

An Advent series by **Cluster Green**

Shining a light for **Biodiversity**

Four perspectives on the life that sustains us



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development
and Cooperation SDC



When nature feeds the world: Healthy people, healthy planet

December 7th, 2023



Shareweb
Climate Change & Environment



SDC Network
Disaster Risk Reduction



The SDC Agriculture and
Food Systems Network

SDC Network

RésEAU
RGE EAU

Diversity feeds the world – seeds for resilient and healthy food systems

Guest speakers



Simon Degelo
Seed policy and biodiversity
SWISSAID

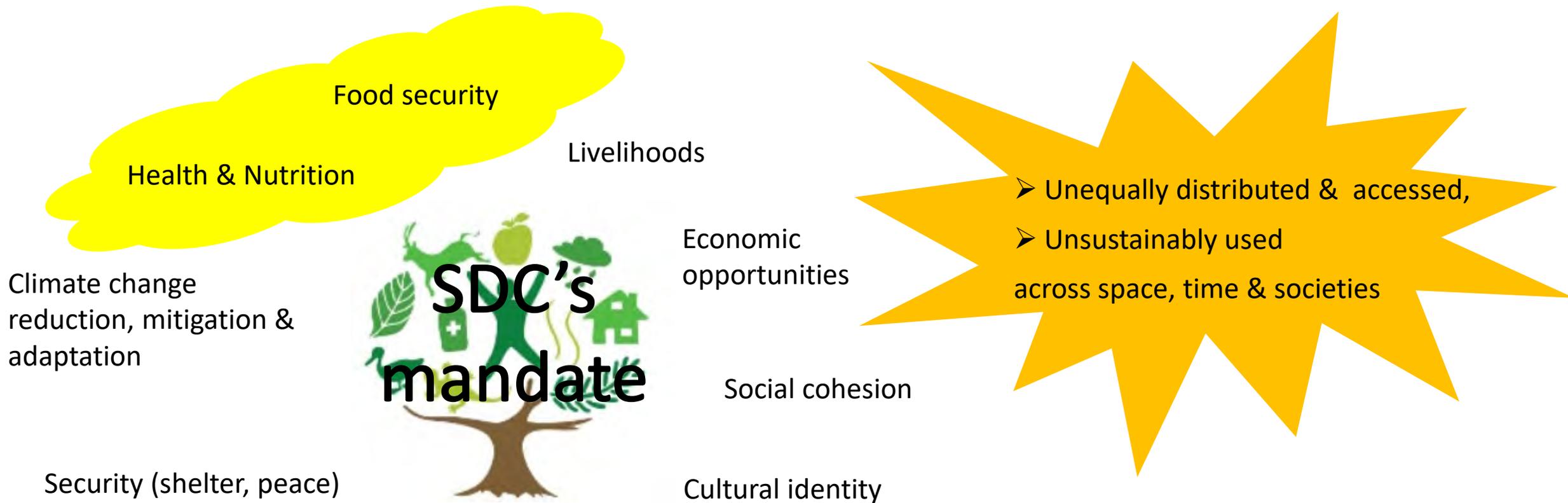


Amrit Riar
Research Coordinator CROPS4HD
FiBL



Sonja Tschirren
Climate and organic farming
SWISSAID

Why is biodiversity important for SDC ?



Conservation vs. Restoration vs. Sustainable use

https://miro.com/app/board/uXjVNFhTDs0=

Programme

Introduction: Agrobiodiversity and global factors for loss and conservation



Simon Degelo
Seed policy and biodiversity
SWISSAID

Breeding for resilience: how farmers adapt their seeds and agricultural practices to a changing climate



Amrit Riar
Research Coordinator CROPS4HD
FiBL

How does agrobiodiversity supports Food Security, Nutrition and Climate change adaptation?



Sonja Tschirren
Climate and organic farming
SWISSAID

Biodiversity in cropping systems

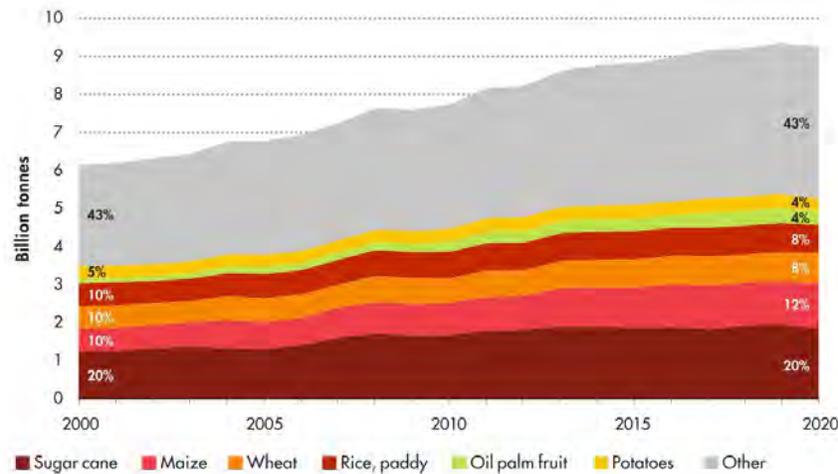
- Diversity of crops (number of species)
- Diversity of varieties (genetic diversity within species)
- Diversity of associated plants (planted or non-planted)
... plus animals, insects, fungi and microbes



Loss factor: Uniformity of agricultural commodities

6 crops dominate global markets

FIGURE 21.
WORLD PRODUCTION OF CROPS, MAIN COMMODITIES



Note: Percentages on the figure indicate the shares in the total; they may not tally due to rounding.
Source: FAO, 2022. FAOSTAT: Production: Crops and livestock products. In: FAO, Rome. Cited October 2022. <https://www.fao.org/faostat/en/#data/QCL>

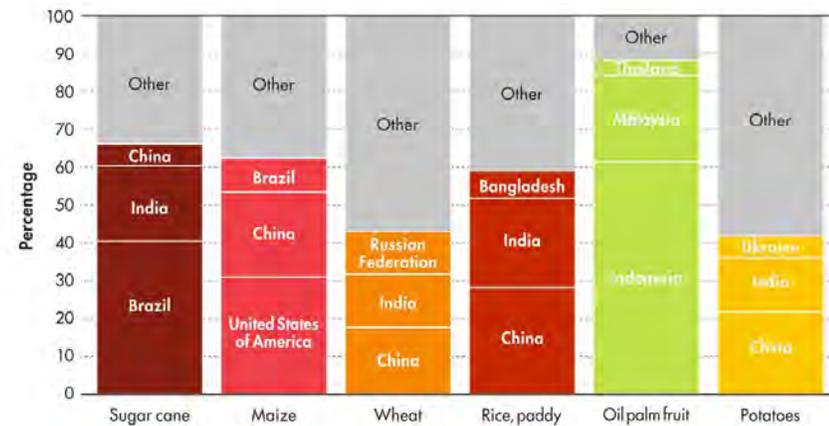
<https://doi.org/10.4060/cc2211en-fig21>



Consequences: Uniformity of commodities

Dependence on few dominant producer countries

FIGURE 22.
WORLD PRODUCTION OF MAIN PRIMARY CROPS BY MAIN PRODUCERS (2020)



Source: FAO. 2022. FAOSTAT: Production: Crops and livestock products. In: FAO. Rome. Cited October 2022. <https://www.fao.org/faostat/en/#data/QCL>

<https://doi.org/10.4060/cc2211en-fig22>



Mismatch between global production and healthy nutrition

Loss factor: Uniformity of global seed system



LEADING COMPANIES BY SEEDS & TRAIT SALES, 2020

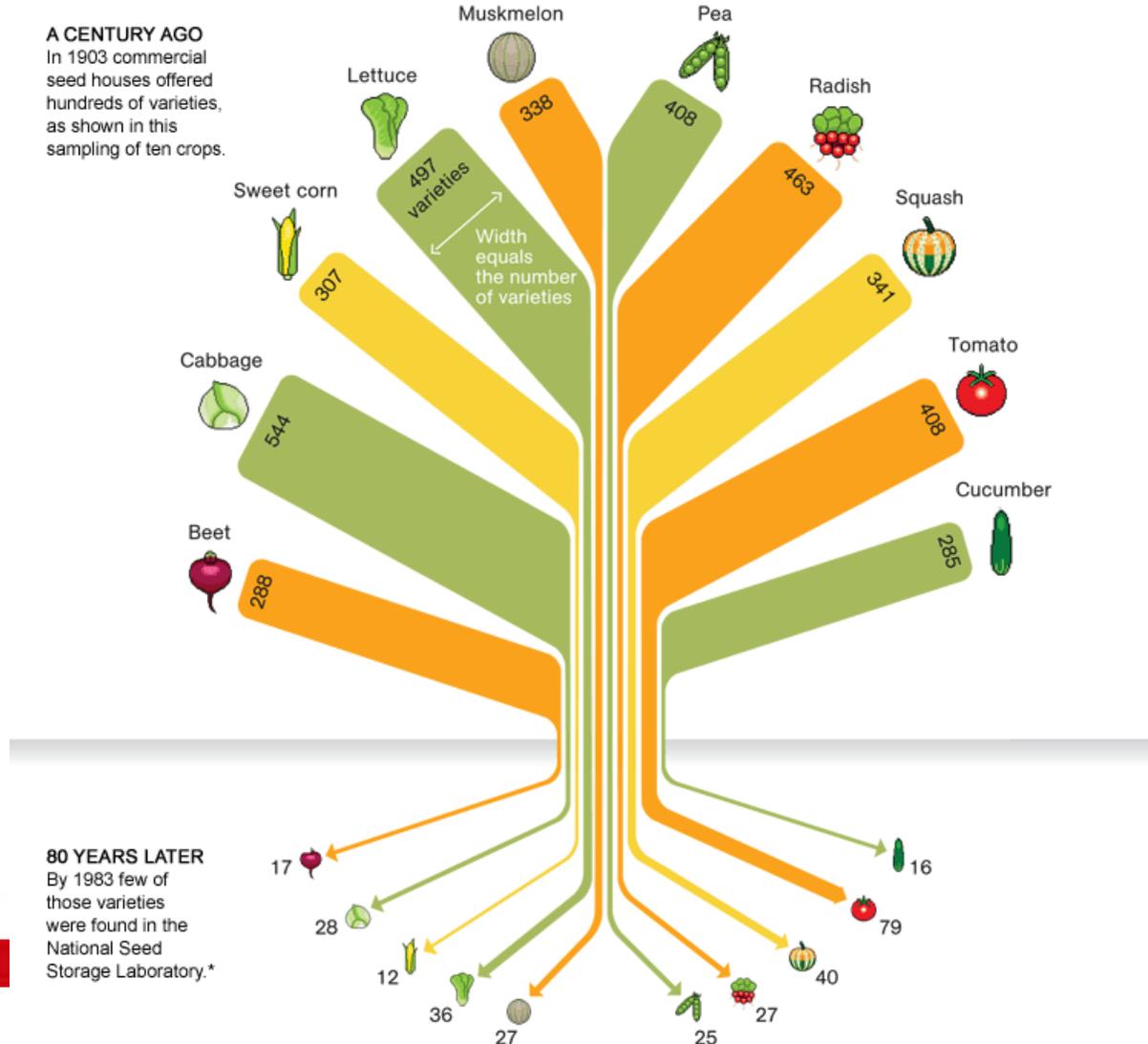


LEADING COMPANIES BY AGROCHEMICAL SALES, 2020

Graphs: Food Barons, 2022, ETC Group

Loss of varieties in 20st century

A CENTURY AGO
In 1903 commercial seed houses offered hundreds of varieties, as shown in this sampling of ten crops.

