CIAT

International Center for Tropical Agriculture
Since 1967 / Science to cultivate change

CGIAR
Science for a food-secure future

Soil Organic Matter The bridge between UNCCD and UNFCCC

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Rio Convention Pavillion
UNCCD COP12, Ankara, Turkey

Dr. Deborah Bossio

d.bossio@cgiar.org

Land Restoration

SOIL ORGANIC CARBON

Climate Change adaptation and mitigation

Thanks to its high level of ambition this initiative is part of the Lima-Paris Action Agenda and contributes to the sustainable development goals to reach a land-degradation neutral world

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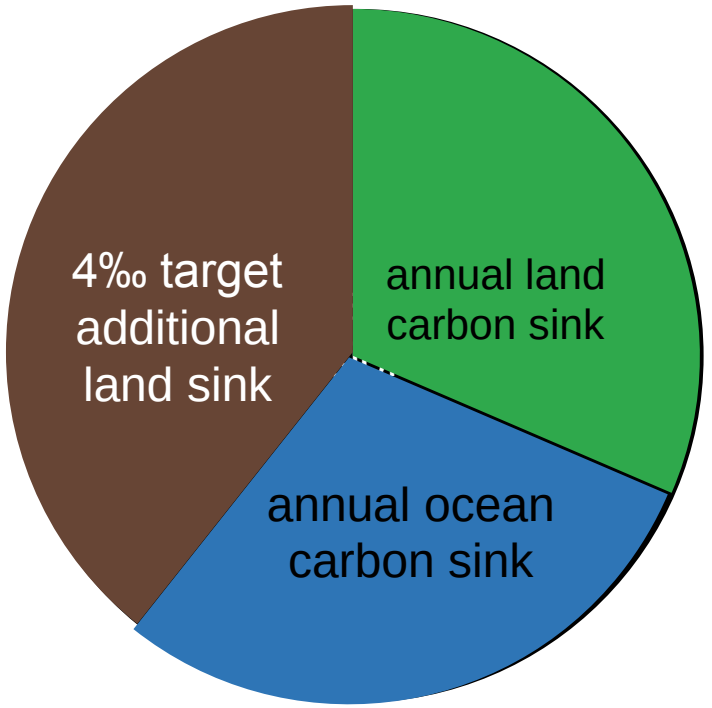
4‰

0.4% per year sequestration soil organic carbon



Soussana, Saint-Macary, Chotte 2015

In March of 2015 Minister Le Foll of France announced the establishment of an international research program “to improve soil organic matter at an annual rate of 4‰[1]”, and that “such an increase would offset emissions of green house gasses on the planet[2]”

[1] Press release ‘Contribution de l’agriculture à la lutte contre le changement climatique : Stéphane Le Foll annonce le lancement d’un projet de recherche international : le « 4 pour 1000 » . MAAF, Paris, March 17, 2015.

