Farmer-led Irrigation Development on the Southern Slopes of Mt. Kilimanjaro, Tanzania

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WISE – futures

Irrigation Landscape on the southern slopes of Mt. Kilimanjaro

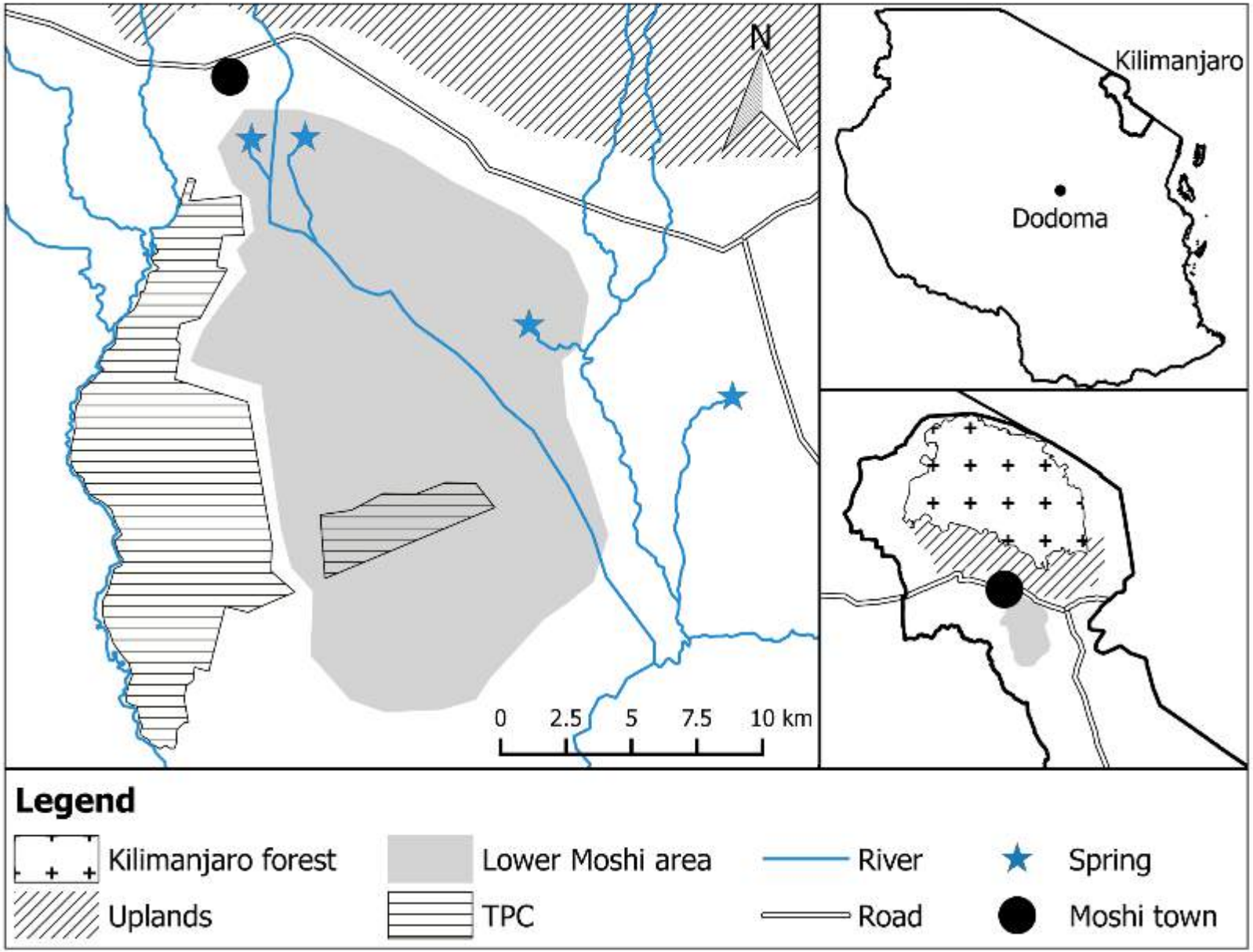
There is a long history of irrigation development (i.e. *both state and farmer-led*)

Many farmer-initiated schemes dating back to pre-colonial time can be found on the higher elevations of the mountain

Initiatives in the Kahe plain (lower Moshi)

- The area is just south of Moshi town.
- Largest farmers is the sugarcane Tanganyika Planting Corporation (TPC)

