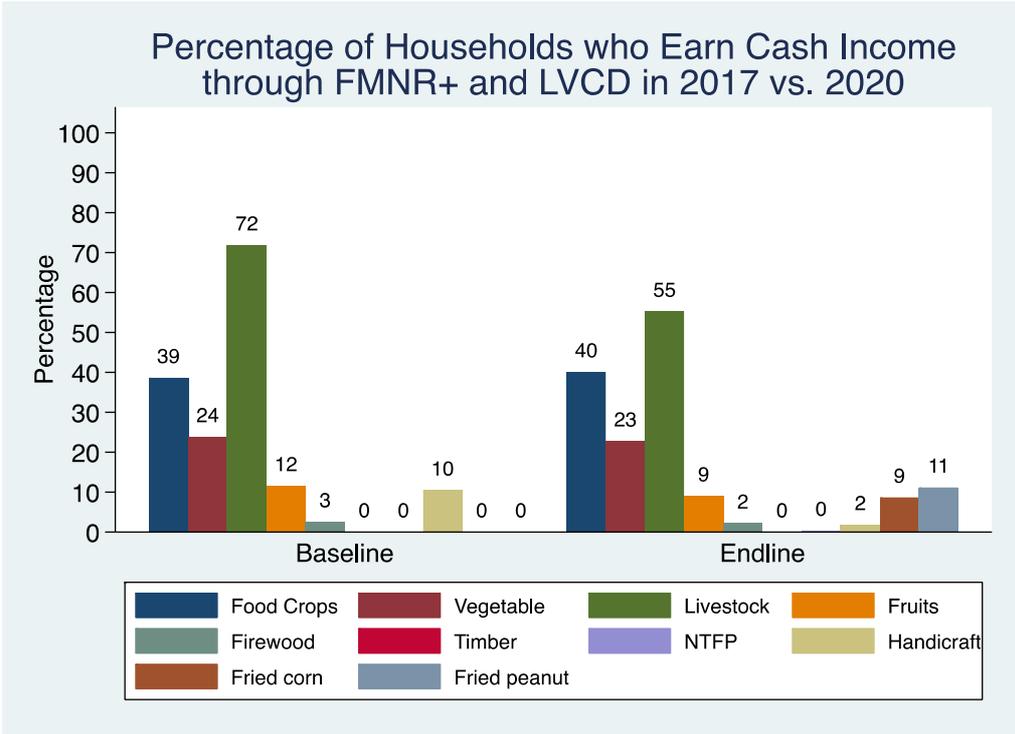
The percentage of households who earn cash income from selling food crops, vegetables, and fruit has not changed much between 2017 and 2020. However, there has been a small increase in the average sales of harvest of food crops, including corn, peanuts, and vegetables. The increase in sales of these commodities has been mainly due to the increase in farm productivity thanks to the training and assistance in FMNR+ and good agriculture practices from the IRED project. As admitted by one of the village agriculture extension workers (farmer champion):

*Without the IRED project, we only plant limited crops like our ancestors. With the presence of IRED, we have come to know a lot of plants and how to plant them properly so that the yield of corn and peanuts and other plants can be almost doubled compared to before IRED.*

(Stefanus, 35, male, farmer)

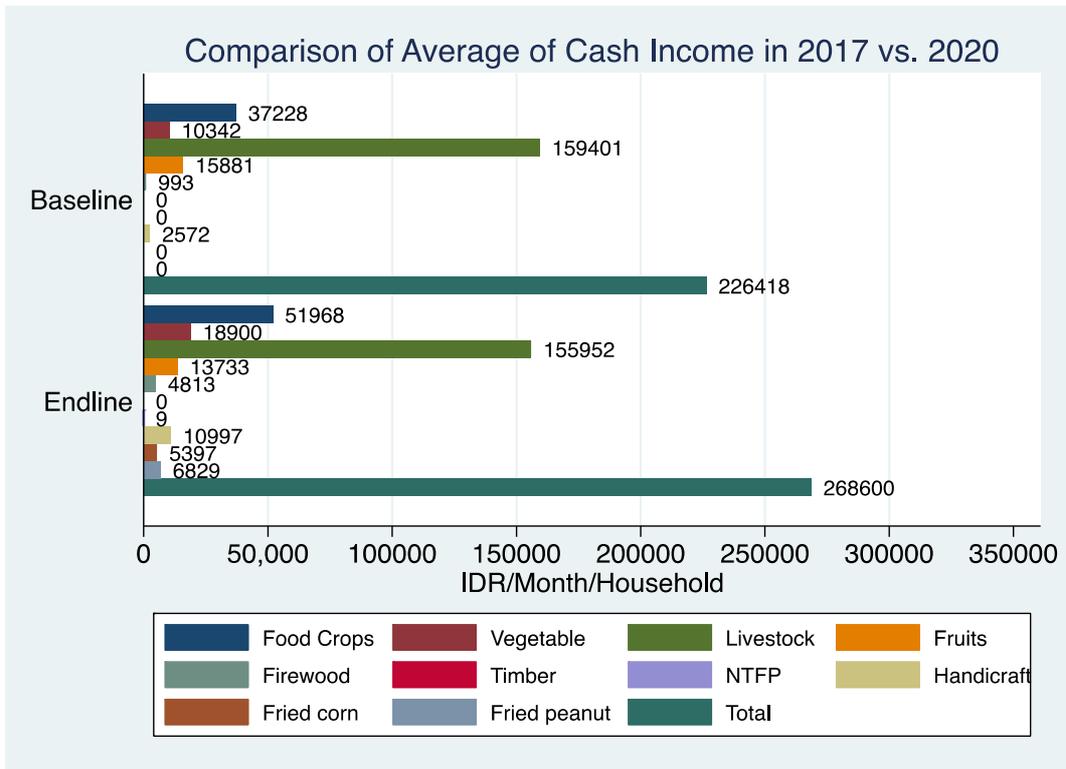
The price of commodities did not change from 2017 to 2020. Farmers in Haharu are price takers, accepting prevailing market prices. For example, in the peanut market, they are not the predominant suppliers yet in East Sumba. Therefore, they could not set the price of commodities. Moreover, they want to sell their harvest immediately in May or June at IDR 16 000 per kilogram because of their need for cash income to buy rice and other necessities, including sending children to school or college (which is in June/July). If they could wait for another two months to sell their peanuts, they would receive an additional IDR 4 000 per kilogram of peanuts. Albeit a good idea if the harvest is plentiful, delayed sales can jeopardise their food security and their children’s education.

One price bargaining strategy that has been advocated by the IRED project is collective selling. Collective selling is expected to increase farmers’ collective bargaining so that they can get a higher price at the market. There has been an agreement at farmers group level to allocate some harvest for collective selling of 25 to 50 kilograms of peanuts or corn per farmer for the 2020 harvest. Given that many farmers previously never sold their corn harvest, agreement to sell relatively small amounts can be seen as a stepping stone for bigger changes in the future.



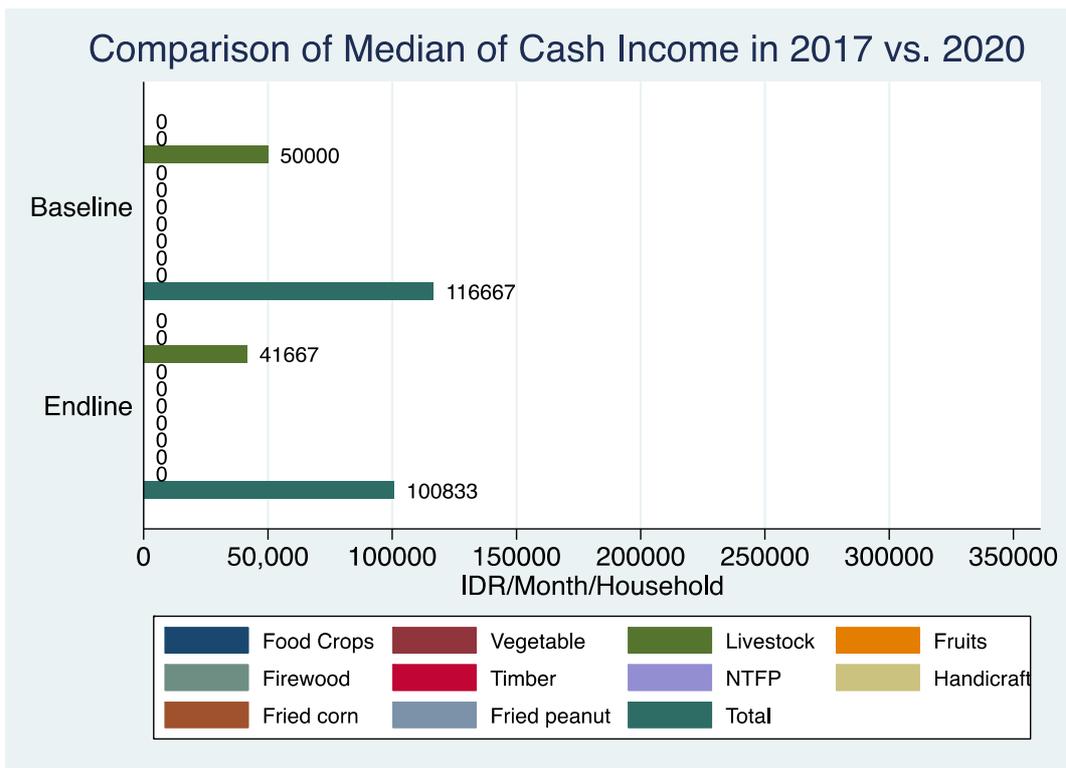
**Figure 3. Percentage of Households who Earn Cash Income from FMNR+ and LVCD**

Source: Baseline and Endline household surveys



**Figure 4. Average Cash Income from FMNR+ and LVCD**

Source: Baseline and Endline household surveys



**Figure 5. Median Cash Income from FMNR+ and LVCD**

Source: Baseline and Endline household surveys



**Figure 6. Goat livestock as a source of livelihood for households in Prailangina Village.**

The median cash income from cash crops is zero (Figure 5) as less than 50% of farmers engage in selling cash crops. Despite the recent increase in harvest and productivity, the main reason for not selling cash crops is the quantity of harvest is only enough for own consumption, and there are cultural taboos against selling crops when extended family members may be in poverty. Therefore, there is a need to keep boosting the farm productivity to enable farmers to produce higher than their consumption, enhance cash income, food security, and overall wellbeing in the region. As of 2020, all village governments have allocated funding for the village agroforestry extension workers to assist farmers on good agriculture practices. These extension workers are results of the IRED project; they were trained by ICRAF during the first two years of IRED intervention. Moreover, village governments have provided funds for farmer groups to enhance their financial ability to buy farm inputs. Therefore, farmers have more ability to persistently practice good agriculture practices both in Palotang and GAP fields going forward and it is expected that the yields from the 2020 harvest (March to July) will be higher than that in 2019. Farmers indicate the harvest from GAP corn and peanuts, the two main cash crops, to increase by 30% to 50% between 2019 and 2020. Combined with collective selling, the increase in harvest shall boost sales by at least 30% after the 2020 harvest period. This increase in sales will in turn help farmers to invest more in farm inputs as well as provide well for their families' food, education, and health.

As of 2020, there are 9% to 11% of households who earn an income from selling processed food – fried corn (9%) and fried peanuts (11%) – that have been introduced via LVCD by the IRED project. These corn-based and-peanut based foods have a comparative advantage thanks to the cheap price of corn (IDR4 000/kg) and peanuts (IDR16 000 – 20 000/kg) in Haharu.

*Through the one-superior-product per village program, the village and district governments have financed the production of fried peanuts, fried corn and chili sauce from Rambangaru so that we can*

*keep producing, promoting, and selling our processed food products. We have attended a product exhibition in the city to promote our products.*

(Rambu Kristina, 40 years, female)

Overall, there has been an increase in total cash income through FMNR+ and LVCD in Haharu between 2017 and 2020. The increase is IDR 42,182/household/month, equivalent to USD3.1/household/month. About 50.5% of households have experienced an increase in cash income from FMNR+ and LVCD commodities.

There is local wisdom in managing a more stable cash income from FMNR+ in dryland in Haharu. That is, planting areca trees near the riverbank and palm trees in the dry fields. The harvest of areca nuts, palm leaves, palm-sap, and processed sugar provides farmers with a stable cash income throughout the year thanks to the shortage of these commodities in the local market. However, the number of farmers planting areca trees and palm trees is still low.

There are three main enabling factors contributing to IRED's excellent achievements. They are:

- Project management: the project provides equality of opportunity for all households in the village to be involved in project activities. Therefore, the participation of individual households depends on their agency. This strategy is vital to eliminate potential negative externalities from social jealousy.
- High participation: a high level of attendance of farmers in meetings and FMNR activities, especially women leaders of communities and young women, who find the project activities as a source of new employment and income.
- Institutional factors: institutional support from village governments for the IRED activities to the point that the governments finance certain items, such as the provision of barbed wire for the fence, a small stipend for the village extension workers (farmer champions), and fund promotion of processed food for a government program of 'one village on advantageous product'.

Nevertheless, the success in achieving the categorical measure of income change above is not supplemented yet by a substantial magnitude of change. The overall income change is USD3.1 (median 0) per household per month and is much smaller than the estimated change from good agricultural practices predicted by Lutheran World Relief in 2017 (USD37-110 per household per month).

To put the income change into the poverty alleviation context, we estimate the poverty transition matrix based on the USD PPP method. The results are presented in Table 3. The proportion of households with cash income of USD<1.25 PPP, USD 1.25-1.9 PPP and >USD1.9 PPP Y2017 are 93.1%; 3.6%; and 3.3%, respectively (see the last column). Meanwhile, the proportion of households with cash income of USD<1.25 PPP, USD 1.25-1.9 PPP and >USD1.9 PPP Y2020 are 92.4%; 4.0%; and 3.6%, respectively (see the last row). Using the USD1.25 PP poverty level, 6.9% of households move out of poverty in 2020 (those in the green box) but 6.2% others fall into poverty in 2020 (those in the yellow box). The insight is that increase in cash income between 2016/2017 and 2019/2020 alone is not sufficient yet for the farmers to move out of poverty.

**Table 3. Poverty Transition Matrix based on Cash Income**

Cash income per person in Y2017		Cash income per person in Y2020			Total (Y2017)
		PPP <USD1.25	PPP USD1.25-1.9	PPP >USD1.9	
USD <1.25 PPP	n	239	10	9	258
	%	86.3%	3.6%	3.3%	93.1%
USD1.25-1.9 PPP	n	9	1	0	10
	%	3.3%	0.4%	0.0%	3.6%
>USD1.9 PPP	n	8	0	1	9
	%	2.9%	0.0%	0.4%	3.3%
<b>Total for Y2020</b>	n	<b>256</b>	<b>11</b>	<b>10</b>	<b>277</b>
	%	<b>92.4%</b>	<b>4.0%</b>	<b>3.6%</b>	<b>100.0%</b>

Source: Baseline and Endline household surveys

Note: Average household size in 2017 is 6.3 and in 2020 is 6.0

We propose seven reasons for this low magnitude of changes in cash income:

- Project Management: There is no explicit target for the magnitude of income change (see also Outcome 2.3.). Therefore, activity design and monitoring are not tied to reach a certain income level
- Lack of priority on livestock development: The importance of livestock as the primary source of income has only been included from the aspect of increasing fodder availability through FMNR+ activities such as planting lamtoro (*Leucaena*), other green forage, and allocating grazing areas. The overall elements of livestock technology and its LVCD have not been touched on by the IRED project.
- Unrealised market potential: The potential for timber harvesting from FMNR and forest plots has not been realised because it is either not old enough to be harvested or harvested but not marketed because farmers prefer to use wood for themselves. For example, farmers use medium-sized lumber for their home construction. In this sense, the cash income indicator underestimates the overall benefit of the IRED project. Therefore, we supplement it with information on respondent's perception on the value of trees.
- Shortage of supply of NTFP: The potential for non-timber forest products (NTFP) harvesting from FMNR and forest plots is low due to the small availability of the NTFP trees and the delay in the maturation of the fruit trees. For the time being, farmers prioritise planting timber trees for future home construction rather than planting NTFP trees for a stable short-term income.
- Low harvest: Low harvest of marketable commodities despite (partial) intensification. Close to 90% of those who have not yet participated in the output market of cash crops stated that their harvests are only enough for their own consumption.

- Lack of available quality inputs: There are no markets for seed, fertiliser, and other farm inputs in Haharu, and it takes a costly journey to buy them in the district capital. The provision of farm inputs and advice could become business opportunities for agroforestry extension workers and BUMDES.
- Slow LVCD intervention: There has been a low uptake of new species of cash crops (shallots, turmeric), despite research and agroforestry demplots<sup>2</sup>, among others, because most farmers prefer cash crops which require less labour despite being in a labour-intensive system.