[2] See http://agriculture.gouv.fr/Cop21-le-4-pour-1000

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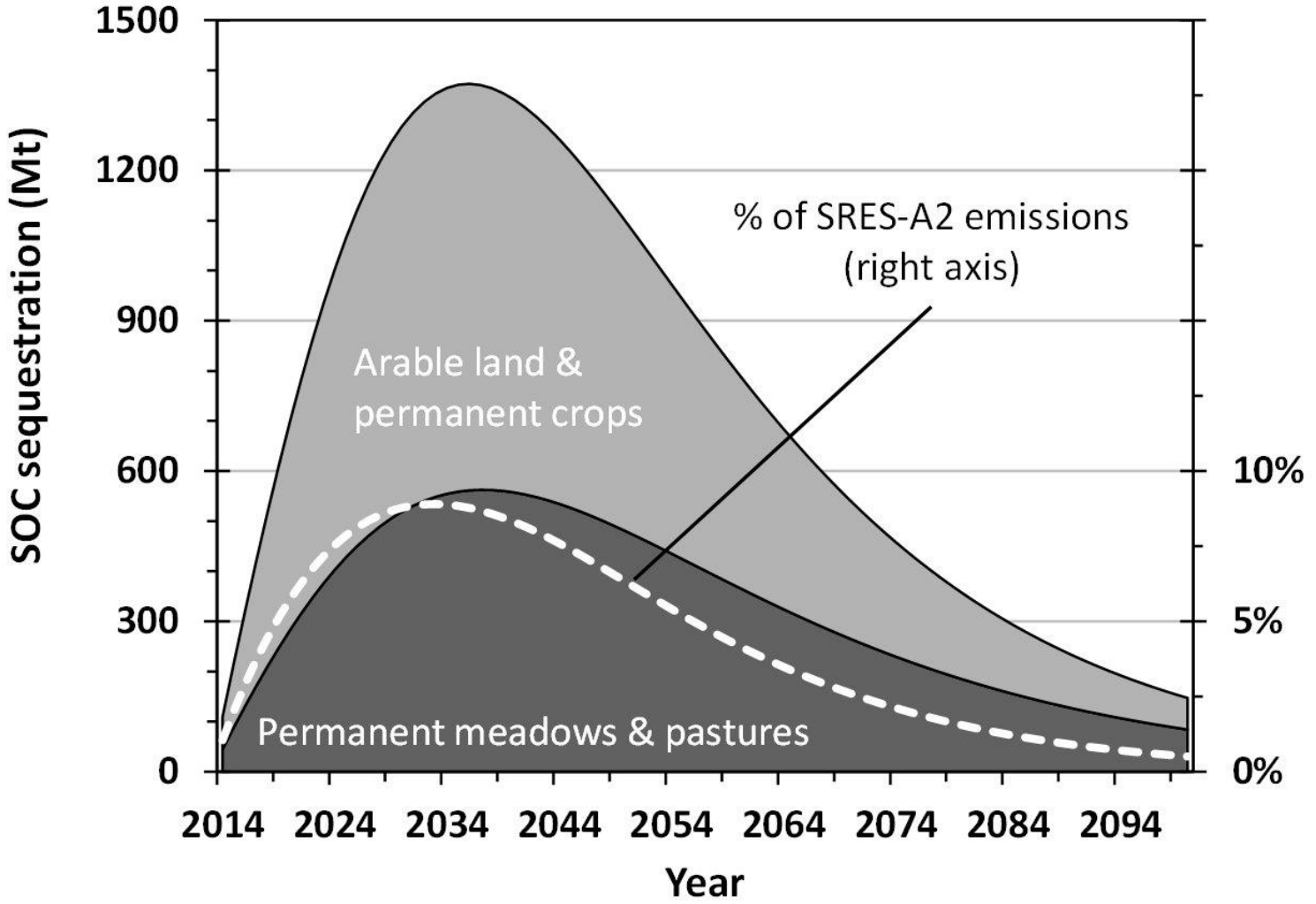
3.5

Gt/year Carbon required for the 4‰ target

- 0.4 – 1.2 Gt estimated total carbon sequestration potential in cropland soils of the world
- 2.8 – 3.0 Gt for all soils of the world

(Lal 2010)



Optimistic senario (1 t/ha/yr) and rapid implementation, peak of carbon sequestration in soil predicted for 2030 - coherent with the need for early action, but far short of the 4‰ target.

(Sommer and Bossio 2014)

