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# INTERNATIONAL WORKSHOP

## TRANSITIONING TOWARDS AGROECOLOGY AND REGENERATIVE AGRICULTURE: A CONTRIBUTION TO FOOD SYSTEMS TRANSFORMATIONS



24-27 OCTOBER 2023, Siem Reap, Cambodia

# Participatory impact assessment for climate-resilient integrated farming systems

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Organizers:



Partners:





# Outline

- Introduction to project
- Impact assessment
- Key results
- Recommendations





# IFAD funded project - Scaling-up Climate Resilient Agriculture (SUCRA) project (2018 - 2022)



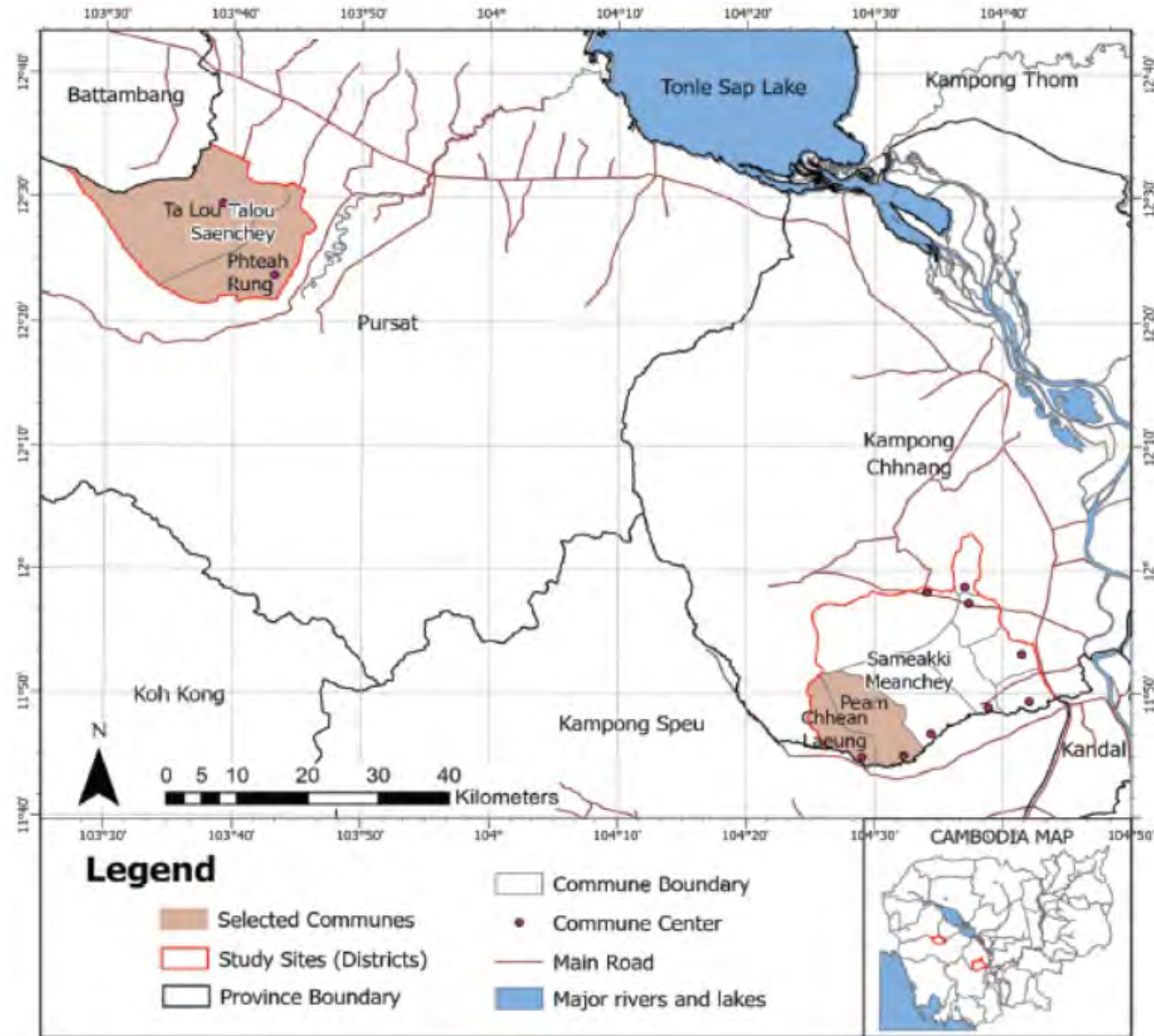
- ✓ The goal is to improve household incomes and build community resilience to climate change by promoting **integrated farming systems**.
- ✓ 1,500 smallholder farmers in Kampong Chhnang and Pursat province
- ✓ Sub-Component 3.2 of ASPIRE of MAFF