### **I.c. Increased value of trees**

The most visible results of the IRED project are the green Palotang plots, agroforestry timber gardens and agricultural farms with timber trees and fodder plants. As of March 2020, the IRED project has implemented FMNR+ on 412.5-hectares of land. This includes 34.8 hectares of timber plantations using the agroforestry method, 327.5 hectares of the Palotang plot, and 50.5 hectares from other land rehabilitation practices. For the period of 2018-2020 farmers have planted more than 6000 seedlings from IRED in addition to seedlings that they have cultivated themselves and from the local government. About 72.5% of households in the endline household survey stated that the value of trees in their compounds had increased.

There is no indication yet that the households have sold the timber from the Palotang and agroforestry plots. Some households use the timber to build their own house. For example, one household gets 8 cubic metres of wood from his timber farm that he grew using Palotang approach. This harvest saves him IDR36 million or USD2769. Another farmer uses the medium sized teak from his agroforestry plot to build his family a decent house.

Farmers stated that:

*I have cut down trees that I planted and maintained from the WVI project and I got about 8 cubic metres. I used the wood to build a house. The price per cubic metres in the market is Rp. 4.5 million. If I have to buy it in the market, I can't. For there is Palotang and a timber garden, so that I am able to make a house.*

*(Konda Hura Meha, male, farmer, 63 years).*

*I have used around 40 medium teak wood from Palotang garden to build a house. So, this Palotang has helped me to have a decent home.*

*(Meta Tanggu Manang, male, farmer, 43 years).*

Other farmers have benefited from the Palotang and agroforestry plots, not by harvesting the trees but by letting them grow. The trees provide shading and function as wind breaker. For example, a female farmer stated that:

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<sup>2</sup> Demplots is abbreviation of demonstration plots. The term is used to differentiate the agroforestry plot from FMNR plots

*Before there were tall trees in the Palotang garden, strong winds could hit the house. Now, our home is protected from strong winds and additionally we get fresh air because there are many trees.*

(Hawa Kahi, female, mother, 43 years)

As mentioned before, livestock is the primary source of cash income of the farmers. The presence of *Leucaena* trees in the Palotang plots provided farmers and their relatives with green feed. As stated by a farmer:

*Family and friends harvest feed leaves in my GAP garden for their goats. We do not have to worry about goats not having green feed anymore.*

(Stefanus, male, farmer, 35 years)

### Outcome 1 - Rehabilitation of landscape and natural resources

The project achieved 3 out of 5 outcome indicators, with one indicator overachieved by 30%. A summary of achievements for key performance indicators on the rehabilitation of landscape and natural resources is presented in Table 4.

**Table 4. Achievement of Key Performance Indicators on the rehabilitation of landscape and natural resources**

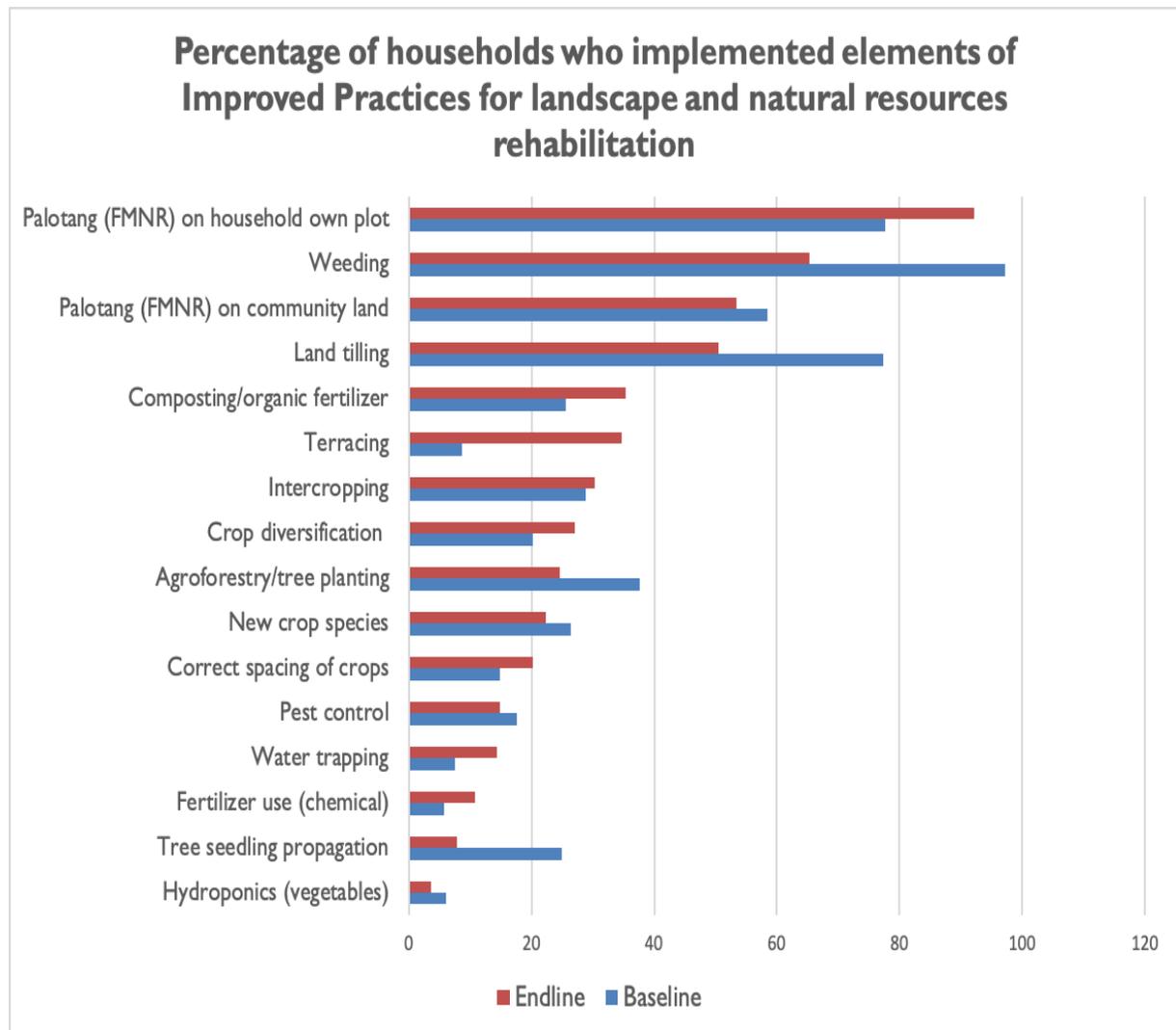
Key performance indicators	Baseline	Endline		Assessment of performance
		Target	Achievement	
<i>1.1 Proportion of households implement improved practices in landscape and natural resources management</i>	26.0% [20.8%-31.2%]	50%	25.3% [20.1%-30.4%]	<i>Not achieved</i>
<i>1.2 Proportion of households practice FMNR (Palotang) on either farmland or community land</i>	95.7% [93.3%-98.1%]	95%	94.2% [91.5%-97.0%]	<i>Achieved</i>
<i>1.3 Proportion of households with access to water through improved water management practices</i>	27.8% [22.5%-33.1%]	50%	52.0% [46.1%-58.0%]	<i>Achieved</i>
<i>1.4 Total area of land (ha) being restored through FMNR+ mechanisms</i>	NA	5000	4931.5	<i>Achieved</i>

Source: Endline household survey except Indicator 1.4, which is calculated from IRED monitoring maps and report.

## 1.1 Households implementing improved practices in landscape and natural resources management

A household is categorised as adequately implementing improved practices in landscape and natural resources management if it performed at least 7 out of the 16 activities outlined in Figure 7, including palotang, weeding, use of improved crops, pest control and terracing.

The endline survey results show that the most common improved practices carried out by the majority of households are Palotang on own land (92% of households), weeding (65%), Palotang on communal land (53%), tillage (50%), composting (35%), terracing (34%), and intercropping (30%) (Figure 7). Meanwhile, practices carried out by less than 30% of households are hydroponics, tree seedling propagation, fertiliser use, water trapping, and pest control.



**Figure 7. Percentage of households who implemented Elements of Improved Practices for landscape and natural resources rehabilitation**

Source: Baseline and endline survey

There was a significant increase in households practicing FMNR on their own plots (from 78% to 92%), while communal FMNR decreased (from 58% to 53%). This shift is in line with the project's focus of

improving sustainability of palotang by encouraging farmers to implement on land that they had more control over, that is each household on their own plot (Table 5). We interpret that as households expanding FMNR by establishing new plots on their own land on top of the communal Palotang. The shift was highlighted during the mid-project Evaluation and was seen as a good thing because usually the communal Palotang is far from settlements and less accessible. At the beginning of the project, the community, who did not understand the economic potential of Palotang, chose vacant land at a low opportunity cost for FMNR while the ground near the house is easily accessible and dedicated to food and cash crops. However, with the success of the plantation of economic trees in several communal Palotang plots, members of the group began to comprehend that Palotang has high economic potential and therefore wanted to have their plots to get more benefits from Palotang. Additionally, on communal land, there is no certainty of harvest rights for group members who are not family of the landowner, which reduces the work motivation of the non-family members.

**Table 5. Percentage of households who implemented improved land rehabilitation practices (not mutually exclusive) in the last 12 months**

Type of improved practices	Surveyed in		Changes	
	March 2017 (%)	March 2020 (%)	% points	Mean difference t-test
Terracing	8.7	34.7	26.0	Significant
Palotang (FMNR) on household own plot	77.6	92.1	14.4	Significant
Composting/organic fertiliser	25.6	35.4	9.8	Significant
Crop diversification	20.2	27.1	6.9	Significant
Water trapping	7.6	14.4	6.9	Significant
Correct spacing of crops	14.8	20.2	5.4	Significant
Fertiliser use (chemical)	5.8	10.8	5.1	Significant
Intercropping	28.9	30.3	1.4	Not Significant
Pest control	17.7	14.8	-2.9	Not Significant
New crop species	26.4	22.4	-4.0	Not Significant
Palotang (FMNR) on community land	58.5	53.4	-5.1	Not Significant
Hydroponics (vegetables)	6.1	3.6	-2.5	Significant
Agroforestry/tree planting	37.6	24.6	-13.0	Significant
Tree seedling propagation	24.9	7.9	-17.0	Significant
Land tilling	77.3	50.5	-26.7	Significant
Weeding	97.1	65.3	-31.8	Significant
Outcome I.I	26.0	25.3	-0.7	Not Significant
	[20.8-31.2]	[20.1-30.4]		

The proportion of households implement minimal seven improved practices in landscape and natural resources management	
Target 2020	50
Assessment	Not achieved

Source: Baseline and endline household surveys

Note: t-test is mean difference test at 90% confidence level

Five land management practices that boost the performance of FMNR, timber plots and crop production are increasingly being adopted. They are composting/organic fertiliser, chemical fertilising, crop diversification, water trapping, and correct spacing of crops. The increase in FMNR is not accompanied by more activities for seedling propagation and agroforestry. The tree seedling propagation and agroforestry/tree planting aspects of land rehabilitation decreased by 17% and 13%, respectively.

The reduction in seedling propagation and tree planting is due to two contributing factors. From the project management side, as ICRAF left the project in mid-2017 without adequate substitute for ICRAF skills on agroforestry, activities on seedling propagation and tree plantation decreased (the baseline having captured a 'burst of activity' in agroforestry/ seedling propagation). Meanwhile from the farmers' side, farmers are already "satisfied" with the small plots of FMNR and timber plots they cultivate. Farmers are facing inelastic supplies of labour and land due to competing interests between food and cash crops for immediate needs, or tree plantation for long-term needs versus being day labourers for quick cash (IDR60000 to IDR70000 per day) in a sugarcane plantation. As stated by two farmers:

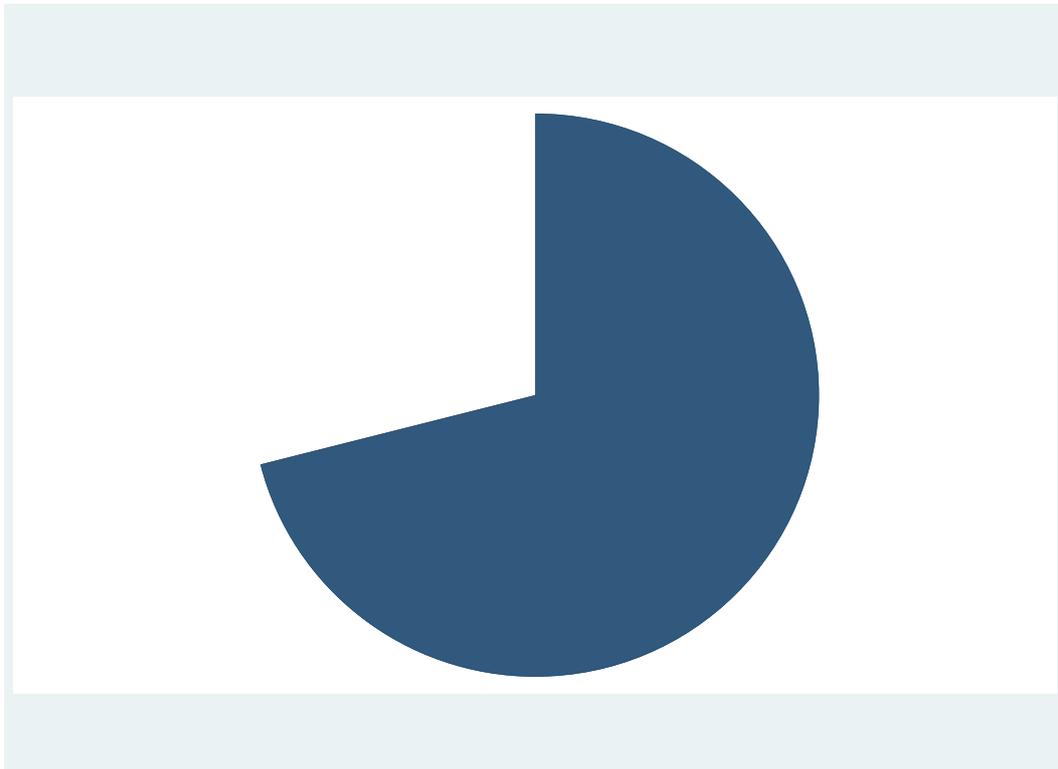
*We work in sugar cane plantation as day labourers. Not every day because it is exhausting and there are other responsibilities such as planting, raising animals, trawling fish, and social affairs. If a husband and wife work alternately on a sugar cane plantation, they can get Rp.4 million per month.*

(Kana Milla Iha, male, 47 years).

*I usually work alone in the family Palotang garden, sometimes I am helped by my wife. I used to work together with 2 grown boys but because they migrate to Bali to work, I have to work alone in the garden.*

(H B Matolang, 55 years, male, farmer)

Also, as the plots are filled with more trees, the allocation of work shifts from planting to plant maintenance. This need for this shift is reflected in the increasing number and value of trees in the plots. Figure 8 shows that 71.4% of respondents indicate that there are more trees in their community. As the trees increase in number, the need for tree maintenance changes. Moreover, as the trees become bigger and taller and their value increases, as stated by 72.5% respondents (Figure 9), there is less plantation in the plot but more maintenance and protection of the trees from fire, cattle invasion, and theft. Luckily, the effort to protect the trees from cattle invasion has decreased thanks to greater availability of quality pasture for cattle (Figure 10) and green feeds from Palotang plots. The overall result is higher farm productivity (Figure 11) that help farmers to provide well for their families and motivate them even more to improve their land rehabilitation skills.