- source: de Bont 2019

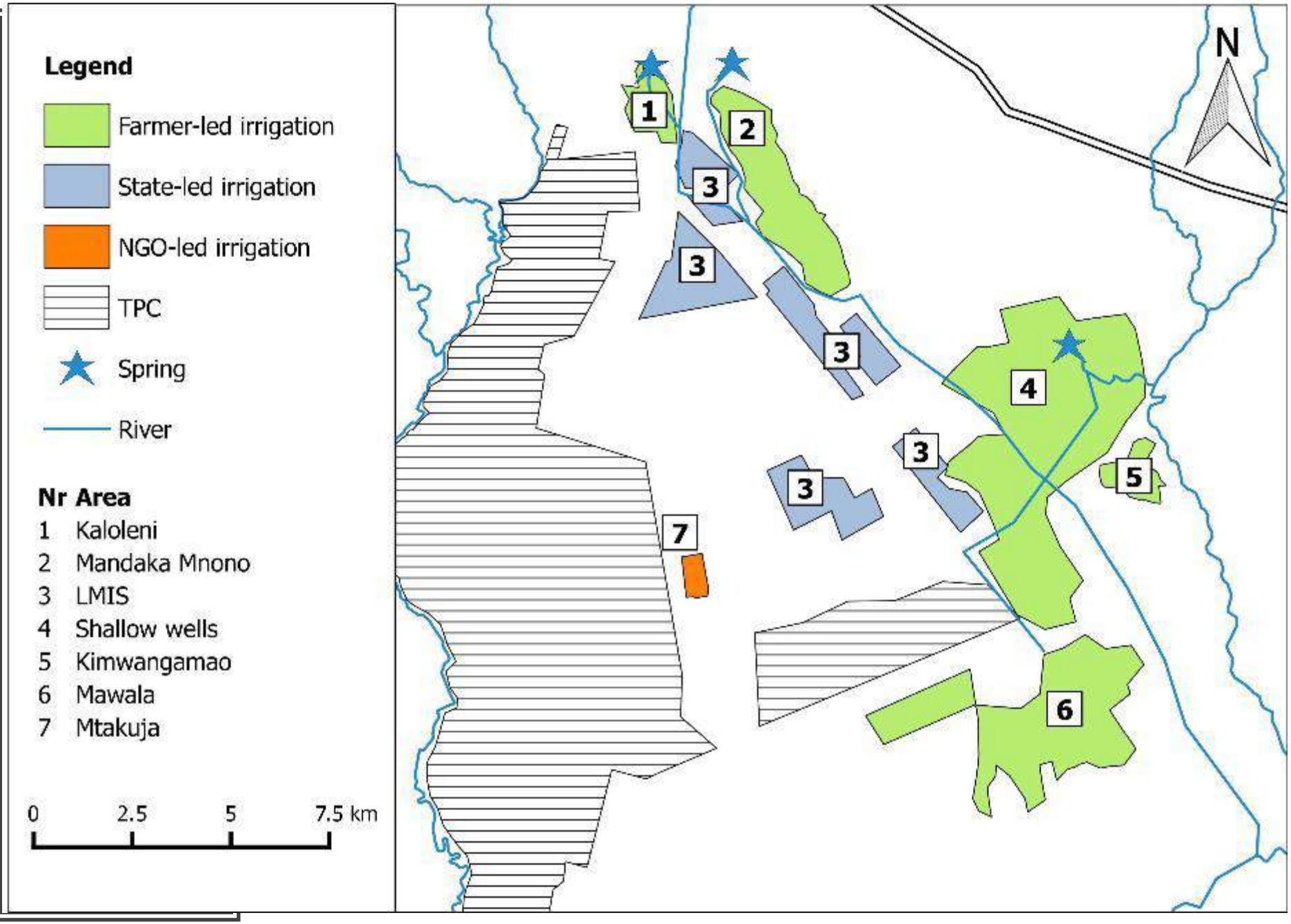


Pre-1980 Farmer-led irrigations in lower Moshi

- Settlement in the lowlands was encouraged by colonial government as a decongestion strategy for the overpopulated highlands
- By 1935, there were six irrigation canals started and maintained by farmers (> 60 years old)
- Water source: Rau river and springs
- By 1977, there were 26 traditional intakes on Rau river (de Bont 2018 cited in URT/JICA 1977)
- Most of these farmer-led irrigations were however considered '*primitive, inefficient and wasteful*', something which still persist today
- The idea that farmers water use was suboptimal led to several state-led interventions (e.g., lining of sections of canals, putting intake gates, water use permits/rights, basin authority, water users associations etc.)