***Integrated farming systems (IFS): aim to combine multiple crops (e.g., cereals, legumes, tree crops, vegetables) and multiple enterprises (e.g., livestock, apiary, aquaculture) on a single farm in an integrated manner (Behera et al., 2015).***

→ **Fostering sustainable land management/agro-ecological practices**



## Study sites

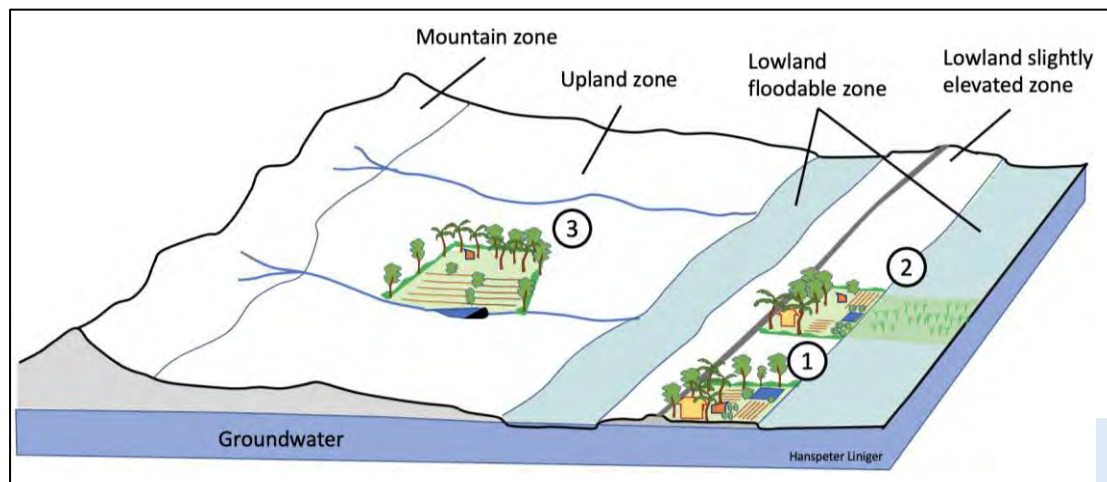


[Tim et al., 2023](#)

Figure 1. Map showing locations of the study sites in Pursat and Kampong Chhnang provinces.



# General Landscape Units (GLU) identified



Key biophysical and social criteria	General Landscape Units (GLUs)		
	HOMESTEAD	HOMESTEAD WITH RICE	CHAMKAR
Agro-Ecological Zone	Lowland / flood plains; Upland above floodplains	Lowland / flood plains	Mostly upland
Slope	Flat (0-2%)	Flat (0-2%)	Gentle, moderate to rolling (<15%)
Groundwater table	Shallow (<1m) to medium (<5m)	Shallow (<1m) to medium (<5m)	Very deep (>10m) to inaccessible (>50m)
Settlement history	Settled >30 years ago	Settled >30 years ago	Newly settled / cleared land / forest
Residential house	Yes	Yes	No
Average farm size [ha]	0.52	0.78	0.67
Labour availability (family / casual workers)	Medium to high	Medium to high	Low