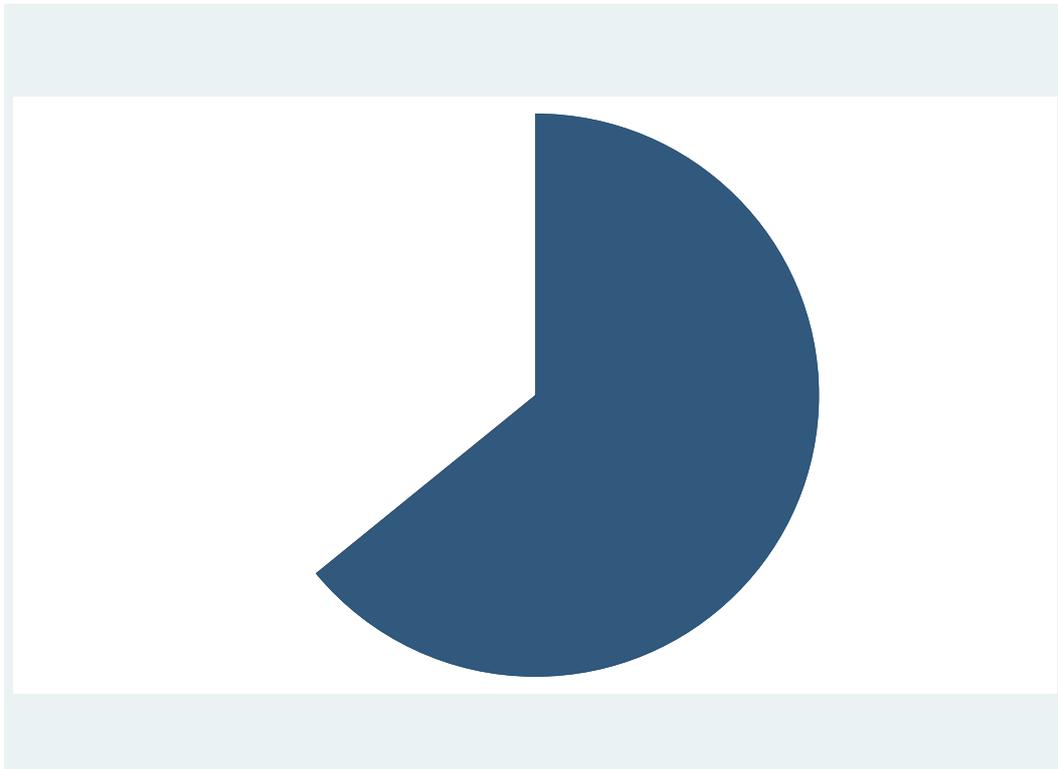
**Figure 8. Respondents' perception of changes in tree coverage in their community over the past 4 years.**

Source: Endline household survey



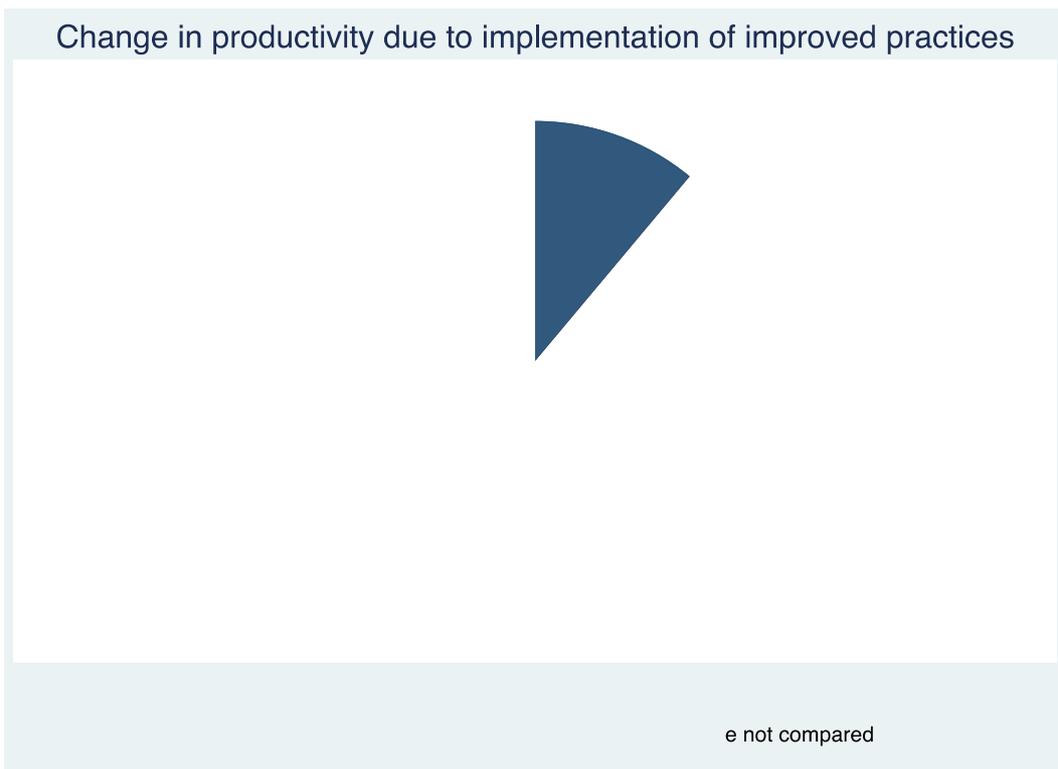
**Figure 9. Respondents' perception of the value of trees on farm and communal land**

Source: Endline household survey



**Figure 10. Respondents' perception of changes in pasture quality**

Source: Endline household survey

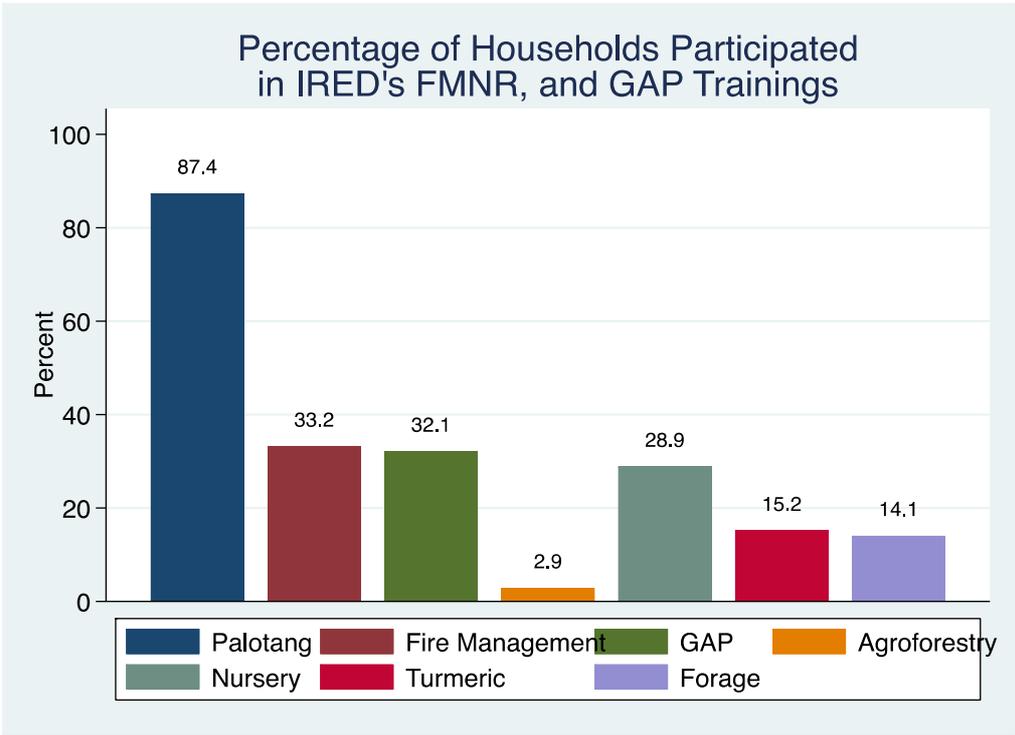


**Figure 11. The overall impact of the IRED project on Farm Productivity**

Source: Endline household survey

Meanwhile, the absence of a strict target of minimum land-size of FMNR and timber plantation per household and the shift to LVCD activities to boost cash income for the farmers has contributed to stagnation in the proportion of households that implemented the target of seven improved practices. IRED has used a soft incentive management system through competitions related to the area and quality of the Palotang plot in 2017, where the winners were awarded agricultural equipment such as hand tractors. However, this approach has not been implemented since 2018 and there has been no substitute for the incentive system in the last two years.

Farmer's willingness and abilities to cultivate trees and crops and associated skills are crafted through hours of *in-situ* on-farm training on FMNR, nursery, good agricultural practices, green-feed for cattle, turmeric, general agroforestry, turmeric agroforestry, and fire management. During 2016-2020, Palotang (FMNR) training has the highest percentage of households trained (87%; Figure 12), followed by training on fire management, GAP and nurseries (around 30%), and agroforestry in general, turmeric agroforestry (15%), forage (14%) and general agroforestry (3%). Palotang (FMNR) is the main tagline of IRED, so it is not surprising that its coverage is the highest. It functions as a core knowledge and skill, while other training creates supplementary or complementary skills to FMNR. Cross-tabulations between household attendance in FMNR training and participation in the other training indicate that 90% to 100% of the households that attended additional on-farm training also participated in the Palotang training. Moreover, 95% to 100% of families who participated in off-farm LVCD training also attended Palotang training.



**Figure 12. Percentage of Households Participated in IED's FMNR, and GAP**

Source: Baseline and endline household surveys

The immediate impact of the training on the farmers is the change in attitudes toward tree plantation and crop cultivation, as they see the beauty and value in the green fields that resulted from their collaborative work with IRED. As put by one of the farmers and a lay preacher:

*"... there is IRED, and it causes me to fall in love with the trees."*

*"... and now I can plant and harvest corn twice a year successfully."*

*(Meta Tanggu Manang, male, farmer, 43 years).*

Meta and his wife invested their time in attending many hours of in-situ on-farm and LVCD training from IRED and had previously participated in INFOCUS. He and his wife manage a green 30 acre teak plantation with turmeric-agroforestry, small but green maize and vegetable garden in their front-yard despite lack of permanent water storage, and about 2 hectare maize field (next to his father's field) – planted with correct spacing and self-made organic fertiliser - in a fertile but narrow valley of Mbatapuhu. There are lines of FMNR trees on one side of the valley. The maize field is about 3 kms from their home on the hilltop of Wuy hamlet. Meta has been helping his fellow farmers cultivate trees and corn and receives a small stipend from the village department for his independent agroforestry extension work. The family sells corn and small animals for cash income but prefers to use the teak for their use, to expand the house.

Results from multivariate analysis indicates that training in good agriculture practices (GAP), tree nurseries, and animal forage during the IRED intervention had a significant positive association with the probability that a household would implement the minimum seven improved practices in landscape and natural resources management during 2019/2020. This strong association indicates that the primary locus for improved practices is in or around the GAP fields that have also become a source of green feeds. Training on Palotang, fire management, and turmeric cultivation also has a positive association with improved practices but this is smaller in relative terms than that of good agriculture practices, tree nurseries, and animal forage training. The overall association of technical training on the implementation of improved practices is small, around 0.4% to 0.8%.

On gender and labour supply, there does not seem a gender bias in practicing the improved practices, so there is no sub-optimal participation due to gender bias. More than half (64%) of the households stated that both equally male and female working hours had been put into the development of FMNR and timber plots, although for some families (30%), the work is more of a male workload. A small percentage (6%) of households stated that 'only women' implements the FMNR's improved practices. It seems that women work more if the FMNR plots are near their residence while the men work more in the plots far away due to women's competing responsibilities for homemaking, including childcare.

The project achieved only half of the target of 50% of households who implemented at least seven improved practices (25.3% of households). There are four possible reasons for this under-achievement. They are:

- Labour: Inelastic supply and reallocation of labour across different elements of farming activities that change as the trees in FMNR and timber plots grow.
- Labour: a shortage of supply of labour for FMNR and timber plot activities because:

- High “reservation wage” as two sites of sugar cane plantations in the Haharu area offers around USD\$6-\$7 per day wage by performance.
- Labour migration: School-age youth live outside the village to attend high school, highly educated workers reside in cities for white-collar employment, and the less-educated ones finds blue-collar employment outside Sumba for a stable non-agriculture wage.
- Land: Lack of availability of arable land for new FMNR and timber plots.
- Method: Most of the work is manual, which does not help as labour gets older.

## 1.2. Households are practicing FMNR (palotang) on either farmland or community land

In the baseline, the households’ participation in FMNR implementation was already high (95%) thanks to IRED’s predecessor’s (INFOCUS) gains of 105-hectare FMNR and timber plots (2011-2015) and initial IRED activities in 2016-2017. Therefore, the project target was to maintain the high level of FMNR activities in the community, which they achieved in 2020.

The primary labours in palotang were adult males (87.5% of households) and adult females (70.2% of households). Children practiced palotang in less than 10% of households, while the elderly rarely practice palotang. In most families (69%), palotang is practiced by both males and females. However, in the rest of the households, palotang is practiced only by males (25% of households) or only females (6% of households). The main reasons for households not practicing palotang are due to shortages in the quantity of labour (i.e., not enough labour in the families to do palotang and other competing farm work) or quality of labour (i.e., too old or disabled).

There have been changes in the elements of FMNR in the last four years (Table 6). From plot observation, we found out that as the trees in the plots grow taller, they were lagging in diameter. The farmers tend to let the trees grow naturally with less pruning because the trees are too high to climb. This challenge is also reflected in the decrease in women and children's participation in Palotang while men’s participation did not change.

Moreover, some of the medium-sized teak, mahogany, and injiwatu trees have been cut for home construction, while the gamal (*gliricidia*), leucaena, and shorter wood trees have been pruned for green-feed or firewood.

**Table 6. Proportion households practice FMNR (Palotang) on either farmland or community land and change in elements of FMNR**

Element of FMNR	March 2017 (Baseline)	March 2020 (Endline)	Change	Mean difference t-test
Allow natural regeneration of trees	10.5	25.9	15.5	Significant
Marking trees	6.1	11.7	5.5	Significant
Managing tree cutting	24.9	33.1	8.2	Significant
Others	24.9	33.1	8.2	Significant
Selection of naturally regenerated trees	28.9	27.8	-1.1	Not significant
Protecting of naturally regenerating trees	56.3	35.7	-20.6	Significant
Pruning	93.1	72.6	-20.6	Significant
Outcome 1.2 Proportion households practice FMNR (Palotang) on either farmland or community land	95.7 [93.3-98.1]	94.2 [91.5-97.0]	-1.4	Not Significant
Target		95.00		
Assessment		Achieved		

Source: Baseline and endline household surveys

Note: t-test is mean difference test at 90% confidence level

The high uptake of FMNR in the IRED project communities remained consistent during the four years. However, there were some shifts in the locations where farmers practiced FMNR (household/farmland compared with community land). As the project progressed, farmers had additional significant FMNR in and around their own fields or timber plots to be planted and focused more on plant maintenance and pruning, as is done in Rambangaru.

The other possible reason is due to the lack of naturally grown seed or seedlings available in the areas. As mentioned by one farmer who cultivates 40 acres of sengon (*Albizia chinensis*) and gmelina (*Gmelina arborea*), the seed from those trees is challenging to grow on their own. This difficulty, we think, is due to the soil quality, and the microclimate in his timber and FMNR plot is not suitable yet for seedlings without human intervention. The local species of cimung (*Timonius sericeus*) and injuwatu (*Pleigonium timoriense*) are quite challenging to propagate and grow, as indicated by their absence in the FMNR and timber plots.

Among other reasons, the stagnation in the proportion of households selecting naturally regenerated trees, which could be a proxy for a lack of extensification of FMNR and timber plots, is likely to have contributed to the underachievement of Outcome 1.4. (the land area being rehabilitated under FMNR and timber plots).

Results from multivariate analysis indicates that training in Palotang, Fire Management, and Turmeric cultivation during the IRED intervention have had a significant positive association with the probability that a household would implement Palotang during 2019/2020. The training on Palotang provided a basis for the implementation of Palotang. The positive association between training on Fire Management and implementation of Palotang is a good thing because this relationship indicates that the implementation of Palotang is integrated with the aspect of fire management which had been one of the primary challenges during the INFOCUS program (beside cattle invasion). The overall association of the technical trainings on implementation of improved practice is small.

Another important finding is that IRED's investment in water infrastructure has made a positive difference to the probability of households implementing Palotang. The results from multivariate analysis shows that households with IRED water infrastructure in their neighbourhood are 5% more likely to implement Palotang than those that do not have the infrastructure.

### 1.3. Households are accessing water through improved water management practices

Naturally, the Haharu region has deficient rainfall, and 5 out of 7 villages (Mbatapuhu, Wunga, Praibakul, and Rambangaru) are either not irrigated by rivers at all or do have flowing rivers for part of the year. The IRED project strategy was for farmers to optimise the rainwater through improved water harvesting and storage methods.

This shortage of water, both in terms of quantity and its permanence throughout the year, is suspected as one of the main inhibitors for the successful growth of trees and plants in the agri-Palotang fields. To overcome these obstacles, IRED formulated the following eight good water management practices for water conservation for the success of FMNR, namely:

1. Water trapping
2. Terracing
3. Rainwater harvesting
4. Storing water for plants (water tanks)
5. Storing water for livestock (water tanks)
6. Irrigation of crops
7. Irrigation of household vegetable garden
8. Hydroponics for vegetables

To encourage the target communities to adopt these good practices, IRED promoted an agreement on water conservation and FMNR work plans in 15 communities. Subsequently, IRED facilitated the formation of 15 water management groups and capitalised these community groups with water conservation infrastructure through the provision of water tanks, piping, or pumps for well in the farmland. In a few selected farms, drip irrigation installations were provided. During the initial phase of the project, IRED distributed water via water tank to give the vegetable farmers in Wunga and Praibakul adequate water for the LWR demplot for cash crops as well as cash crops on farmers' land. This practice was stopped because it was seen as counter-productive to the project's aim of water harvesting and conservation.