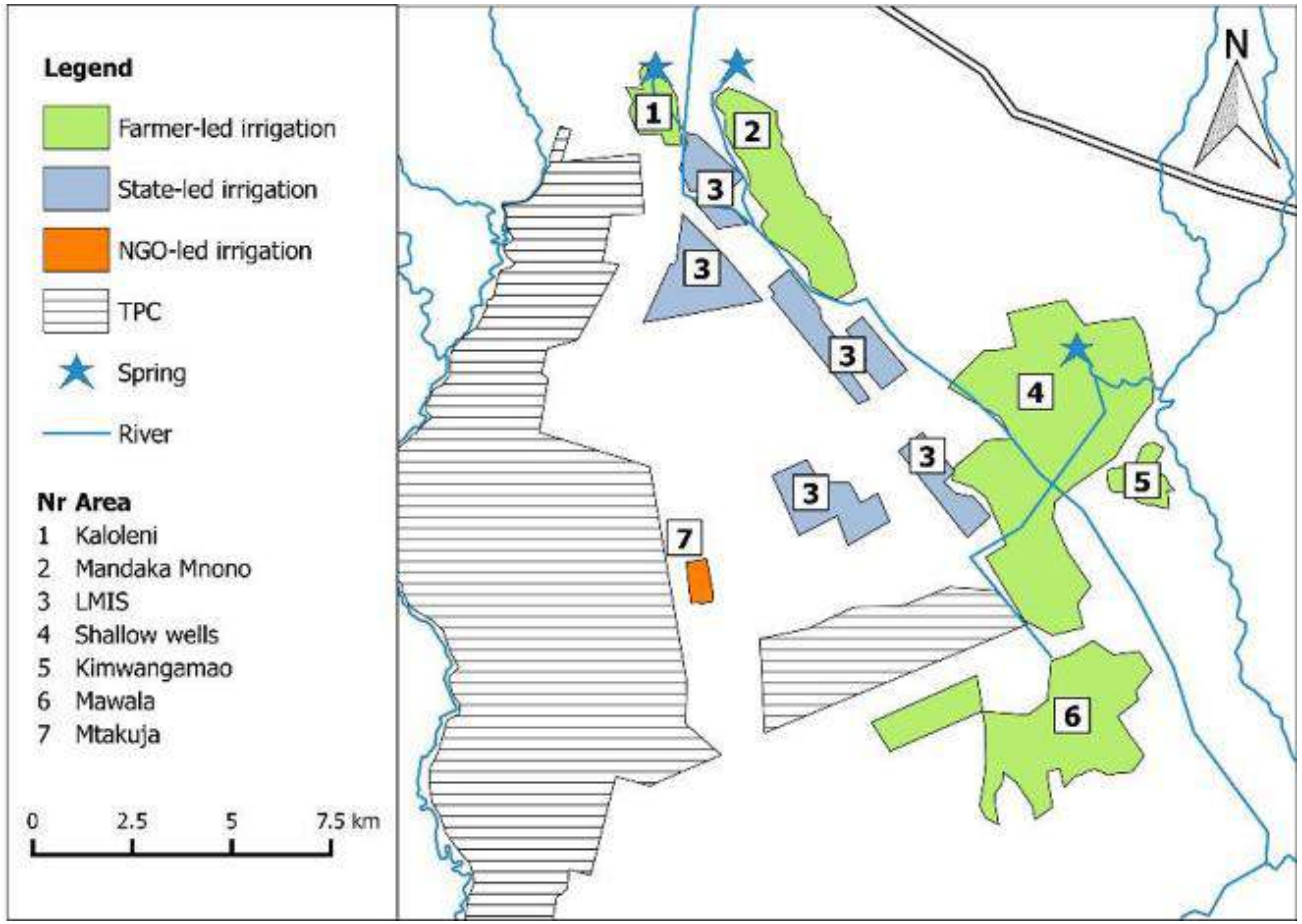
Irrigation schemes in Kahe plains

source: de Bont 2019



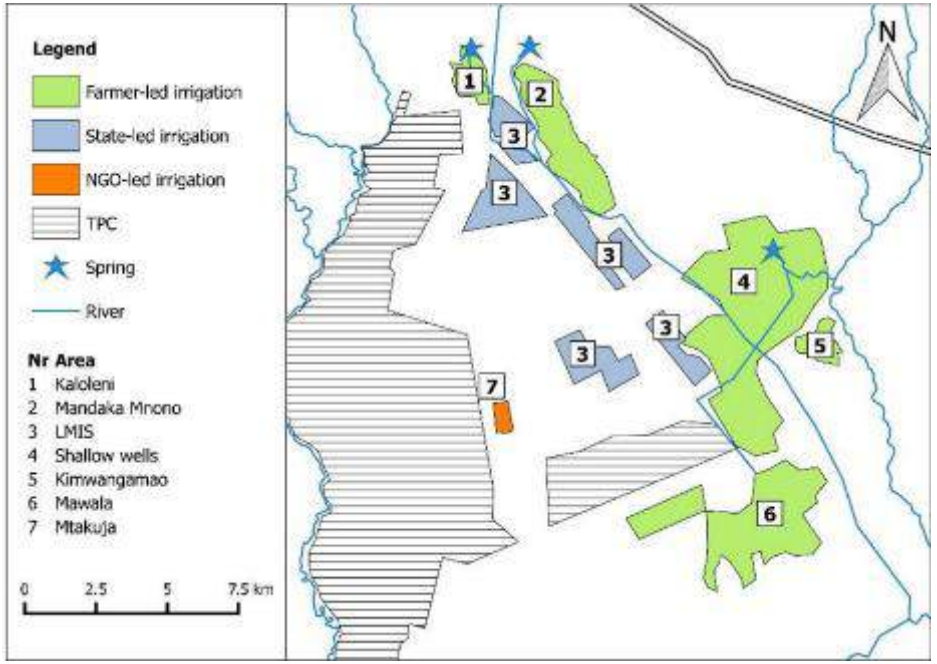
State-led Lower Moshi Irrigation System (Location **#3**)

- LMIS is a 2300 ha rice scheme constructed by JICA in the 1980s
- The irrigation infrastructure consists of high-tech diversion weirs, lined canals and control gates, and allocated water use permits
- The project promoted:
  - ✓ The use of improved rice seeds,
  - ✓ Application of fertilizer and pesticides,
  - ✓ The use of machinery for land preparation
  - ✓ Transplanting of seedlings
  - ✓ Market development to recover the investment costs



FLI: (Location **#1**) Kaloleni and (Location **#2**) Mandaka mnono

- The area was excluded from government project on irrigated rice cultivation (#3: LMIS)
- It was considered too steep (slopes: 2-5%) for rice cultivation
- However, farmers:
  - ✓Received rice farming training
  - ✓Copied the agronomic practices from #3
  - ✓Intensified their production practices
  - ✓Expanded their cropped areas

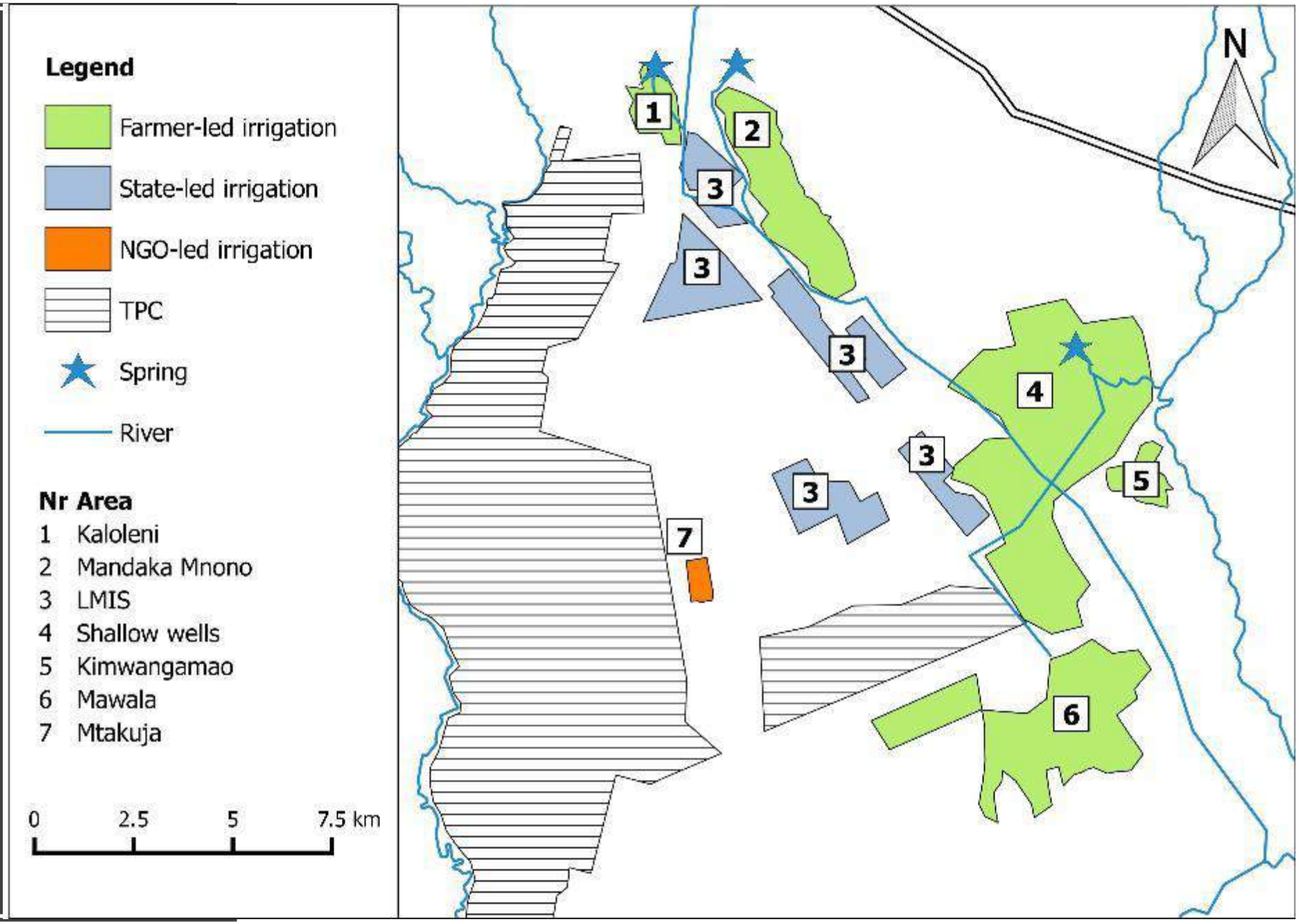


FLI: (Location **#1**) Kaloleni and (Location **#2**) Mandaka mnono

- Water use upstream led to shortages in the LMIS (#3)
- State response to FLI in location #2