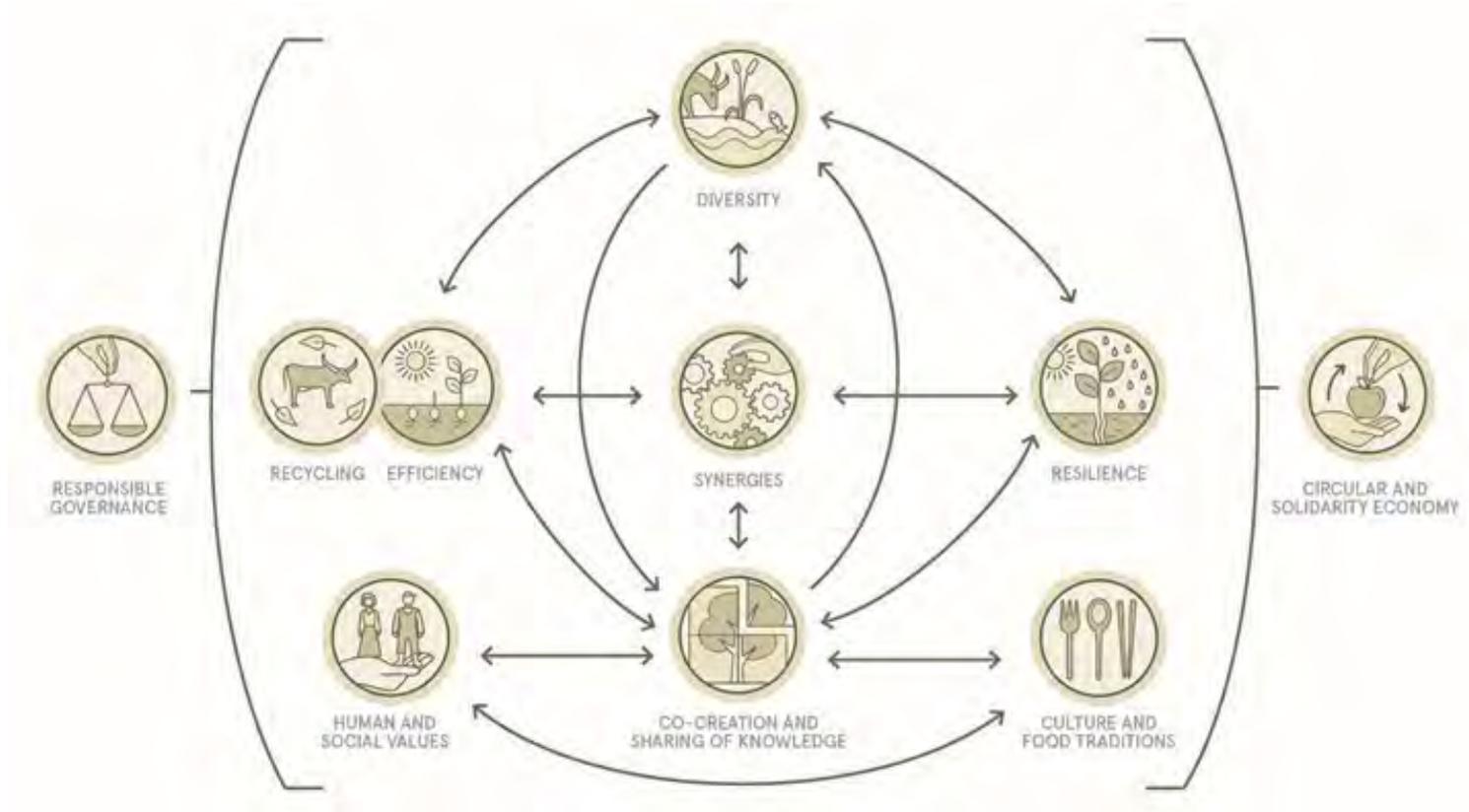


80 YEARS LATER
By 1983 few of those varieties were found in the National Seed Storage Laboratory.*

* CHANGED ITS NAME IN 2001 TO THE NATIONAL CENTER FOR GENETIC RESOURCES PRESERVATION

JOHN TOMANIO, NGM STAFF. FOOD ICONS: QUICKHONEY
SOURCE: RURAL ADVANCEMENT FOUNDATION INTERNATIONAL

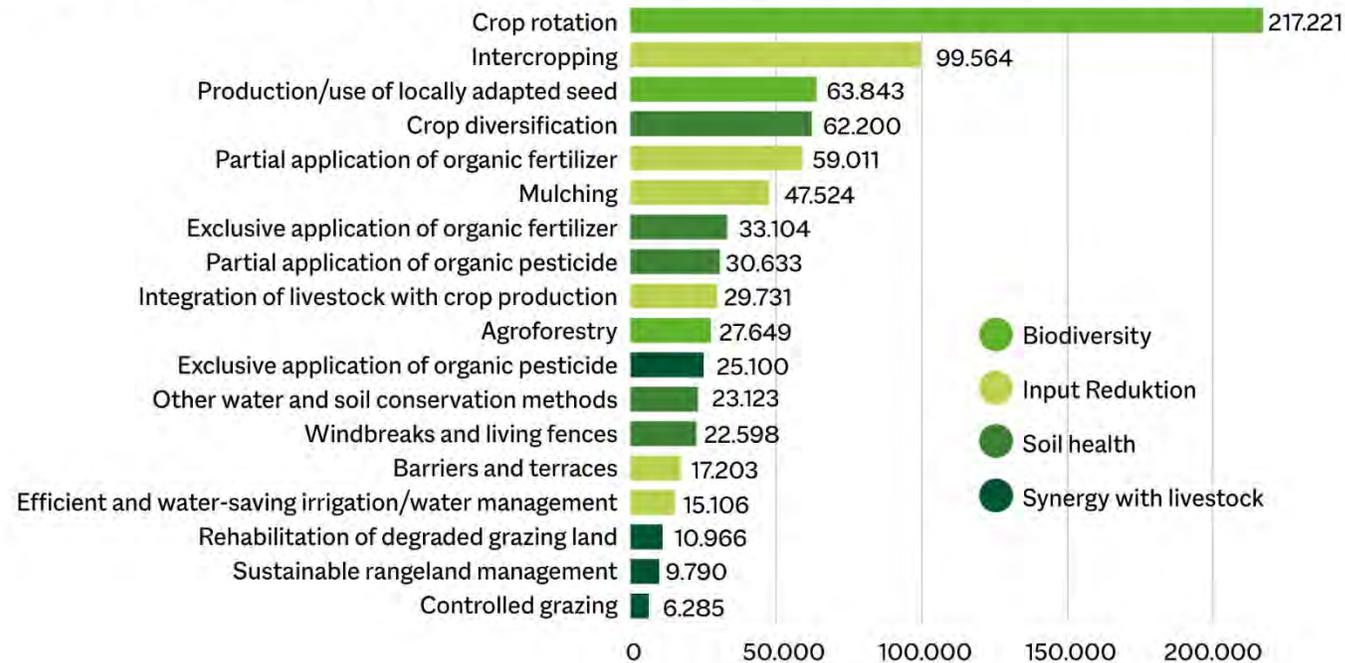
From loss to conservation: Agroecological transformation of food systems



FAO 10 Elements of Agroecology

Conservation factor: Agroecological practices

Number of households newly implementing at least one agroecological farming practice



Source: Sufosec (2022)

Conservation factor: Farmer-managed seed systems



Benefits: Farmer- managed seed systems

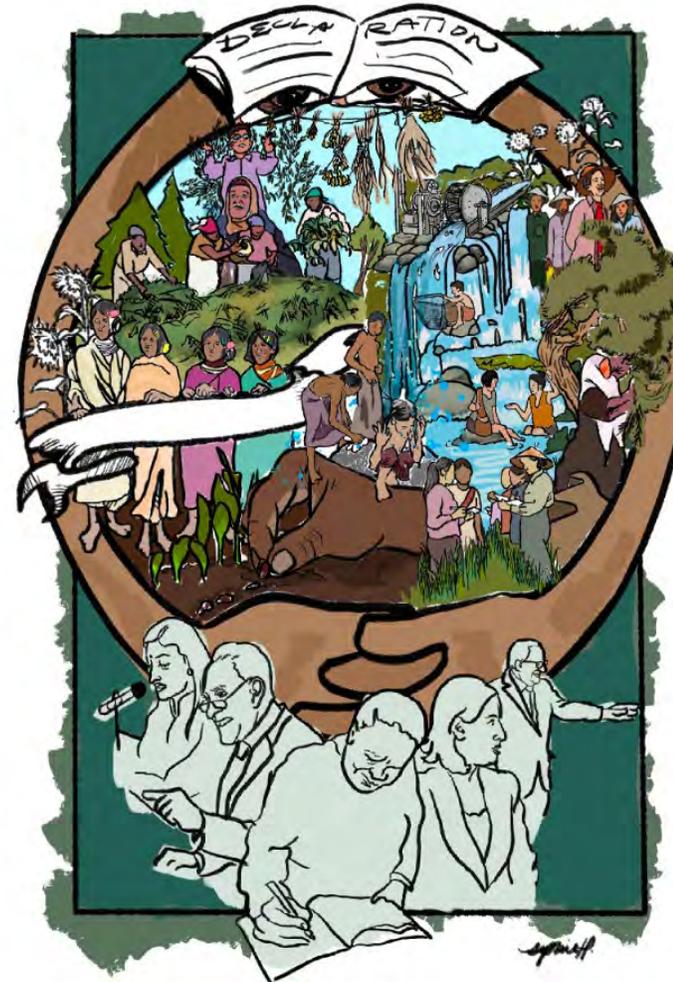


- Broader range of varieties – including Neglected and Underutilized Species
- Resilient and nutritious varieties: Saline tolerant, flood tolerant, black rice
- Farmers varieties: continuous selection under field-conditions allows adaption to changing climate

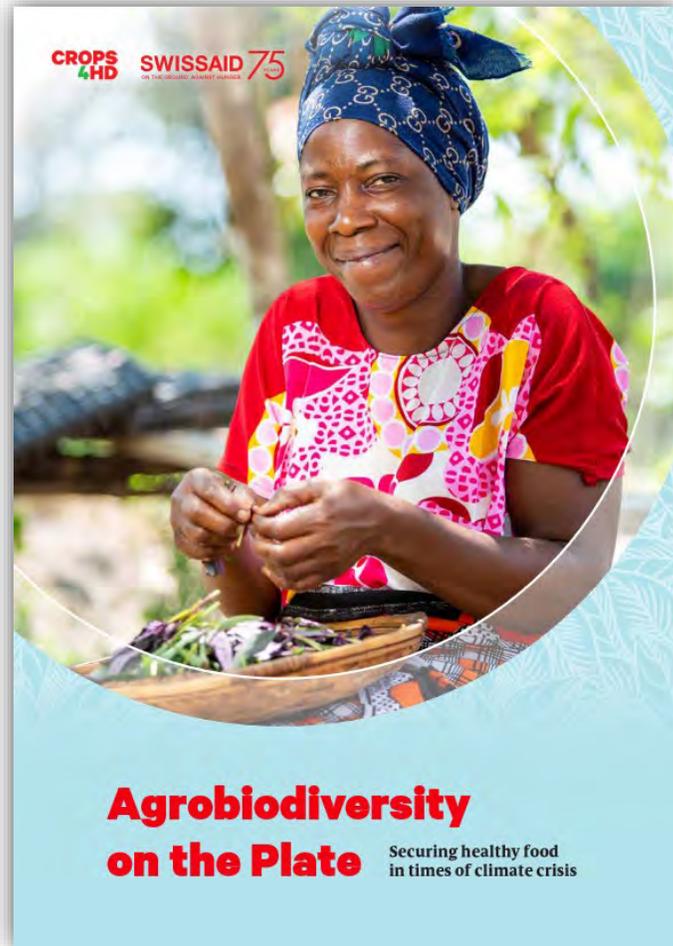


Protecting biodiversity and human rights

- 2022** CBD Post 2020 Global Biodiversity Framework recognizes rights of local communities and indigenous people
- 2004** International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA/Plant Treaty): Protection of farmer's right to seeds
- 2018** UN Declaration for the Rights of Peasants and Other People Working in Rural Areas (UNDROP)
- 2007** UN Declaration for the Rights of Indigenous People (UNDRIP)



Thank you!



<https://www.swissaid.ch/en/articles/agrobiodiversity-on-the-plate/>

Programme

Introduction: Agrobiodiversity and global factors for loss and conservation



Simon Degelo
Seed policy and biodiversity
SWISSAID

Breeding for resilience: how farmers adapt their seeds and agricultural practices to a changing climate



Amrit Riar
Research Coordinator CROPS4HD
FiBL

How does agrobiodiversity supports Food Security, Nutrition and Climate change adaptation?