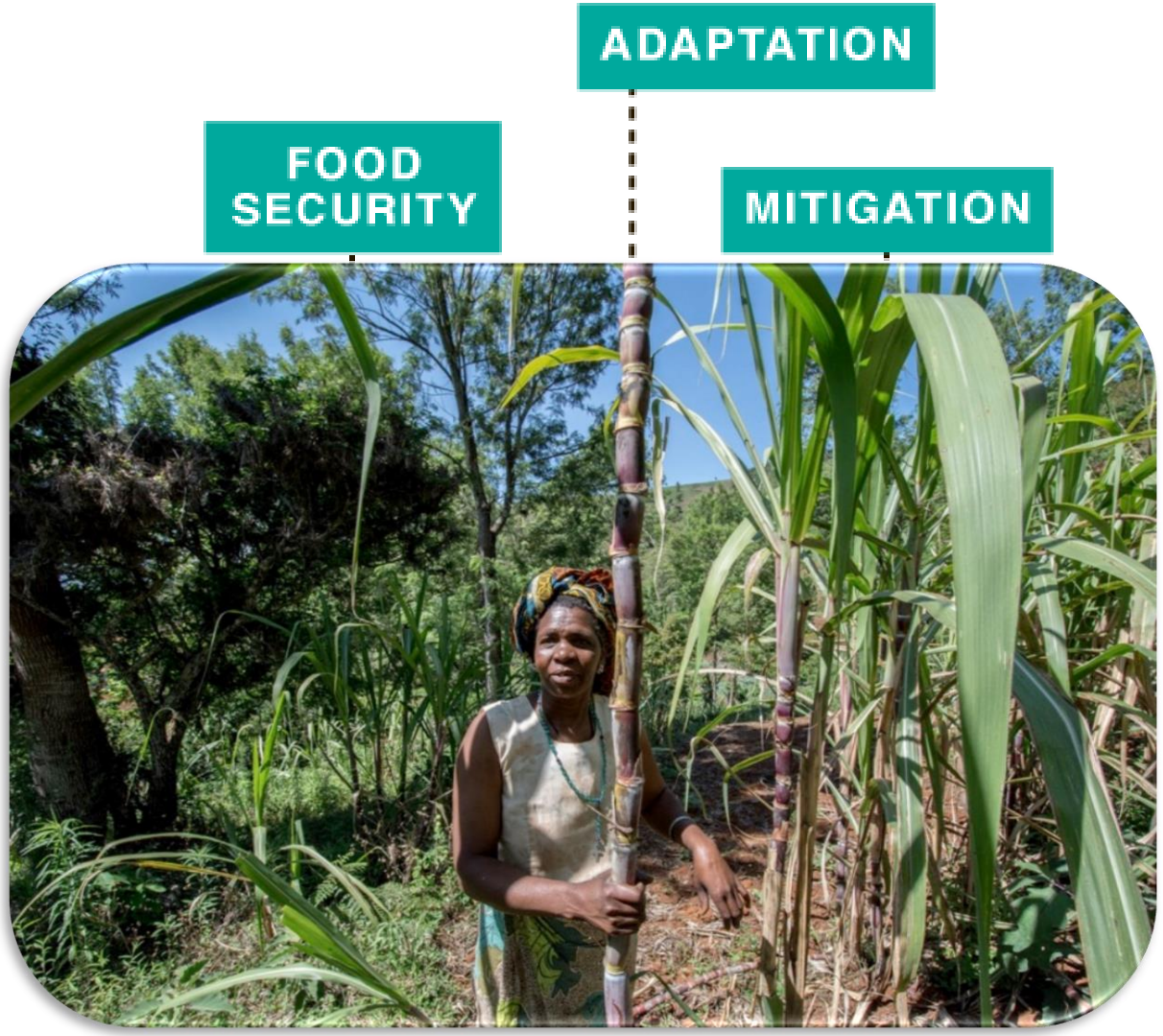
50 to 70

% loss of soil carbon stocks in cultivated soils (Lal 2004)

