

Agricultural diversification for climate change risk management in smallholder agriculture systems

Maarten van Zonneveld, 27 April 2015

Objectives

- Establish a basis for discussion on how agricultural diversification can be an effective measure for smallholders in the development of climate smart agricultural landscapes, with a focus on adaptation and food security
- Specific examples from Central American coffee landscapes

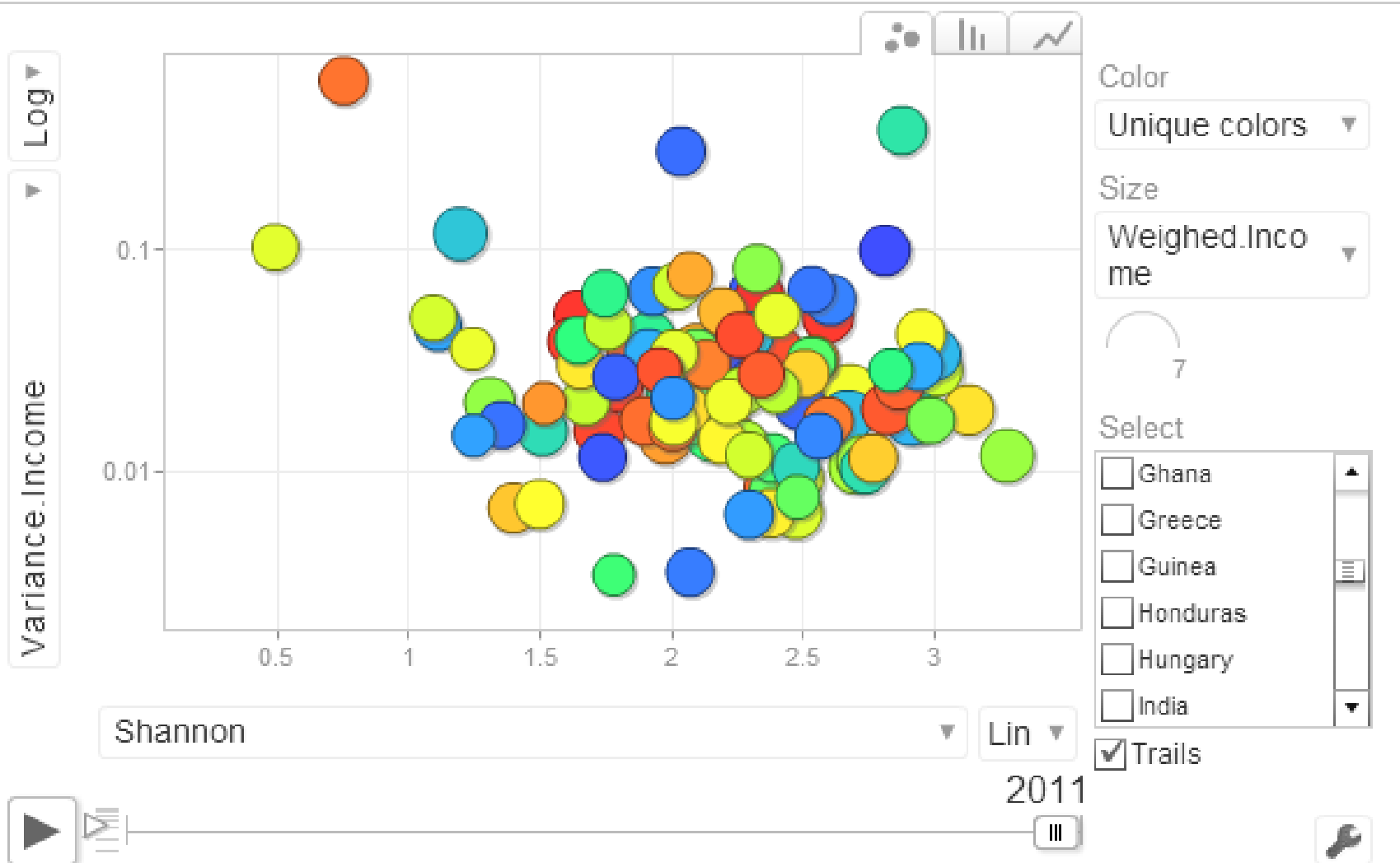
Concepts of agricultural diversification