Sonja Tschirren
Climate and organic farming
SWISSAID



Research Institute of Organic Agriculture FiBL
info.suisse@fibl.org | www.fibl.org



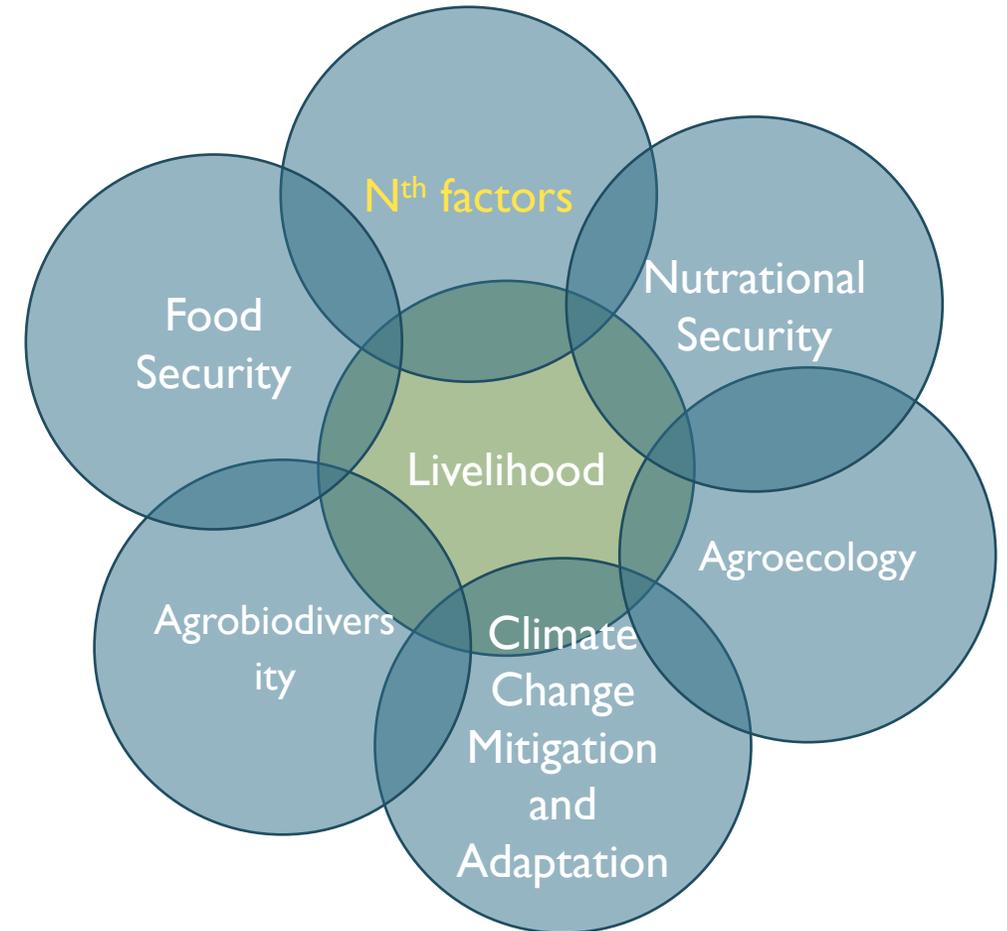
How agrobiodiversity supports Food Security, Nutrition and Climate change adaptation?

Increasing Crop Diversity – Promoting NUS in Africa

Biodiversity Advent series, 5/12/2023 Amritbir Riar amritbir.riar@fibl.org

Outline

1. Agrobiodiversity, climate change, A+F systems and Nutrition – A complex relationship
2. Some pieces of evidence for these relationships
3. A proposed framework for addressing mutually dependent challenges
4. How the application of this framework is unfolding



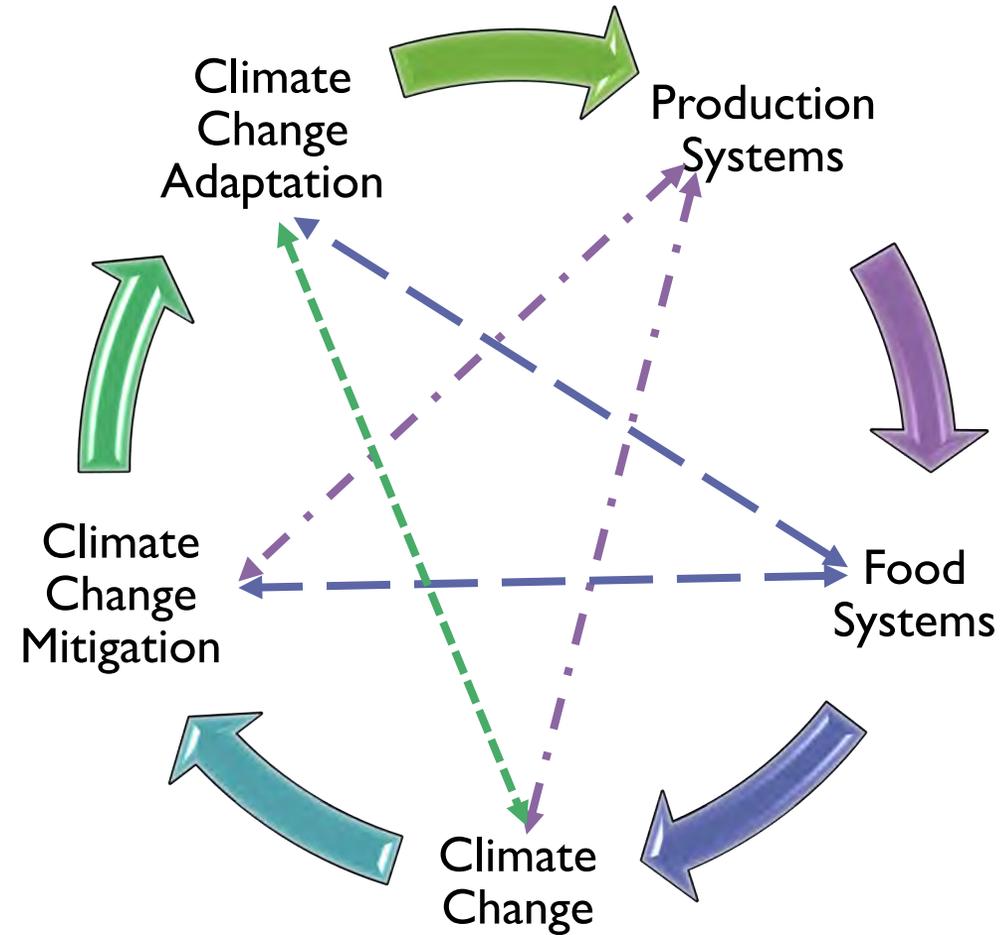
Agrobiodiversity

- 150 plant species (out of 250,000 known plant species) dominate the world's agricultural landscapes
- Only 12 crop species provide 80% of the world's food.
- Agricultural biodiversity is crucial to coping with climate change as the diversity of genes, species, and ecosystems in agriculture represents the resource base for food.



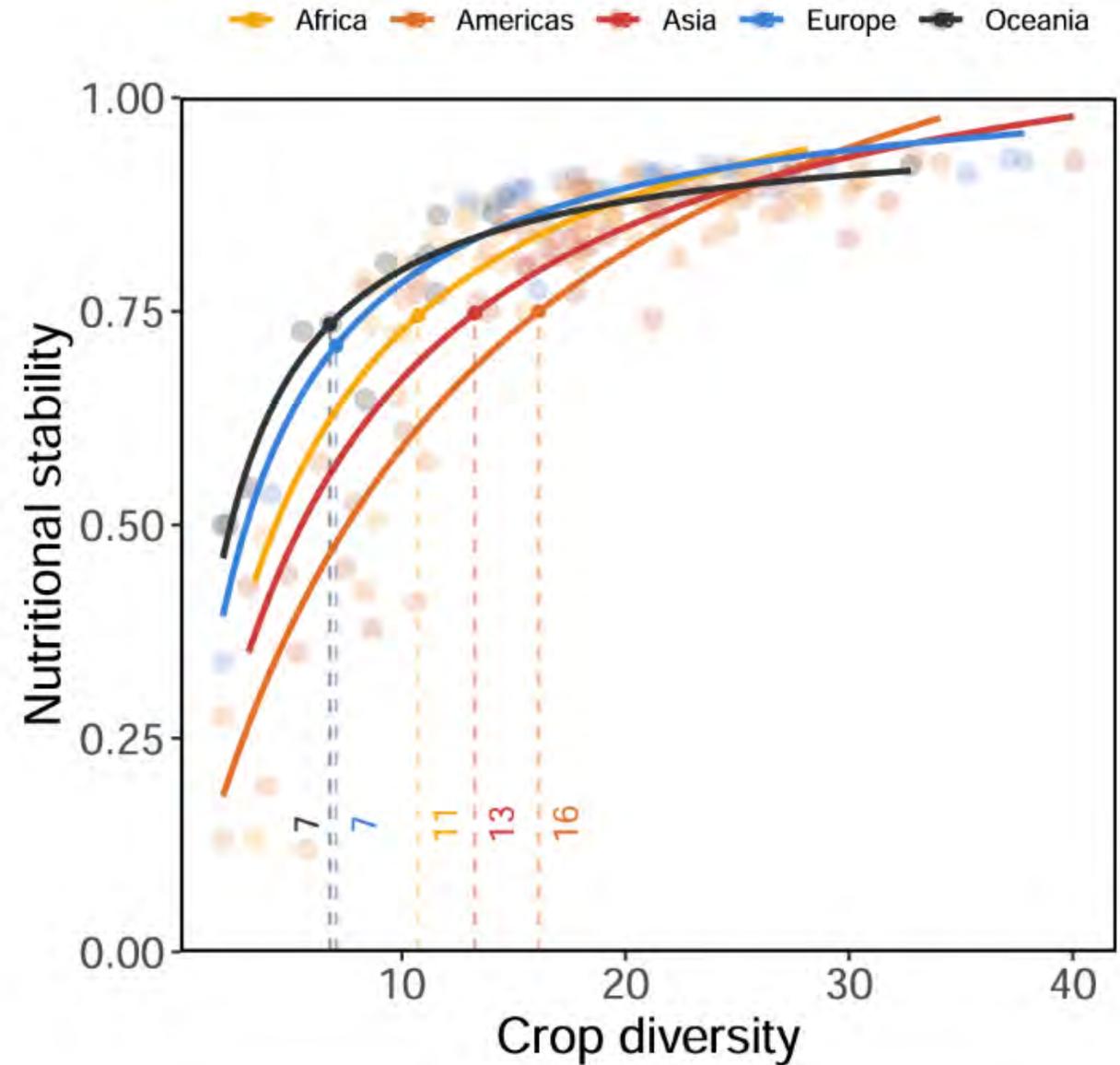
Agrobiodiversity, Food Systems and Climate Change