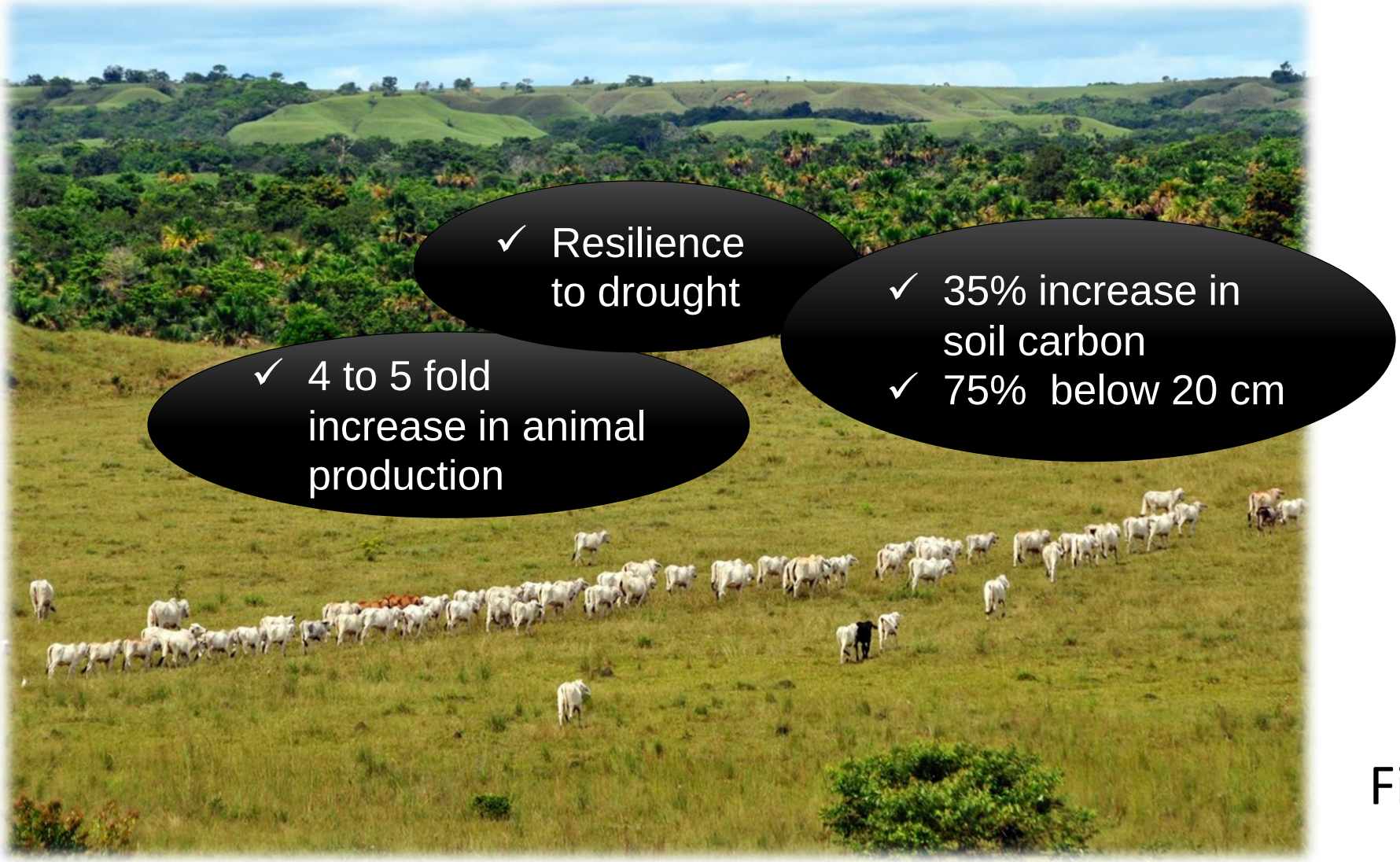
Restoring degraded soils affords substantial opportunities to sequester carbon