## GLU Types:

1. Homestead
2. Homestead with Rice
3. Chamkar

### Homestead – IFS including artificial pond and aquaculture (GLU1 – IFS M3)



- Vegetables, fruit trees, multi-purpose crops, small livestock, and **artificial pond and aquaculture**:
- 1: Farmhouse
  - 2: Pond with fish
  - 3: Irrigated leafy vegetables
  - 4: Irrigated climbing/fruit vegetables
  - 5: Agroforestry with fruit trees
  - 6: Banana, herbs along walk path
  - 7: Small livestock (chickens, ducks)
  - 8: Wells
  - 9: Water storage tanks
  - 10: Vegetable nursery
  - 11: Living fence, multipurpose trees, indigenous trees

Photo: Hanspeter Linger

### Homestead with Rice – IFS including paddy rice-fish aquaculture (GLU2 – IFS M5)



- Vegetables, fruit trees, multi-purpose crops, small and **large livestock** and forage, and **artificial pond and paddy rice-fish aquaculture**:
- 1: Farmhouse
  - 2: Staple of large livestock (cows)
  - 3: Chicken house
  - 4: Forage under coconut trees
  - 5: Vegetables
  - 6: Sugar cane between fruit trees
  - 7a-7b: Bamboo
  - 8: Compost making place
  - 9: Newly planted mango and citrus
  - 10: Rice field
  - 11: Rice-fish-pond aquaculture
  - 12: Indigenous trees
  - 13: Irrigation canal

Photo: Sophea Lim

### Chamkar – IFS including irrigated commercial crops (GLU3 – IFS M7)



- Irrigated commercial crop** cultivation integrating vegetables, fruit trees, multi-purpose crops:
- 1, 2, 3: Cashew plantation
  - 4: Excavated pond for water harvesting in a natural stream
  - 5: Natural shrub as a stream buffer
  - 6: Irrigated mixed vegetables intercropped with fruit trees
  - 7: Lemon trees
  - 8: Mango trees
  - 9: Resting shade

Irrigation from pond and natural stream

Photo: Hanspeter Linger

[Tim et al., 2023](#)

# Integrated Farming System (IFS) Models



## 7 IFS Models:

**M1:** IFS including **small livestock** – agroforestry – fruit/vegetable production

**M2:** IFS including **large livestock** – agroforestry – fruit/vegetable production

**M3:** IFS including **artificial pond and aquaculture** - agroforestry – fruit/vegetable production – small/large livestock

**M4:** IFS including **paddy rice cultivation** - agroforestry – fruit/vegetable production

**M5:** IFS including **paddy rice-fish aquaculture** - agroforestry – fruit/vegetable production

**M6:** IFS including **rainfed commercial crops** - agroforestry – fruit/vegetable production

**M7:** IFS including **irrigated commercial crops** - agroforestry – fruit/vegetable production

Key components / characteristics	HOMESTEAD			HOMESTEAD WITH RICE		CHAMKAR	
	IFS M1	IFS M2	IFS M3	IFS M4	IFS M5	IFS M6	IFS M7
IFS Model including	Small livestock	Large livestock	Pond & aquaculture	Paddy rice cultivation	Paddy rice-fish-aquaculture	Rainfed commercial crops	Irrigated commercial crops
Mixed vegetables							
Multi-purpose crops/bushes/trees							
Leguminous crops							
Commercial crops							
Fruit trees							
Small livestock							
Large livestock (>2)							
Pond and fish culture							
Paddy field							
Paddy field-fish aquaculture							
Composting (fertilizer)							
Bio-digester (gas production for cooking and lighting)							
Water source: Pond/well/tap water							
Irrigation (importance)	+++	+++	+++	+++ (dry season)	+++	Mostly rainfed	++

**Colour legend:** Key component (orange), Additional component (blue), Optional component (grey)

Tim et al., 2023

(Tim et al., 2023)