– A complex relationship



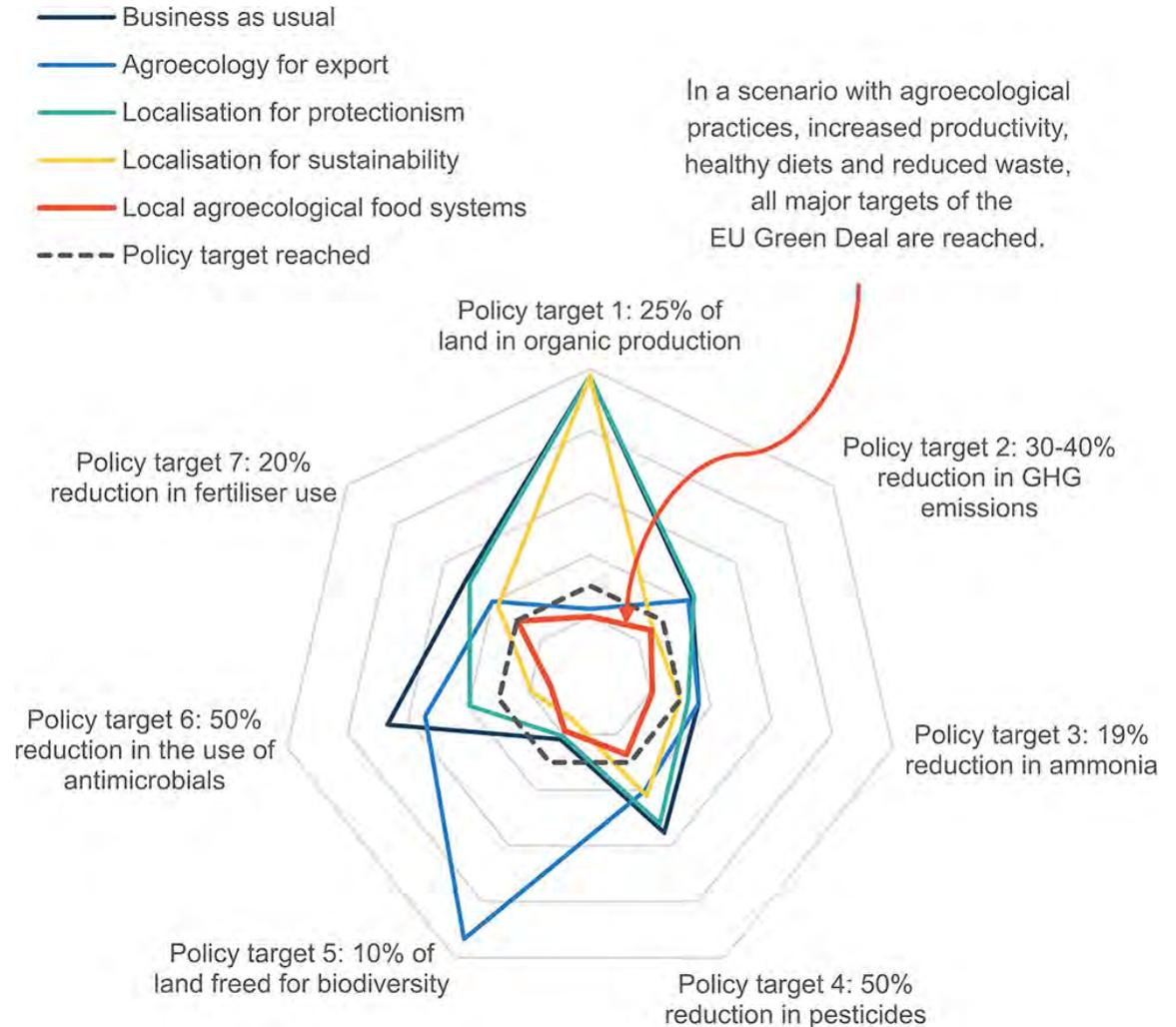
Global relationships between crop diversity and nutritional stability

Nutritional stability increased non-linearly with crop diversity

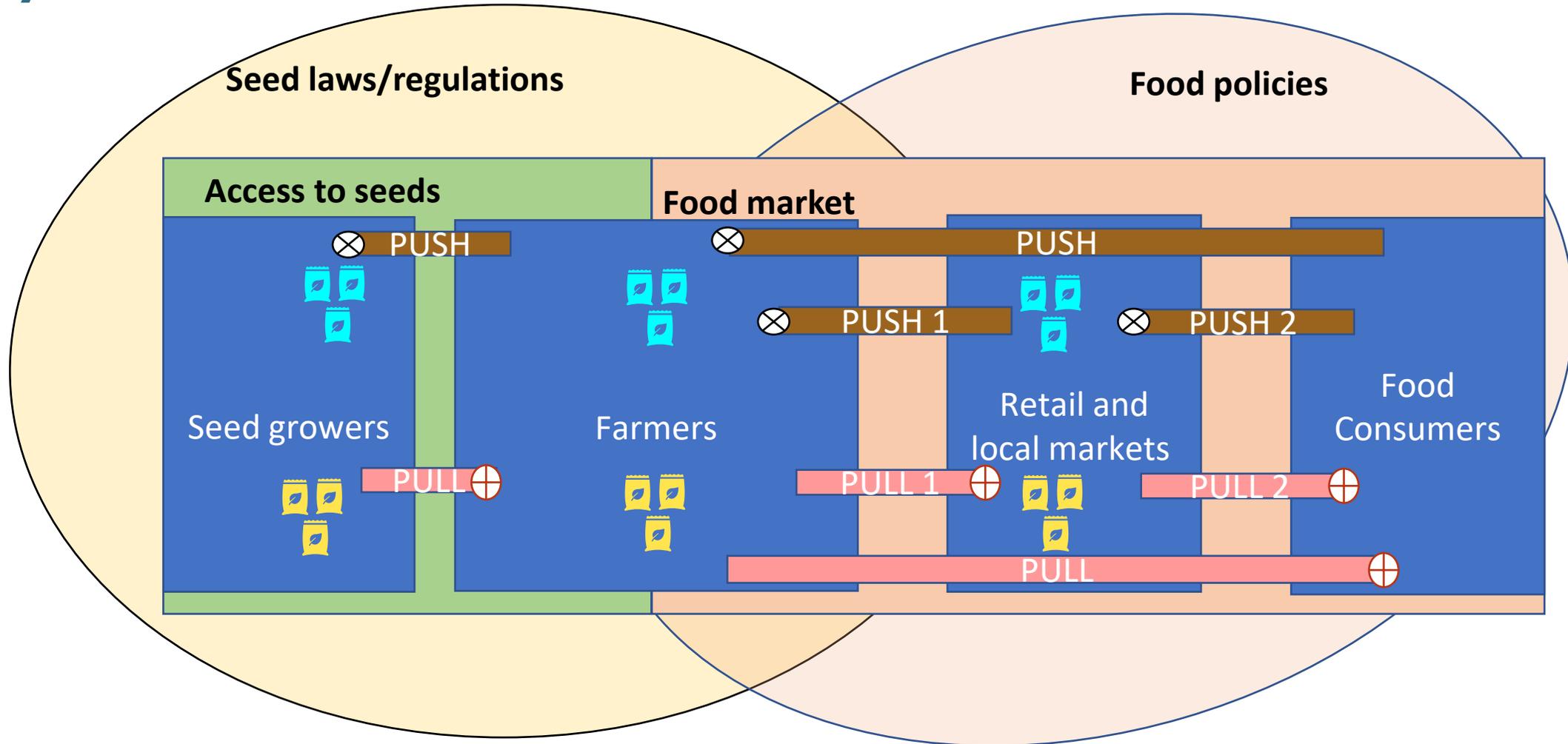


Agroecological practices in combination with healthy diets can help meet EU food system policy targets

- Large-scale organic farming for export risks increasing environmental impacts in EU.
- EU policy targets can be met when agroecology is combined with dietary change.
- Unchanged preferences and technology will require unrealistic taxes and tariffs.

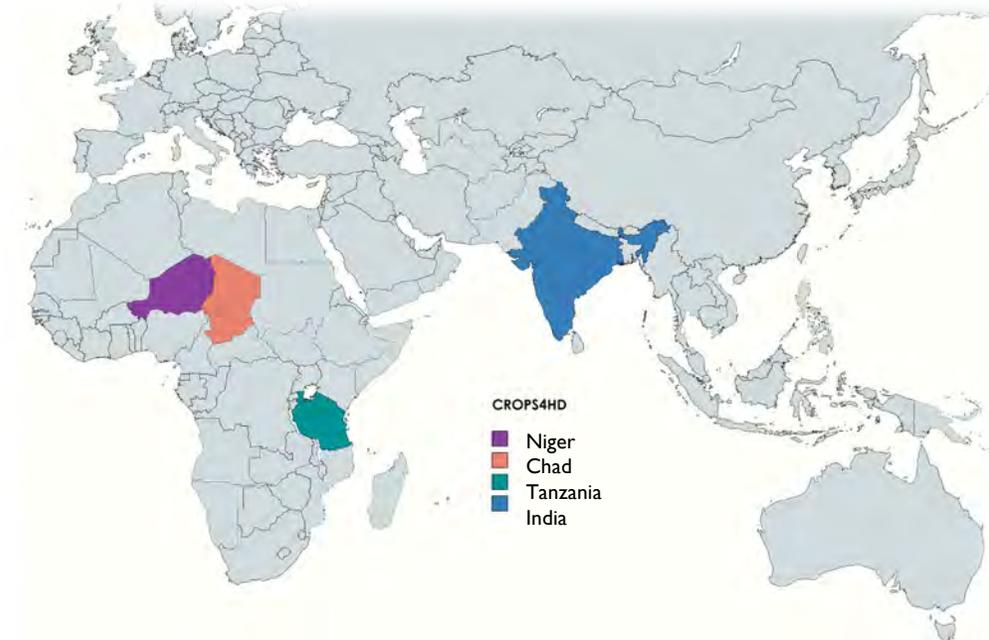


Framework for food and nutrition secure climate-resilient A+F Systems

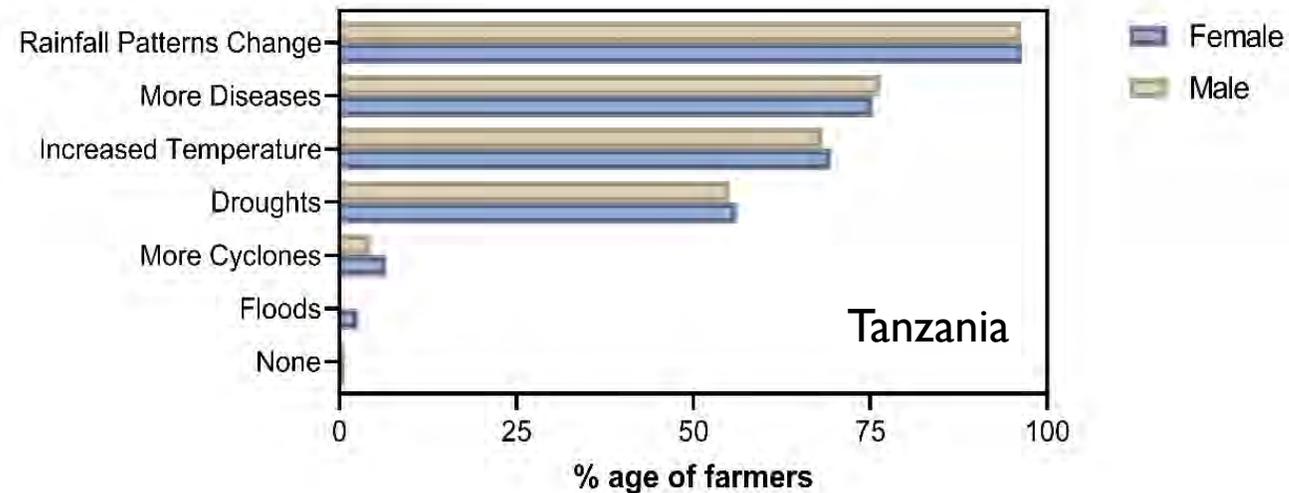
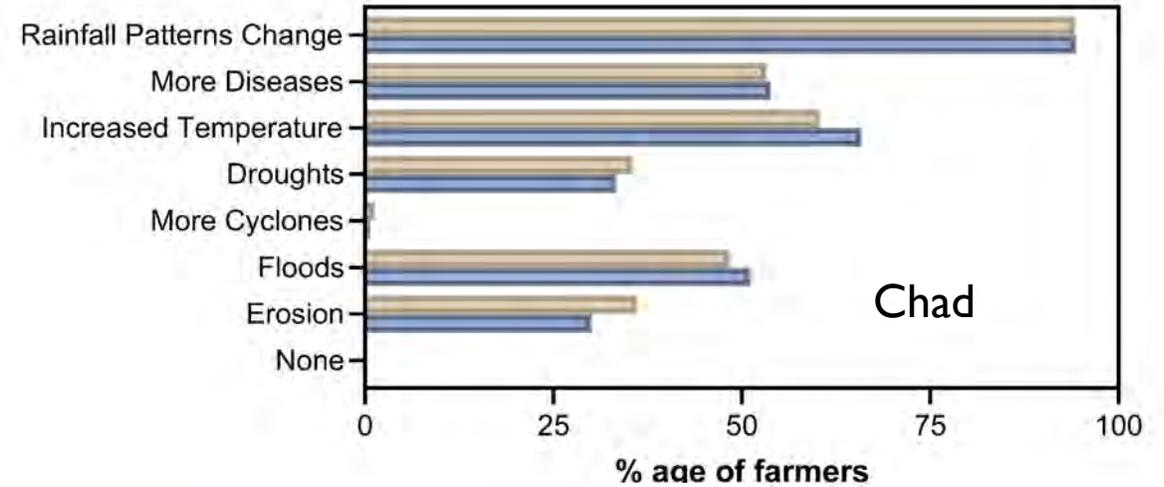
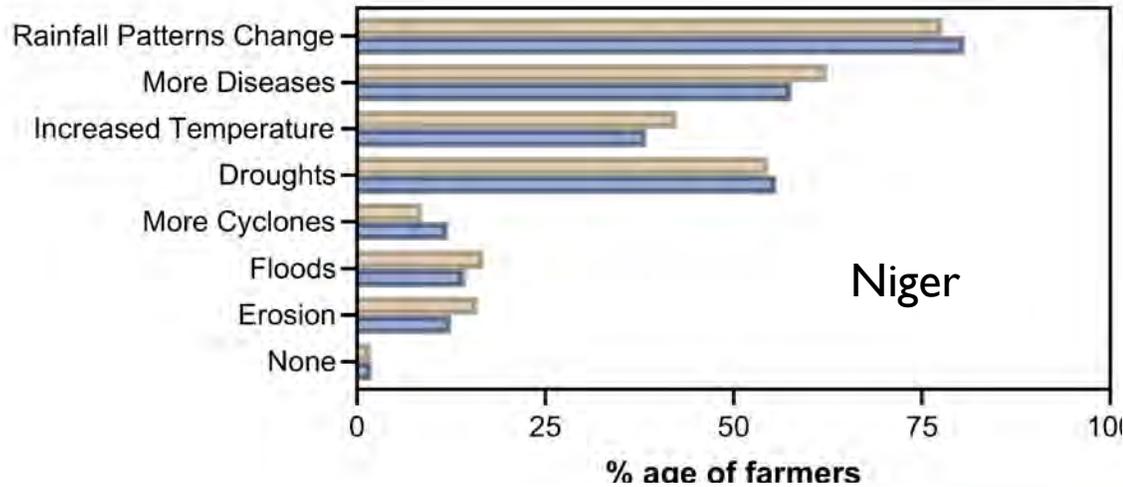