As of 2019-2020, 79% of households were implementing at least one good water management practice, rising from 48% of households at the baseline in 2016-2017. At endline, the predominant water harvesting and conservation management practices implemented by farmers were rainwater harvesting, terracing (51%), water trapping (27%), and storing water for plants (24%) and cattle (16%) (Table 7). Terracing cultivated with leucaena (lamtoro) has also increased because IRED management and the farmers boosted this practice before the recent rainy season, targeting soil and water conservation on the steep and barren hillsides. The quality of the new terraces is yet to be tested by time.

Those who store water during the dry season are usually farmers of cash crops. For example, in Wunga, a new adopter of on-farm LVCD stores water to enable her to plant vegetables prior to the rainy season so she can supply vegetables to the market ahead of other farmers. In 2019 she gained Rp3 Million (~USD\$215) profit, which she invested back into agricultural inputs and especially into water provision.

The key to investing in water provision was also found when other types of water infrastructure were in place. In other villages in Wunga, Kalamba, and Mbatapuhu, the local government installed a pipe of clean water to several hamlets. In Kalamba and Mbatapuhu, farmers pay a monthly subscription for the freshwater and fill the water tank near FMNR and vegetable plots to water the plants. From reinvesting in water, two female farmers from Kadahang each enjoy harvests of chili, watermelon, and eggplants, with sales revenue up to Rp12 Million (~USD\$862) in 2019. They save their money and reinvest it in the provision of inputs, including water.

**Table 7. Type of water management practiced by farmers in 2017 and 2020**

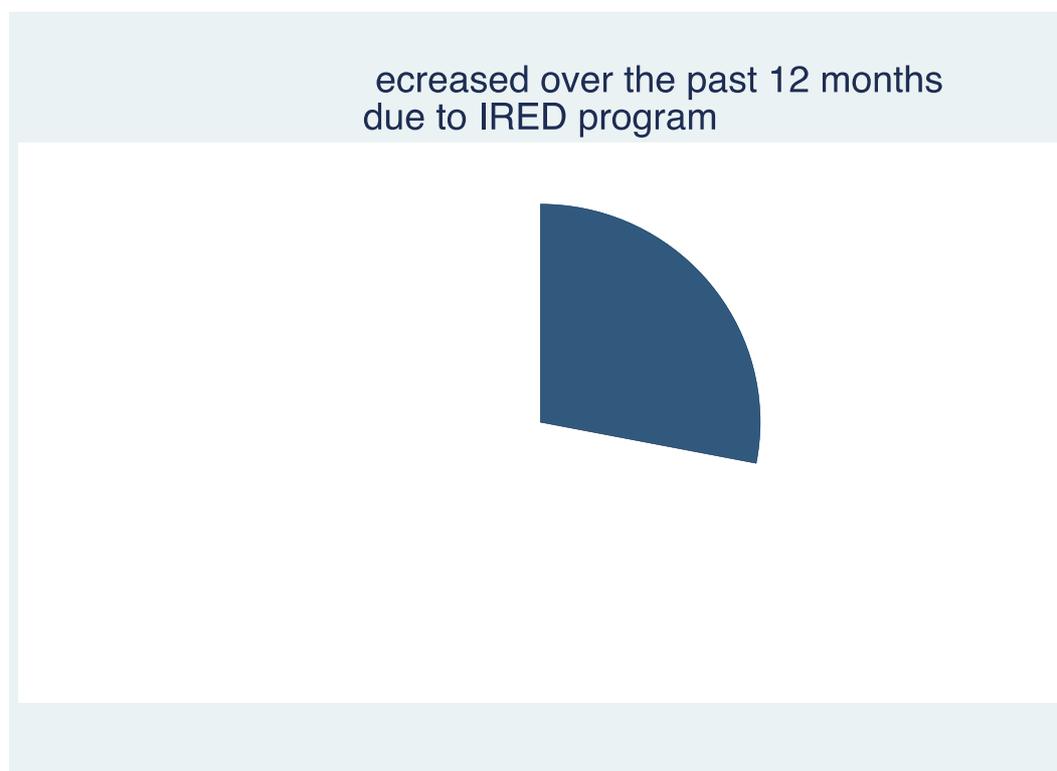
Type of water management practiced	Surveyed in		% points	Change Mean difference t-test
	March 2017 (%)	March 2020 (%)		
Terracing	8.7	34.7	26.0	Significant
Rainwater harvesting	31.4	50.5	19.1	Significant
Water trapping	10.8	26.7	15.9	Significant
Storing water for livestock (water tanks)	9.4	15.5	6.1	Significant
Irrigation of household vegetable garden	1.8	5.1	3.3	Significant
Storing water for plants (water tanks)	22.7	24.2	1.4	Not significant
Irrigation of crops	9.8	9.4	-0.4	Not significant
Hydroponics for vegetables	5.4	2.9	-2.5	Significant
None of these practices	51.6	20.9	-30.7	Significant

Outcome 1.3 Proportion of households with access to water through improved water management practices	27.8	52.0	24.2	Significant
Target		50		
Assessment		Achieved		

Source: Baseline and endline household surveys

Note: t-test is mean difference test at 90% confidence level

About 34% of the endline households surveyed stated that there are functioning water sources or water infrastructure built by the IRED project. These are water tanks, bores, wells with or without pumps, and one conserved spring. Moreover, in 2020, 28% of households have enjoyed an increase in water availability for their household agricultural needs due to IRED (Figure 13).



**Figure 13. Due to the IRED program, the proportion of households with a valuation of water availability for their household agricultural needs due to IRED program**

Source: Endline household survey

Results from multivariate analysis indicates that training in Palotang, Fire Management, and Turmeric cultivation during the IRED intervention has a significant positive association with the probability that a household would implement good water management during 2019/2020.

Another important finding is that IRED’s investment in water infrastructure has made a positive difference to the probability of households practicing good water management. The results from multivariate analysis show that households with IRED water infrastructure in their neighbourhood are 16% more likely to implement good water management than those that do not have the infrastructure.

This positive association shows the critical role water infrastructure plays in boosting the successful implementation of good water management. Moreover, the presence of village agroforestry extension workers or farmer champions has a strong association with good water management practices. The farmer champions are 20% more likely than the non-champions to practice good water management. This result shows that farmer champions can play the ‘leading by example’ role in good water management practices. These champions can use their plots where they have practiced good water management to training unskilled farmers. These training sessions have now been facilitated by the village government through the provision of annual stipends for the village agroforestry extension workers and funds for training activities.

1.4. Area of land (ha) being restored through FMNR+ mechanisms

In the IRED project, there are three approaches to developing FMNR (Palotang), namely:

- I. Pure FMNR on degraded land by planting or maintaining the growth of local species such as injiwatu (timber) and cimung (firewood), or pioneer plants such as gamal (gliricidia) and leuceanea (lamtoro) (animal feed). This practice was a priority in the various villages from 2016 to 2018. In the IRED NRM monitoring map, the locations are marked as Palotang locations. Until 2020 there are 34.8 hectares of land categorised as the location of Palotang or FMNR.



Figure 14. Palotang KK Landscape in Prailangina Village.

2. FMNR in agroforestry or timber plots (teak, mahogany, gmelina, and sandalwood). This practice has been dominant in Kadahang, Rambangaru, Praibakul, Kalamba, and Mbatapuhu in the period from 2018 to 2020. The farmers like this approach because it gives them both the environmental (clean and fresher air, better soil) and economic benefits (for building materials and firewood). In the map, the locations are named as Agroforestry demonstration plots, or for short: Demplots. Until 2020 there were 92.75 hectares of land categorised as Agroforestry or Demplots.



**Figure 15. One model of corn planting in Napu Village, integrating the concept of agroforestry.**

3. FMNR in fields of food crops and horticulture both for own consumption and for cash crops. Timber plants for land rehabilitation, animal feed, and for commercial purposes are planted around the garden or in the middle of the garden. This practice has been dominant in Kadahang and Rambangaru in 2019 and 2020. The locations are marked on the map as a mixture of GAP and Palotang. Until 2020 there were 334.45 hectares of land included in this category. This approach is marked as GAP or mixed Gap-Palotang on the monitoring map.



**Figure 16. GAP Beans in Matawai Pandangu Village owned by Mrs. Dorkas**

In the 9 IRED intervention villages the evaluation team visited in March 2020, the implementation of improved practices was visible through the presence of FMNR and timber plots with various tree densities interspersed with family or communal tree gardens, terraces, and corn, peanut and vegetable farming. For example,

- In Praibakul village on Mr. Kahora Hamandika's land, a riverbank plot of 25 acres was planted in 2016 at the start of the IRED project. The plot is dominated by mahogany trees and two local species, namely injiwatu and menggit. Injiwatu and menggit are cultivated through FMNR.
- In the village of Mbatapuhu on Mr. Meta Tanggu Manang's land, 30 acres of agroforestry plantations on Wuy Hill, which were planted at the beginning of IRED in 2016, is dominated by teak and gmelina trees with local species of injiwatu, enriched with turmeric and moringa plants.
- Terraces on the sides of steep and barren hills in Kalamba and Mbatapuhu, which are planted with the Taramba variety of leucaena (lamtoro). Some terraces were only made earlier this year, others were made last year.
- Chili and vegetable gardens in Rambangaru, Wunga and Praibakul some grown with IRED-made water infrastructure and others grown without water infrastructure. These gardens are surrounded by forage plants or commercial wood trees such as teak, gmelina, or mahogany.
- Peanut and maize gardens in narrow valleys in Mbatapuhu, Rambangaru, Praibakul, Wunga, and near the riverbank of Kadahang and Kalamba that are cultivated regularly and use low-cost fertilisation following IRED's on-farm GAP training and promotion. Forage plants or commercial timber trees surround some of these gardens.

Table 8 shows the total area of land use as of May 2020. The total area of land under agroforestry, FMNR or other improved practices is 412.5 hectare or 8.3% of the 5000-ha target. We then add GAP corn, peanuts, and vegetables because, since 2018, farmers have also applied FMNR in their plots of food/cash crops, among others, due to limited arable land available to start new timber or FMNR plots. The mixed Palotang (FMNR) and GAP are also encouraged by local government and village agroforestry extension workers. The method is excellent in increasing soil fertility, providing shade in crop farms and minimising travel time for farmers between crop fields and timber plots.

**Table 8. Type of Land Used and Area (Ha) as of March 2020**

Type of land use	Area (ha)	%
<b>A. The total area of FMNR, Agroforestry, and Other Improved Practices (ha)</b>		
Agroforestry	34.8	
FMNR	327.2	
Other Improved Practices	50.5	
<b>The total area of FMNR, Agroforestry, and Other Improved Practices</b>	<b>412.5</b>	
Share to IRED target (%)		8.3%
<b>B. Other Use</b>		
GAP corn, peanuts, vegetables	1637.4	
Buffer Zone & Pasture	2881.6	
<b>The total area of Other Use</b>	<b>4519.0</b>	
Share to IRED target (%)		90.4%
<b>C. Grand Total (A + B)</b>		
<b>Share to IRED target (%)</b>		<b>98.7%</b>
Target	5000	
Assessment	Achieved	

Source: analysed from NRM monitoring maps and field notes of IRED

The other category we added to the achievement is the grazing and buffer zone for fire breaks and land allocation between the grazing area and FMNR, timber, and GAP plots. The traditional burning of pasture during the peak of dry season and intrusion of cattle into the FMNR and timber plots are the main inhibitors to the successful rehabilitation of landscape and natural resources. In other words, investment in fencing, fire breaks, and buffer zones (which is pasture) are the necessary conditions for better pasture and the sustainable presence of FMNR and timber plots. About 64% of households stated that the pasture is now in better condition, among others, due to land allocation, barbed fencing,

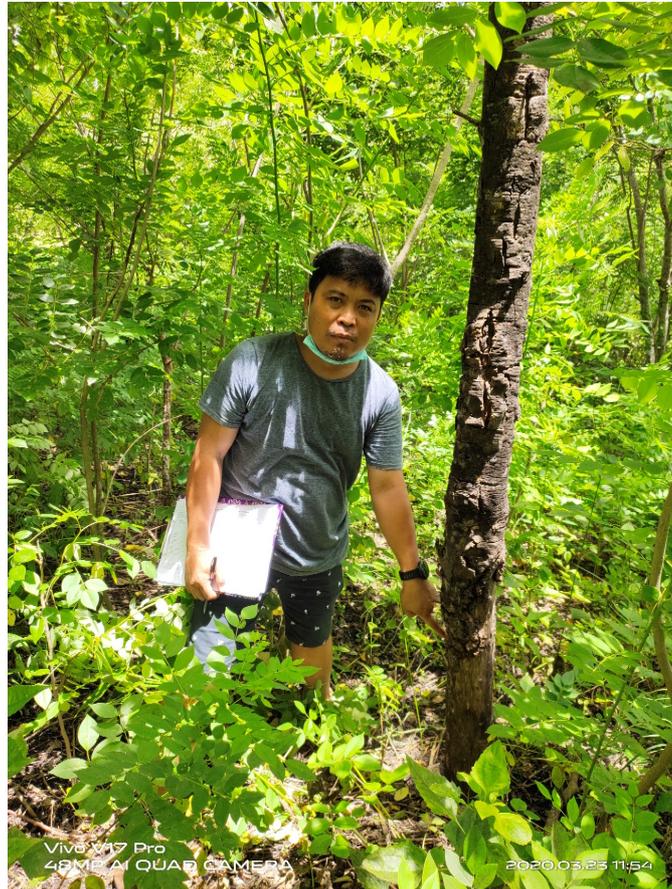
and enforcement of bylaws that discourage negative practices such as cattle invasion to the farmland and FMNR plots, and uncontrolled burning that could destroy the green landscape. Cattle invasion has had a detrimental impact on the growth of the trees. The following photos show examples from Haharu where the tree trunk is broken or dying due to cattle invasion (Figures 17-19).



**Figure 17. Gmelina trees in a common Palotang in Kalamba Village. The bark has been severely damaged by grazing livestock during the animal feed crisis.**



**Figure 18. Mahogany plants in the sample demonstration plot in Praibakul Village, whose black stems are blackened due to ‘skinning’ by goats. This can cause tree death.**



**Figure 19. Gmelina plant condition in the general Palotang demonstration plot in the village of Kalamba which has died due to skinning by goats.**

Using village funds in 2019, the village government of Mbatapuhu invested heavily in the provision of barbed wire for about 7 kilometres of the fencing, aiming at protecting the green landscape in the village. The fence is thickened with gamal (*gliricidia*) and *leucaena*. Because the local government has invested significantly in fencing the area, they have an incentive for enforcing fines for people who burn pastures or destroy the fence. The strategy for local government to put real investment alongside the IRED project is a good practice on how to optimise the use of government funds and power to accelerate achievement for their communities.

The progress of expanding the land area to be rehabilitated peaked during 2019 to 2020 (Table 9). This was especially true for FMNR+, agroforestry, and other practices. Meanwhile, the buffer zone and pastureland peaked in 2018 and then has stabilised throughout the project lifetime.

**Table 9. Type of Land Used and Area (Ha) from 2016 to May 2020**

Instrument of land rehabilitation:	Cumulative land area (ha) in year					
	2011-2015 (INFOCUS)	2016	2017	2018	2019	2020
Agroforestry	37.2	26.7		14.0	25.8	34.8

FMNR+ (Palotang)	68.0	6.4		61.2	92.7	327.2
Other Improved Practices				0	20.8	50.5
GAP corn, peanuts, vegetables				70.9	185.9	1637.4
Buffer Zone & Pasture				2137.5	2881.6	2881.6
<b>Total area of FMNR, Agroforestry, and Other Improved Practices (ha)</b>	<b>105.2</b>	<b>33.1</b>	No record	<b>75.2</b>	<b>139.3</b>	<b>412.5</b>
Share to IRED 5000 ha target (%)				<b>1.5%</b>	<b>2.8%</b>	<b>8.3%</b>
<b>Total area of all efforts (ha)</b>	<b>105.2</b>	<b>33.1</b>	No record	<b>2,283.6</b>	<b>3,227.6</b>	<b>4,931.5</b>
Share to IRED 5000 ha target (%)				<b>45.7%</b>	<b>64.6%</b>	<b>98.6%</b>

Source: analysed from NRM monitoring maps and field notes of IRED

Cumulatively, the IRED project has rehabilitated an area of 4931.5 ha or 98.6% of the initial 5000 ha. The IRED achievement in the development of FMNR and timber plots and other improved practices (412.5 ha) is close to 4 times the area developed under INFOCUS (105.2 ha).

Consequently, the visible results from the presence of the FMNR+ and GAP is that the area has become greener and more productive. As mentioned in the previous section, 71% of survey respondents reported that the number of trees in their community had increased, that the trees were very valuable (72% households), and that the quality of grazing area was better (64% households). These changes also reflect an improvement in farmer attitudes to valuing the environment.

