Flood-fed Irrigation in Kenya

Improving Community Spate Irrigation
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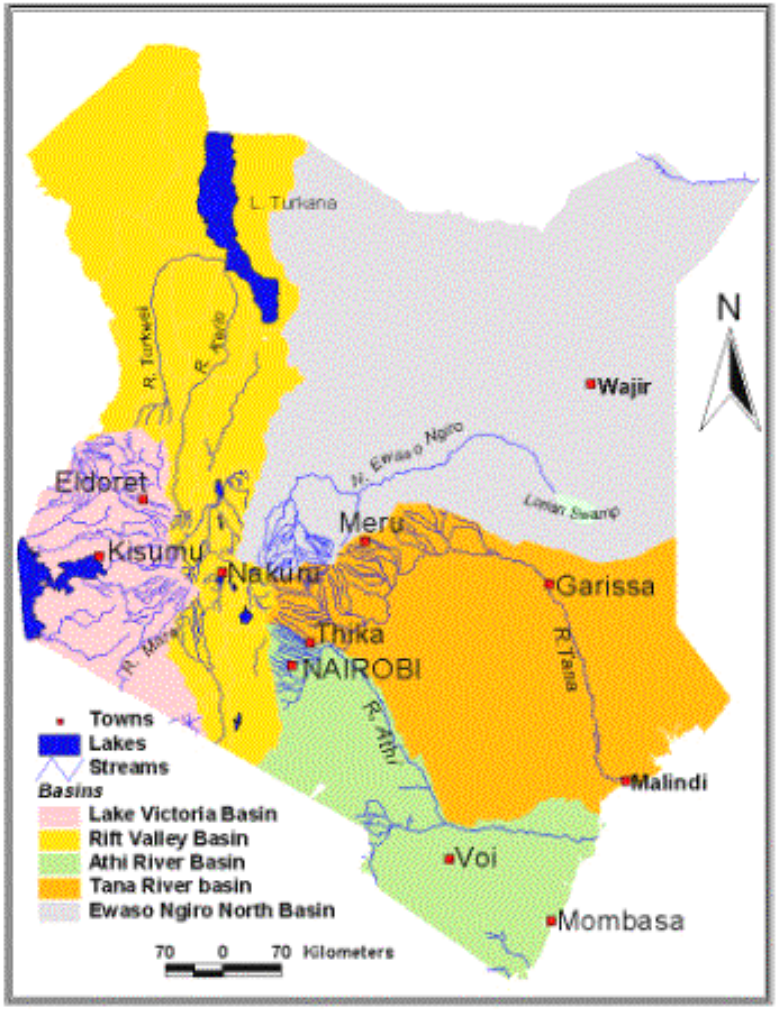
Irrigation in Kenya

- Kenya has a landmass of 582,000 Km^2 out of which only 16% of this is of medium to high potential.
- The high potential area receives over 1000mm annual rainfall and accounts for less than 20% of the agricultural land and carries about 50% (15 million) of the country's population.
- The medium potential area receives between 750mm to 1000mm per annum, occupies 35% of the agricultural land and carries 30% (9 million) of the population.
- The rest of the country (80%) is classified as Arid and Semi-Arid (ASAL) with mean annual rainfall of less than 750mm and carries about 20% of the population.

Irrigation in Kenya

- Based on matching mean flood flows and 80% dependable monthly flow with irrigation demand with no water storage the land surface potential for irrigation is estimated at 539,000 hectares.
- Approximately 110,000 hectares of the total irrigation potential has been exploited.

Water basins



Irrigation in Kenya

Basin	Potential (ha)	Developed (ha)
1. Tana	205,000	68,700
2. Athi	40,000	11,000
3. Lake Basin	200,000	10,700
4. Kerio Valley	64,000	5,400
5. Ewaso Ngi'ro	30,000	10,000
Total	**539,000**	**105,800**

Flood Irrigation

- Flood irrigation (flood recession farming) in Kenya is practiced mostly at a private level.
- For the traditional flood fed irrigation, water collecting in drainage systems flows into low lying areas; in other cases water from full flowing rivers with their origin in the highlands over flows the banks to depressions and low lying areas.
- As water dissipates due to evaporation and flow to other areas or back to the streams and farmers plant.
- Sorghum and maize are the main crops – in flood fed systems

Flood Irrigation

- Flood irrigation has been practiced for many years in North Eastern Province along the Tana, Daua, and the tail end of the Ewaso Ng'iro rivers.
- Flood fed agriculture has as well been practiced for many years by the Marakwet in Northern Rift Valley.
- In these traditional systems the communities would utilize the naturally occurring depressions along the flood basins of the rivers.