Agricultural diversification is part of diversified farming systems that incorporate agrobiodiversity in production systems through a range of practices like multiple cropping systems, agroforestry systems, field scattering, and crop rotations (Vandermeer 1989; Somarriba 1992; Goland 1993; Leibman and Dyck 1993; Brookfield 2001; Kremen et al. 2012).

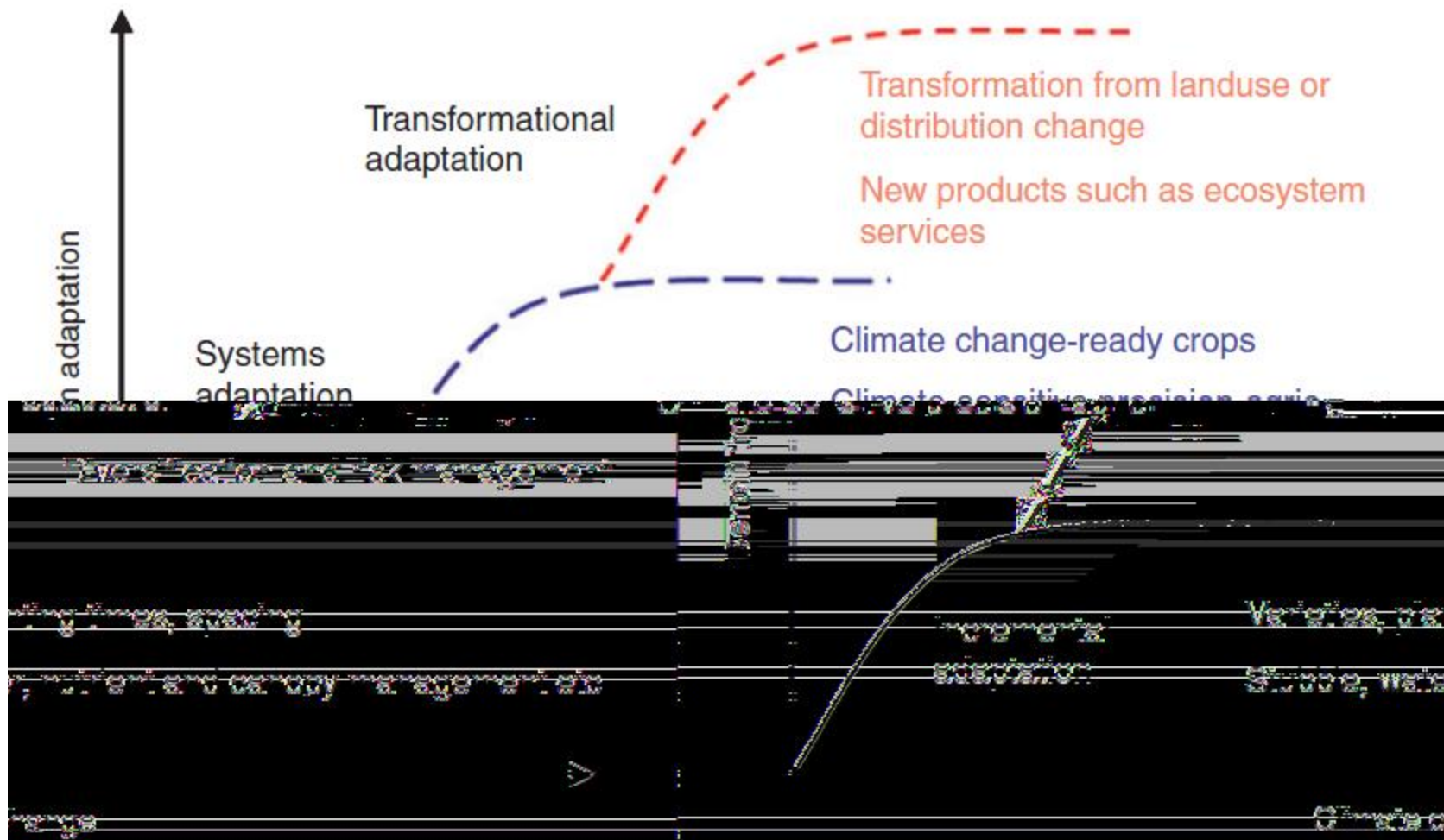
Diversification is a dynamic process that reflects change in business activities to respond in a flexible way to changing opportunities and constraints (Barghouti et al. 2003).