How the application of this framework is unfolding?

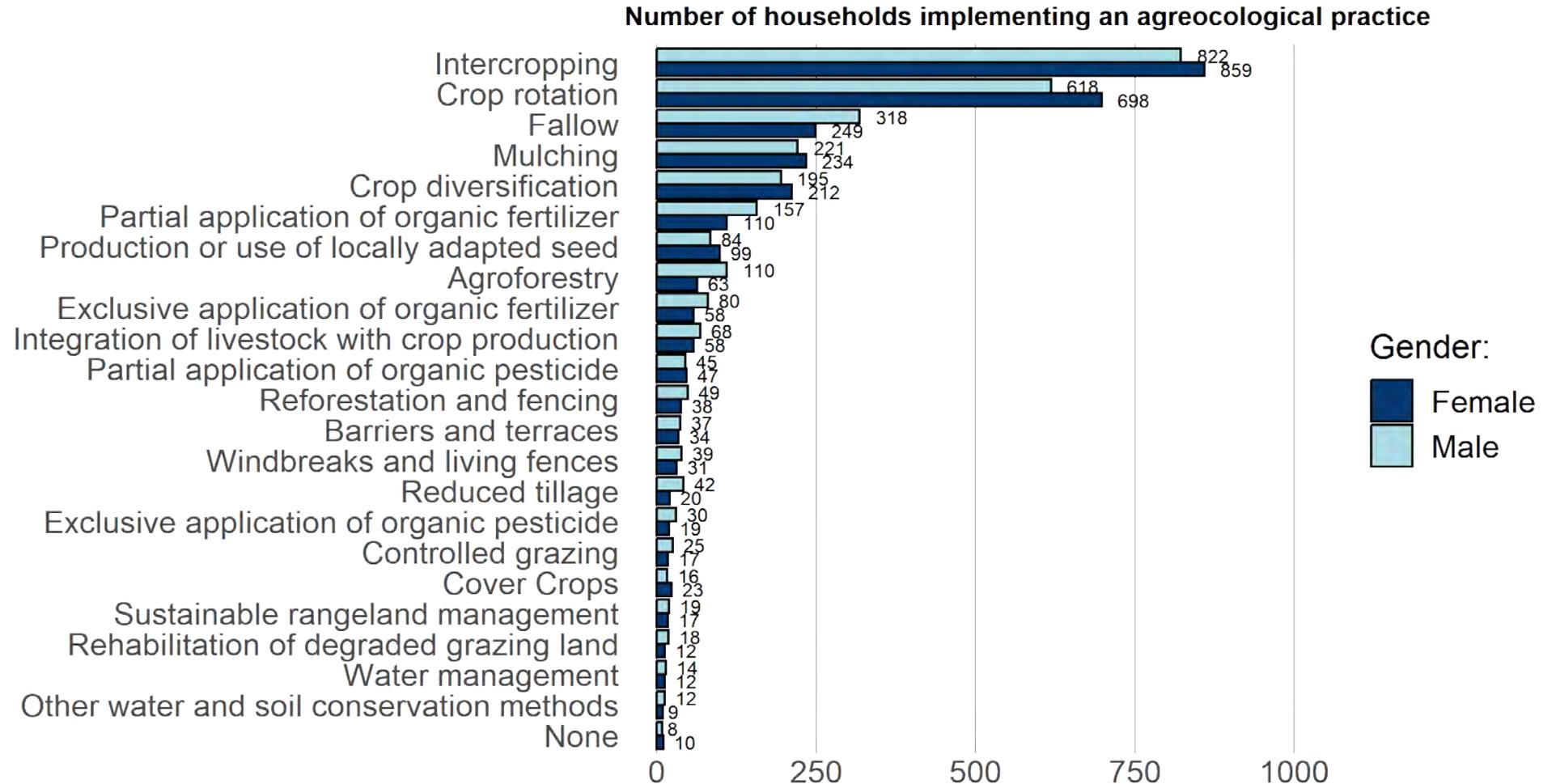
Consumption of Resilient Orphan Crops & Products for Healthier Diets (CROPS4HD) :
Main goal is to improve **food security and nutrition** of smallholder farmers, especially **women**, through sustainable use and **conservation of farmers' varieties/landraces, neglected and underutilized species**, respecting **agroecological approaches**



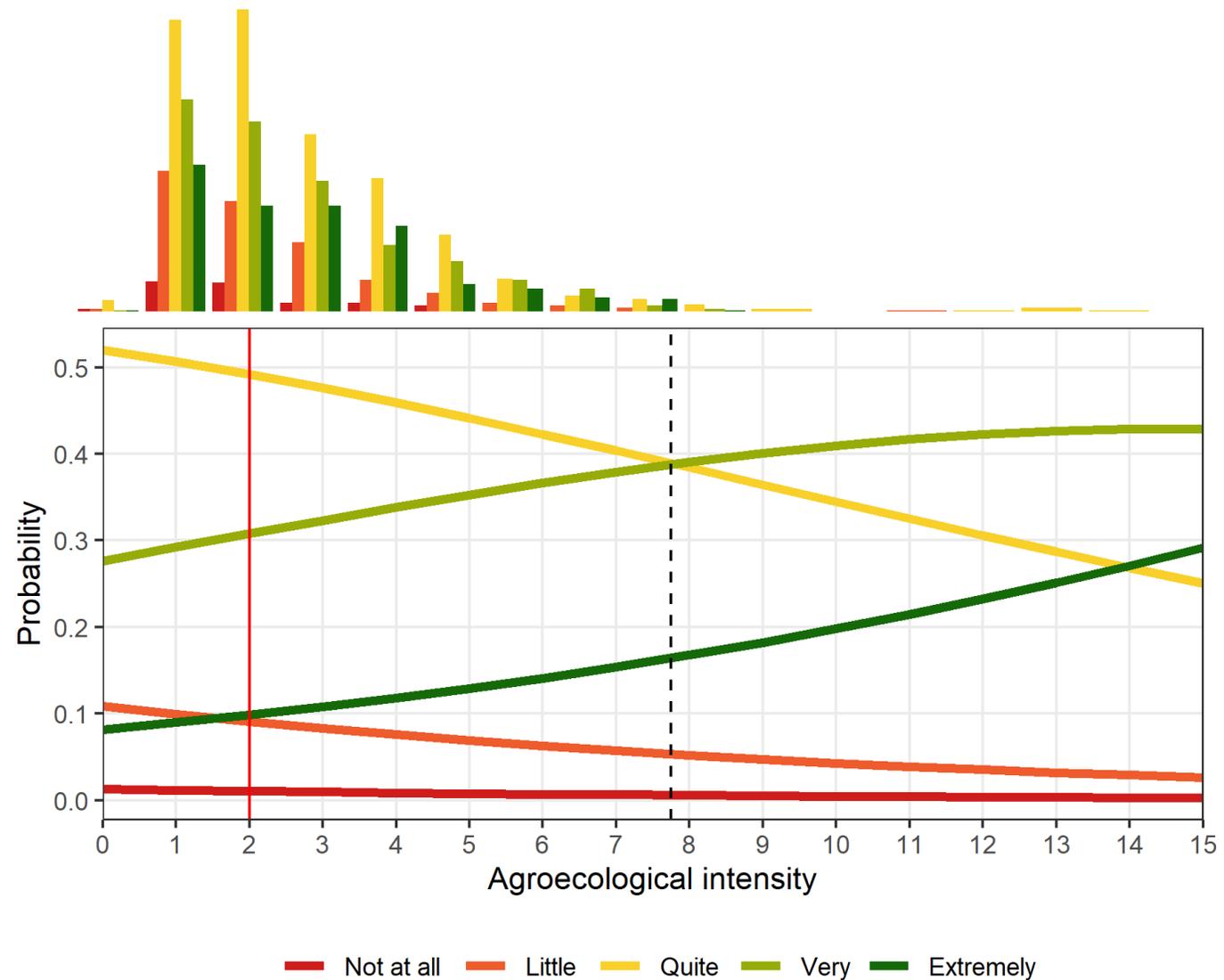
Climate change: what it means for farmers?



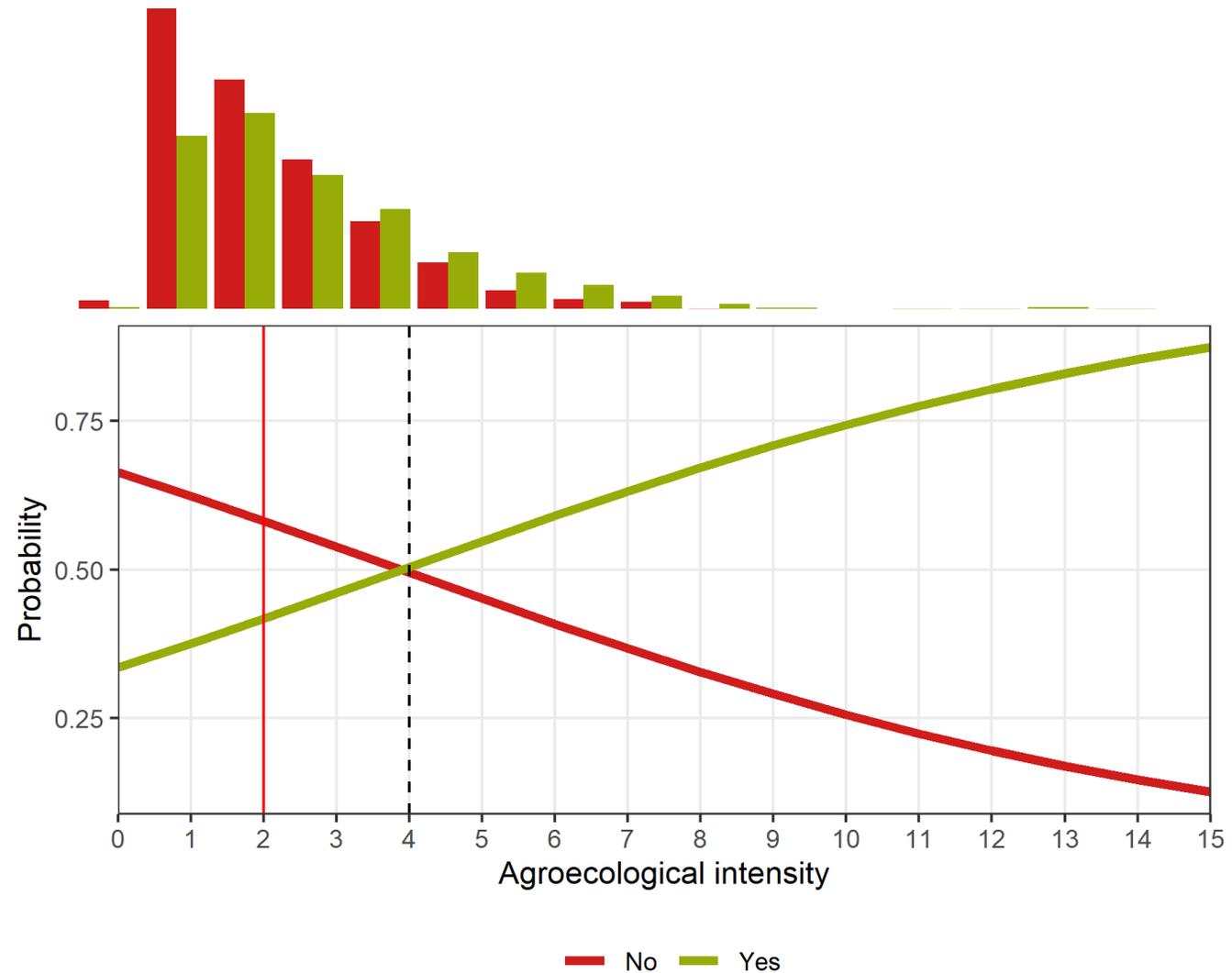
How Agroecology contributes to Agrobiodiversity?



