



# ISFM in sustainable intensification: Key lessons and experiences

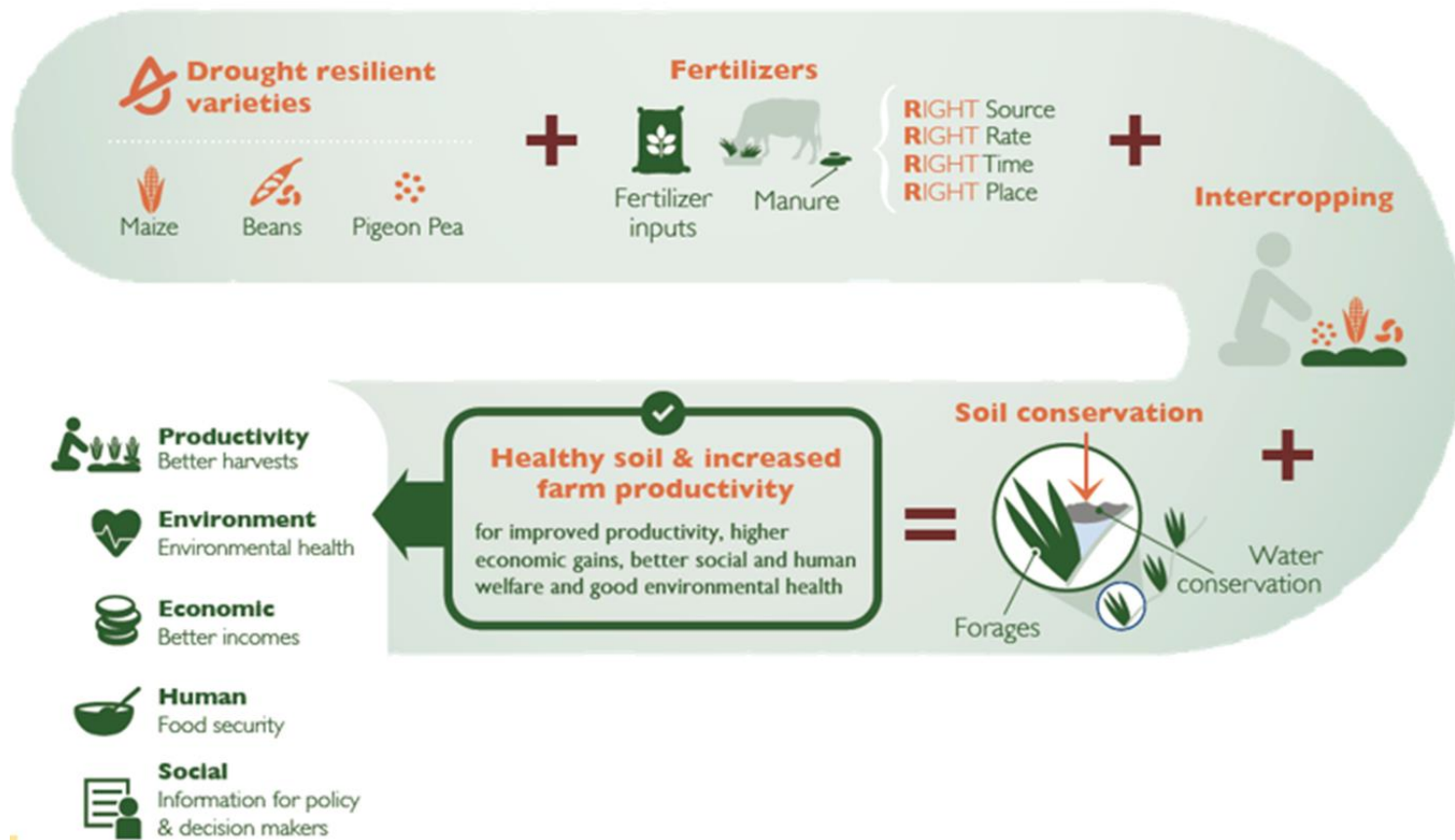
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Alliance of Bioversity International and CIAT  
Africa RISING East and Southern Africa Project  
Science Outcomes and Impacts Review  
Meeting, 24-25 August 2022  
Dodoma, Tanzania



