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> "Reconcile land system changes with planetary health" Water ecology and climate change aspects - 414

## Influence of irrigation on land use intensity and specific income for small farms in Togo

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GIZ Sun4Water,

Planetary Health is a solutions-oriented, transdisciplinary field and social movement focused on analysing and addressing the impacts of human disruption to Earth's natural systems, on human health and all life on Earth. One way of addressing this is balancing productivity and conservation.

- According to FAO (1996) the potential of irrigable land was of 180 000 ha of which only 1.3% were equipped with irrigation system. Updates from Aquastat. In 2021 indicate that 7 860 ha are equipped of which 80% under exploitation
- Major crops sown are cereals, tubers and some cash crops. Besides these, lots of farmers produce vegetable crops (okra, onion, tomato, pepper, eggplant, carrot, cabbage and legumes) which are generally irrigated or grown in hydromorphic soils in marshy areas or bordering streams (agrarian wetlands)
- Togo has committed to make progress towards a long-term low-carbon development and climate resilience strategy through its national development plan (PND 2018-2022) and the government roadmap
- Contribution to greenhouse gas reduction (11.14% reduction between 202 and 2025).

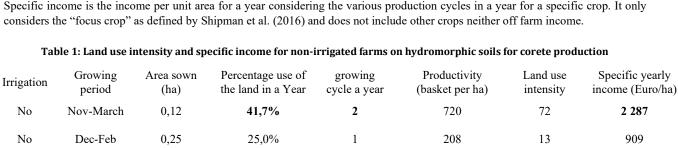
**Objectives:** Analyze how irrigation in crop systems may enhance the efficiency on land and water resources for food production. This is done through two parameters: land use intensity and specific income.

50,0%

50,0%

Land use intensity for the agricultural use of land for a specific crop is measured in terms of the quantity of crop produced per year either under irrigation or not on a given land area and frequency. Output as indicated by Erb et al. (2013).

Specific income is the income per unit area for a year considering the various production cycles in a year for a specific crop. It only considers the "focus crop" as defined by Shipman et al. (2016) and does not include other crops neither off farm income.



2

864

864

Table 2: Land use intensity and specific income for irrigated farms on hydromorphic soils for corete production

Irrigation	Growing period	Area sown (ha)	Percentage use of the land in a Year	growing cycle a year	Productivity (basket per ha)	Land use intensity	Specific yearly income (Euro/ha)
Yes	Dec-Feb	0,12	25,0%	1	832	25	813
Yes	Dec-Feb	0,5	25,0%	2	384	96	585
Yes	Dec-may	0,18	50,0%	2	864	156	2 287
Yes	Dec-June	0,3	58,3%	3	960	504	2 744

In non-irrigated farm growing fresh vegetables on hydromorphic soils in the dry season in Togo with production cycle using land 3 months a year for 1 cycle the land use intensity is very low compared to farms having two cycles with longer production cycle (5 - 6 months a year)

0,12

0,25

Irrigation for vegetable production on same period and growing cycle on hydromorphic soil doesn't yield a significant difference in productivity and land use intensity.

Extending growing period provide an extra cycle in the same area. Avoiding extension of the cropped area, then making more with same land resource

104

216

3 430

1 646

Four of the eight outcomes Amede et al. (2023) indicated for sustainable farming for smallholder farms in Africa, namely productivity, climate adaptation, productivity and low energy consumption

Amede, T.; Konde, A.A.; Muhinda, J.J.; Bigirwa, G. Sustainable Farming in Practice: Building Resilient and Profitable Smallholder Agricultural Systems in Sub-Saharan Africa. Sustainability 2023, 15,

Boserup Ester (2014) The conditions of agricultural growth: The economics of agrarian change under population pressure. https://doi.org/10.4324/9781315070360 Shipman Emily, Soto Gabriela, Mullan Jessica, Maireles González Marta and Daniels Stephanie (2016) Measuring Smallholder Incomes: Towards better alignment and reporting of farm economic metrics. October 2016.