Level of concern about Climate change



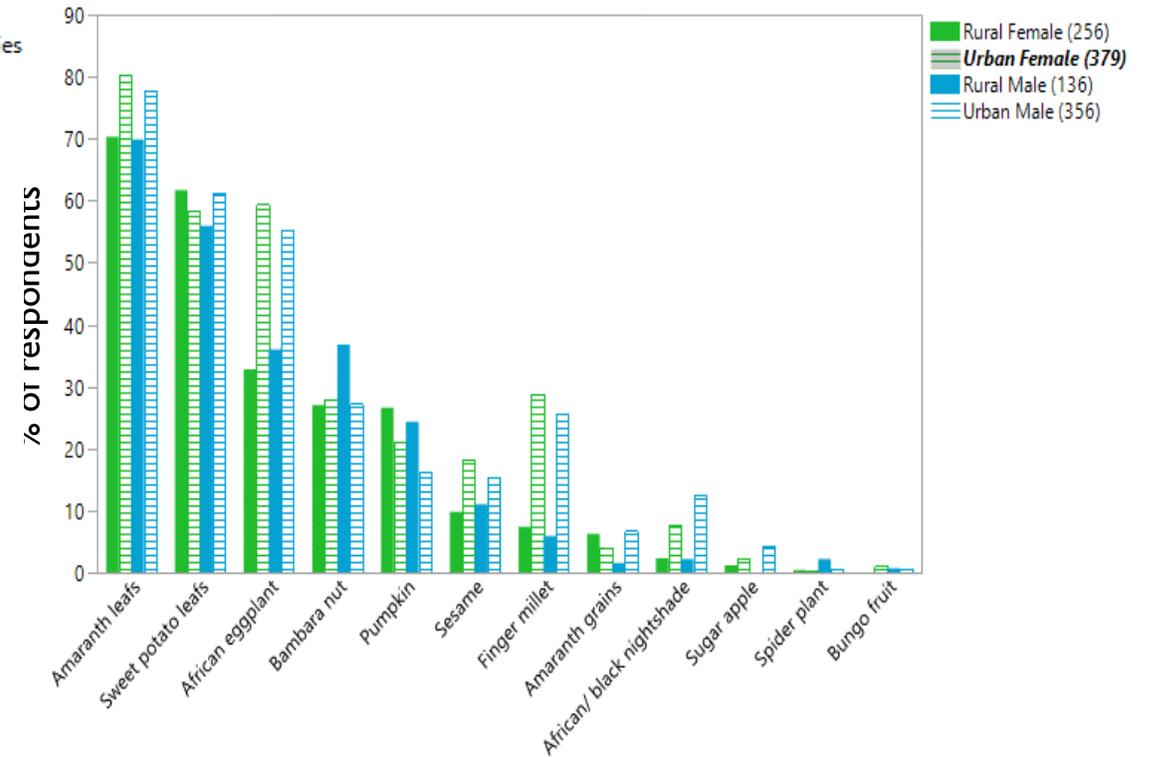
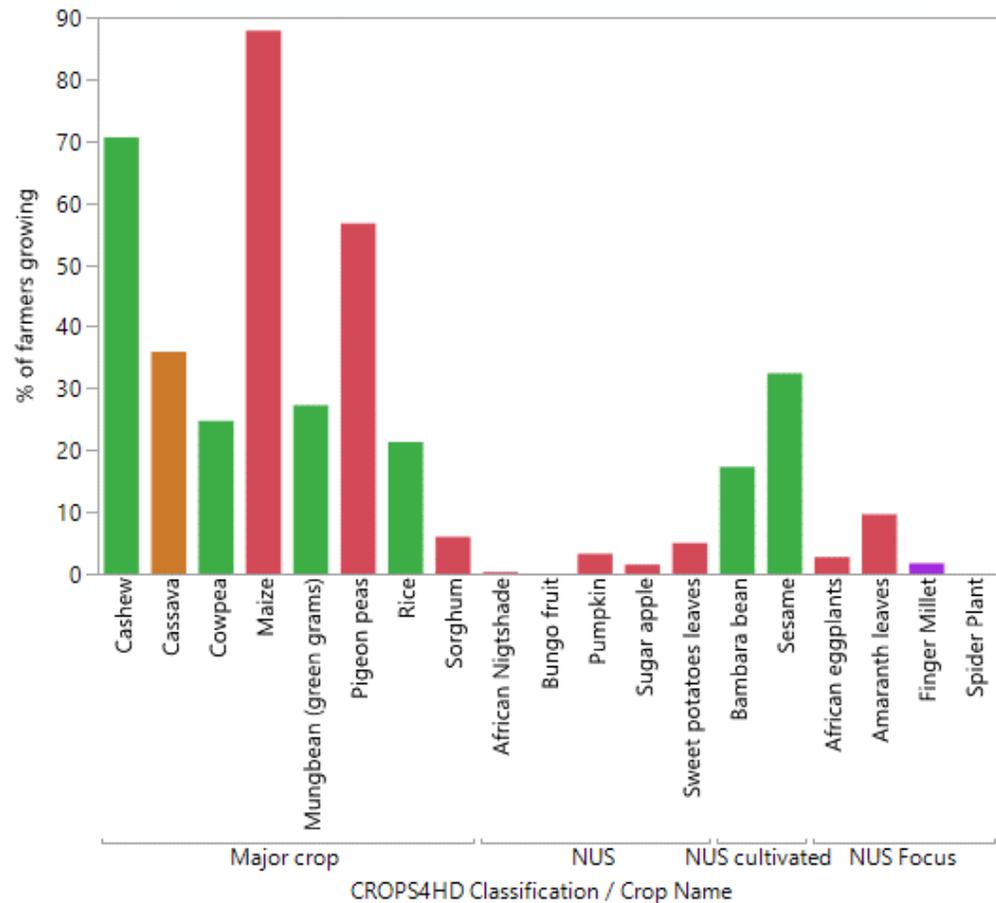
Farmers' perceived ability to cope with Climate Change.



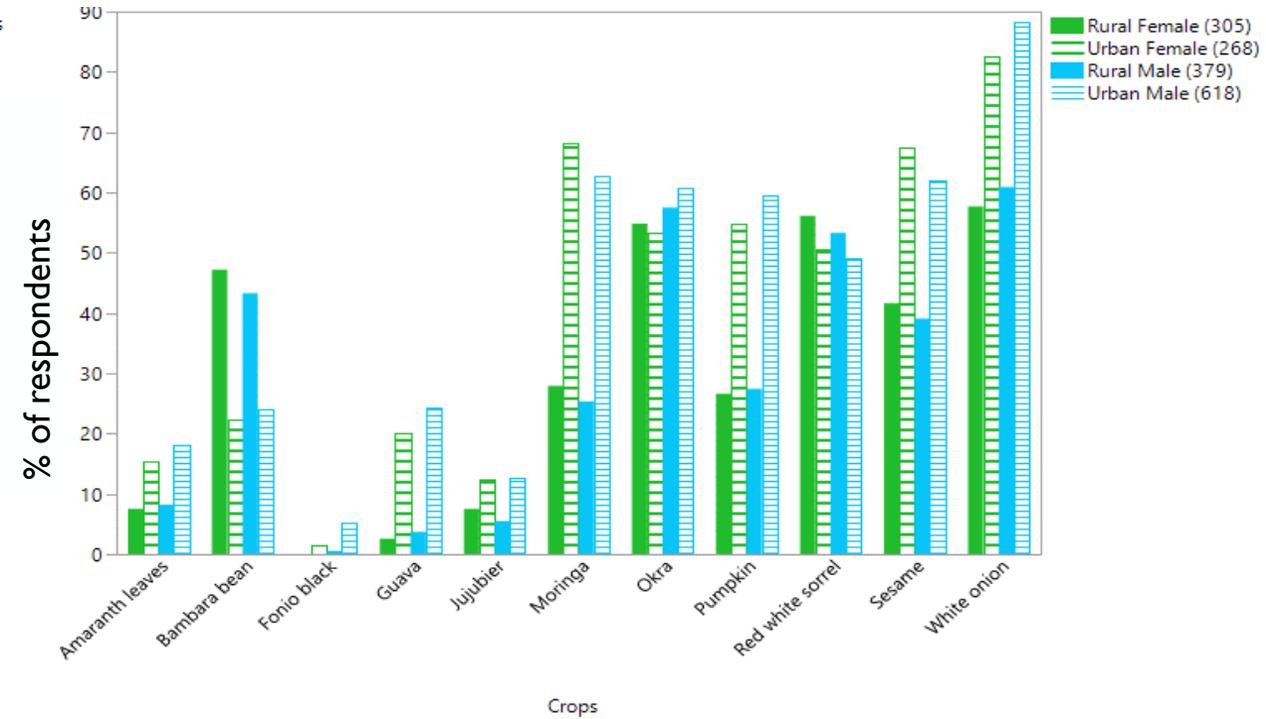
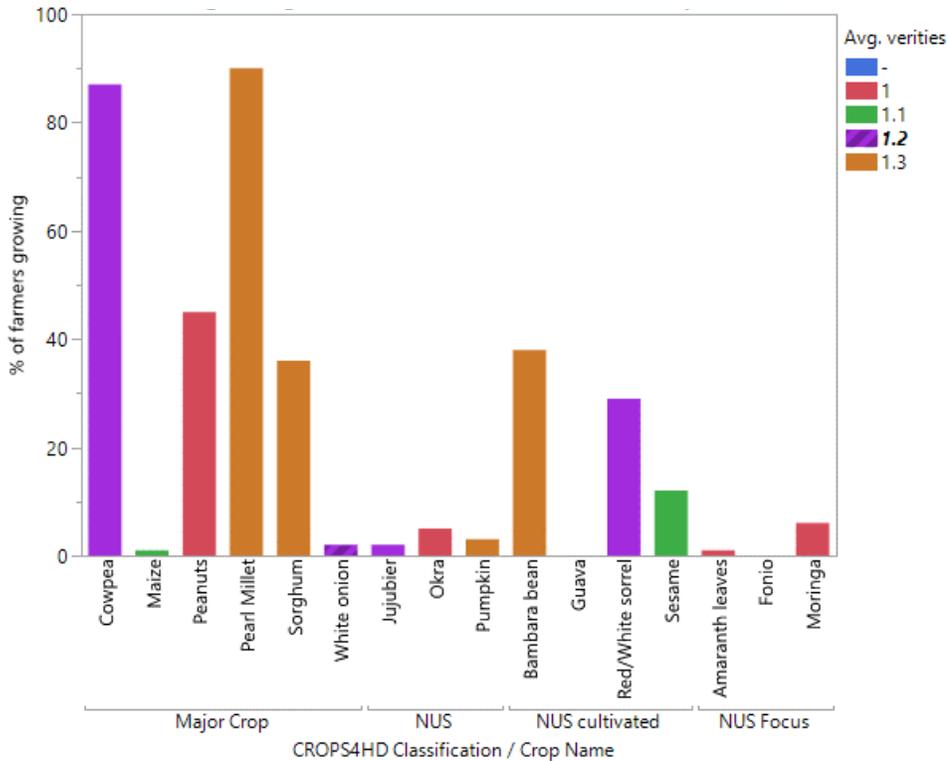
Farming Systems Diversity