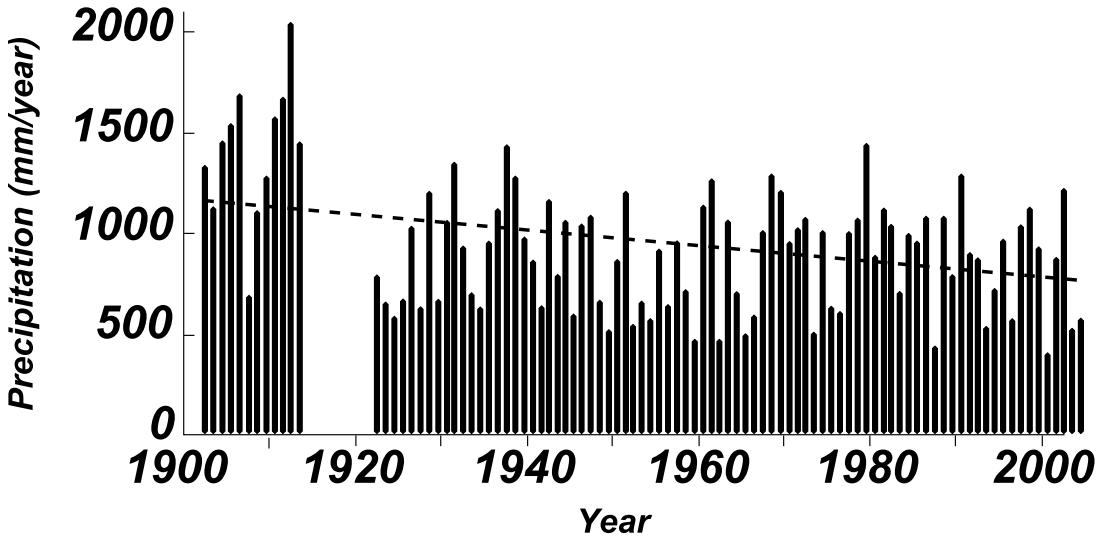
  - ✓Allocating water permit to LMIS
  - ✓Created Lower Moshi Irrigation Association (LOMIA) to bring upstream and downstream farmers together
  - ✓Funded construction of farmers intake and lining 800m section of the canal
  - ✓The assumption: more water will be released for the lower Moshi project

Location #4: Groundwater Irrigation in Kahe



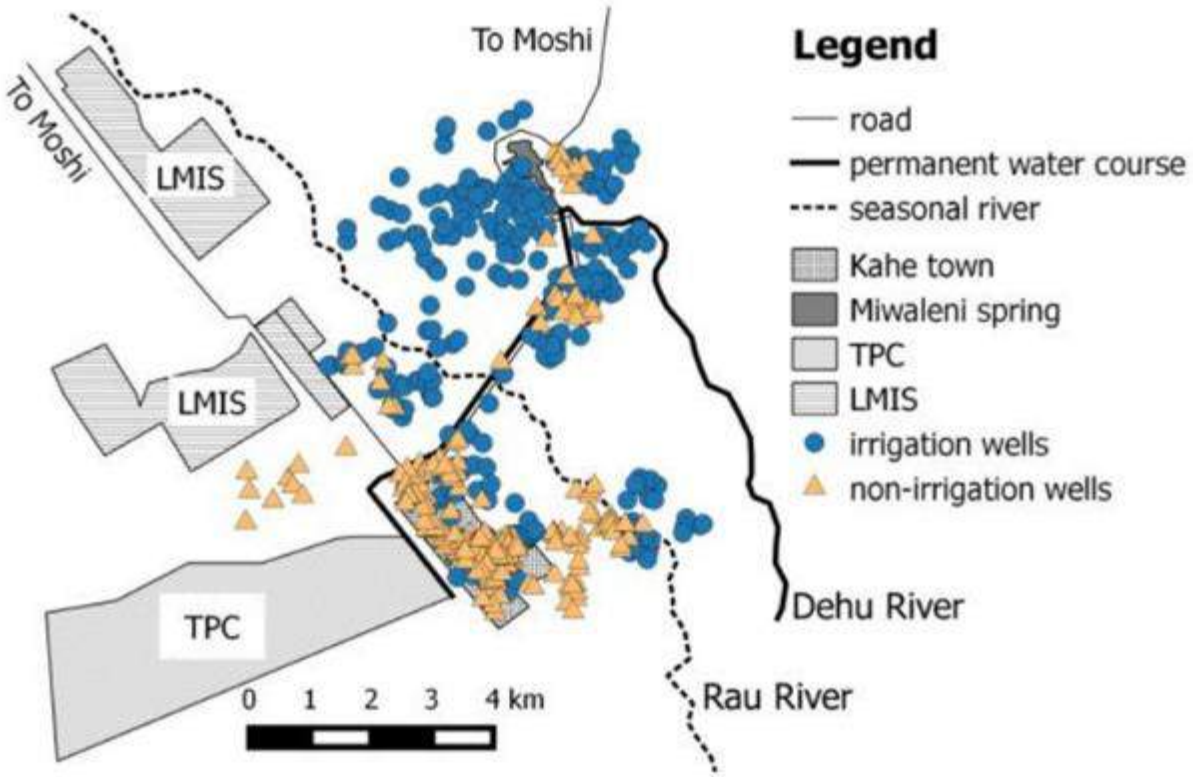
Downstream villages (location #4)

- Downstream communities who were also dependent on the same river for irrigation lost out.
- The lower section of the river water source dried up for most of the year
- Decreasing rainfall rendered rain-fed agriculture unreliable.
- Domestic shallow dug wells became attractive for irrigation
- The above coincided with arrival of cheap petrol and diesel pumps, growing markets
- The groundwater is being used to grow maize, beans, tomatoes and onions
- The development improved food security and economic activity in the area



Precipitation around Moshi has decreased by 34% (Hemp, 2009)