Adaptiveness: Actively manage how a system responds to change (Eakin et al. 2012)





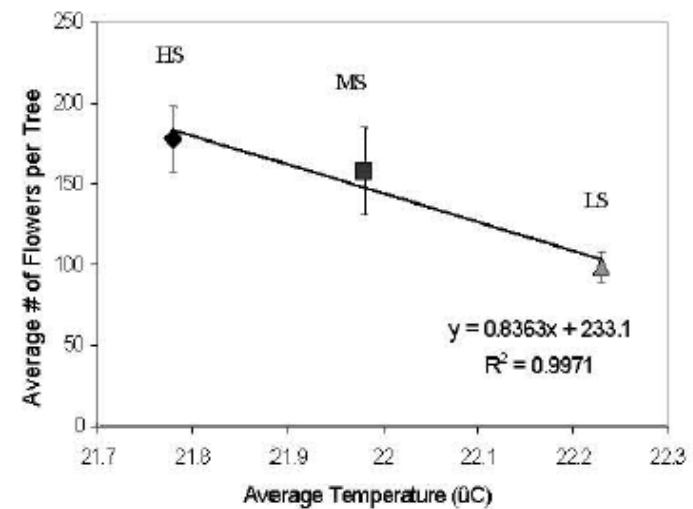
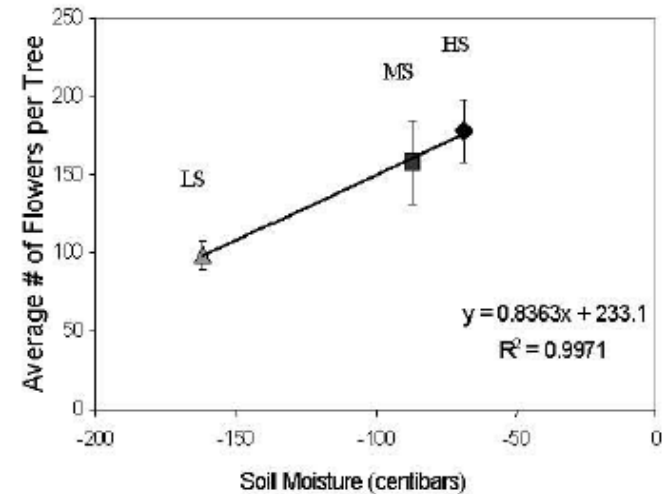
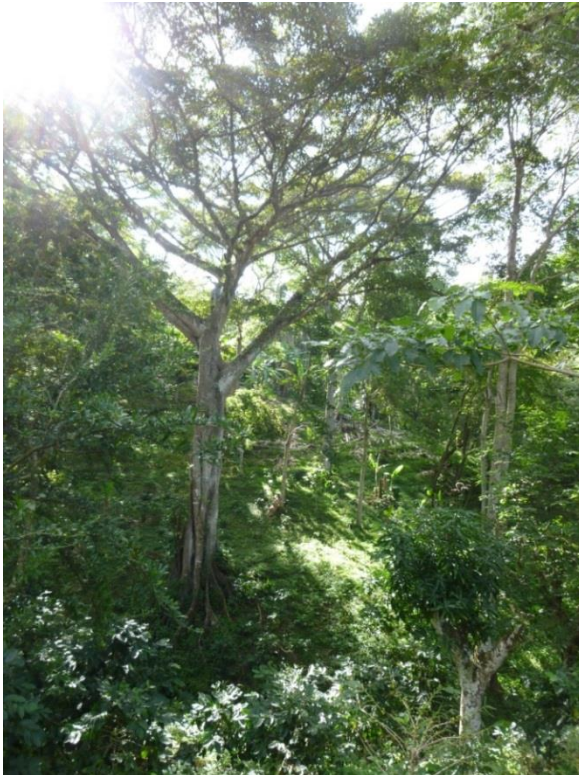
Agricultural diversification under transformative characteristics of climate change