Regarding the impact on the overall productivity, 67% of respondents stated that the good practices that had been carried out during the IRED project had increased the productivity of the whole agroforestry system and farming during times of normal rainfall. A further 3% reported an increase in productivity even when rainfall was below normal. Therefore, the immediate impact on productivity is good, and hopefully, as the FMNR and timber plots grow, the microclimate will further improve favourably and the landscape will become more suitable for high productivity even in periods of below-normal rainfall.

On the data management aspect, the first land use mapping of the IRED intervention area was finalised in mid-2018, followed by further mapping in mid-2019 and early 2020. The map in 2018 was a culmination of work carried out from 2016 to 2018 (Figure 20). However, mapping in 2019 (Figure 21) and 2020 (Figure 22) recorded only incremental changes in land size each year. We overlaid these three maps to get the cumulative end of project achievement (Figure 23).

Whilst digital mapping activities were conducted for evidence purposes (to estimate achievement for Outcome I.4 and demonstrate impact), they were under utilised from a planning and evaluation perspective. We found several challenges with the maps and the cost seemingly outweighs its benefit. Firstly, progress maps are not compared to the plan for intervention so there is no direct information from the maps which has been successfully used for program operations. Secondly, inter-year maps are not directly linked so that the accumulation of changes to the intervened areas needs to be computed manually. The type of computer-based mapping chosen by the project is not farmer-friendly so the map cannot be completed independently by farmers. Moreover, it cannot easily be used for routine monitoring of type of land use and its quality. The possible reasons for these problems are limited resources, such as a shortage of mapping and planning skills, the Monev officer turnover, and mapping technology.

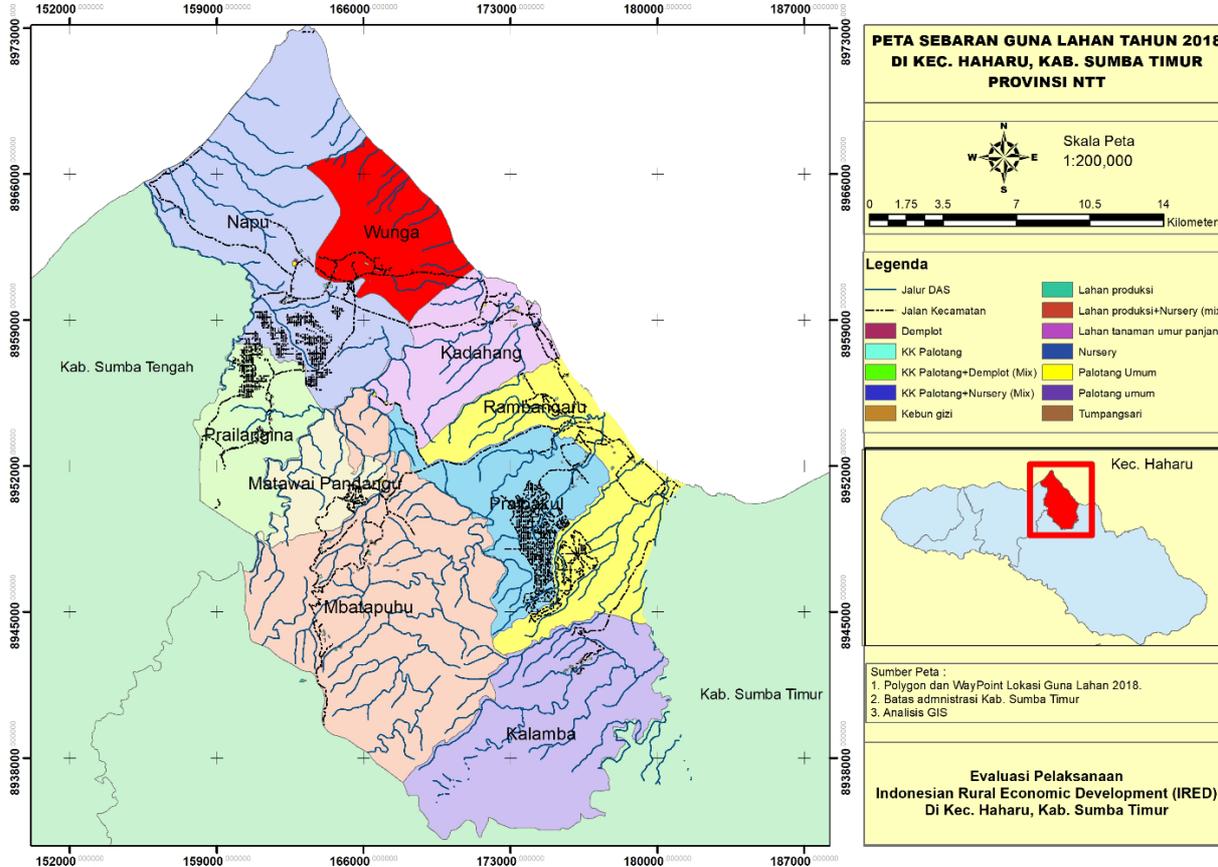


Figure 20. Map of Land Use in Year 2018

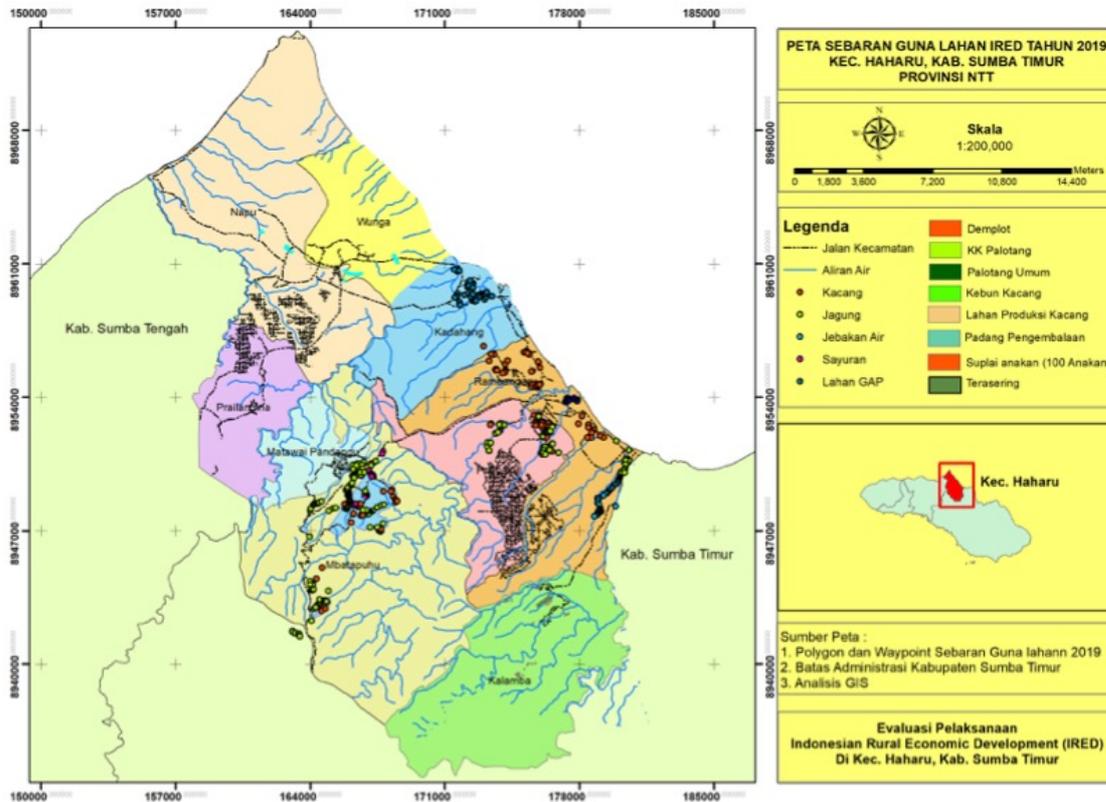


Figure 21. Map of Incremental Land Use in Year 2019

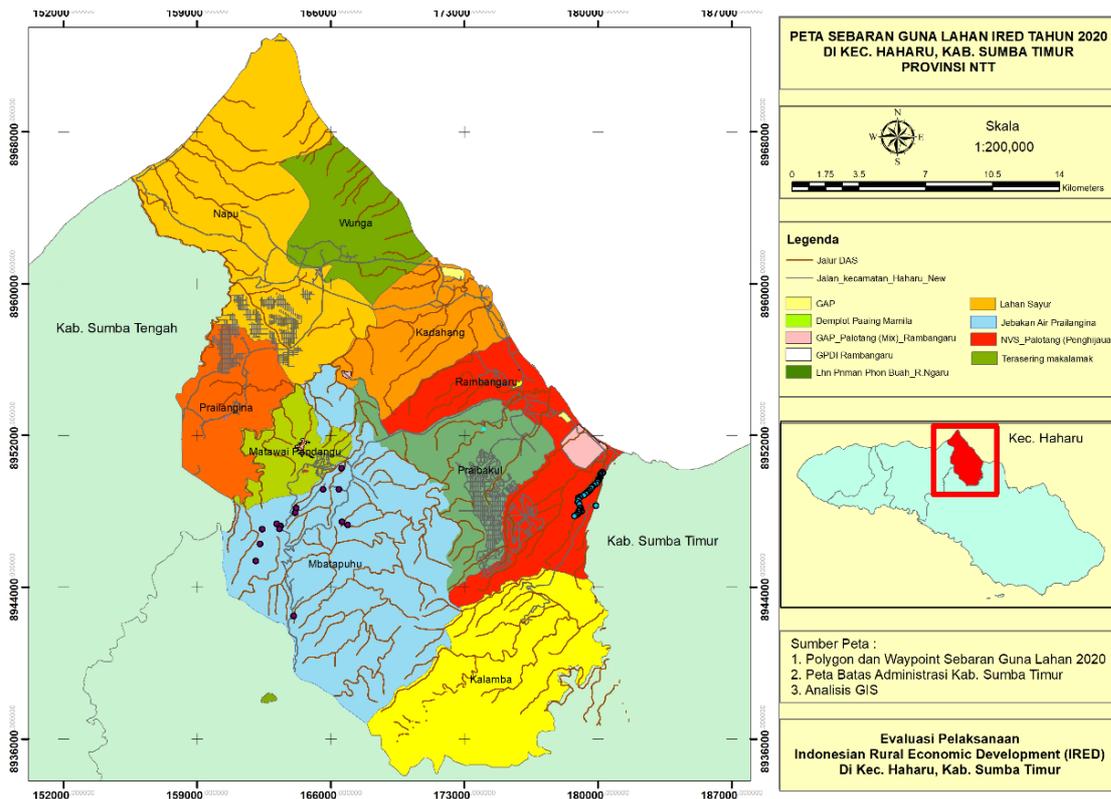
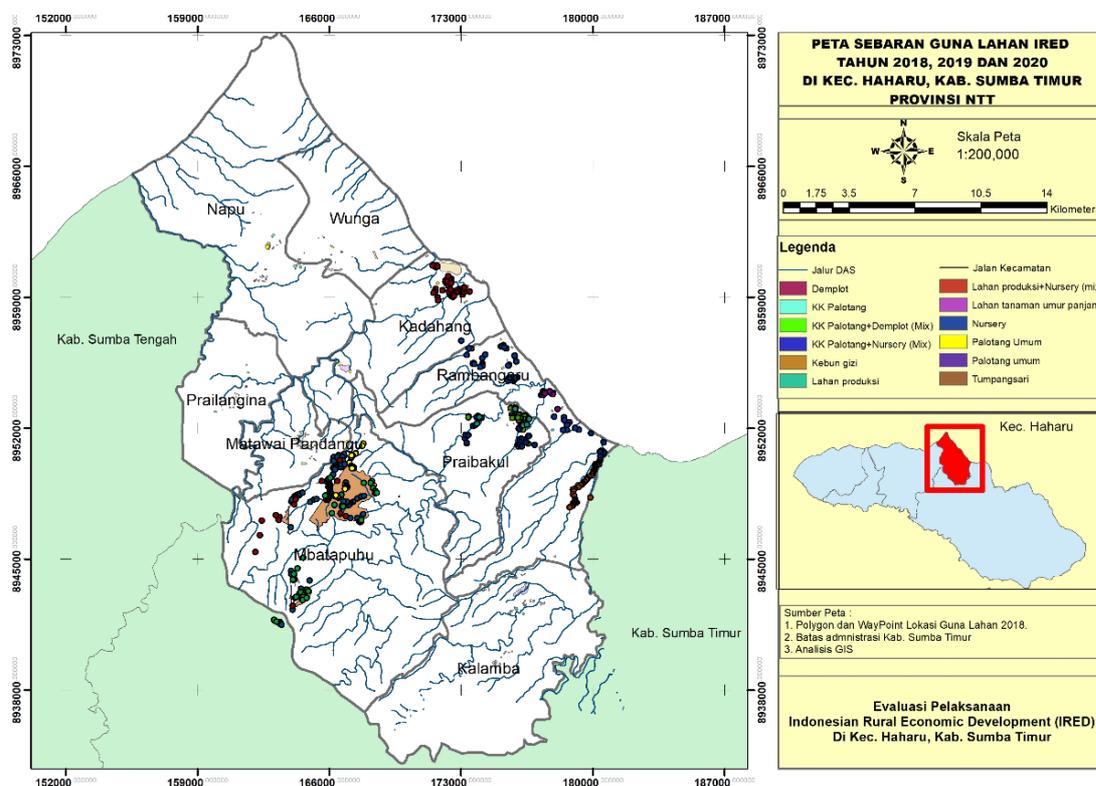


Figure 22. Map of Incremental Land Use in Year 2020



**Figure 23. Map of Cumulative Land Use from Year 2018 to Year 2020**

## Outcome 2 - Increased community's sustainable income

Increased income through FMNR + LVCD has been discussed in the Goal sub section. This sub section adds more detail on the LVCD element of the intervention. 50.5% of households in Haharu have increased their incomes through FMNR and LVCD mechanism. Overall, these households consist of 2410 individuals (1290 men and 1120 women) that represent 48% of adults in Haharu.

Meanwhile, 69 producer groups have been assisted through IRED LVCD activities. The above-mentioned 2410 adults are part of at least one on-farm or off-farm producer group. Six of these groups are food processing groups and the other 63 are on-farm groups. These 63 groups cultivate peanuts and corn. We separate the analysis for corn and peanuts because the report is based on the type or species of cash crops or commodities. The profiles of these groups are presented in Table 10.

**Table 10. Business Profitability Profile of Producers by Commodity of Interest**

Number of Group-product	Name of Producer Groups	Product	Scale of production per group	Profit per group (Rp Million/group)	Total Profit (Rp Million)
A	PROCESSING				
I	Kawini Raing (I)	Egg-coated peanuts	90 package	0.27	0.27
I	Maringa Pana Au	Fried corn	60 package	-2.72	-2.72
I	Malara Humba	Chili sauce	17 package	-0.29	-0.29

I	Kawini Pingu	Sweet-Potatoes sticks	300	package	0.20	0.20
I	Lata Luri	Pumpkin stick	200	package	0.14	0.14
I	Kawini Raing (2)	Onion coated peanuts	10	package	-0.18	-0.18
<hr/>						
B	ON-FARM					
63	Peanut Farming	Peanuts	360	kg	5.09	320.38
63	Corn Farming	Corn	700	kg	-0.62	-38.95
<hr/>						
Total					278.83	
<hr/>						
Average per group					2.11	
<hr/>						

Source: IRED LVCD monitoring data in 2019

The summary of achievement for key performance indicators for Outcome 2 is presented in Table II.

**Table II. Achievement of Key Performance Indicators on Increased community's sustainable income**

Key Performance Indicators	Baseline	Endline		Assessment of performance
		Target	Achievement	
2.1 Women and men report increased income through FMNR and LVCD products	Not available	1400 (Women 700; Men 700)	2410 person, equals to 48% of men and women in the population  (Women 1290; Men 1120)	Achieved
2.2 Proportion of participating producer groups with an increased net profit	0%	50%	50% of producer groups are profitable in 2020	Achieved
2.3 Additional net profit of participating producer groups		No explicit target	Average profit in 2020 = Rp2.11 Million/group (=USD \$151)	Achieved

Source: Outcome 2.1. Baseline and endline household surveys; Outcome 2.2. and 2.3. from IRED-Injiwatu LVCD monitoring data

## 2.1. Households (Women and Men) report increased income through FMNR and LVCD products

### Most Important Cash Crops: Planted and Sold

The top-five choice of crops to be planted in 2017 were corn, vegetables, peanuts, cassava, and chili. These groups are also the predominant ones in 2020 but with peanuts switching places with vegetables. The percentage of households who harvest cashews has increased from 8.3% in 2017 to 10.8% in 2020. The percentage of households who planted turmeric has more than doubled, from 3.2% in 2017 to 7.2% in 2020 (Table 12). However, none of the households surveyed chose turmeric as one of their three most important cash crops, probably due to its low harvest. A view of turmeric plants in Palotang and agroforestry plots are presented in Figures 24 and 25 below.