Several shallow groundwater wells



Led to emergence of diverse farming practices

Food only
Maize/beans, <1.2ha

Source: De Bont etal. 2018

Food plus: Maize + tomatoes/veg <1.2ha

Local commercial

Primarily tomatoes and onions >1.2ha

Source: De Bont etal. 2018

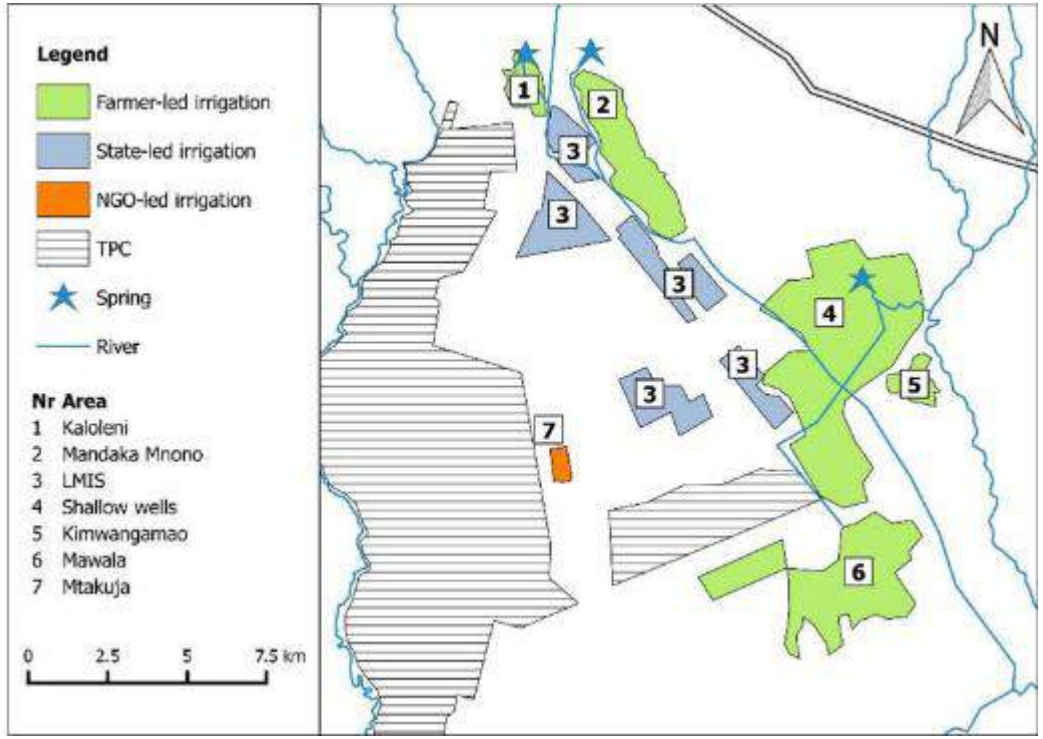
Commercial plus

Onions and tomatoes >1.2ha, rented

NGO-led irrigation (location #7)

- Located near TPC, a large-scale sugarcane producer
- Developed by FTK for improving food security in the Mtakuja and Msarikie village
- Mtakuja Development Organization (MDO) was created to manage the scheme.
- Command area 180 acres all fitted with buried pipes and sprinkler connections. But only 60 – 100 acres farmed per season
- Lottery system of farming implemented

Mtakuja irrigation scheme developed by a FTK a Netherlands NGO

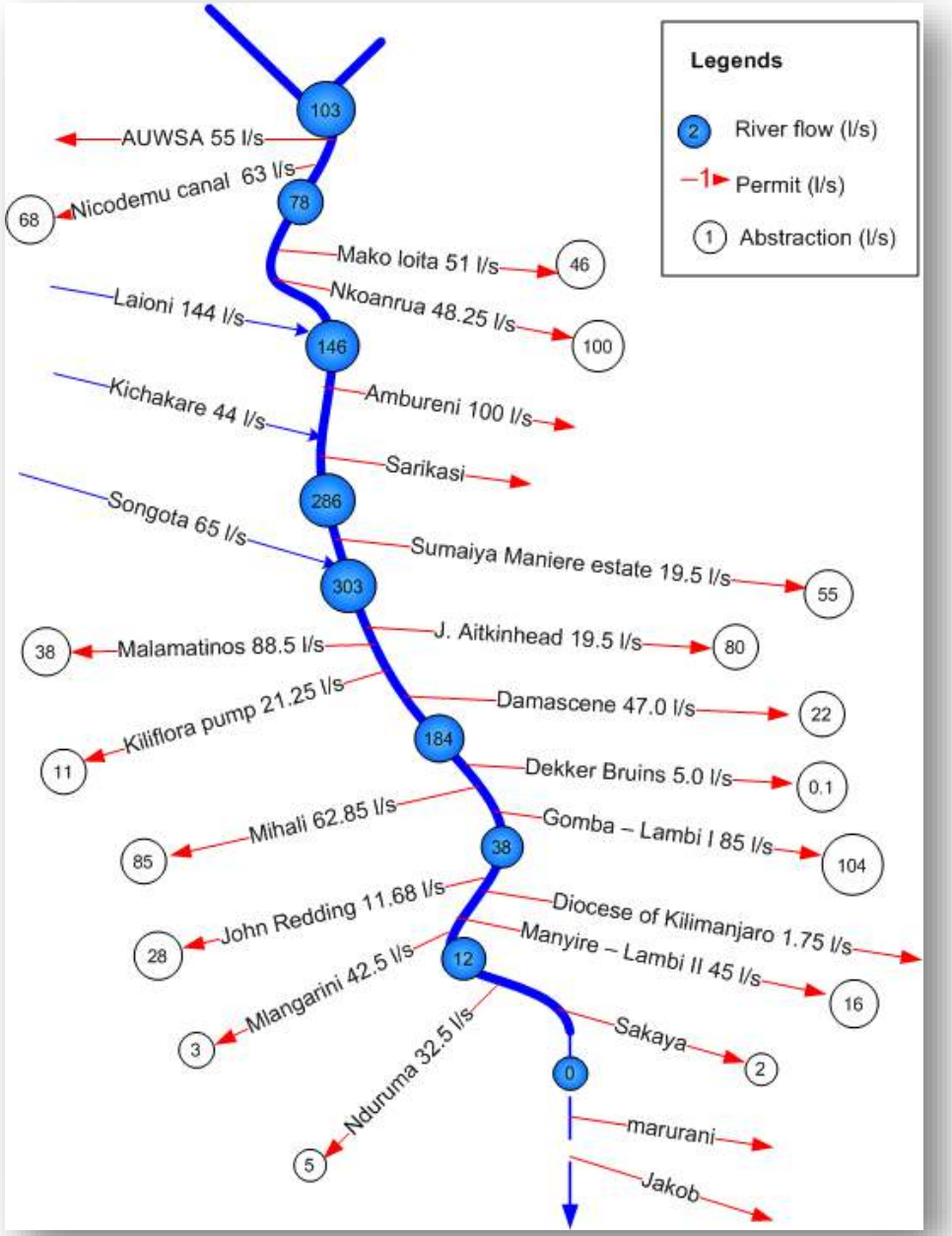


NGO-led irrigation (location #7)

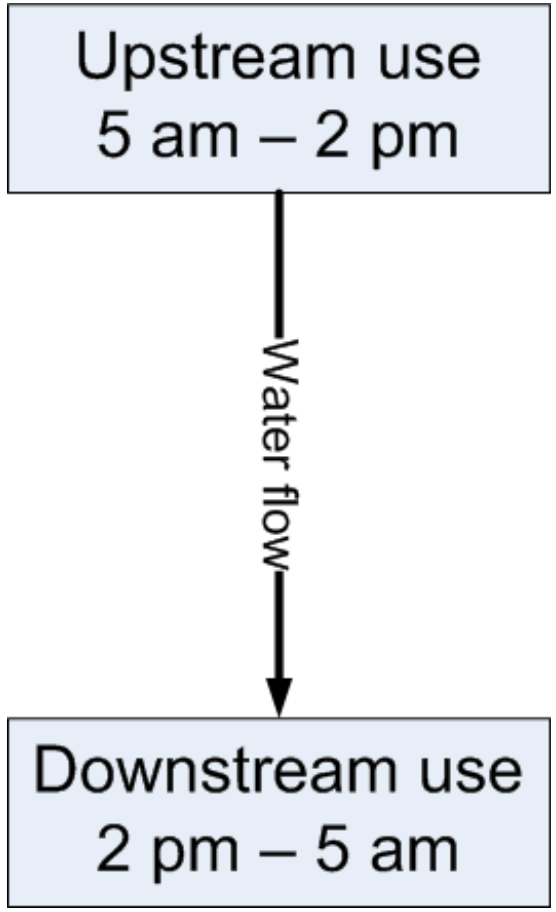
- Farmers pay per season to grow crop. TZS370,000 for Maize crops and TZS 680,000 for vegetables
- Irrigation interval is approximate every 5 days
- However, the running costs is very high. Vert high energy costs
- MDO pays 6 – 9million TZS per month (2,600 – 4,000USD) on electricity bills
- High input costs and fluctuating markets
- Some farmers want to take back their land
- Threat from new private wells emerging in the area.