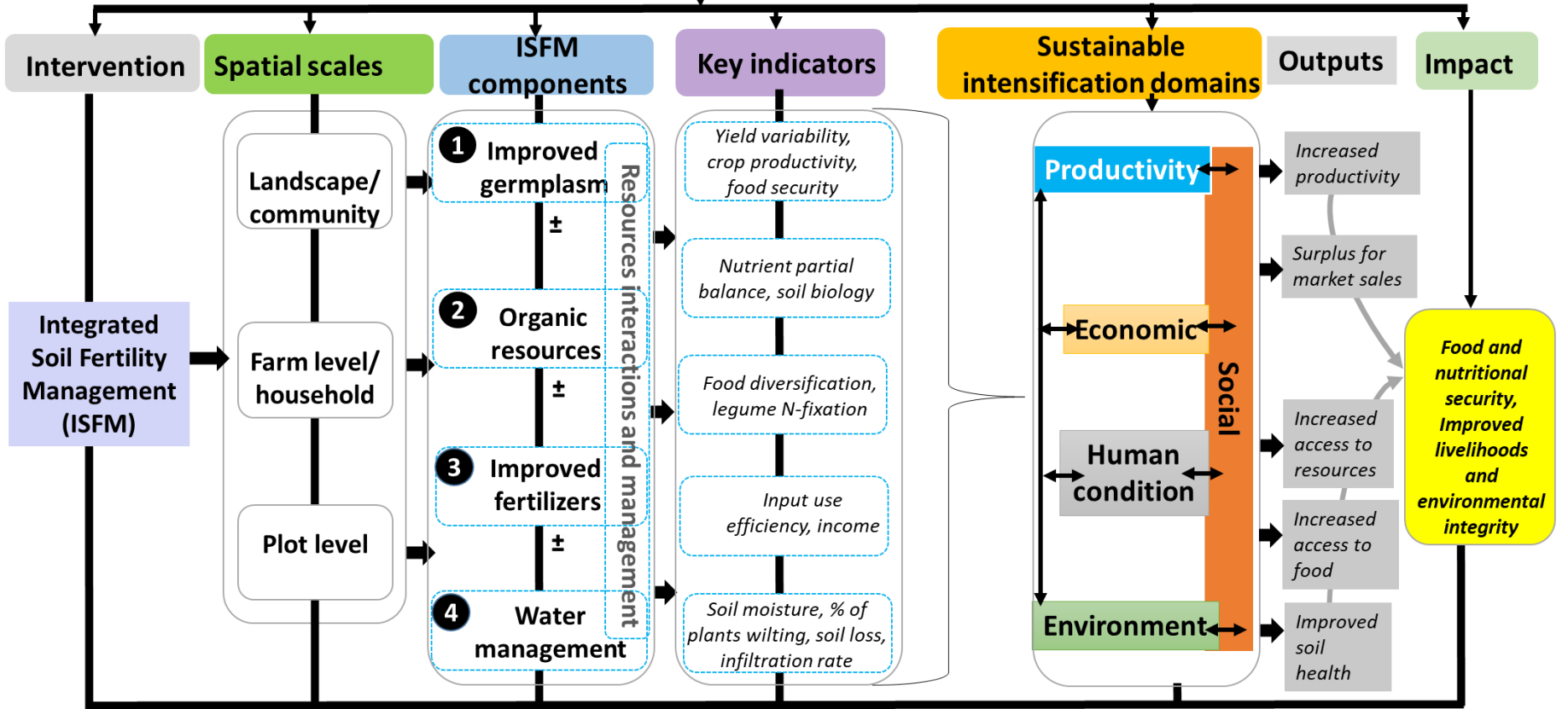


# Interventions





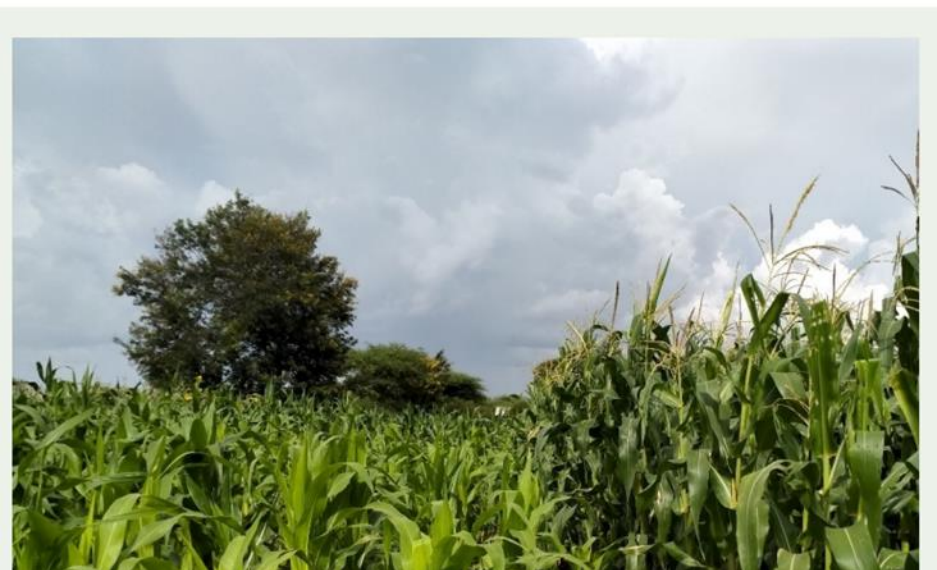
**Sustainable smallholder farmers' ISFM**





## **What needs to change in Babati for smallholder farmers to sustainably intensify?** Lessons from 10 years of community action research