## Activities

- ✓ Farmer mobilization and training on IFS and related topics
- ✓ Development of IFS farm plans
- ✓ **Decision support workshops with farmers**
- ✓ Training farmers on post-harvest technologies
- ✓ Implementation of farm plans
- ✓ **Assessment framework and monitoring of IFS**

## Key figures

- ✓ 1,502 HHs (female: 834) trained on IFS and related topics
- ✓ 1,500 IFS farms set up (all with farm plans)
- ✓ 28 communities of practices (CoP) groups formed

Lead: IIRR and RUA



# Objectives of the Impact Assessment

- ✓ To assess impact of the IFS practices on a farm
- ✓ To compare initial and end of project assessment using bio-physical and socio-economic indicators (monitoring)
- ✓ To identify suitability of IFS practices for different landscapes.
- ✓ To train the project team and stakeholders (PDAFFs) on data collection, data entry, data analysis and dissemination of results.





# Co-development of Impact Assessment Framework

- The tools are **co-designed** through an online process building on existing tools
- Process includes **capacity building** components on IFS



**SUCRA**  
**ASSESSMENT TOOLS**

## Core team

CDE/WOCAT  
(leading)

RUA Team

Local Consultant

## Executive partner

International Institute of  
Rural Reconstruction  
(IIRR)



# Assessment of Impacts



Google Earth image



Nov 2019

Drone picture



VS

Aug 2021

# The Assessment Tools consist of five parts – plus a field manual

- Part 1: General farm assessment
- Part 2: Farm layout, land use, IFS practices and water
- Part 3: Biophysical indicators assessment sheet
- Part 4: Social-economic indicators assessment sheet
- Part 5: Data entry analysis



SUCRA Part 1: General farm assessment  
Data record sheet

drop down - simple  
drop down - complex  
write in excel cell (no drop down)

1. General information about the farm      Assessment      Farm x

**Part 2: Farm layout, land use and water resources**

Preparation before the field visit:

**PART 3**  
SUCRA Field record sheet: biophysical indicators  
Date: 07.09.2021      Legend: drop down - simple

**PART 4**  
SUCRA Field record sheet - socio-economic indicators  
Date: 07.09.2021      Legend: drop down - simple  
Name observer(s): Yutha Nida/ Teamhy      Farmer assessment F      write in excel cell (no drop down)  
Farm ID / Assessment: PP-CR104      Interviewer assessm I  
General Landscape Unit: 3      Together I/F  
IFS Model: 7

No	SE Indicators	Assessment	Mapping unit 1	Mapping unit 2	Mapping unit 3	Mapping unit 4	Mapping unit 5			
I/F E1	Given name of mapping unit	Transfer result from part 3 E1	Farmstead	Fruit Tree inter cropping	Pond					
I/F E2	Mapping unit	Transfer result from part 3 E2	Ab-1,39-BKNP	Gb-13-BKOP	Cb-43-W					
I/F S1	Land ownership	A: State; B: Company; C: Communal/ village; D: Group; E: Individual - not titled; F: Individual - titled (soft); G: Individual - titled (hard); H: Other	F	F	F					
I/F S2	Land use rights	A: Open access (unorganized); B: Communal (organized); C: Leased (rental); D: Individual; E: Other	D	D	D					
I/F S3	Water use rights	A: Open access (unorganized); B: Communal (organized); C: Leased (rental); D: Individual; E: Other	D	D	D					
I/F E4	INPUTS on each mapping unit for last year (or since the last assessment), (judgment by land user)	1 to 5 <b>Labour (compare mapping units):</b> 0: No, 1: Very low, 2: Low, 3: Medium, 4: High, 5: Very high  <b>Costs for material/inputs (compare mapping units):</b> 0: No, 1: Very low, 2: Low, 3: Medium, 4: High, 5: Very high	Labour (all the labour by the farmer, his family members, or by hired labour)	Costs for materials, including hired as well as own machinery	Labour (all the labour by the farmer, his family members, or by hired labour)	Costs for materials, including hired as well as own machinery	Labour (all the labour by the farmer, his family members, or by hired labour)	Costs for materials, including hired as well as own machinery	Labour (all the labour by the farmer, his family members, or by hired labour)	Costs for materials, including hired as well as own machinery
I/F S5	Land preparation	<b>Labour (compare mapping units):</b> 0: No, 1: Very low, 2: Low, 3: Medium, 4: High,	2	2	3	2	2	2		