Example of water sharing practices

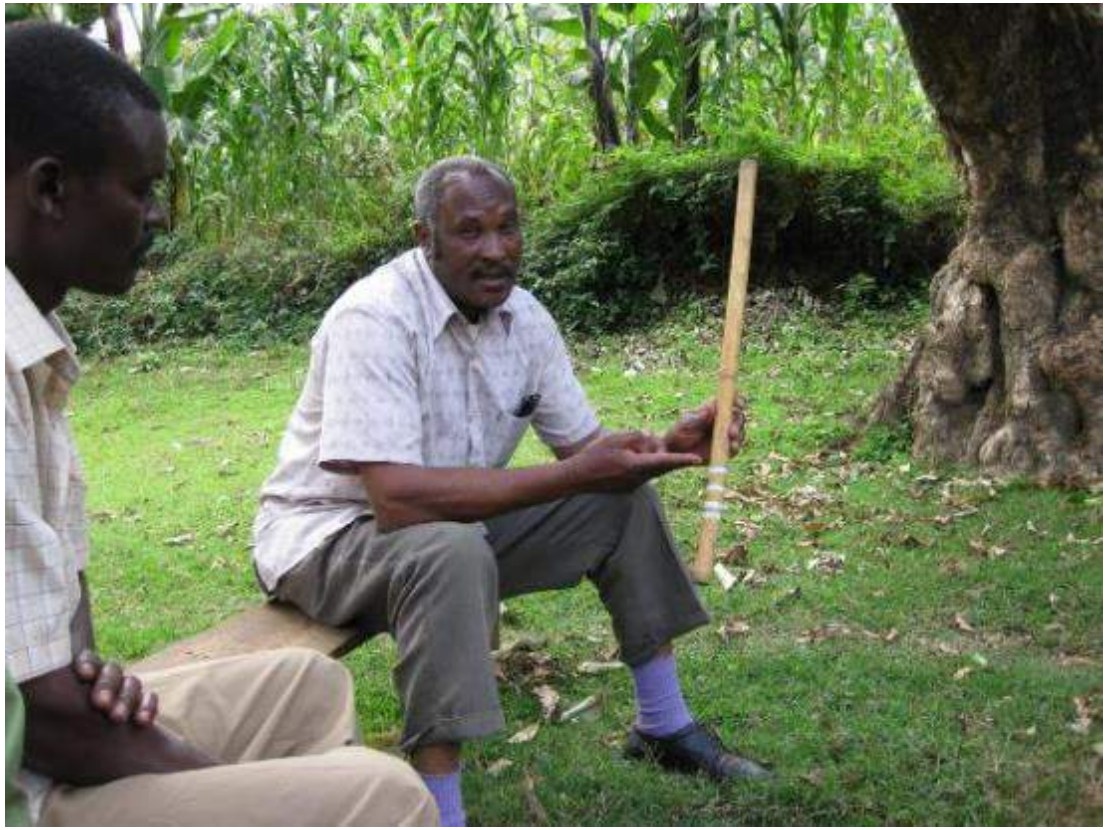
State issued water permits, at times leading to drying up. E.g., Nduruma river



