



## “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***Stephane LAKO MBOUENDEU, Macben MAKENZI, Guillaume IMBERT**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 2025
- 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.

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.

**Table 1: Land use intensity and specific income for non-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)
No	Nov-March	0,12	<b>41,7%</b>	<b>2</b>	720	72	<b>2 287</b>
No	Dec-Feb	0,25	25,0%	1	208	13	909
No	Dec-may	0,12	<b>50,0%</b>	<b>2</b>	<b>864</b>	104	<b>3 430</b>
No	Dec-may	0,25	<b>50,0%</b>	<b>2</b>	<b>864</b>	216	<b>1 646</b>

**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	<b>832</b>	25	813
Yes	Dec-Feb	0,5	25,0%	<b>2</b>	384	96	585
Yes	Dec-may	0,18	<b>50,0%</b>	<b>2</b>	<b>864</b>	156	<b>2 287</b>
Yes	Dec-June	0,3	<b>58,3%</b>	<b>3</b>	<b>960</b>	504	<b>2 744</b>

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)

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

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