**Table 12. Planting and Selling Important Cash Crops**

Important Commodities	% household who plant/harvest			% households who sell (n=277)		
	Baseline	Endline	Changes	Baseline	Endline	Changes
Corn	96.8	94.6	-2.2	3.2	8.7	5.4
Peanuts	65.0	68.6	3.6	23.8	34.3	10.5
Vegetable	85.2	54.9	-30.3	17.3	9.4	-7.9
Cassava	41.9	26.0	-15.9	0.0	0.4	0.4
Chili	20.6	14.8	-5.8	0.4	1.4	1.1
Cashews	8.3	10.8	2.5	2.9	6.9	4.0
Coconut	30.0	9.4	-20.6	0.0	1.1	1.1
Turmeric	3.2	7.2	4.0	0.0	0.0	0.0
Shallots	6.5	5.4	-1.1	1.4	0.7	-0.7
Others	30.0	2.5	-27.4	0.0	0.0	0.0
Alang (Imperata)	0.0	1.0	1.0	0.0	0.4	0.4
Citrus	1.4	0.7	-0.7	1.1	0.7	-0.4
Banana	11.9	0.4	-11.6	2.9	0.7	-2.2
Breadfruit	5.1	0.4	-4.7	0.4	0.0	-0.4
Lime	1.1	0.4	-0.7	1.1	0.0	-1.1
Guava	1.1	0.4	-0.7	0.4	0.0	-0.4
Green beans	0.7	0.4	-0.4	0.4	0.4	0.0
Jackfruit	0.7	0.4	-0.4	0.0	0.4	0.4
Other fruits	10.1	0.4	-9.7	0.4	0.0	-0.4

Kedondong	0.4	0.0	-0.4	0.4	0.0	-0.4
Pineapple	0.4	0.0	-0.4	0.0	0.0	0.0

**Source:** Baseline and endline household surveys



**Figure 24. Agroforestry teak and turmeric in Mbatapuhu. The turmeric plants are two years old and have not yet been harvested and sold**



**Figure 25. Turmeric plants in communal Palotang in Kalamba Village. There is lack of plant maintenance in the plot**

There are 10 important cash crops that have experienced an increase in total sales for households in the sample. From the highest to the lowest increase are peanuts (increase by IDR91 Million), cashews (IDR16 Million), corn, chili, bananas, shallots, alang<sup>3</sup>, coconuts, jackfruit, and cassava (IDR150,000) (Table 13). Five of the top six most important commodities, with the exception of banana, received massive attention during the IRED intervention. Therefore, it is a good thing that their sales have increased because it shows that LVCD has worked.

For sales per participating household or individual households who sell a specific commodity, the change in the sale of peanuts, cashews, corn and chili lagged behind bananas, shallots and alang. This higher change in sales is due to lower number of participating households. For example, only 0.4% of households sell bananas while a very popular commodity, peanuts is sold by 69% of households.

**Table 13. Cash Income from Three Important Cash Crops**

Important Commodities	Number of participating households (out of 277 HHs)		Total Annual sales (IDR/year)			Monthly sales for participating households (IDR/month)		
	Baseline	Endline	Baseline	Endline	Changes	Baseline	Endline	Changes
Peanuts	66	95	99,000,000	190,000,000	91,000,000	125,000	166,667	41,667
Cashew	8	19	9,200,000	26,000,000	16,800,000	95,833	114,035	18,202
Corn	9	24	1,300,000	16,000,000	14,700,000	12,037	55,556	43,519
Chili	1	4	250,000	3,900,000	3,650,000	20,833	81,250	60,417
Banana	8	2	3,300,000	5,400,000	2,100,000	34,375	225,000	190,625
Shallots	4	2	2,400,000	4,200,000	1,800,000	50,000	175,000	125,000
Alang (Imperata)	0	1	0	1,500,000	1,500,000	0	125,000	125,000
Coconut	0	3	0	770,000	770,000	0	21,389	21,389
Jackfruit	0	1	0	200,000	200,000	0	16,667	16,667
Cassava	0	1	0	150,000	150,000	0	12,500	12,500
Turmeric	0	0	0	0	0	0	0	0
Pineapple	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0
Breadfruit	1	0	200,000	0	-200,000	16,667	0	-16,667
Kedondong	1	0	500,000	0	-500,000	41,667	0	-41,667
Green beans	1	1	700,000	50,000	-650,000	58,333	4,167	-54,167
Lime	3	0	950,000	0	-950,000	26,389	0	-26,389
Other fruits	1	0	1,000,000	0	-1,000,000	83,333	0	-83,333
Guava	1	0	2,000,000	0	-2,000,000	166,667	0	-166,667
Citrus	3	2	3,900,000	650,000	-3,250,000	108,333	27,083	-81,250
Vegetable	48	26	40,000,000	25,000,000	-15,000,000	69,444	80,128	10,684
			<b>164,700,000</b>	<b>273,820,000</b>	<b>109,120,000</b>	<b>908,912</b>	<b>1,104,441</b>	<b>195,529</b>

**Source:** Baseline and endline household surveys

<sup>3</sup> Alang or imperate grow naturally in the forest.

The enabling factor for the improvement in household sales revenues from cash crops is the wise selection of species of crops to be cultivated and sold. Farmers who have followed the on-farm GAP recommendations for peanuts, corn, shallots, cashews, and chilli score positive income change. The increase in sales of these commodities is more due to the increase in productivity than increase in price. More specifically, the new adopters of improved practices of FMNR+ – those who adopt the FMNR+ during the last one or two years – were 12.2 to 13.1% more likely to report higher productivity than those who had never adopted the practices, those who had ceased the practices or even those who had adopted these practices for a longer period. Moreover, the farmer champions were 12.7 to 13.8% more likely to report higher productivity than the non-champions. For a farmer champion who was also a new adopter of FMNR+, the chances doubled.

The promotion of activities for off-farm LVCD, such as collective selling and delayed sales, has the potential to boost prices but this strategy has not yet materialised due to timing. The activities only began in the second semester of 2019 and farmers have had an intra-group agreement for collective selling of 25 to 50 kgs of corn or peanuts. They plan to carry out collective selling after the 2020 corn and peanut harvest. If it runs smoothly, the strategy is likely to add more cash income for the corn and peanut farmers. However, there is concern that corn sales at the current price of Rp4000 to Rp5000 kg is not profitable due to the high hidden cost of labour. Also, it is difficult for suppliers to set the price of corn because it is still heavily imported to the island. Boosting the sale of peanuts is a better option because it can give about a 50% profit (see Table 14 in the next section for detail).

The sales of processed food, such as fried peanuts and fried corn, is profitable due to the comparative advantage of the availability of relatively cheap raw material, i.e., corn and peanuts. However, the sales of chilli sauce (Malara Humba), for example, is prone to loss because of the lack of comparative advantage: the primary raw materials such as chili and garlic are not produced on a large scale in Haharu.

Selling both unprocessed and processed peanuts is profitable but the unprocessed ones have a higher marketability than the processed ones. The processed ones have many competitors in the market while for the unprocessed ones, peanuts grown in Haharu gain a competitive advantage. The local peanuts have a higher yield than the hybrid ones.

On livestock sales, from the interviews we got an insight that for routine needs outside school or college fees and social events (adat), household usually sell small animals such as chickens, pigs, and goats. They leave the sales of big animals such as horses, water buffalos and cows for bigger needs. However, given that selling any animal will boost household cash income, while there is a potential animal virus such as ASF for pigs, diversification of livestock is a better strategy than only focusing on one species of animal. Taking advantage of the availability of green feeds and grains (from corn), farmers can shift their animal rearing from free range grazing to fattening ('cut and carry' feed systems) but this shift is still difficult because they are not used to the fattening method.

On the household management side, improving the gender balance in decision-making and work has a positive association with productivity and cash income. This is because by relaxing gender norms, households get more labour and skills that can be utilised for farm productivity. The bivariate analysis shows that:

- Households whose decision-making power shifted from a male-dominated one to one shared equally between genders scored a greater improvement in household income than households who did not make an effort for more equality of opportunity and power in intra-household decision-making (Table 14). The same occurred for households where women started participating actively in agricultural training. Some women participate

actively in agriculture training because they are leaders of the community or farmer groups so they should set an example. Other women participated in training by themselves if they were from a women's group or represented their spouse who was unable to attend.

- Women are more likely than men to take care of the household's daily needs, as men in the communities perform the role in *adat* meetings and ceremonies (such as deathwatch, funerals, and traditional marriages), which are perceived as essential in the villages. So as men often travel outside their residence to participate in *adat* meetings while women stay in the hamlet more than, this 'division of labour' strategy makes women better farmers and managers, taking on the primary farming responsibility, especially for seasonal crops, while the men are away. In this situation, women multitask between homemaking and farming, as well as childcare if they have a young child or grandchild to take care of.
- Young women, especially young women were more entrepreneurial, worked to face the challenge of a lack of rainwater when others gave up.
- Women leaders of communities who are risk-takers in seeking new business activities want to set themselves as examples for their community. Opportunities for being formal village leaders under popular elections probably play some role in boosting this positive behaviour. These women are persistent in agricultural development so that they can be trusted with more significant roles in their communities.

**Table 14. Mode of Gender roles and direction of changes, and its correlation to impact on the change of household income from FMNR+ and LVCD (Sample: Y2017 100% male; Y2020 96% male)**

Aspect of interest	Mode		Direction of change between 2017 and 2020 is toward			
	Y2017	Y2020	Only or mostly Men	Men and Women Equally	Only or mostly Women	Don't know
Who in your household decides what to do with family income?	Only or mostly Men	Men and Women Equally	0	+	-	0
Who in your household participates in agricultural training?	Only or mostly Men	Only or mostly Men	0	+	0	0
Who in your household decides what to plant, when and where (food crops)?	Men and Women Equally	Men and Women Equally	+	-	0	0
Who in your household decides what to plant, when and where (cash crops)?	Men and Women Equally	Men and Women Equally	+	0	0	-
Who in your household decides on agricultural investments?	Men and Women Equally	Men and Women Equally	+	-	0	0

Who in your household prepares food?	Only or mostly Women	Only or mostly Women	0	0	0	NA
Who in your household cares for children?	Only or mostly Women	Only or mostly Women	-	+	-	0

Source: Baseline and endline household surveys.

Note: 0 No significant change; + Increased significantly; - Decreased significantly at 90% confidence level



Gender inclusion that give rise to equality of opportunity participate in decision-making and work for women seem to be triggered by the agency of the women themselves. For example, the female farmers stated:

*“Because I am the leader of the community, I participate in training and chilli cultivation so that I can set a good example for my constituents.”*

(Kahi, 50, female farmer and community leader)

*“Once I got money from selling vegetables and watermelons, I reinvested my money in farming so I could have a better harvest and better income for me and my family.”*

(Margaretha, 35 years, female farmer)

*“I am not ashamed of working and walking under the sun to plant vegetables and sell them in my compound.”*

(Yanti, 30 years, female farmer)

### Risk Factors for Sustainable Income

From our observation of FMNR and timber/agroforestry plots, the predominant tree species are high-value timber such as teak, mahogany, and gmelina with a few species of trees for non-timber forest products (NTFP) such as lime, citrus, mangoes, palm trees, coconuts, betel (*sirih*) and areca nuts (*pinang*). The provincial government categorises the two latter species as advantageous local species due to their high demand in East Nusa Tenggara. However, they did not receive adequate attention in the FMNR/agroforestry/timber plot design.

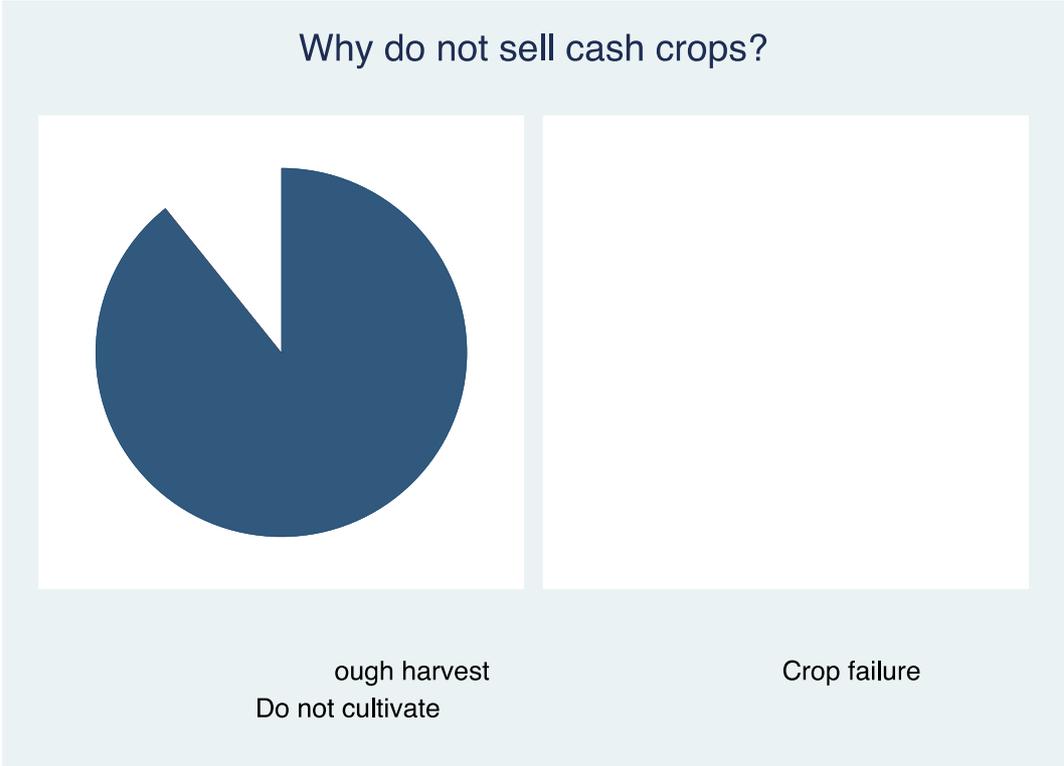
There was an idea to introduce pepper agroforestry and coffee agroforestry during the first year of the project after ICRAF's successful intervention in Sulawesi. Still, these two species are not suitable for the hot and dry climate of the Haharu region. There was also an idea to develop pineapple agroforestry and turmeric agroforestry but only turmeric agroforestry remains in some plots. If successful, those ideas could change the farming and marketing habits of the farmers as they shift from

only harvesting mostly corn and peanuts once or twice a year to continuous harvesting of NTFP to gain a high and stable income. However, as turmeric only remains in small plots, the potential harvest and income from NTFP are low.

The option for cash income is mainly left to the harvest and sale of cash crops and livestock. At the initial stage of the project, it developed trials for shallots (by LWR), turmeric, and peanuts (by ICRAF). Farmers still plant all three of these species. However, peanuts remain the most important cash crop, a kind of reinventing the wheel because peanuts had been the main cash crop of farmers in Kanatang and Mondu sub-districts before IRED’s intervention. Additionally, the IRED project invested in disseminating technology that is considered lacking from the government intervention. These technologies are plant spacing and low-cost organic home-made fertiliser, solid (compost), liquid fertilisers, and pesticides. Given the high risk of crop failure due to poor climate mitigation and pest control, IRED added to the portfolio for cash income with options for processing food from corn, peanuts, and chili, which are abundantly available during the first two months of the harvest of each species.

Members of the processing producer groups are only women. However, the producer group's inability to accumulate working capital poses a high risk of their sustainability. The producer groups mixed the processing activities with a 'micro-finance' business, such as lending money to its members, which turned out to be unproductive for the producers’ cash liquidity.

From the on-farm point of view, the other risk factor is the low yield that prevents half the farmers from selling their products because they only have enough for consumption. 90% of the farmers who did not sell cash crops (N=168 in 2017 and 145 in 2020) stated the problem of low yield (Figure 26). This problem has persisted throughout the IRED period.



**Figure 26. Main Reasons why farmers do not sell the harvest? (Baseline n=168, Endline n=145)** Source: Baseline and endline household surveys

There are two causes of this low yield. First, FMNR or agroforestry plots cannot easily be intercropped with food crops because farmers prefer not to cut or thin the trees. The fully grown trees are seen as more valuable than the yet to be seen food-crop harvest. Because of the dry climate that poses a risk of crop failure, farmers who are more risk-averse perceive that the benefit of keeping the trees outweighs the benefits of intercropping.

Second, an intensification strategy and improved practices only partially work in GAP plots because of farmers' inability to predict the rainy season and hence their inability to plan cultivation ahead before the rainy season begins. Though they are implementing seed-spacing during seed planting, farmers do not fully embrace the use of fertilisers and pest control because of unwise labour allocation and inadequate working capital. Therefore, the risk of low yield is still a significant challenge, especially if the rainfall is below average.