Farmers use diverse allocation practices



Water level-based allocation

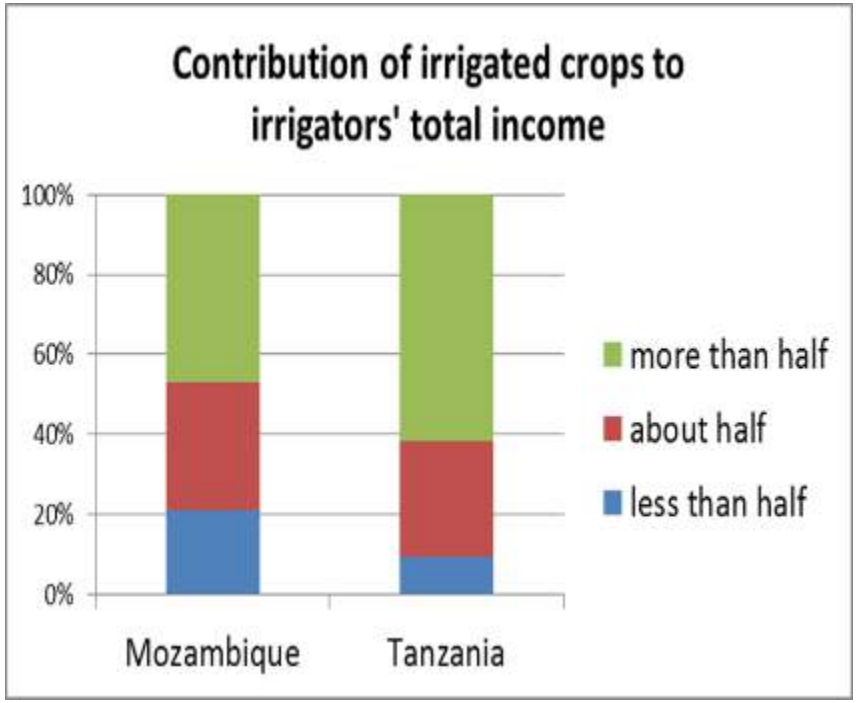


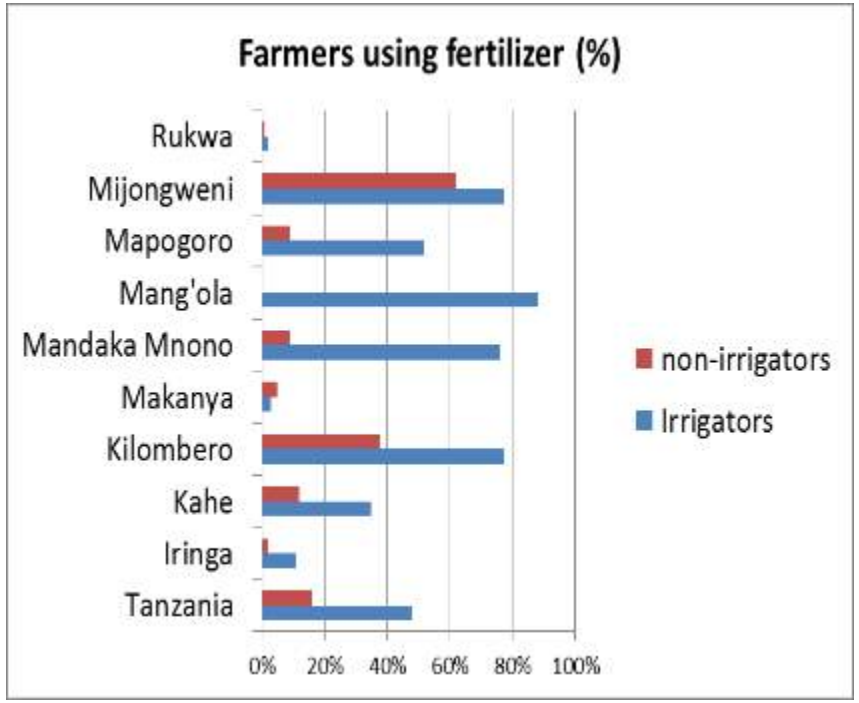
Challenges to farmer-led irrigators

Pesticides and herbicides use

Final remarks FLID

Farmer-led irrigation development is market-oriented and a principal source of income. Irrigators invest in inputs





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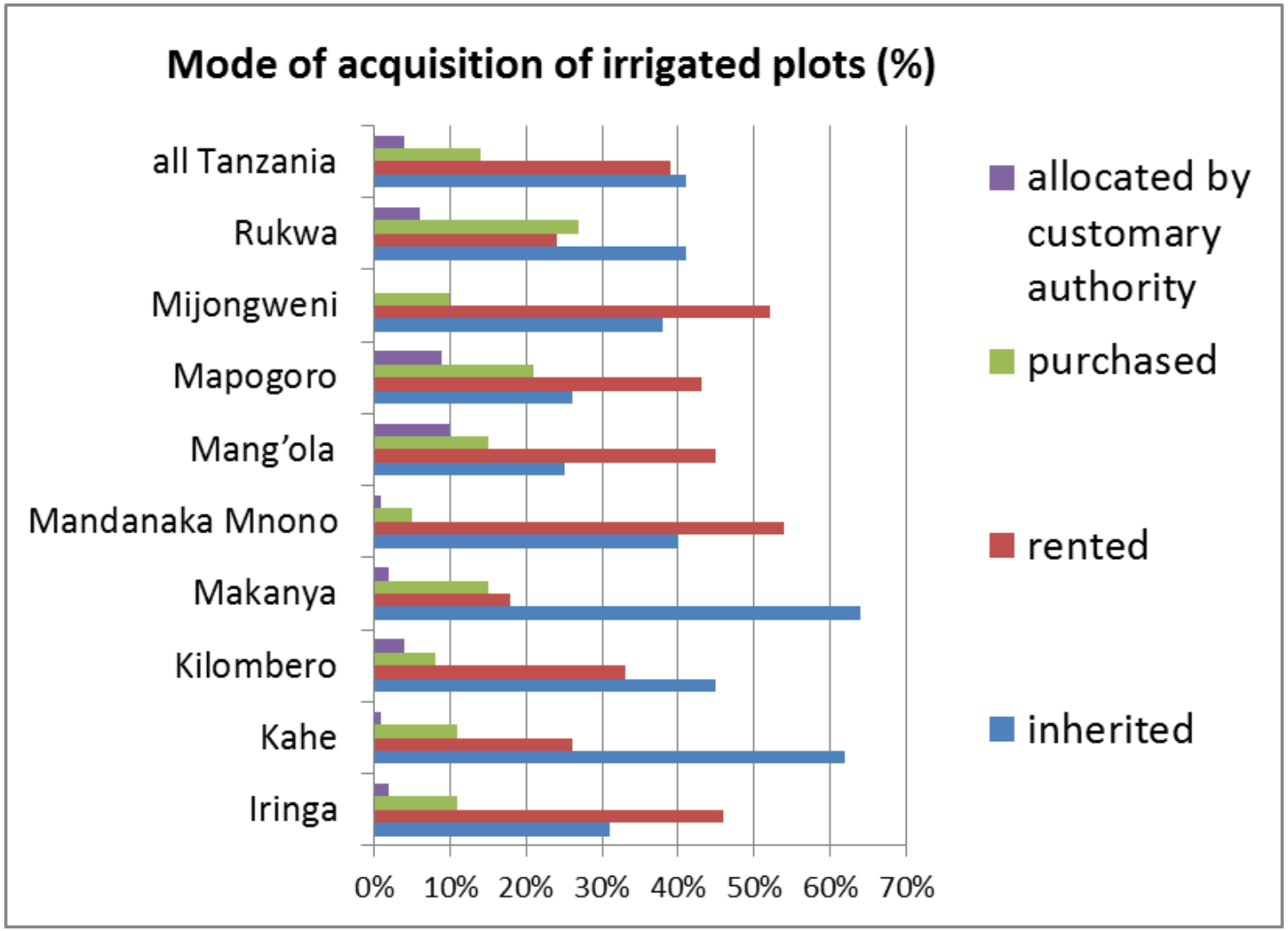
Market-based land acquisition of land for irrigation.