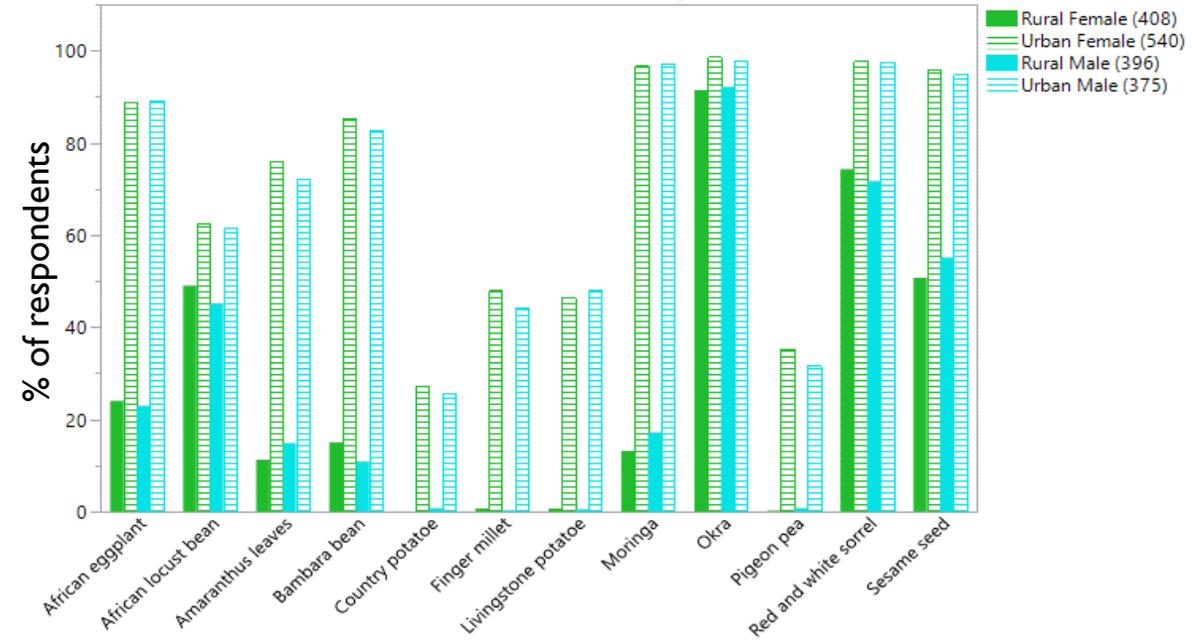
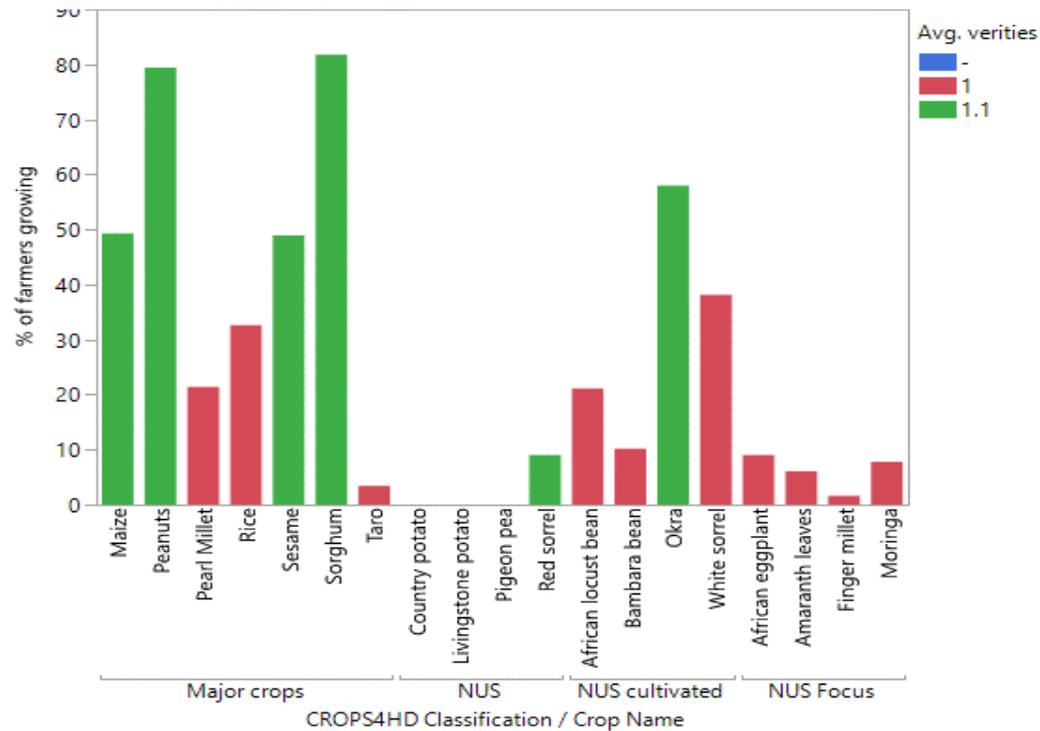
NUS Production and Dietary Diversity in Tanzania



NUS Production and Dietary Diversity in Niger



NUS Production and Dietary Diversity in Chad



Products development

Ungalishe



Ingredients: Finger millet, Bambara beans, rice and pumpkin seeds

Bambara bean Flour



Ingredients: Bambara bean and Maize

Dark chocolate jam



Honey, Simsim (Sesame) and cocoa

Products development

Sesame & Coconut biscuits



Ingredients: Coconut,
Sesame and wheat flour

Bambara bean biscuits



Ingredients: Bambara bean flour



Conclusions

1. Farmers' perceived ability to cope with climate change increases with higher Agroecological intensity.
2. Linking Agrobiodiversity with a diverse and nutritious diet is a knowledge-intensive process
3. Improved and diverse production and Food systems need improved capacities among farmers, farmer organizations, market actors, and stakeholders.
4. Context specifies technical know-how at the different levels of A +F systems is key for adaptation to global challenges of Food security and nutrition

Thanks for your kind attention



Programme

Introduction: Agrobiodiversity and global factors for loss and conservation



Simon Degelo
Seed policy and biodiversity
SWISSAID

Breeding for resilience: how farmers adapt their seeds and agricultural practices to a changing climate



Amrit Riar
Research Coordinator CROPS4HD
FiBL

How does agrobiodiversity supports Food Security, Nutrition and Climate change adaptation?



Sonja Tschirren
Climate and organic farming
SWISSAID



Case Study by **SWISSAID**
& the Swiss NGO DRR Platform

Participatory crop breeding supported by small-scale
weather stations in Nicaragua

S. Tschirren, Agroecological Food Systems & Climate Change

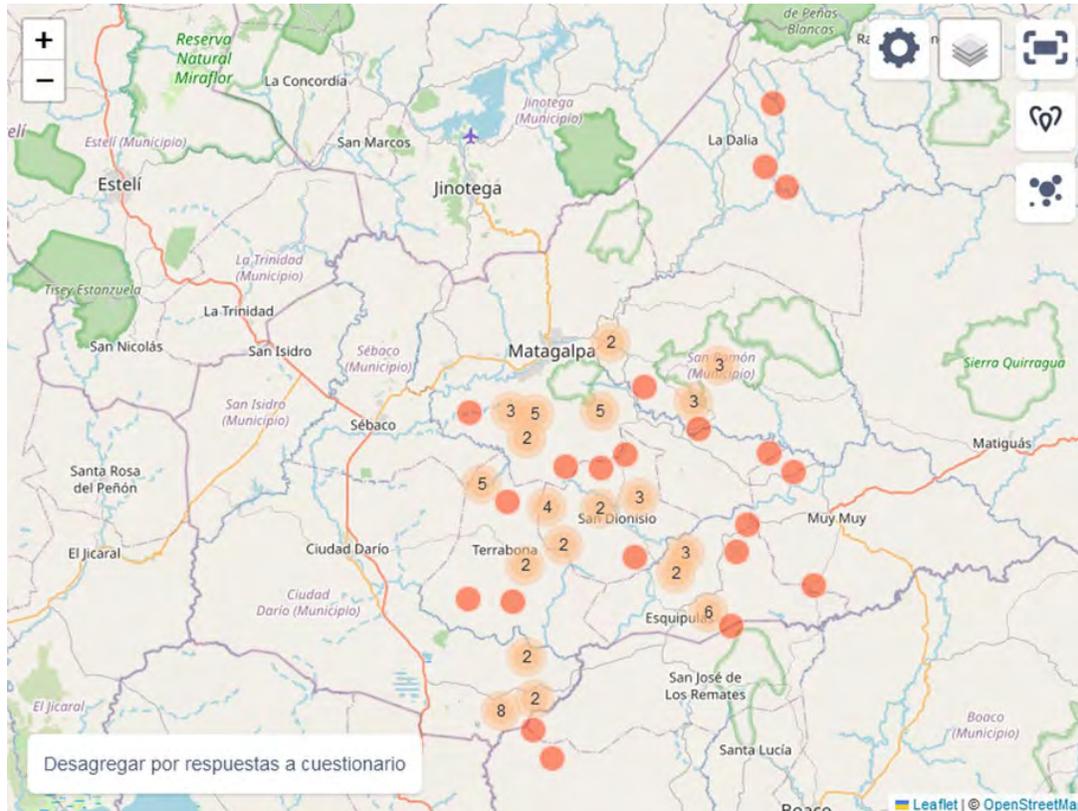
The Content

- Project „Cambio Climático“ objective and content
- Use for farmers & agrobiodiversity
- Insights from the case study

Project origin: farmers' seeds & breeding



Strengthen resilience to CC through agrobiodiversity



- 69 communities
- 6 municipalities in the Matagalpa Department
- 85 smallscale farms
- 72 leaders on weather and climate information