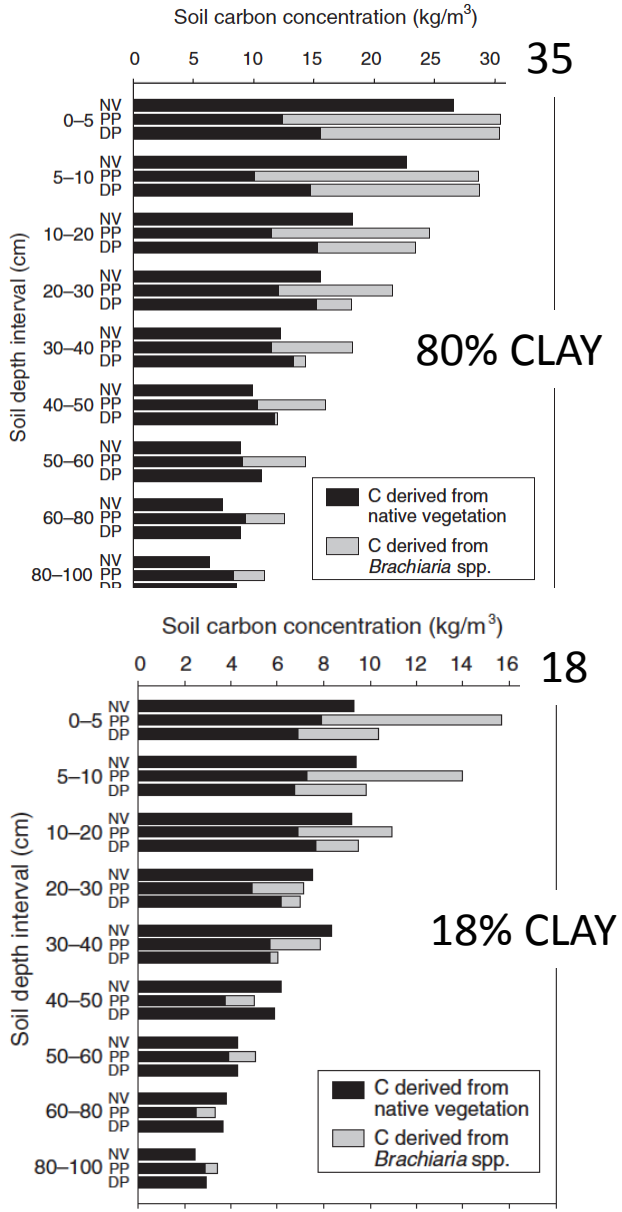
Increase of 1 ton of soil carbon pool of degraded cropland soils may increase crop yield by 30 to 50 kilograms per hectare (kg/ha) for wheat, 100 to 300 kg/ha for maize, and 30 - 50kg/ha for soybeans (Lal 2006)