On top of the factors mentioned above, there are also two underlying factors for why farmers do not sell their produce: false pride and low expectations. Some farmers are embarrassed if they are seen selling vegetables and fruit on the roadside or market. Some others put low expectations on their improvement of incomes. While a few women farmers have overcome these challenges, others need more support and group-work to enable them to learn to sell. In this case, group marketing is a good idea from IRED's LVCD intervention. However, the idea has had a low uptake as it is a new strategy developed during conversations between IRED management and farmers. For instance, groups have agreed on communal or group sales of corn and peanuts for the coming harvest season.

### The proportion of participating producer groups with an increased net profit

As mentioned at the beginning of the section on Outcome 2, there are 69 on-farm and off-farm producer groups whose profiles are presented in Table 10 above. As seen in Table 10, 3 out of 6 (50%) processing groups scored a profit based on IRED-Injiwatu's estimation of their on-going business scale. The business scale of these groups is considerably small, which is one inhibitor to profitability. The main causes of this situation are the inability to accumulate working capital despite the opportunity to gain capital from the village and district government. The groups used money from the sale of processed food for 'microfinance' activities among their members who do not always return the money on time. Moreover, some of the essential raw materials need to be bought because the farmers do not grow them. Through the combination of small production scale, expensive raw materials, and high marketing cost (for transportation to Waingapu), the per-unit production and marketing is higher than the sales revenue, causing the group to score a loss in 2019.

Meanwhile, all on-farm groups planted corn and peanuts. Corn is not profitable, while peanuts are profitable. The unprofitability of corn is due to the unproductive farming system and low prices in the market. The farmers in Haharu have only started selling corn in small quantities in the last two years. Farmers have not had the habit of thinking in a commercial way on planting corn because the primary motive for planting corn is for a staple food where milled corn is mixed with rice. Therefore, unless the farming scale of corn and peanuts is expanded, it is difficult to enhance the sales and profitability of farming systems in Haharu.

One way to boost the farming scale is to relax the constraints from the input side. Together, BUMDES and Farmers Champions (promoting agroforestry) can play a role in increasing the availability of farm inputs by providing input credit (by BUMDES) complemented with knowledge in GAP (by Farmer Champions) that is paid for by the harvest. This strategy is possibly a better business opportunity for

BUMDES in Rambangaru, Praibakul, and Mbatapuhu, who, until now have not scored a reasonable profit. BUMDES receives annual funds from village funds so there is some seed funding available for their farm-input LVCD roles.

There is good demand for peanuts, with supply shortages, so BUMDES can then sell the harvest from farmers to the wholesale buyers in Waingapu or elsewhere without a price penalty for over-supply. One of the primary buyers of dry peanuts in Waingapu continues to buy from farmers all year round, with a peak in demand to provide fried peanuts during Islamic Eid-Fitr and Christmas celebrations. Usually, peanuts are only abundant in the market in the 2 months after the harvest. For value-added creation, BUMDES can help boost the production and sales of the women producer groups and, if necessary, introduce the BUMDES brand.

Given there were no producer groups or group sales during the baseline, we fix the baseline value at zero. Therefore, following the estimation in Table 10, the additional profit of the producer groups is Rp278.83 Million for all groups or Rp2.11 million per group.

However, given the updated information on the considerable increase in corn and peanuts yield in the 2020 harvest compared to 2018 and 2019, we expect that the on-farm producer's profit level groups should increase beyond Rp2.11 million per group. Moreover, in the context of there being more harvest available for consumption and sales, it is interesting to predict the direction of the behaviour of actors in LVCD of corn and peanuts.

BUMDES is a new game in the village. Most of the BUMDES were established about one year ago and are in the stage of searching for a business model. For example, the BUMDES in Kalamba invests in on-farm cultivation of peanuts. Peanut farming scores the highest total profit per farm unit of any commodity in the target area (in Table 10). Meanwhile, the BUMDES in Rambangaru focuses on playing the middle-person role in peanut sales. They bought peanuts from farmers in the last trimester of 2019 and sell them to big buyers in Waingapu at a low profit-margin of around Rp1000 per kg. Meanwhile, the BUMDES in Mbatapuhu, whose business is in groceries, has not been able to make use of the allotted funds from the village government due to a lack of financial transparency.

Given their good (albeit small and late) start in the 2019 harvest, we expect the BUMDES in Rambangaru and Kalamba to play a greater role in the peanuts and corn LVCD for the 2020 harvest. This is because they can utilise their 2019 experience to strengthen and expand their role as middle-person between farmers groups and big buyers.

For corn and peanut farmers groups, they already committed in 2019 to start collective selling of the 2020 harvest. Fortunately, the harvest of corn and peanuts is abundant this year so they will be more likely to implement collective sales. They are likely to sell their produce to the BUMDES in Rambangaru and Kalamba because they have had a gentleman's agreement to work together in pricing and helping farmers groups who want to do collective selling. Farmers groups will benefit from these transactions because they do not need to pay for high transportation costs to the city of Waingapu. BUMDES will sell their harvest to big buyers in Rambangaru at a small profit margin.

There is no discussion yet between BUMDES and the off-farm producer groups on BUMDES playing a middle-person role for processed food.

### Outcome 3 - Increased capacity of community and children to conduct environmental engagement

According to the ITT data, the project achieved all the indicators for this outcome. The summary of achievements for key performance indicators is presented in Table 15.

**Table 15. Achievement of Key Performance Indicators on Increased capacity of community and children to conduct environmental engagement**

Key Performance Indicators	Baseline	Endline		Assessment of performance
		Target	Achievement	
3.1 Women and men with increased knowledge and skills for environmental management		300 community members (180 (60%) men, 120 (40%) women)	1313	Achieved, over by 338%
3.2 Elementary students with increased knowledge and skills for environmental management		300 elementary students (50% boys, 50% girls)	738	Achieve
3.3 Government institutions engaged with the project to increase the community's knowledge and skills for environmental management		2	12 9 village government 1 District Environmental Office 1 District Agriculture Office 1 Sub-district government	Achieved; over by 500%
MELF 3.311 Number (x) of people exposed to awareness-raising campaigns/activities highlighting climate change and environment issues (from # of individuals who ever attended training on Palotang or GAP or NVS or Environmental Protection Campaign)		1400	1955 (Male 1018; Female 937)	Achieved; over by 40%

Source: IRED ITT and Training Monitoring file

### Women and men with increased knowledge and skills for environmental management

IRED's Monitoring and Evaluation Officer tabulated the achievements for this indicator from training attendance. We cross-validated the results using data from the endline survey for 25.3% of households who performed minimal 7 elements of improved practices (Outcome 1.1). The endline has information on which age group (children, adults or elderly) and gender (men or women; boys or girls) who performed the improved practices.

The achievement for Outcome 3.1 is also thanks to the active participation of 9 village governments who managed to pass bylaws on water management, fire banning, and the separation of pasture and farming areas (Outcome 3.3 and Outcome 4.1). Two village governments, Mbatapuhu and Kadahang, put real investment into fire breaks, buffer zones, and fencing, and this investment gave them motivation to enforce the bylaws.

### Elementary students with increased knowledge and skills for environmental management

IRED's Monitoring and Evaluation Officer tabulated achievements for this indicator from the number of students exposed to reference books for Local Content subjects in elementary school, a collaborative work with the District Education Office of East Sumba that involves teachers as resource-persons and implementors. Teachers can choose to use chapters from the Muru la Humba books to teach their children about the environment and culture in the Haharu and East Sumba local context. There was an enrichment program through the 'Sumba Green camp' held for students in March 2020. The provision of the book itself is a real contribution to the child education sector in Haharu, although its distribution is limited to only 2 elementary schools. The Deputy Head of the District Education Office welcomes the availability of luxury printed books but he thinks that it would have been better if the book was also released in the Kampera language, the dialect spoken by the majority of East Sumbanese (and slightly differs from the Haharu dialect) so that it could be used more broadly across the district.

The students and teacher that we interviewed expressed their satisfaction with the availability of the book. The students especially like the camping activity and planting trees.

*I love camping because I learn about planting trees. I want to plant a tree near the school so the air in the school is cool.*

(Tri, 11 years, girl, student)

*I love camping because I can learn not to not make trash in school. I also want to plant lots of trees at school and at home so that I can see lots of green leaves.*

(Ara, 11 years, boy, student)

*I like being able to teach students about greening at school. The school in Haharu is still not green. It is still very hot and arid so we learned about Green Schools and want our schools to be green schools too.*

(Matius, 45 years, teacher, male)

In terms of increasing student knowledge and skills for environmental management, we think the way the indicator was measured is problematic because listening to teachers and attending camp does not

provide good internal validity for skills. If we proxy the achievement of the indicator by using the number of boys and girls in households who stated that boys and girls perform real work on improved practices for rehabilitation of the landscape and natural resources (Outcome 1.1) we found that these training sessions and camps for children have not translated into real action of greening their environment. One of the main reasons is that it took quite a while to organise meetings and write and print the book. After that, the real activities in schools only began during the last semester. It takes time for students to learn, internalise, and practice the idea repeatedly before they could form new cognitive, motor, and psychomotor skills.

#### Number of Government institutions engaged with the project to increase the community's knowledge and skills for environmental management

From the document review and interviews with local government officers and communities, we found that two local government entities engaged with the IRED project to increase community awareness of environmental management. They were the District Environmental Office, which oversees forestry and environmental protection affairs, and the District Agriculture Office, which oversees agricultural extension and input subsidies for farmers, the 9 village governments, and the sub-district governments.

They provided institutional support for the project to work in the rehabilitation of landscape and natural resources and, to some extent, complement the project work with real investments, such as a fencing materials, seedlings, and input subsidies for farmers. These government entities have yearly funds and a mandate for the welfare of the community. The village governments in Haharu are the primary institutions that will sustain the Palotang and LVCD activities because they have established village regulations on land allocation, contributed to action on Palotang and Fire Management, provided stipends for the village agroforestry extension workers trained from the IRED project, and funded producer groups via the one-village one-product program. The district government offices have also provided funding for poverty alleviation, agricultural development, and environmental protection and can contribute to the continuation of Palotang and LVCD. The key to access government funding lies in integrating Palotang and LVCD into funding proposals submitted by the farmers' and producers' groups. Moreover, groups that are well organised administratively and financially have better opportunities to access government funds.

#### MELF. 3.311 Number (x) of people exposed to awareness-raising campaigns/activities highlighting climate change and environment issues

Monitoring data shows that the IRED project reached 1955 men and women with activities related to climate change and environmental issues. This figure is the number of adults attending training on Palotang, GAP, or NVS, and/or participating in the Environmental Protection Campaign, which included topics on climate change and environmental issues.

### **Outcome 4 - Strengthened good governance to endorse FMNR and LVCD**

The IRED project implemented a number of partnerships to ensure a cohesive community response towards achieving the project goal and sustainability of project outcomes.

The summary of achievements for key performance indicators is presented in Table 16.

**Table 16. Achievement of Key Performance Indicators on Strengthened good governance to endorse FMNR and LVCD**

Key Performance Indicators	Baseline	Endline		Assessment of performance
		Target	Achievement	
4.1 Community bylaws to manage water, fire, and livestock in place		7	9 (7) All 7 villages and the two new village governments of Matawai Pandangu and Prailangina 2 Village government (Mbatapuhu, and Kadahang) contributed to real investment for fire breaks and fence	Achieved
MELF 2.513 Number (x) of women's groups, organisations and coalitions supported		11	11 6 Producer's group (Malara Humba, Kawini Pingu, Maringa Pana Au, Mawini Raing 1, Mawini Raing 2, Lata Luri) 5 Woman Farmer groups (KWT Andamonung, KWT Pahamu Mamila, KWT Pangadang Mamila, KWT Ningu Monung)	Achieved
MELF 2.520 Number (x) of management committees in which women are equally represented		28	28 9 Fire Brigades, 7 BUMDES, 10 Water Committe 2 Mapping group (Wunga and Praibakul)	Achieved
MELF 2.521 Percentage (%) of management committees in which women are equally represented		80	80% (28 of 35 (9 Fire brigades, 7 Bumdes, 9 Mapping group, 10 Water Committe)	Achieved

Key Performance Indicators	Baseline	Endline		Assessment of performance
		Target	Achievement	
MELF 6.101 Number (x) of local in-country partners participating in ANCP funded projects/programs		66	65  9 village governments 29 local churches 7 BUMDES 1 District Education Office 1 District Environmental Office 1 Sub-District Agriculture Office 1 Sub-District government 9 Schools 1 Injiwatu Foundation 1 CV Monica 1 UD Utama 1 CV Matahari 1 BPBD 1 Community and Village Empowerment Office 1 Industry and Trade Office	Achieved
MELF 6.103 Number (x) of local in-country partners reporting an increased organisational and project implementation capacity as a result of participating in ANCP funded projects/programs		20	29  9 village governments 11 local churches 1 BUMDES (Rambangaru) 1 District Education Office 1 Sub-District Agriculture Office 1 Sub-District government 4 School 1 Injiwatu Foundation	Achieved

Source: IRED Indicator Tracking Table

The project ITT reported achieving all 5 indicators, although our tabulation of 'in country partners' fell slightly short of the target of 53, as some of the initial institutions were dropped as reported in the ANCP Annual Performance Report 2015-16 report. Those institutions are:

1. Large Farm Input Importers (x2) (Private Sector)
2. Financial Service Providers (x2) (Private Sector)
3. Small Farm Input Retailers (x10) (Private Sector)
4. Transporters, Buyers, and Traders (x50) (Private Sector)
5. Processors (x5) (Private Sector)
6. The University of Nusa Cendana, Faculty of Agriculture (Education)

Of all the 'in country partners' listed in Table 16, we think the law of proximity is at work. This means that institutions at the village level, such as the village government and local churches, are more participatory in the way they endorse FMNR and LVCD than institutions far away in the city of Waingapu. One possible reason is the division of responsibility between government institutions in the village which are also sub-ordinate to those institutions at the district or sub-district level. Another reason is that the travel time from Waingapu to Haharu is quite time consuming, around 1.5 hours to reach the centre of the sub-district and can take 3 hours to reach villages like Kalamba and Prailangina. IRED field facilitators stay in the sub-district centre or village, so it is easier for them to engage the village government, the local church, BUMDES, and local communities.

The village governments and local churches, with their inter-denominational fellowship for Green Churches, are the main endorsers of Palotang (FMNR) and LVCD in Haharu. The village government organises meetings, pushes for bylaws, and, in some cases, finance activities from the village fund. Most recently, two village governments (Kalamba and Rambangaru) have been interested in linking their BUMDES with the IRED LVCD model of output markets for peanuts and corn. In turn, the IRED LVCD advisor has recently engaged with BUMDES management. BUMDES still need to come up with business plans that are economically and socially feasible to create profit and simultaneously help farmers boost their farm productivity.

## 7. Conclusion

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**Goal: to increase sustainable economic development for 6,565 community members in economically deprived and land-degraded areas of Sumba Island through Farmer Managed Natural Regeneration (FMNR) and Local Value Chain Development (LVCD) approaches.**

After four years of planning and implementation, the project achieved its goal of improving the community's cash and non-cash income in a pro-poor and gender-inclusive manner. Although an increase in cash income from FMNR+ and LVCD is still small relative to the poverty line, the non-cash income from increased productivity is big enough to cause a drastic drop in food insecurity in the region. Moreover, 72.5% of households have experienced an increase in the value of their tree plots and some enjoy financial savings because they have used medium-sized timber to build a decent house.

### **Outcome 1: Rehabilitation of landscape and natural resources**

The primary sources of cash income in Haharu are the sale of small livestock such as chickens, goats, and pigs, as well as crops such as beans, corn, shallots, cashews, and fruits. The productivity of these crops and livestock is primarily driven by the adoption of good practices in land rehabilitation through FMNR+, village agriculture extension workers, and investment from IRED in water infrastructure. The adoption rate of Palotang has reached 95%, and the adoption rate of water management 50%; both reaching the target at the beginning of the project. However, the adoption rate of overall good practices for land rehabilitation has reached only 25.3%, which is below its 50% target. Nevertheless, the IRED project has successfully expanded the land area for FMNR+ up to 412.5 hectares, the buffer zone and grazing zone for cattle up to 2881.6 ha, and good agriculture practices up to 1637.4 hectares. All in all, the IRED project covers 4931.5-hectare land from the 5000-hectare target so the 5000-hectare target has been effectively achieved even though only 9.8% is FMNR+ area.

The low adoption rate for overall improved practices in land and landscape rehabilitation is partly due to a shortage of labour supply. As the formal education of the youth improves, they have a tendency to move away from their villages for blue or white collar occupations. Moreover, for those who remain, there are competing interest between implementing FMNR+ and other agendas, including working as daily labourers in a nearby sugarcane plantation.