### *Evidence from Babati*

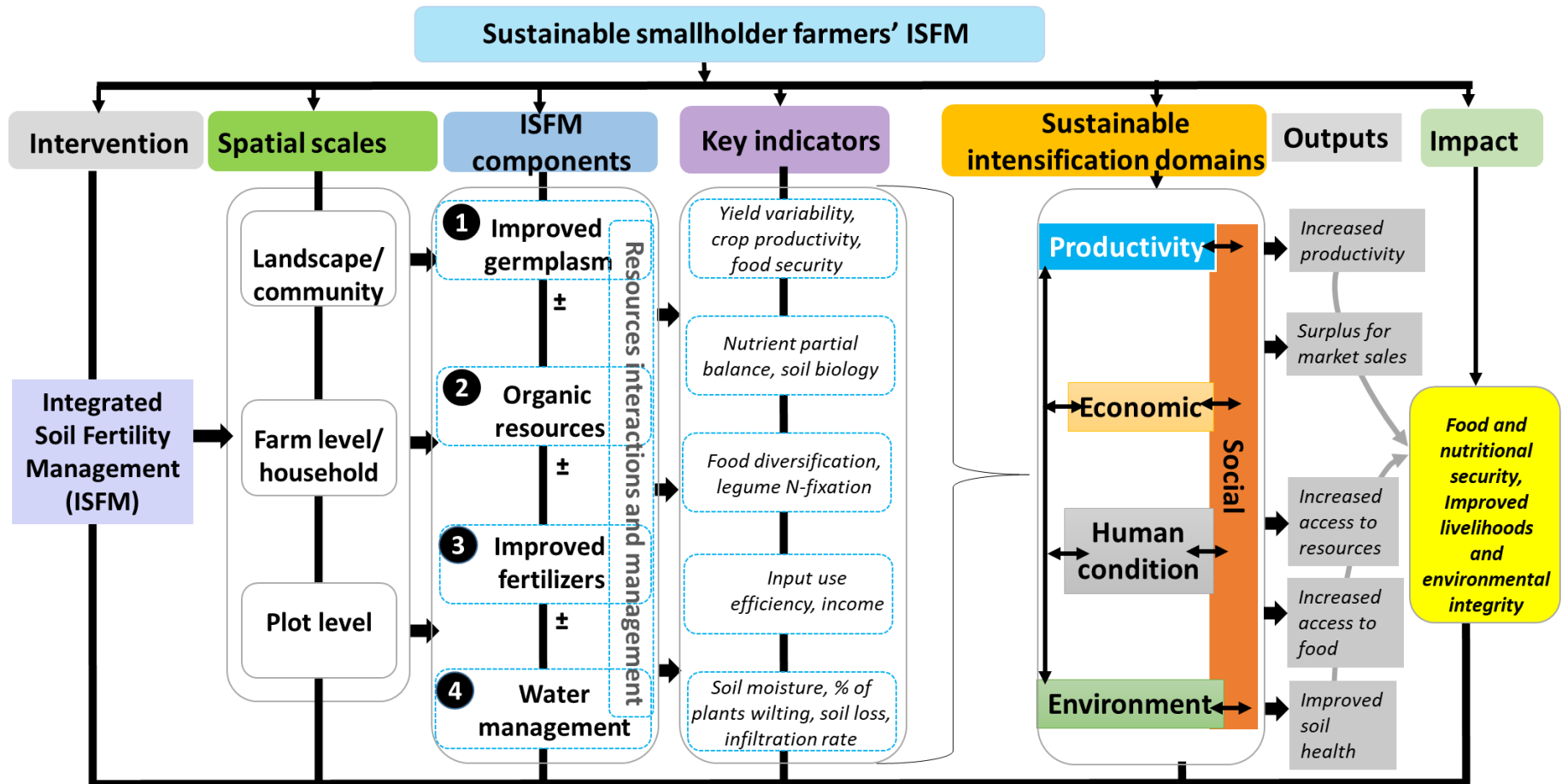


through harvests than the nutrients applied indicating declining soil nutrients. Soils in Long, Sabilo, Seloto, Riroda and Gallapo are low in N (<0.2%). Except Gallapo where levels were optimal, the rest of villages have soils with low or moderate levels of P ( $\leq 29$  ppm) while Riroda has soils that are also low in Zn (<2 ppm).

3. About 65% of farmers apply on average  $3.5 \text{ t ha}^{-1}$  manure in their fields i.e., 35% of farmers do not apply manure. Application of manure is increasing maize yields by up to  $900 \text{ kg ha}^{-1}$  for most farmers when the season has good amount of rainfall. Quantities of manure applied reduce with distance of field from home



# ISFM





# Improved germplasm

Low elevation  
(Gallapo, Sabilo)

4.8 t/ha  
SC 627

+ 1.6 t/ha Meru HB 513

Medium elevation  
(Seloto)

5.1 t/ha  
SC 627

+ 0.8 t/ha Meru HB 513  
+ 0.2 t/ha Pioneer 3253

High elevation  
(Long/Bashnet)

6.6 t/ha  
HB 614

= PAN 691

Other good performing varieties with slightly lower yield

Pioneer 3253 (-0.6 t/ha)  
DK 8031 (-0.6 t/ha)

DK 8031 (-0.7 t/ha)