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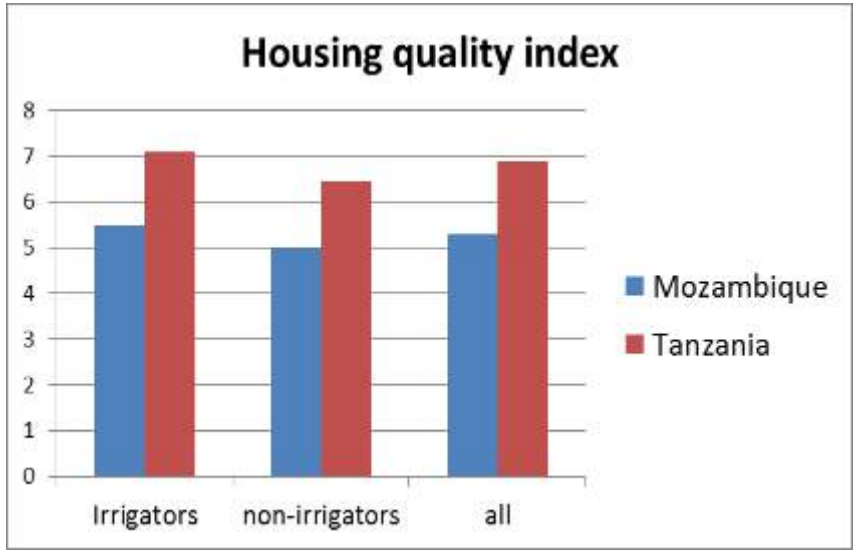
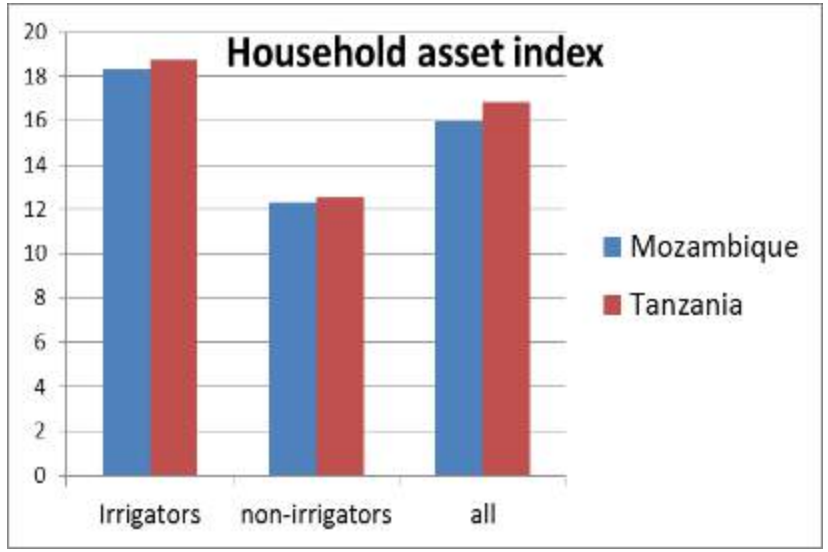
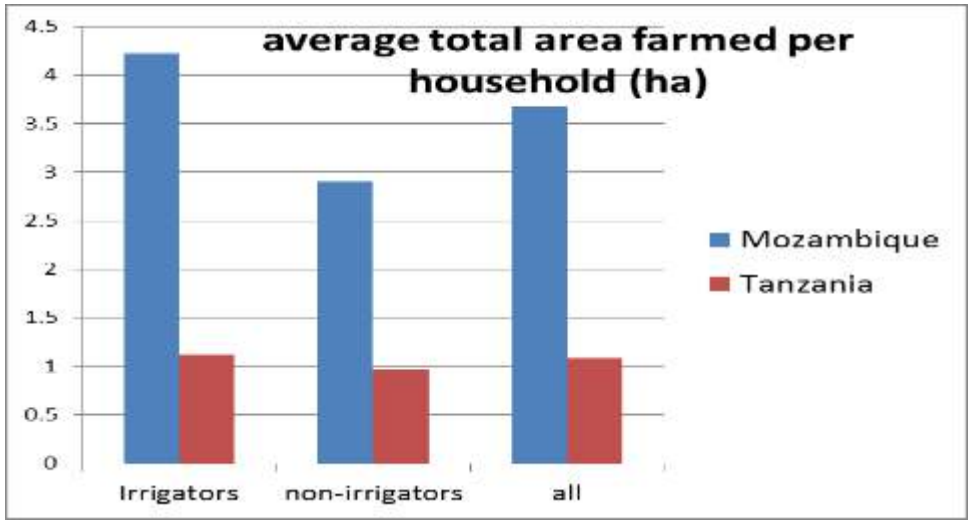
Irrigators are wealthier than non-irrigators







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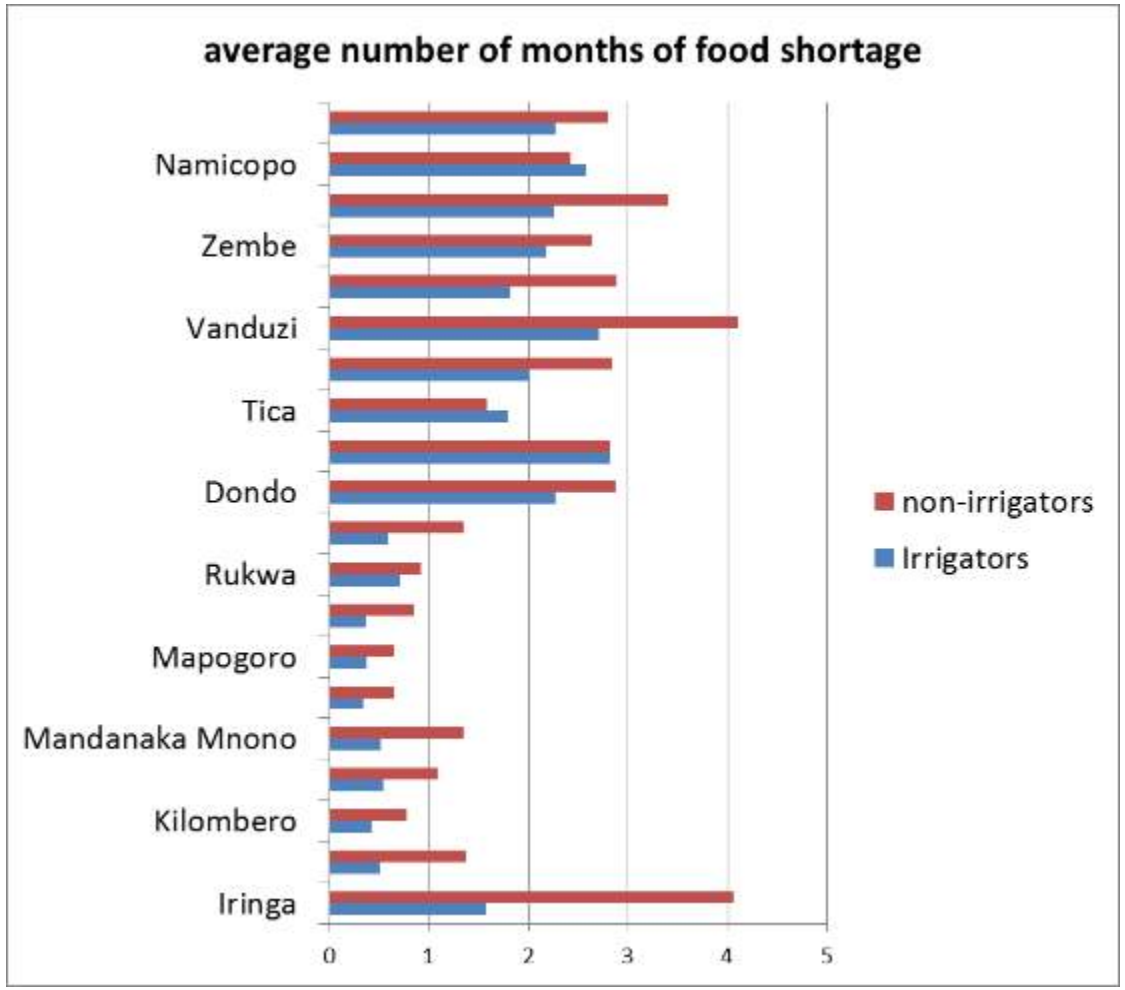
And have greater food security



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Thank you