The promise of *Climate Smart Agriculture?*



Restoring degraded pastures with tropical forages – storing carbon at depth

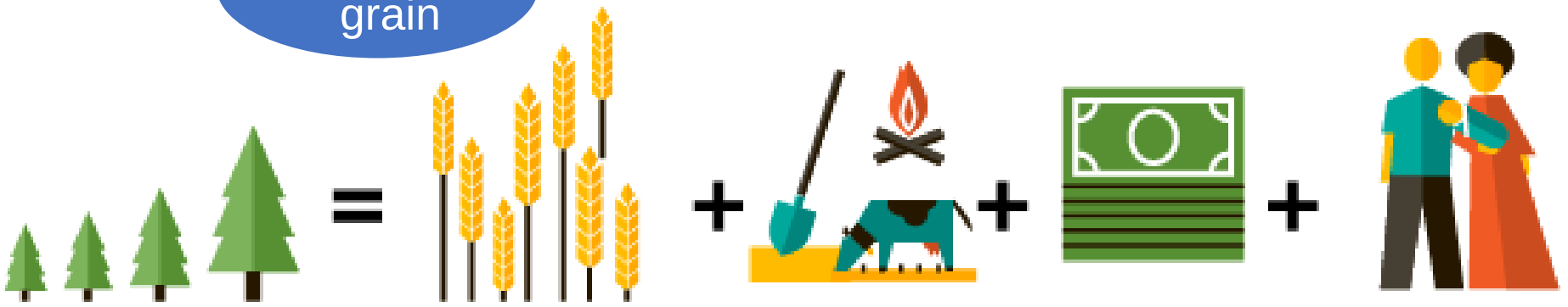




Fisher et al. 1994, 2007

Bringing back Sahel's Underground Forest

✓ More grain



200 MILLION new trees on 5 million hectares of farmland

500,000 TONNES more grain

Better soil, firewood & animal fodder

$56 MORE BENEFIT per hectare per year

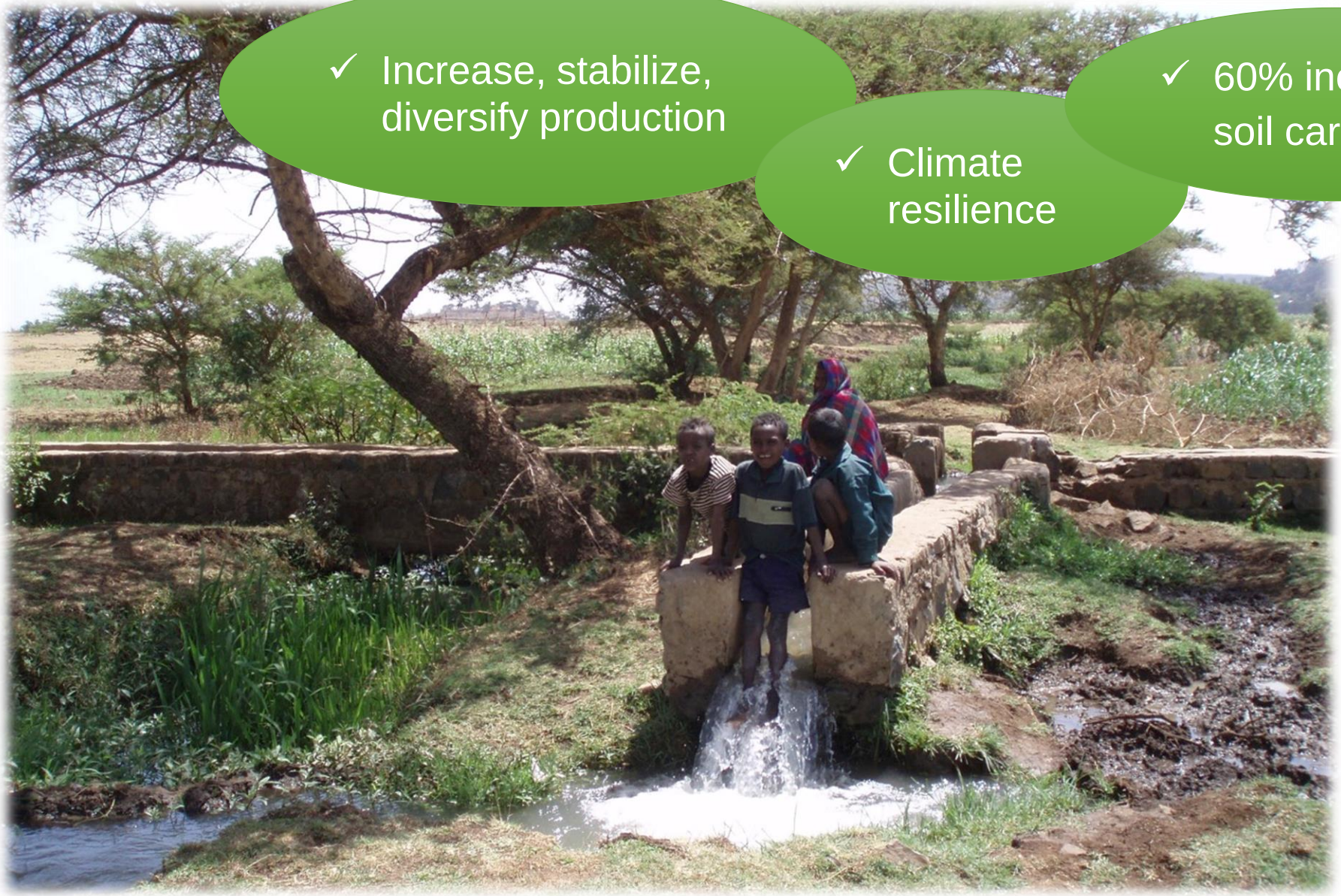
2.5 MILLION people better off

✓ Restored Soils
✓ Sequestration of carbon in soils and trees

✓ Reduces drought impacts

Cooper et al 2013; Reij et al 2009

Irrigation – unexplored opportunity



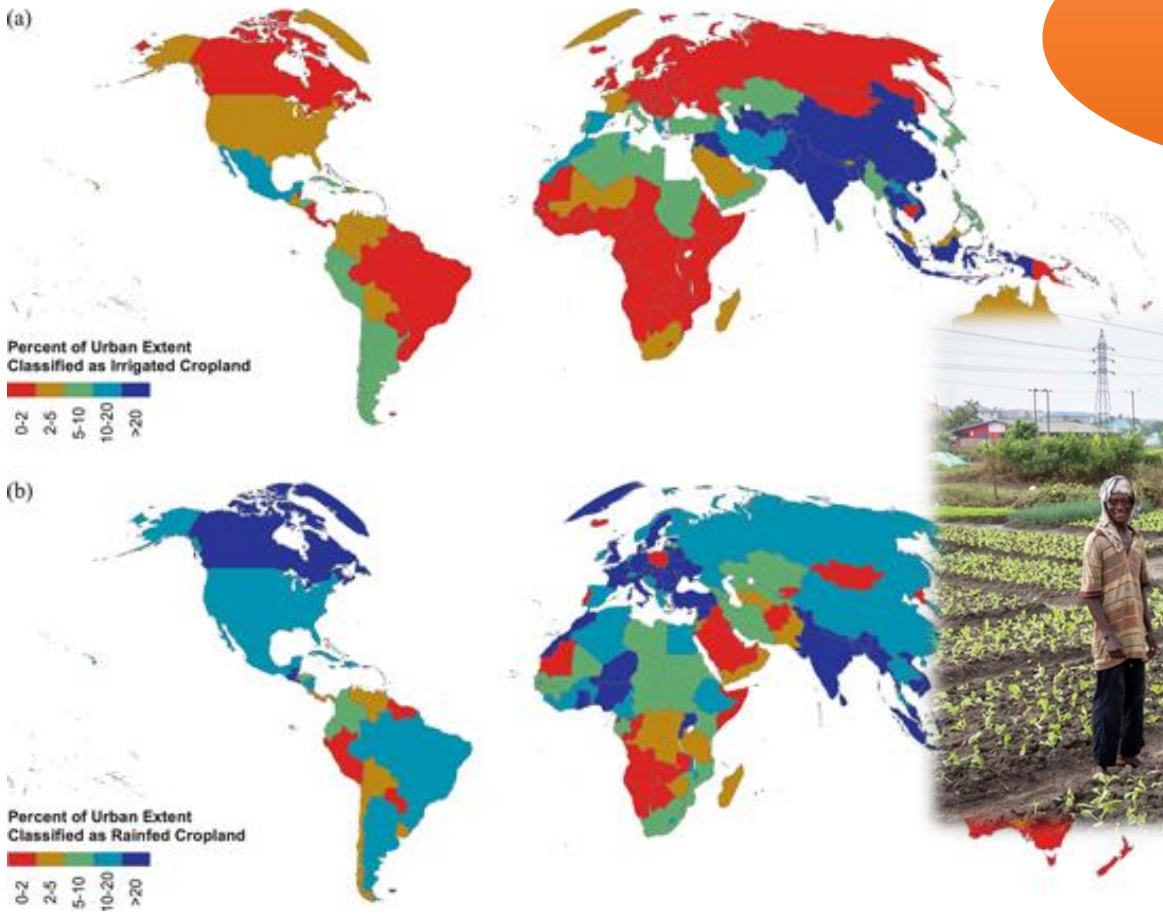
- ✓ Increase, stabilize, diversify production
- ✓ Climate resilience
- ✓ 60% increase in soil carbon?!*

Irrigation is a major policy initiative in African Nations, embedded in CAADP

*temperate system, native sagebrush to irrigated pasture
Entry, Soika, Shewmaker 2002

Urban-rural waste recycling – answer to the missing nutrients?

Figure 2 from A L Thebo et al 2014 Environ. Res. Lett. 9 114002



Thebo, Drechsel and Lambin 2014

- ✓ Peri-urban food production
- ✓ Climate resilience
- ✓ ??% increase in soil carbon

- 456 million hectares of land, 11% of irrigated and 5% of rainfed croplands, are within 20 kilometers of cities
- Waste water a gigantic source of nutrients or gigantic pollution problem

Program of climate smart agriculture solutions to build soil carbon

- Design, test and implement CSA solutions at scale
- Leading to enhanced soil carbon sequestration
- 5-6 emerging and least developed countries eligible for GCF funding
- 225m$ on 5 years

Initiative of the CGIAR Programs and the French INRA, CIRAD, IRD

CGIAR RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security

CCAFS

CGIAR Research Program on Water, Land and Ecosystems

THANK YOU

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