a) Overview



# Data collection at an IFS farm



Drone picture and mapping unit delineation



Interview the farmer



Observe the farm and collect bio-physical data

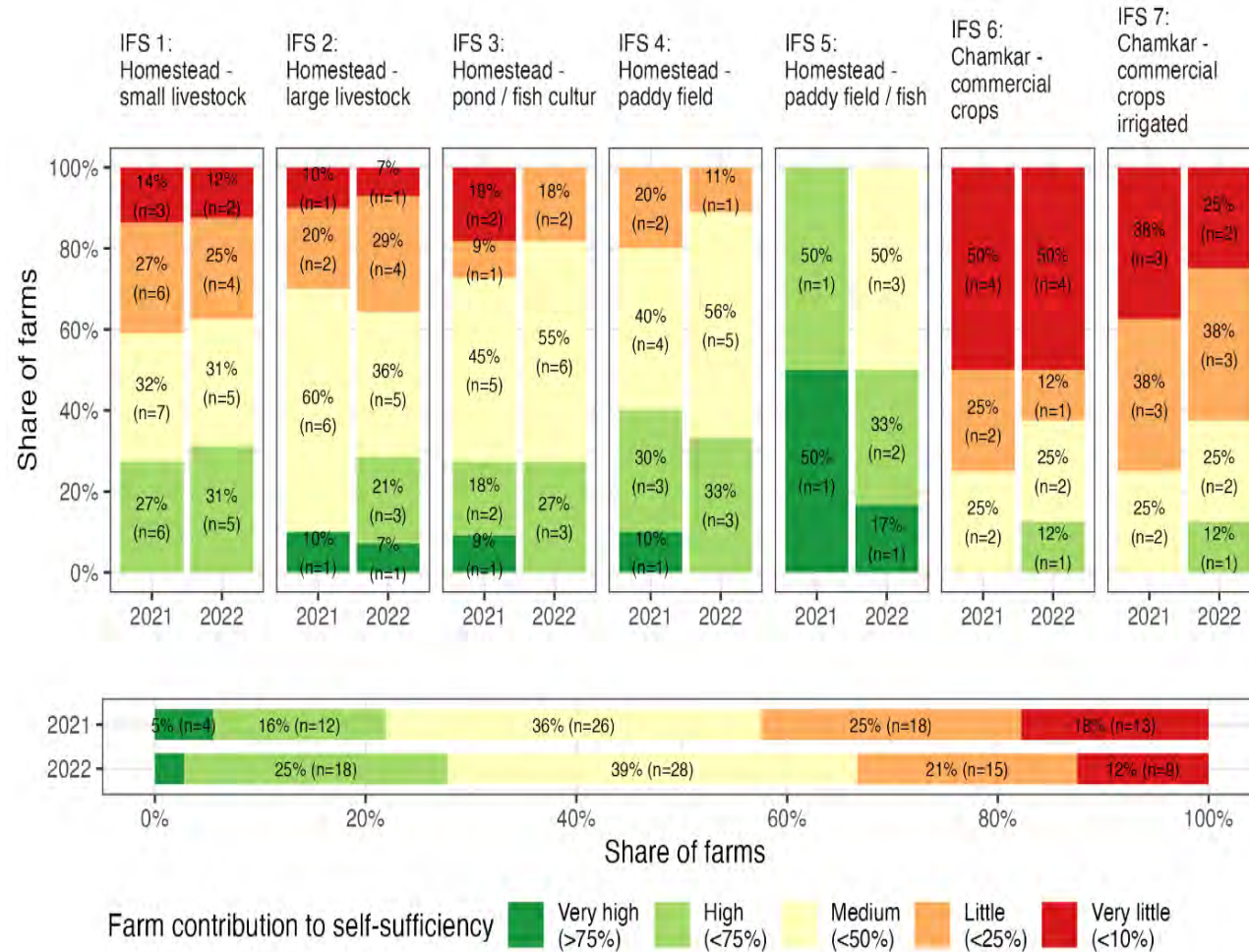


Panorama photo

Key  
results



# Farm contribution to self-sufficiency by IFS



Impact assessment allows to compare different IFS models, e.g. **self-sufficiency**.

- Homestead with rice & fish (IFS 5) has highest contribution.
- Chamkar (IFS 6 & 7) has the lowest as it is market oriented.