Agricultural diversification for climate amelioration and buffering against extreme events

Agroforestry systems

Forest-agriculture mosaics



Balancing food and cash crops

High risk - maintain competitiveness

High risk - strategic advantage



White bears

Climate
vulnerable crops

Crops for the future



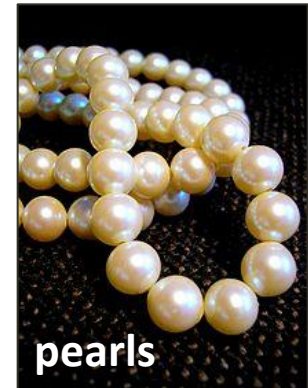
oysters



Tortillas

Food crops

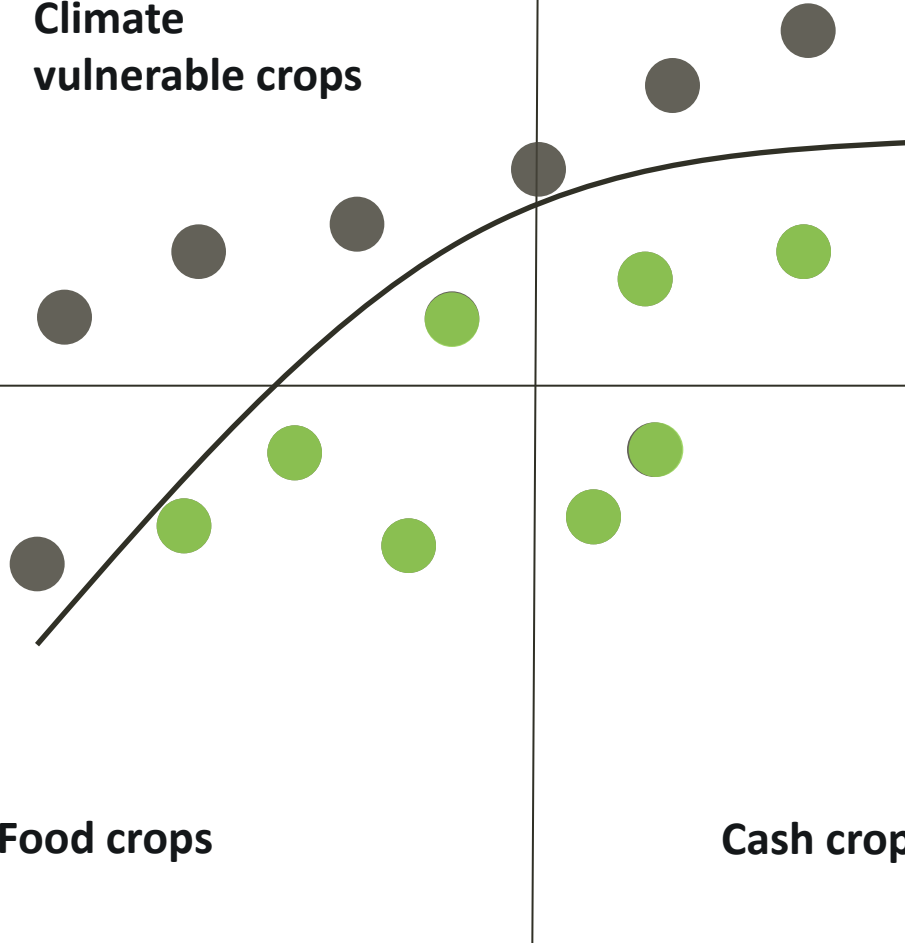
Cash crops



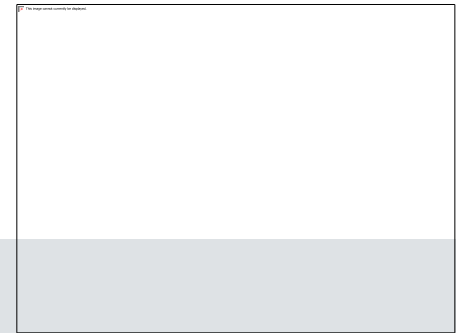
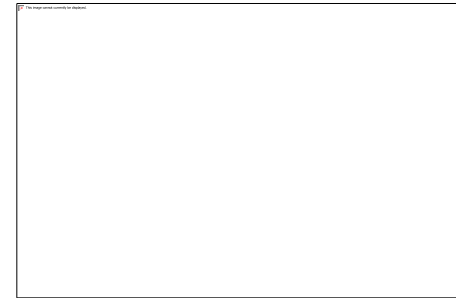
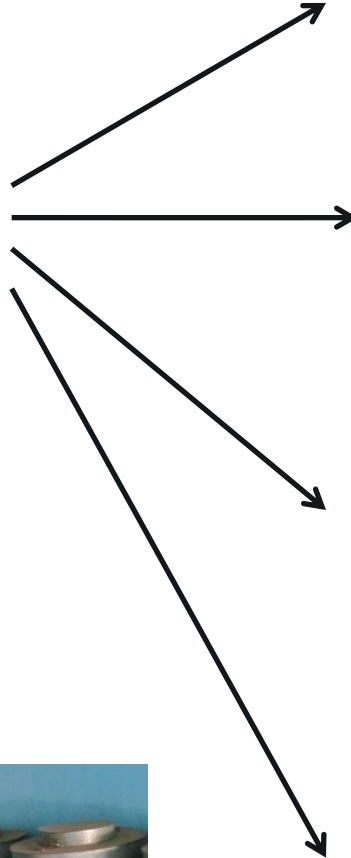
pearls

Low risk - maintain competitiveness

Low risk - strategic advantage



Transformation coffee systems and coffee farmer livelihoods under progressive climate change and after extreme events



Drawbacks of agricultural diversification

- Short-term investment costs for long-term benefits
- Learning curve to manage new crops and systems
- New crops may host new diseases
- Uncertain markets for new crops
- Trade-offs because of limited land and labor availability
- Limited availability to seed material, information and equipment
- Economy of scale favors specialization