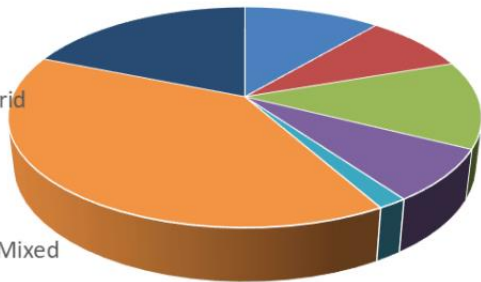
Pioneer 2859 (-1.1 t/ha)



# Improved germplasm...

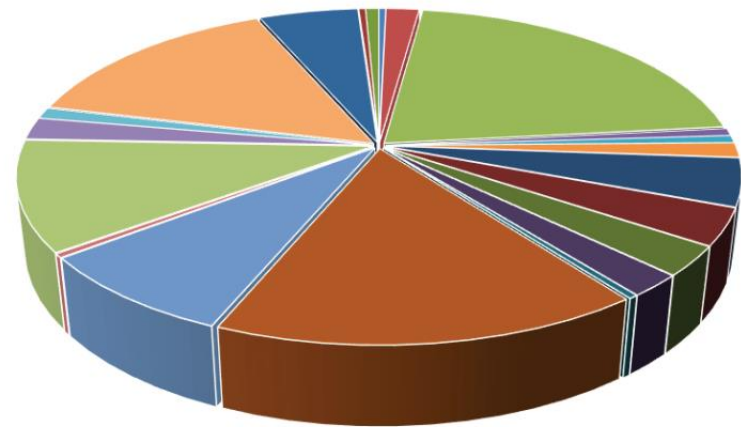
2013

- DK
- H614D
- Other Hybrid
- Pioneer
- Recycled
- SC627
- Local and Mixed



2021

- Cp101
- East African seeds
- Local
- Meru 515 (Nyati)
- Pioneer 3253
- SC 419
- SC719 (Tembo)
- DK 777
- H614
- Lubango
- Meru 623 (Kiboko)
- Sangita
- SC 513 (Punda Milia)
- Situka
- DK 8031
- Kitale Hybrid
- Meru 513 (Ngamia)
- Pannar 691
- SC 403 (Tumbili)
- SC627 (Simba)
- Zamseed



# Organic resources



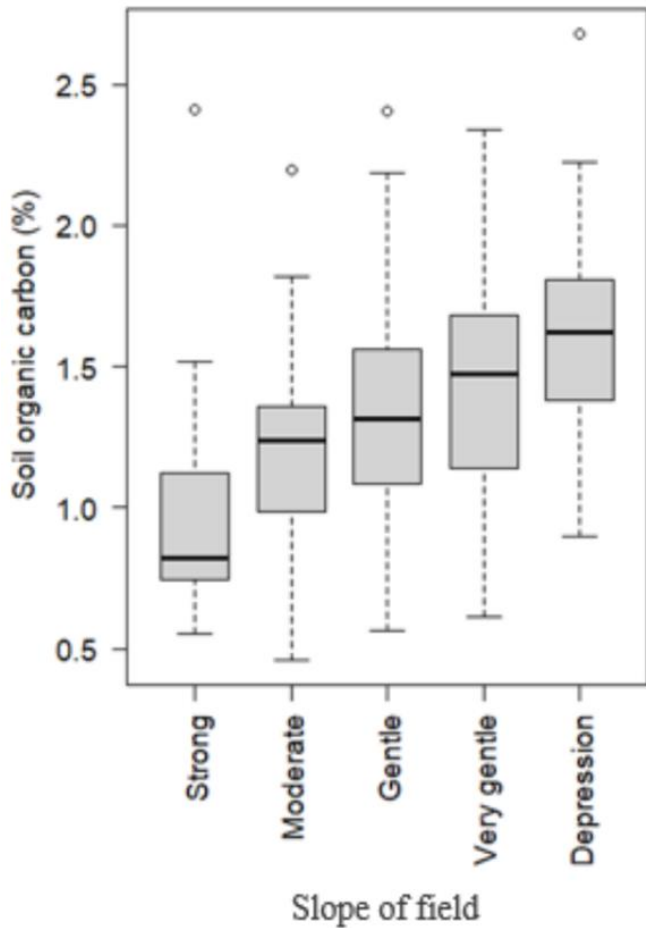
Additional maize yields  
with crop residue retention