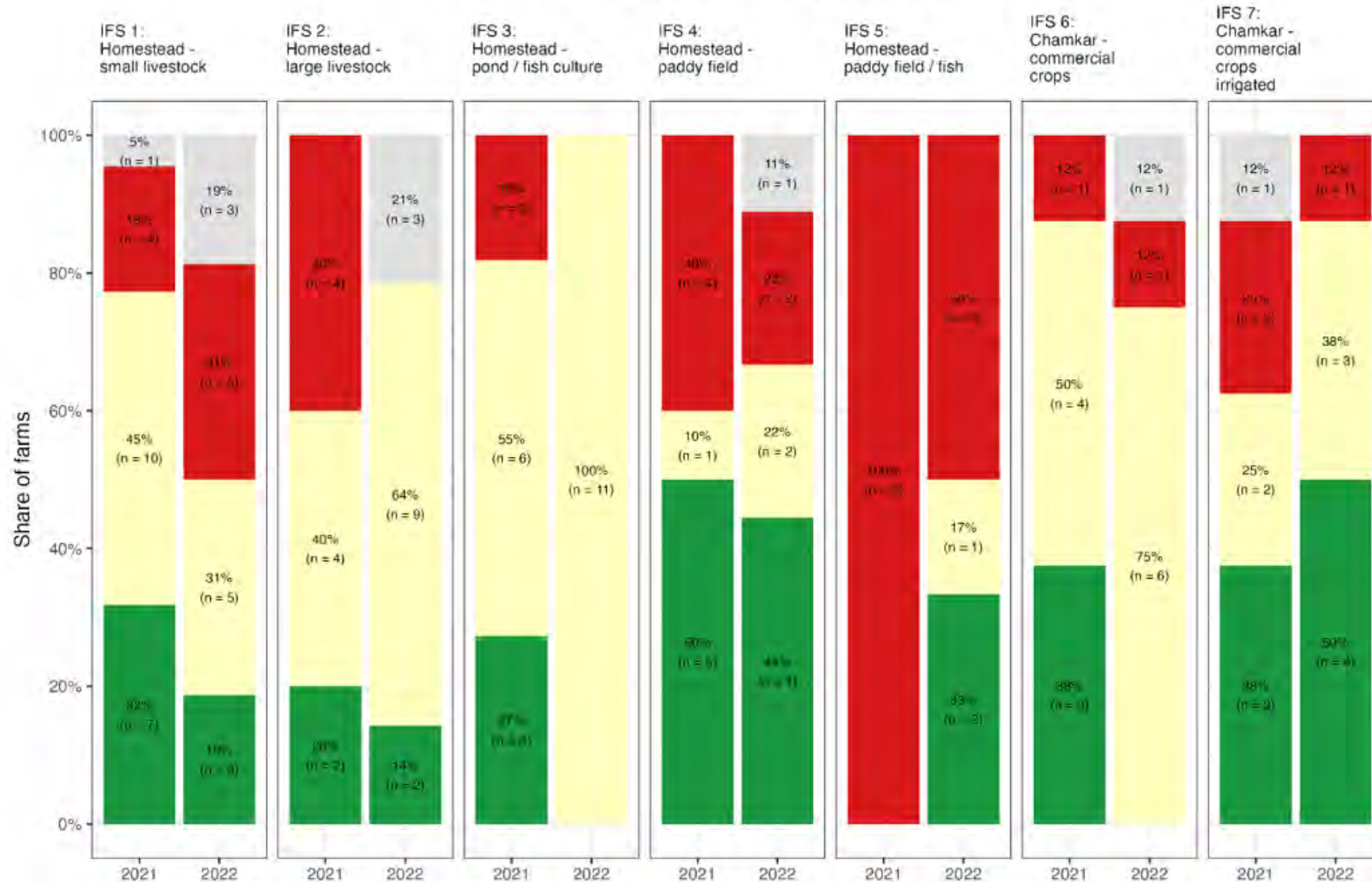


# Market value of farm products

Market value of farm products ■ Increased ■ Stable ■ Decreased ■ Do not know



Market value of farm products by IFS model

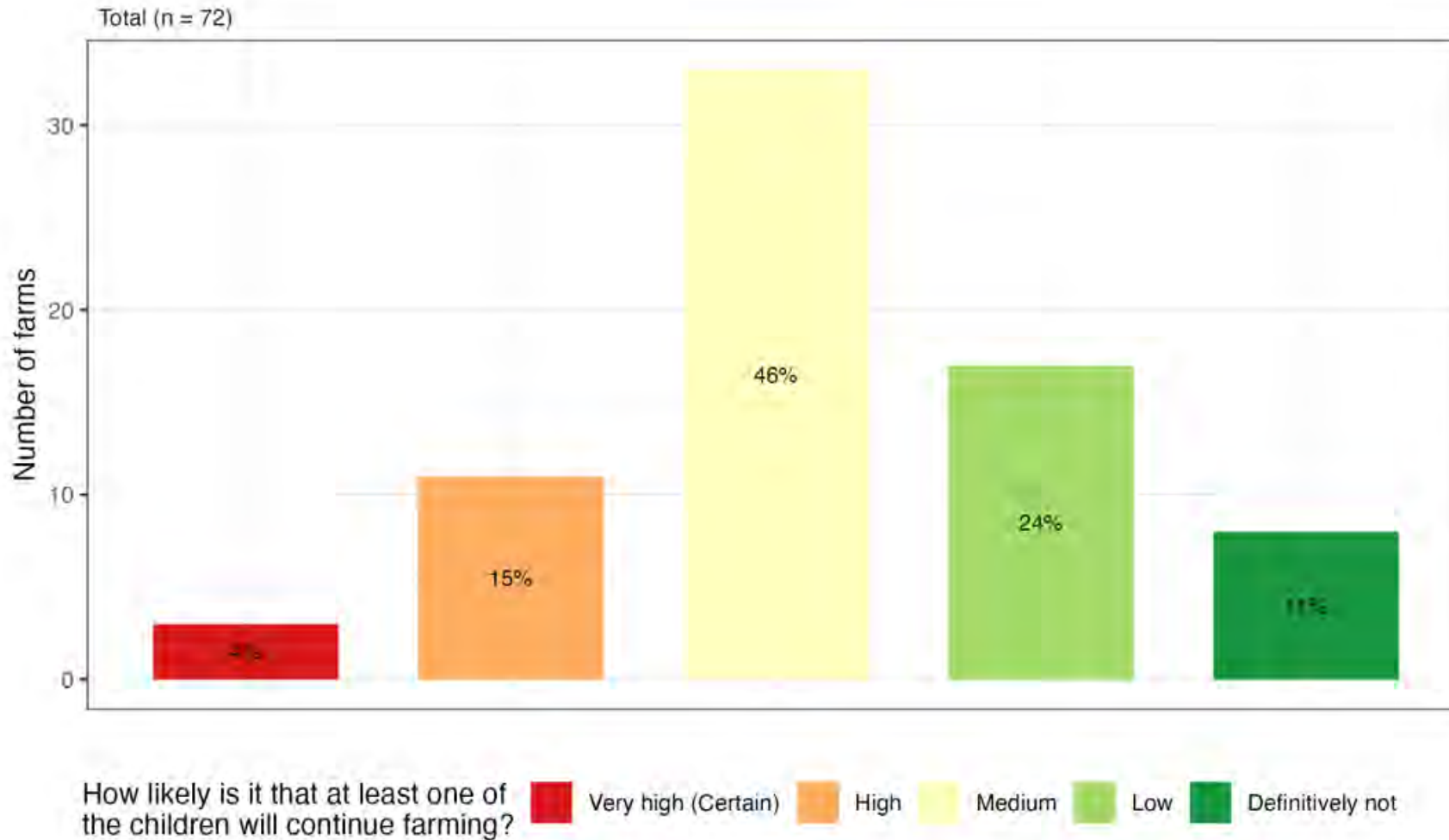


Market value is mostly increasing for all IFS

→ More indicators have been assessed: soil health, impact of climate extremes, ...



# Likelihood of children continuing farming



Key concern for the future:  
Few young farmers are interested to continue farming

→ What would make farming more attractive?





# Knowledge Products by the Project



- SUCRA leaflet
- Posters of 7 IFS models
- Guideline of IFS community of practice (CoP)
- Guideline of IFS promotion with farmers
- Journal article (Tim et al. 2023)

The SUCRA leaflet is a colorful document with multiple sections. It features photographs of farmers working in their fields, diagrams of agricultural systems, and text in Khmer. The IFAD logo is visible at the top.