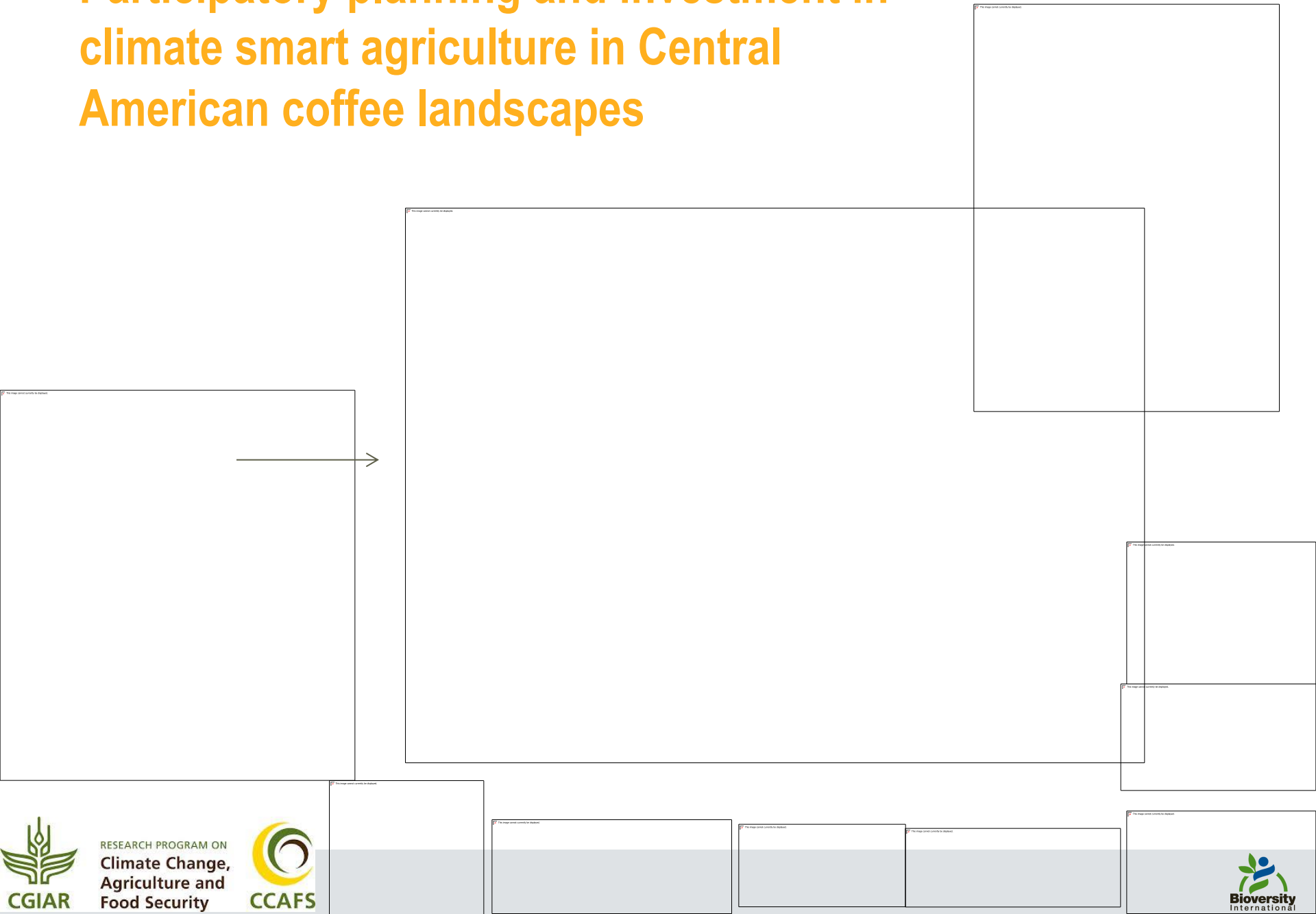
Enabling environment for diversification

- Analyze effectiveness of policies and programs that support flexible and local implementation of adaptation measures
- Market diversification for smallholders (non-traditional export crops)
- Methods to analyze and promote diversification of consumption preferences
- Organizational and institutional strengthening to support diversification at larger scales

Activities and tools to support farmers and their organizations in choices to diversify

- Understanding drivers of diversification and specialization
- Development of decision-support tools to estimate reduction of production and price risks through agricultural diversification
- Participatory planning to integrate CSA options and define optimal scales for diversification
- Prioritization and evaluation of crops and trees of interest to farmers for diversification and linked to food systems and value chains
- Access to information on management and seed availability of crops, trees and production systems

Participatory planning and investment in climate smart agriculture in Central American coffee landscapes



Evaluation of horticultural crop potential for agricultural diversification

- Central America is area of high horticultural crop diversity
- Horticultural production is being promoted in Central America as export diversification option
- Important source for diet diversification and nutrition



RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security



Ecological potential of fruit and agroforestry trees for diversification in existing coffee production systems

Current

2050s CRP 4.5



RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security





Thank you

Maarten van Zonneveld
Marie Soleil Turmel
Abigail Fallot

www.bioversityinternational.org