Flood Irrigation

- The Government of Kenya aims to focus on:
  - Accelerating the construction of irrigation and drainage infrastructure.
  - Increasing productivity per unit area.
  - Increasing water harvesting and storage.
  - Improving water management, irrigation efficiency and sustainability.

Flood Irrigation

- Enhanced flood water harvesting and storage will improve flood fed irrigation systems.
- In recent past many individual farmers either on their own or through support of donors have excavated on farm water storage pans to store run-off.
- Water storage system such as subsurface dams and sand dams that limit evaporation have become acceptable and have been replicated in most areas with sand river beds with ephemeral flow.

Flood Irrigation

- Large off-stream reservoirs have been built to hold run-off that can later be used for crop production as well as irrigated crop production.

A 120,000 m^3 water reservoir developed for a 45 acre drip irrigation farm

Reservoir intake built of gabions

Large debris screen

River bank stabilisation using gabions

Potential for Spate Irrigation

- The country has high rainfall in the highland zones and a good network of rivers.

- During rain seasons lower reaches on some of the drainage systems experience flooding that interrupts normal agricultural activities as well as other livelihood activities. This is the case in Lake basin, lower reaches of Tana and Athi basins

Potential for Spate Irrigation

- Budalangi Floods - 2007

Beramo Lagga – Buna Division

Potential for Spate Irrigation

- During the state opening of the 10th Parliament the President of Kenya committed that the Government will table the National Water Harvesting and Storage Policy to facilitate harnessing and storage of the recurrent floodwaters.

Potential for Spate Irrigation

- Dependable stream flow, run-off, flood water harvesting and spate irrigation practices combined with effective exploitation of ground water resources and innovative management of trans-boundary water resources could allow increasing of the irrigation potential for Kenya to well beyond the 1.3 million ha envisaged when only 80% dependable flow (537,000 ha) and water harvesting and storage (800,000 ha) are taken into account.

Water diversion Structures

- For the traditional flood fed irrigation systems no improvements would be made to the intake or the point through which water would enter in to the cultivated depressions.
- Water is diverted to these depressions via naturally occurring low laying sections on the river banks, natural channels would direct the flood waters to the depression when such was far from the stream.
- Where improvements were necessary i.e. to slow water flow along the stream, stones, logs and branches would be used and these would force flow through the breached bank or a naturally lower section of the bank.

Organizational Structure

- Kenya's irrigation sector can be put into three organizational categories namely
- **Smallholder schemes**; these are irrigation schemes owned, developed and managed by communities as irrigation water user groups or individual farmers. There are 2,500 such irrigation schemes covering an area of 47,000 hectares, a figure that accounts for 46 percent of the total area under irrigation.
- **Public schemes**: these are irrigation schemes developed and managed by public agencies, specifically NIB and Regional Development Authorities (RDAs). Ninety percent of Kenya's rice is produced on NIB schemes.
- **Private schemes**: These are commercial high tech schemes mainly irrigating high value crops for export market. These schemes employ a workforce of about 70,000 persons.

Maintenance of Flood/Spate Systems

- Water harvested for domestic and livestock use on communal basis and stored in medium and small scale earth pans have traditional rules that ensure maintenance of reservoir based on animals watered or water drawn from the pan, this is mainly so in the North Eastern Province.

Recommendations

- Targeted studies to document traditional spate irrigation systems (mainly flood recession cropping)
- Targeted studies to document flood related irrigation systems including flood water harvesting and storage extents and areas under controlled irrigation mainly from flood water storage
- Mapping of water harvesting structures especially surface storage based on satellite imagery