### **Outcome 2: Increased community's sustainable income**

On the LVCD element, the IRED project has been successful in establishing women producer groups that produce processed food, such as varieties of fried corn, fried peanuts, and chili sauce. The corn and peanut-based products have a comparative advantage due to the relatively low price of primary materials. Still, the chili sauce is not profitable because the primary materials are not produced in sufficient quantities in Haharu. The remaining challenge for the producer groups is to boost both on-farm and post-harvest production scales to an economy of scale level. To do so, they need to be more selective in plants and businesses and reinvest their incomes back into the farming and processing system. Moreover, group selling, which could help to boost prices, is on the way but its realisation needs to wait until after the corn and peanut harvest each year.

There is local wisdom in managing a more stable cash income from FMNR+ in dryland in Haharu. That is, planting areca trees near the riverbank and palm trees in dry fields. The harvest of areca nuts, palm leaves, palm-sap, and processed sugar provides farmers with stable cash income throughout the year thanks to the shortage of these commodities in the local market.

The importance of livestock as the primary source of income has only received project intervention from the aspect of its feed through planting lamtoro (*Leucaena*) and other green forages. The overall elements of livestock technology and its LVCD have not been managed in the IRED project.

### **Outcome 3: Increased capacity of community (including children) to conduct environmental engagement**

The project fully achieved its target of increased community and children's capacity to conduct environmental engagement through the provision of reference books for local content in elementary schools with FMNR+ essence, and children's camps. The District Education Office plans to use the book as a reference for teachers in East Sumba District so there is a chance for sustainability.

#### **Outcome 4: Strengthened good governance to endorse FMNR+ and LVCD**

The project achieved most of the outcome target indicators on strengthened good governance to endorse FMNR and LVCD. Our observation indicates that the project's emphasis on engaging village institutions, such as the village government, local churches, BUMDES, and schools is the right strategy. In turn, village governments are the most influential endorsers of FMNR and LVCD mechanisms and, to some extent, fund FMNR and LVCD activities. The village government, village agroforestry extension workers, and the local churches are the three powerhouses that have shown motivation and ability to continue leading the community in the adoption of FMNR+ and LVCD in the post-IREC era. Support from district governments for funding and in-kind assistance is there if the producer and farmer groups can align their activities with the district government's programs.

#### **Gender Inclusion**

Overall, the decision-making processes and physical work on land rehabilitation and farming are shared between men and women. This situation is enhanced by gender equality training, and by designing in-situ and in-house training that requires the attendance of couples (husband and wife), and the presence of women's groups. Households where decision-making features equal participation of men and women have a positive and strong correlation with high income from FMNR and LVCD because of their more optimal use of complementary talents and skills of men and women when they work together.

#### **Disability Inclusion**

Community members with disabilities (hearing, seeing, self-care limitations) are more likely to be prevented from participating in the IREC project and excluded from participating in any project than those without disabilities. The differences are statistically significant. Those who have mobility disabilities felt they were not hindered from participating in the IREC project but felt excluded compared to those without disabilities. The hilly terrain of the region poses a challenge to the inclusion of community members with physical mobility problems due to age or disability. Their families prefer that family members with disabilities stay home to reduce the risk of having an accident in steep terrain.

## **8. Recommendations**

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### **General**

1. Future programming should consider using **multiple indicators or indexes on cash income, non-cash income, and valuation of the remaining trees** to comprehensively capture the notion of sustainable income from the FMNR+ and LVCD interventions.
2. Future programming should **explicitly set targets for achievement per actor (household or farmer group or producer group) per project phase** so that the process of rapid self-assessment and monitoring communication can be carried out effectively and comfortably between the project management and the farmers. For example, the big target on the land area for FMNR+

intervention should be broken down to a target per household so that each participating household is aware of the goal and can make an objective assessment of his or her progress.

3. Cognitive, motor, and psychomotor skills on agroforestry and good practices are critical determinants of successful implementation of an FMNR+ intervention. However, it isn't easy to measure these skills because they were not readily observable at the time of the survey. Future programming should consider using a **more operational or results-based definition for skills** to supplement the current cognitive pre- and post-training test for FMNR+ related skills.
4. Future programming should **consider the use of farmer friendly paper-based mapping** of progress of in the target land area so that it is easy for the farmers to assess their progress. The project can use the current computer-based one to consolidate reporting,

### **Outcome 1: Rehabilitation of landscape and natural resources**

5. **Given the still high dependency of food and cash crop yield on rainfall, adoption of FMNR+ and especially water harvesting need to be expanded.** There is evidence that water harvesting improves long-run soil fertility, enables farmers to cultivate food and cash crops at least twice a year and boost overall agroforestry productivity.
6. **More training and advocacy to decrease cattle invasion** in the FMNR+ and agroforestry plots needs to be done. There is evidence of trees dying due to cattle invasion in Kadahang and Praibakul villages.
7. **The use of local wisdom in the choice of species in FMNR+ and agroforestry plots** that simultaneously provide farmers with a stable income throughout the year needs to be advocated. For example, the choice of planting areca trees in place with high water availability and palm trees in places with low water availability. The products of these trees have a strong market demand and can provide farmers with a sustainable income.

### **Outcome 2: Increased community's sustainable income**

8. Market failure due to the remoteness of the region and small-scale farming is visible in the shortage of quality farm inputs (such as seeds, fertilisers, and machines) and the lack of access to large output markets. The local government needs to intervene to relax this constraint through the **provision of an agriculture micro-finance institution (MFI) that enables farmers to borrow from the MFI and pay their debt using the harvest of cash crops.** One possibility is to train BUMDES to perform the MFI role and become the focal-point role in LVCD profitably and sustainably. This could strengthen the supply chain of high-quality farm inputs, thereby providing access to farmers. Alternatively, provide an incentive for private MFIs such as KSP Swastisari, who successfully played the agriculture MFI role in a former WVI project in southwest Sumba, to distribute government credits for smallholders in the Haharu region.
9. The sale of livestock is consistently the primary source of cash income for most households. Future interventions should also **cover comprehensive livestock technology, such as breeding technology, fattening systems, and disease prevention technology, and its LVCD especially on provision of calves through credit.**
10. **Training on business feasibility and market needs to be intensified** so that farmer and producer groups know which commodities can give them a comparative and competitive

advantage and at what scale of production. Currently, peanut farming and processed corn and peanuts have shown profit but other businesses, such as corn farming and chilli sauce continue despite making a loss.

11. **Better farmer organisation and cohesion needs to be promoted** if the group's power through delayed sales and group selling is to materialise.

### **Outcome 3: Increased capacity of community (including children) to conduct environmental engagement**

12. The **Muru la Humba (Sumba Green) module for the Green School program can be introduced to children via the fellowship of pastors** so that they can use it as a reference for teaching children under the Green Church theme. Children can learn the topic during Sunday School or other children's meetings organised by local churches (19) in Haharu. This strategy will help the dissemination of the idea and natural resource management knowledge to children outside the school environment in a culturally appropriate way. Sunday Schools are not tied to government regulations with a heavy-burdened curriculum so they have more flexibility to teach environmental awareness to children.

### **Outcome 4: Strengthened good governance to endorse FMNR+ and LVCD**

13. The village government, church leaders and farmer champions have shown motivation and ability to organise the successful implementation of FMNR+. **However, they need to acquire skills on planning activities, and designing and performing effective project monitoring in the post-IREC era.** As the project will cease to exist in June 2020, it is essential to train the village government and farmers champion to perform post-project monitoring so that they can evaluate the progress of their FMNR, timber, and GAP plots and make necessary adjustments.
14. The village governments have provided BUMDES with Rp60 Million in seed funds per year for their operation and require them to contribute to locally generated funds. **BUMDES need to acquire skills to perform LVCD analysis of the input and output markets for valuable commodities** so that they can build their business plans that place them at the centre of the LVCD web in input and output markets for FMNR+ related commodities in Haharu.

## **9. References**

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SMERU Research Institute (2018) Poverty and Livelihood Map of Indonesia 2015: Kab. Sumba Timur, Nusa Tenggara Timur Province Poverty Map by Village, 2015. SMERU Jakarta [http://povertymap.smeru.or.id/map3/kabbydesa/5302\\_kabdesa/table](http://povertymap.smeru.or.id/map3/kabbydesa/5302_kabdesa/table)

# 10. Appendices

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## **Appendix A: Evaluation Terms of Reference**

## **Appendix B: Survey Tools and Data Sources**

### **Household Survey**

### **Key Informant Interviews**

### **Focus Group Discussions**

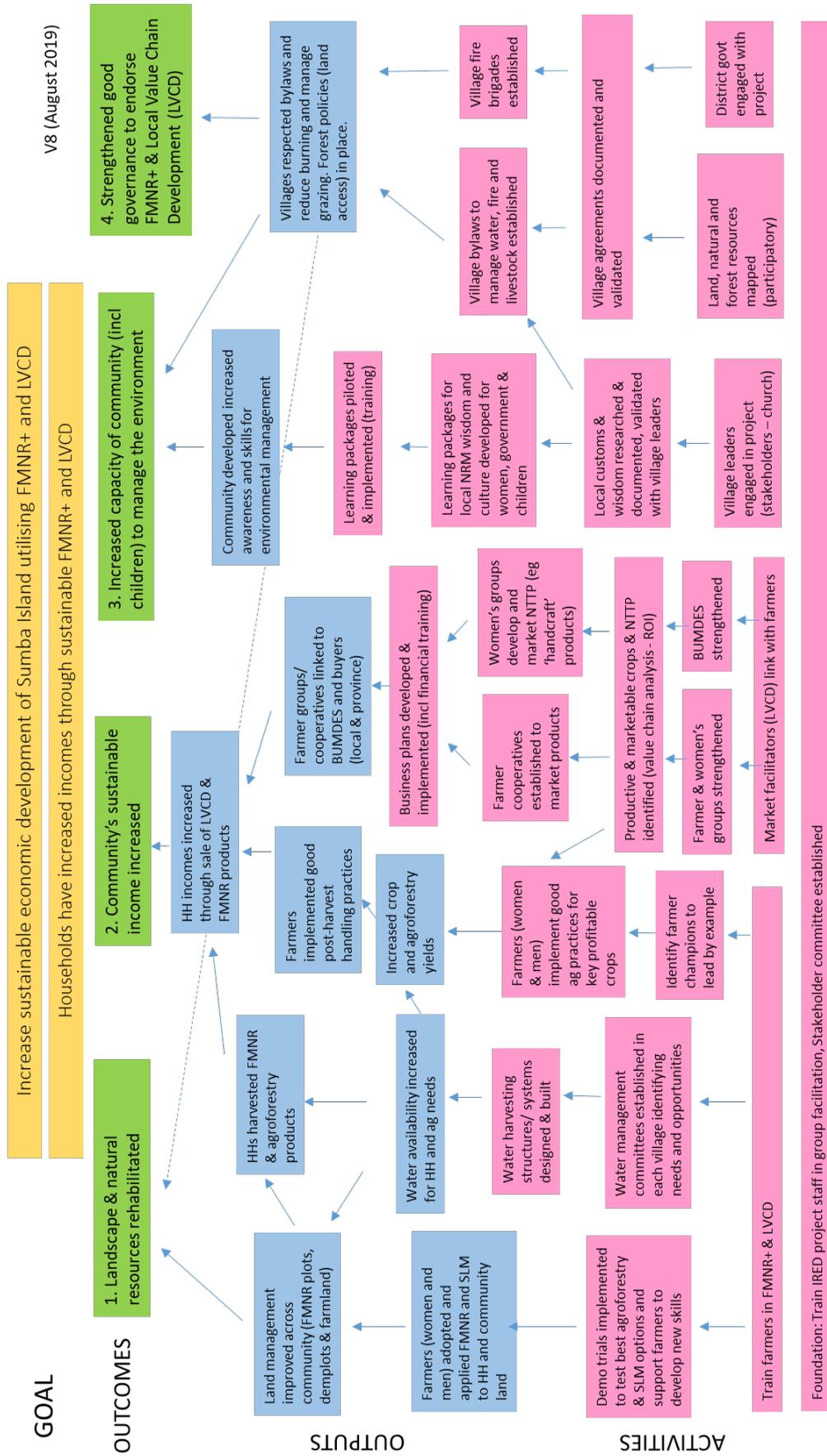
## Appendix C: Key Achievements

Key performance indicators	Baseline	Endline		Assessment of performance
		Target	Achievement	
1. Proportion of households with increased income by utilising FMNR+ and LVCD mechanisms	NA	50%	64.8%	Achieved
1.a. Increased food security, i.e., reducing the number of months without enough food			71.4%	
1.b. Increased cash income from sales of commodities			50.5%	
1.c. Increased value of trees			72.5%	
MELF 3.102 Number of poor women and men with increased incomes (defined as the number of adult members of poor households – using 2017 multidimensional poverty status - who experienced increased income from IRED-related commodities between 2017 and 2020)	NA	1400	1745 (women 825; men 920)	Achieved
1.1 Proportion of households implement improved practices in landscape and natural resources management	26.0% [20.8%-31.2%]	50%	25.3% [20.1%-30.4%]	Not achieved
1.2 Proportion of households practice FMNR (Palotang) on either farmland or community land	95.7% [93.3%-98.1%]	95%	94.2% [91.5%-97.0%]	Achieved
1.3 Proportion of households with access to water through improved water management practices	27.8% [22.5%-33.1%]	50%	52.0% [46.1%-58.0%]	Achieved
1.4 Total area of land (ha) being restored through FMNR+ mechanisms	NA	5000	4931.5	Achieved
2.1 Women and men report increased income through FMNR and LVCD products	Not available	1400 (Women 700; Men 700)	2410 person, equals to 48% of men and women in the population  (Women 1290; Men 1120)	Achieved
2.2 Proportion of participating producer groups with an increased net profit	0%	50%	50% of producer groups are profitable in 2020	Achieved
2.3 Additional net profit of participating producer groups		No explicit target	Average profit in 2020 = Rp2.11 Million/group (=USD \$151)	Achieved
3.1 Women and men with increased knowledge and skills for environmental management		300 community members (180 (60%) men, 120 (40%) women)	1313	Achieved, over by 338%
3.2 Elementary students with increased knowledge and skills for environmental management		300 elementary students (50% boys, 50% girls)	738	Achieved

Key performance indicators	Baseline	Endline		Assessment of performance
		Target	Achievement	
3.3 Government institutions engaged with the project to increase the community's knowledge and skills for environmental management		2	12 9 village government 1 District Environmental Office 1 District Agriculture Office 1 Sub-district government	Achieved; over by 500%
MELF 3.311 Number (x) of people exposed to awareness-raising campaigns/activities highlighting climate change and environment issues (from # of individuals who ever attended training on Palotang or GAP or NVS or Environmental Protection Campaign)		1400	1955 (Male 1018; Female 937)	Achieved; over by 40%
4.1 Community bylaws to manage water, fire, and livestock in place		7	9 (7) All 7 villages and the two new village governments of Matawai Pandangu and Prailangina 2 Village government (Mbatapuhu, and Kadahang) contributed to real investment for fire breaks and fence	Achieved
MELF 2.513 Number (x) of women's groups, organisations and coalitions supported		11	11 6 Producer's group (Malara Humba, Kawini Pingu, Maringa Pana Au, Mawini Raing 1, Mawini Raing 2, Lata Luri) 5 Woman Farmer groups (KWT Andamonung, KWT Pahamu Mamila, KWT Pangadang Mamila, KWT Ningu Monung)	Achieved
MELF 2.520 Number (x) of management committees in which women are equally represented		28	28 9 Fire Brigades, 7 BUMDES, 10 Water Committe 2 Mapping group (Wunga and Praibakul)	Achieved
MELF 2.521 Percentage (%) of management committees in which women are equally represented		80	80% (28 of 35 (9 Fire brigades, 7 Bumdes, 9 Mapping group, 10 Water Committe)	Achieved
MELF 6.101 Number (x) of local in-country partners participating in ANCP funded projects/programs		66	65	Achieved

<i>Key performance indicators</i>	Baseline	Endline		Assessment of performance
		Target	Achievement	
			9 village governments 29 local churches 7 BUMDES 1 District Education Office 1 District Environmental Office 1 Sub-District Agriculture Office 1 Sub-District government 9 Schools 1 Injiwatu Foundation 1 CV Monica 1 UD Utama 1 CV Matahari 1 BPBD 1 Community and Village Empowerment Office 1 Industry and Trade Office	
<i>MELF 6.103 Number (x) of local in-country partners reporting an increased organisational and project implementation capacity as a result of participating in ANCP funded projects/programs</i>		20	29 9 village governments 11 local churches 1 BUMDES (Rambangaru) 1 District Education Office 1 Sub-District Agriculture Office 1 Sub-District government 4 School 1 Injiwatu Foundation	Achieved

# Appendix D: IRED Project Theory of Change



**Appendix E: Evaluation Response from World Vision Indonesia**