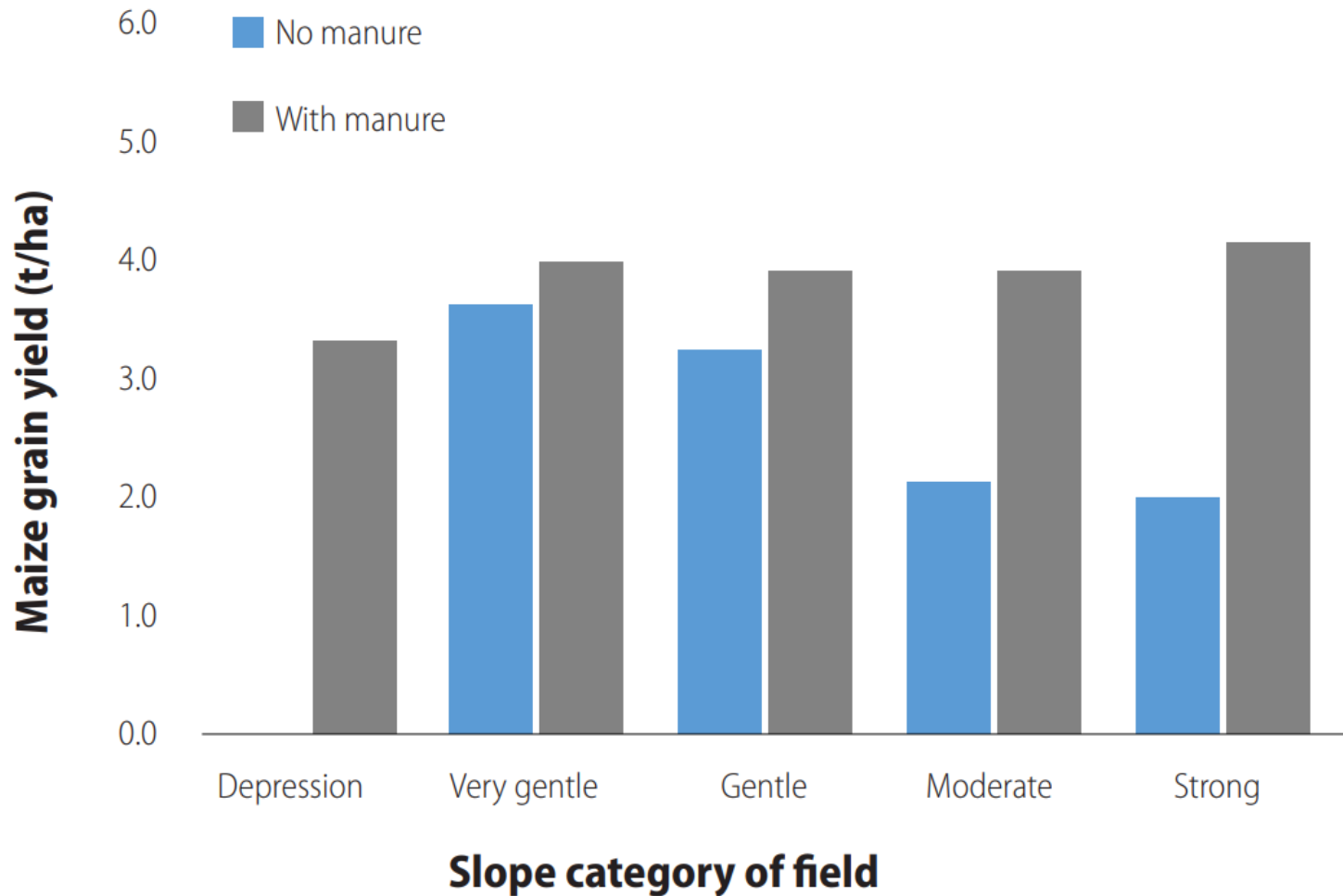
Additional maize yields with combined  
manure & crop residue retention



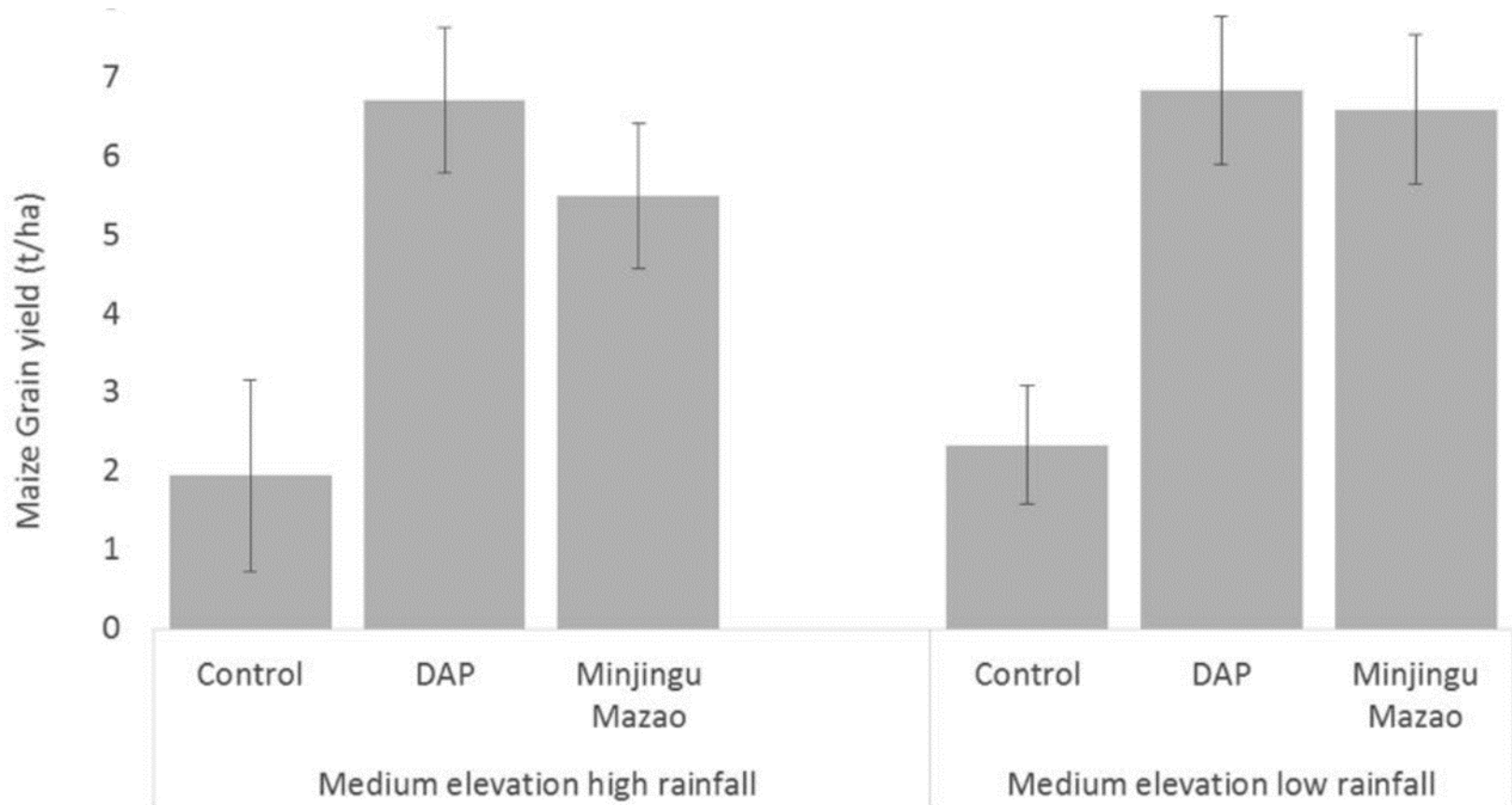
# Organic resources...