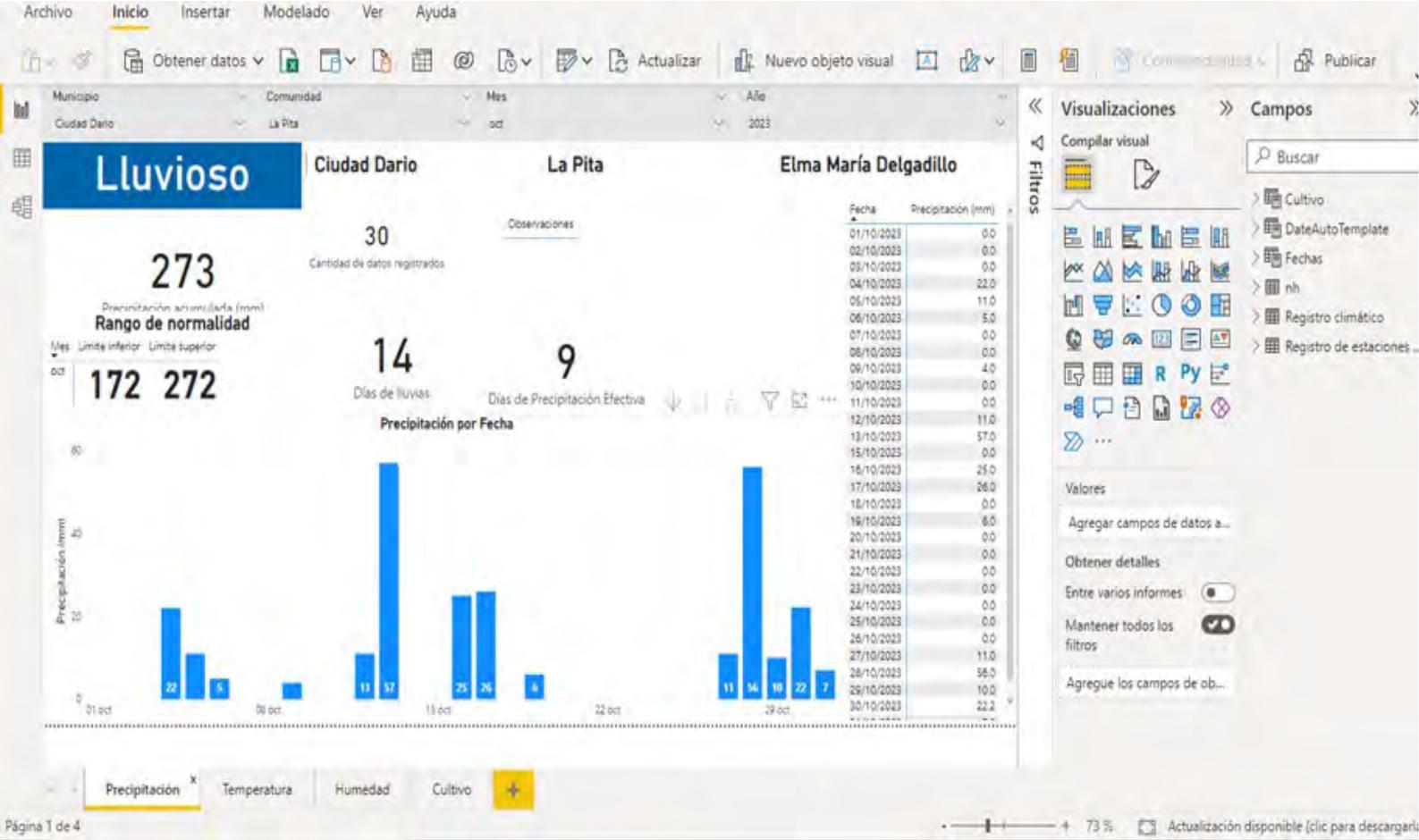
- ➔ Gathered weather data (9 yrs.)
- ➔ using the information to reflect on crops selection/handling and the agricultural calendar

Collected data

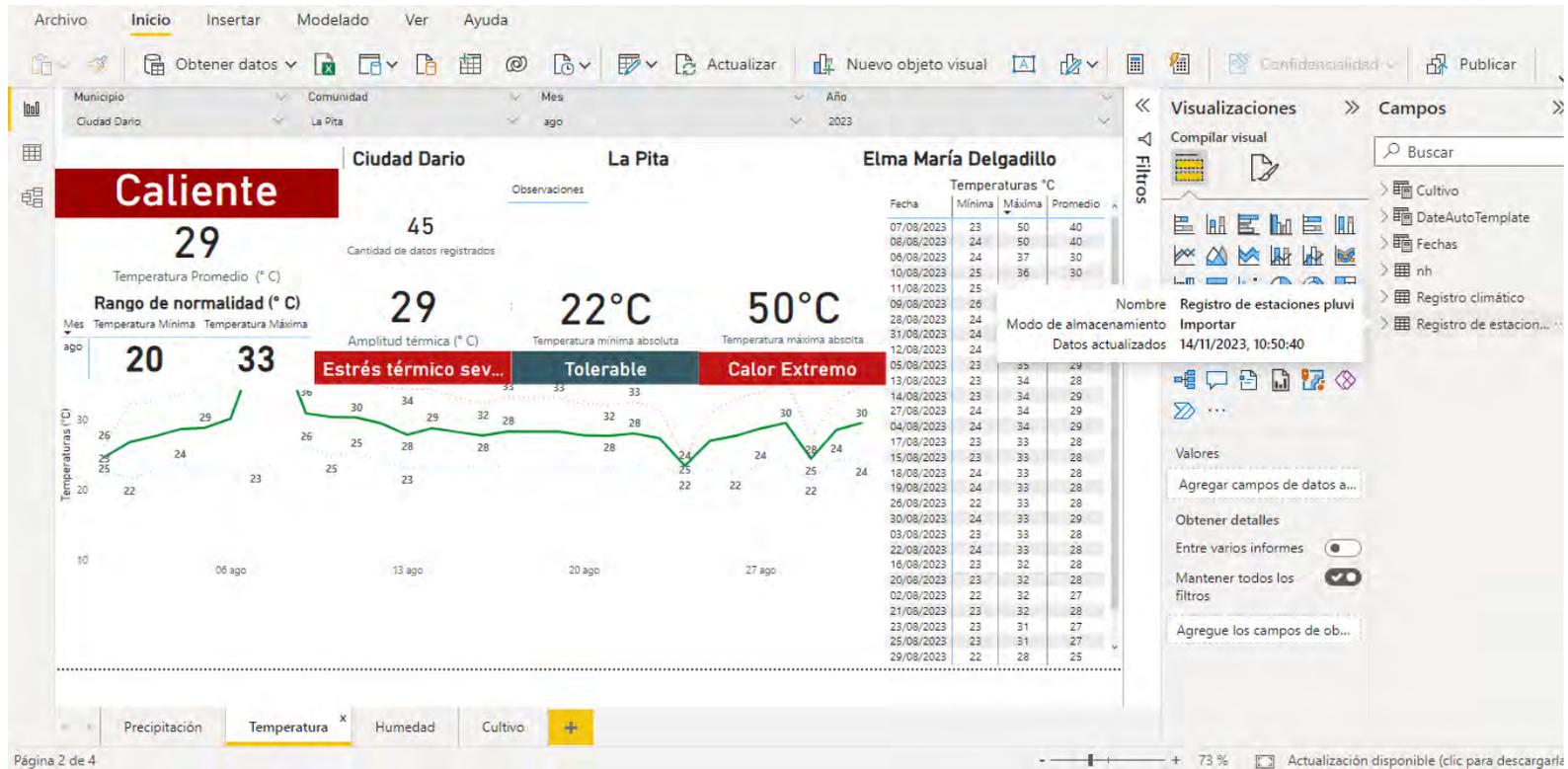
- Weather stations in rural communities
- Data collected by the farmers directly (precipitation, temperature and relative air humidity)
- Data collection through the KoboCollect App
- Later uploaded to the Power BI Platform & made available, including to other organizations
- Validation of the data based on 30 years of data by the Instituto Nicaragüense de Estudios Territoriales (INETER)
- Since correlated with CHIRPS satellite data



Precipitation



Temperature



Data handling & interpretation

- Community leaders on weather and climate change take care of uploading the data
- Data is checked by the technical staff in our partner organisations
- Summaries of the data registries are established per community (monthly, 3-monthly, annually)
- In regular meetings, workshops per community (ordered per climatic differences), **community leaders & farmers interpret the data together**

Use for farmers and agrobiodiversity:

- Learning/exchanging about Climate Change, agroecology and specific varieties

Perspectiva Climática



1. Distribución Irregular de las Lluvias

La experiencia previa indica una posible distribución irregular de lluvias en septiembre y octubre debido al inicio tardío de la temporada de lluvias y a lluvias intensas hacia finales de mayo y junio. Los agricultores deben seguir de cerca los cambios en los patrones de lluvia y considerar estrategias eficientes para asegurar suficiente agua para sus cultivos.



2. Temperaturas Más Altas de lo Normal

Pueden tener un impacto negativo en la producción de maíz y frijol al acelerar el ciclo de crecimiento, afectar la polinización, causar estrés térmico en las plantas y favorecer plagas y enfermedades. Los agricultores deben aplicar medidas de adaptación, como la selección de variedades resistentes al calor y la vigilancia constante para mantener la productividad y calidad de los cultivos en estas condiciones.



3. Mayor Actividad de la Temporada de Huracanes

La posible influencia de la temporada de huracanes en el Caribe y el Atlántico es una preocupación para la región, ya que aunque Matagalpa no se encuentra directamente en la trayectoria de huracanes, los efectos periféricos, como lluvias intensas y vientos fuertes, podrían afectar la zona. La mayor actividad de la temporada de huracanes podría causar variaciones en los patrones climáticos locales.

Perspectiva Climática

Precipitación proyectada Septiembre 2023



Precipitación proyectada Octubre 2023



Las perspectivas de precipitación para septiembre en Matagalpa y sus municipios varían considerablemente, desde acumulados más altos en San Ramón y San Dionisio hasta acumulados más bajos en Matagalpa. Estas diferencias subrayan la importancia de adaptar las prácticas agronómicas a las condiciones locales y a las variaciones en la disponibilidad de agua.

- Choose the right crop, seed/plant, handle, harvest & market adapting to CC
- Look back and learn, but also look forward and plan



Archivo Inicio Insertar Modelado Ver Ayuda

Obtener datos Actualizar Nuevo objeto visual

Municipio: Ciudad Darío Comunidad: La Pita Mes: oct Año: 2023

Selección Fecha de siembra Fecha de Siembra

1 de octubre
2 de octubre
3 de octubre
4 de octubre
5 de octubre
6 de octubre
7 de octubre
8 de octubre
9 de octubre
10 de octubre
11 de octubre
12 de octubre
13 de octubre
14 de octubre
15 de octubre
16 de octubre
17 de octubre
18 de octubre
19 de octubre
20 de octubre
21 de octubre
22 de octubre
23 de octubre
24 de octubre
25 de octubre
26 de octubre
27 de octubre
28 de octubre
29 de octubre
30 de octubre
31 de octubre

martes, 10 de octubre de 2023

Cultivo	Etapa	Fecha estimada	Acumulado de lluvia (mm)
Frijol	Floración	martes, 14 de noviembre de 2023	231
	Maduración fisiológica	domingo, 17 de diciembre de 2023	231
	Cosecha	domingo, 24 de diciembre de 2023	231
Maíz	Floración femenina	martes, 5 de diciembre de 2023	231
	Cosecha	viernes, 2 de febrero de 2024	231

Precipitación Temperatura Humedad Cultivo +

Visualizaciones Campos

Compilar visual

Buscar

- Cultivo
- DateAutoTemplate
- Fechas
- nh
- Registro climático
- Registro de estaciones ...

Valores

Agregar campos de datos a...

Obtener detalles

Entre varios informes

Mantener todos los filtros

Agregue los campos de ob...

Seleccione Fecha de siembra

- 1 de mayo
- 2 de mayo
- 3 de mayo
- 4 de mayo
- 5 de mayo
- 6 de mayo
- 7 de mayo
- 8 de mayo
- 9 de mayo
- 10 de mayo
- 11 de mayo
- 12 de mayo
- 13 de mayo
- 14 de mayo

Fecha de Siembra

lunes, 1 de mayo de 2023

Fecha estimada

Frijol	Floración	lunes, 05 de junio de 2023	Acumulado de lluvia (mm) 264
	Maduración fisiológica	sábado, 8 de julio de 2023	Acumulado de lluvia (mm) 300
	Cosecha	sábado, 15 de julio de 2023	Acumulado de lluvia (mm) 329



The use for farmers & agrobiodiversity

- Choose the right crop variety for the given weather conditions (-> better adaptation to climate change)
- Knowledge of the phenological stages of the crop -> Accurate identification of key days in the crop cycle
- Data use for projection: allows forecasting optimal seeding/planting & harvesting dates
- Improved agroecological practice planning
- Maximization of yields and efficiency, while maintaining agrobiodiversity



Swiss NGO DRR Platform Case Study

Insights

- SWISSAID & partners are well anchored in communities -> great nb of farmers can be reached
- Resource-intensive for our partners' technical staff -> understanding/interpreting the data
- Government should provide localized data (private providers) -> NGOs could focus on data interpretation & use
- Community leaders invest unpaid time
- The links between CC and certain successful breeds/ crops could be researched more systematically
- For now: aim to bring the technical environmental units of the municipalities on board



Thank you!

Q&A

Outlook

Candle #3 – Thursday, 14.12., 12:05 – 13:00h - Tropical Forests beyond biodiversity – what is in it for the climate?

Guest speakers: Jane Carter, Helvetas, and Federico Cammelli, ETH Zürich

Tropical Forests beyond biodiversity: a debate on global relevance, national sovereignty, and local options.

Candle #4 – Tuesday, 19.12., 12:05 – 13:00h - When cinema looks to nature

Guest speaker: Adelina von Fürstenberg, President a.i. Art For the World

How art can help (re-)connect human beings with nature to preserve biodiversity