Two posters are displayed. The top one is titled 'សាកលវិទ្យាល័យកម្ពុជា' (Cambodian University) and 'កម្ពុជា' (Cambodia). It features a circular diagram with seven segments representing different Integrated Farming Systems (IFS) models. The bottom poster is titled 'សាកលវិទ្យាល័យកម្ពុជា' and 'កម្ពុជា', and shows a group of farmers sitting on the ground, engaged in a community meeting or training session.

The CoP guideline consists of several pages. The top page has a title 'គម្រោងស្តីពីការពង្រឹងប្រព័ន្ធកសិកម្មដែលមានជីវចម្រុះ' (Project on Strengthening Diversified Farming Systems). It includes circular diagrams showing the flow of information and resources within the community of practice, along with photographs of farmers and agricultural fields.

The journal article cover is for 'JOURNAL OF LAND USE SCIENCE'. The title is 'Strengthening climate resilience of rural communities by co-producing landscape-specific integrated farming systems in Cambodia'. The authors listed are Sophea Tim, Isabelle Providoli, Teamhy Sien, Sokphors Yim, Soben Kim, and Hanspeter Liniger. The Taylor & Francis logo is prominently displayed.

A stack of various knowledge products is shown. At the top is a poster with the IFAD logo and the text 'សាកលវិទ្យាល័យកម្ពុជា' (Cambodian University). Below it are several more posters, each with the IFAD logo and the project title. At the bottom is a page from the journal article, showing the title and authors' names.



# Recommendations and outlook



- ✓ Farms and IFS practices have to be linked to the respective **agro-ecological zone/landscape**.
- ✓ **Proper monitoring and evaluation** of the impacts of IFS is needed to show the benefits and reveal constraints for large-scale implementation of IFS.
- ✓ Implementation projects should support **long-term impact assessment** including bio-physical and socio-economic indicators.
- ✓ The approach is suitable for **upscaling to other projects and areas/provinces** in Cambodia.
- ✓ Farming should be made **more attractive for the young generation** by promoting new business opportunities.



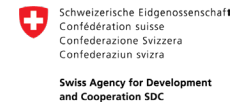


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