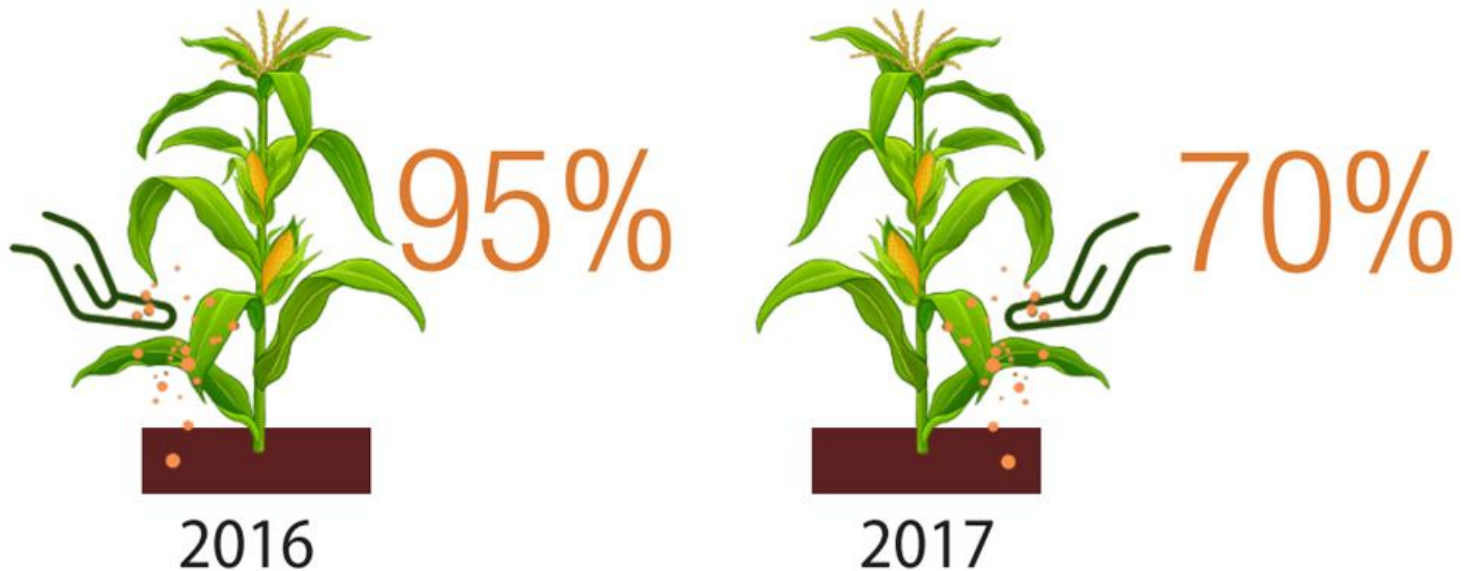
# Organic resources...



# Fertilizer applications

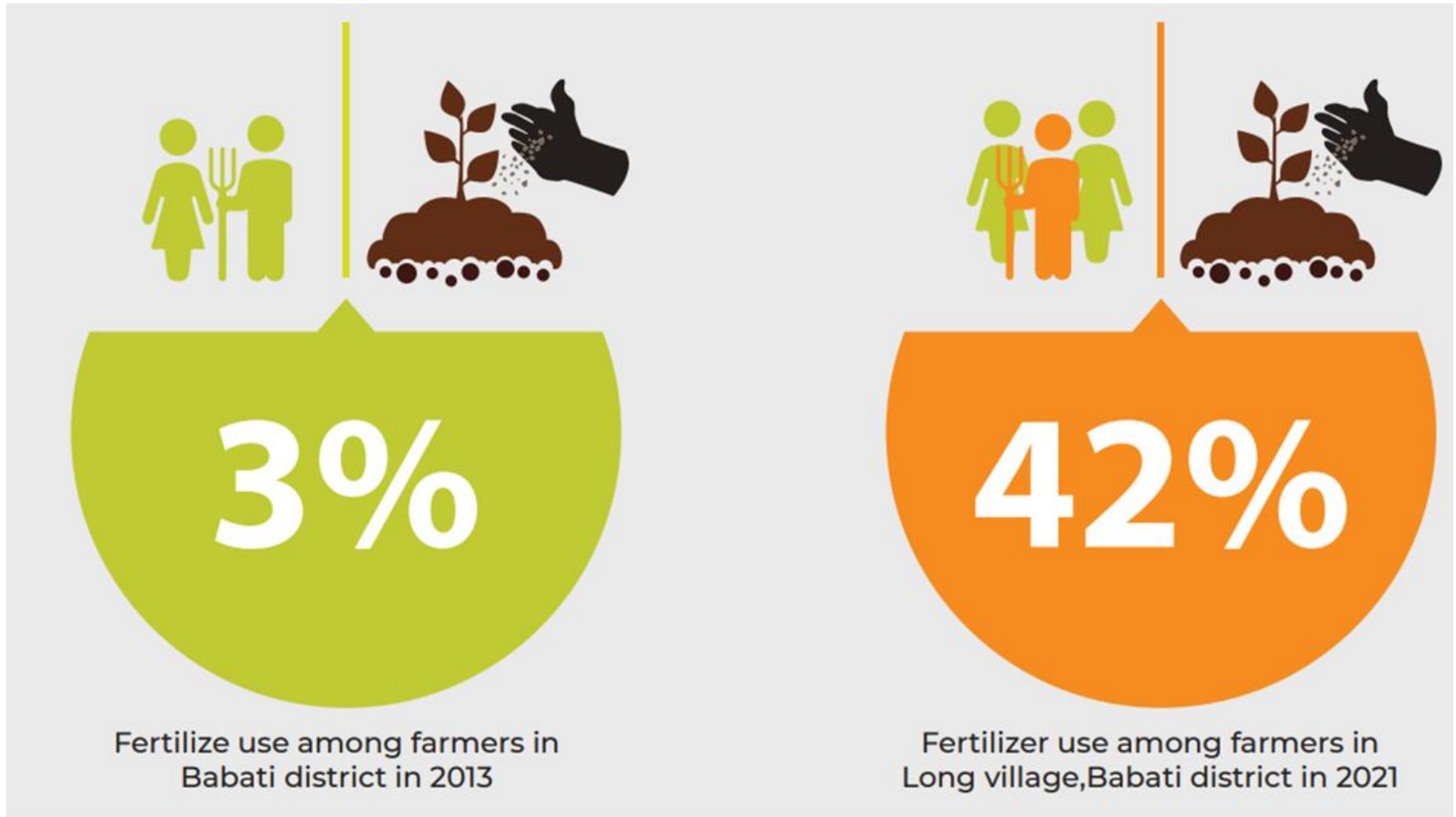


# Fertilizer applications



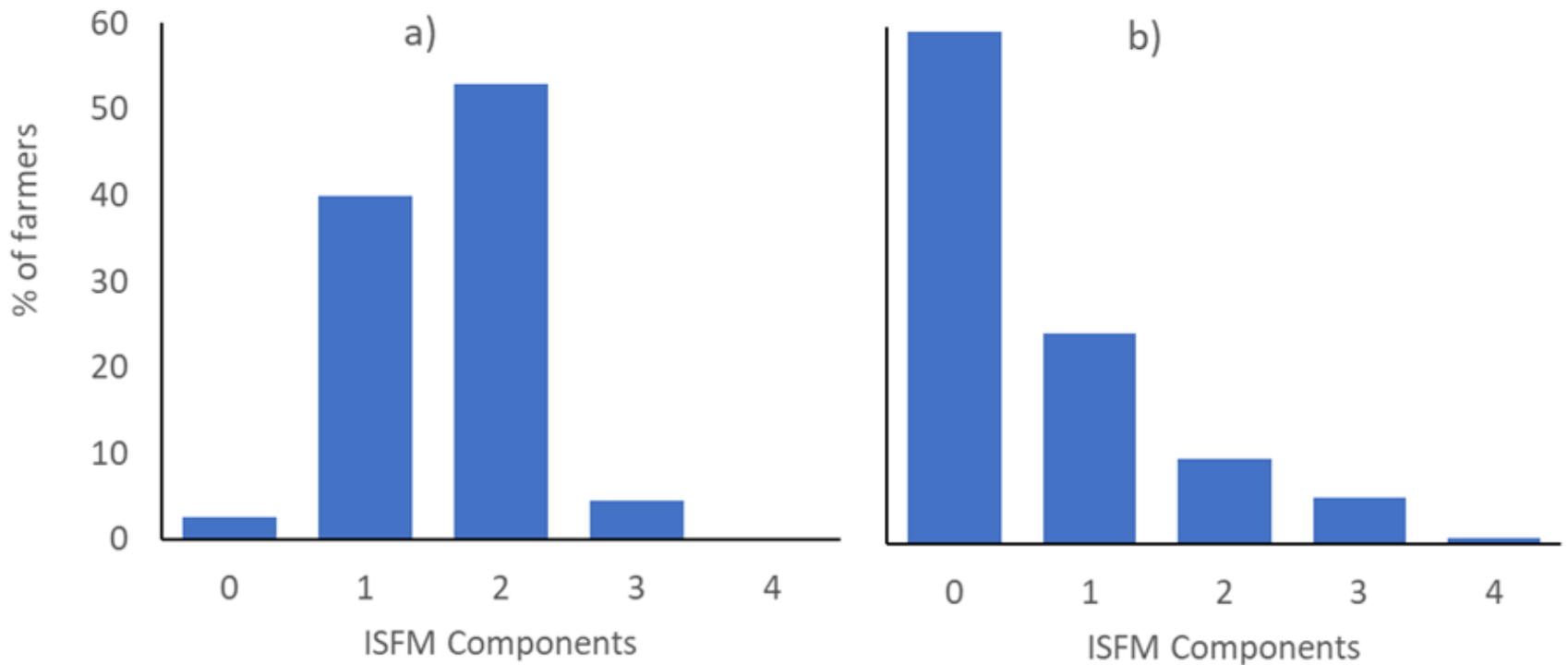
*The proportion of cases where fertilizer improved maize yields in 2016 and 2017, respectively.*

# Fertilizer applications...





# Distributions of application of ISFM



Babati (n=873) and Kongwa Kiteto (n=131)



# Other GAPS





# Additional key messages

- Sensitizing farmers on the benefits of residue retention is needed. Nutrient removals through harvests within intercropping systems can be reduced by up to 80 % for N and 30 % for P by retaining crop residues in the field.
- Re-invigorate soil and water conservation, especially on the sloping fields. Following several years of soil erosion, farmer fields on moderate to steep slopes produce maize yields that are up to 1.6 t ha<sup>-1</sup> less than on flat fields.
- Train farmers to optimize plant densities in their fields. This holds huge potential to drastically increasing productivity.

# Lucia Lulu transforms her poor farm field into a highly productive land

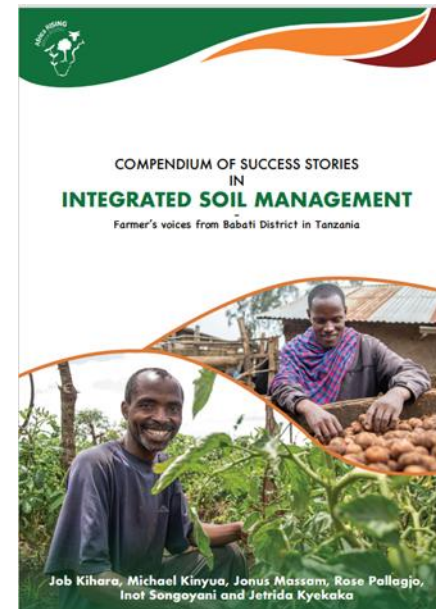
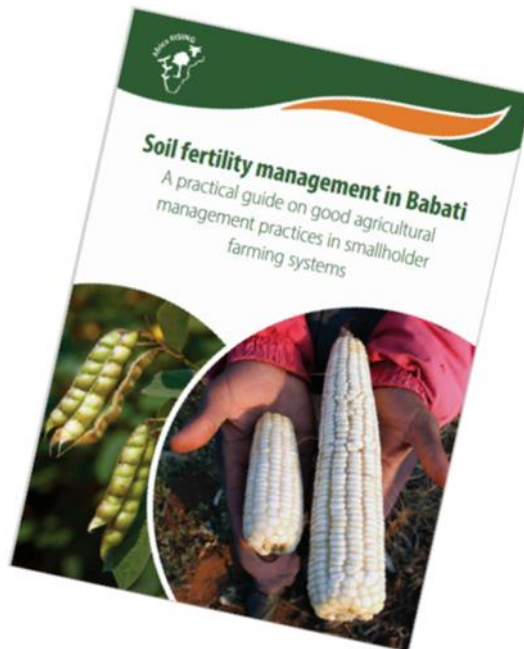






# Important resources

- Our partnership model (Public and Private Partnerships improve smallholder farmer fortunes in Babati, Tanzania - The Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT) ([alliancebioversityciat.org](http://alliancebioversityciat.org)))
- English field guide: <https://hdl.handle.net/10568/119507>
- Swahili field guide <https://hdl.handle.net/10568/119280>









# Thank You

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