

Best-bet options in soil and water Management

Bugesera and kibungo

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Challenges

Low productivity of land in turn caused by constraints related to:

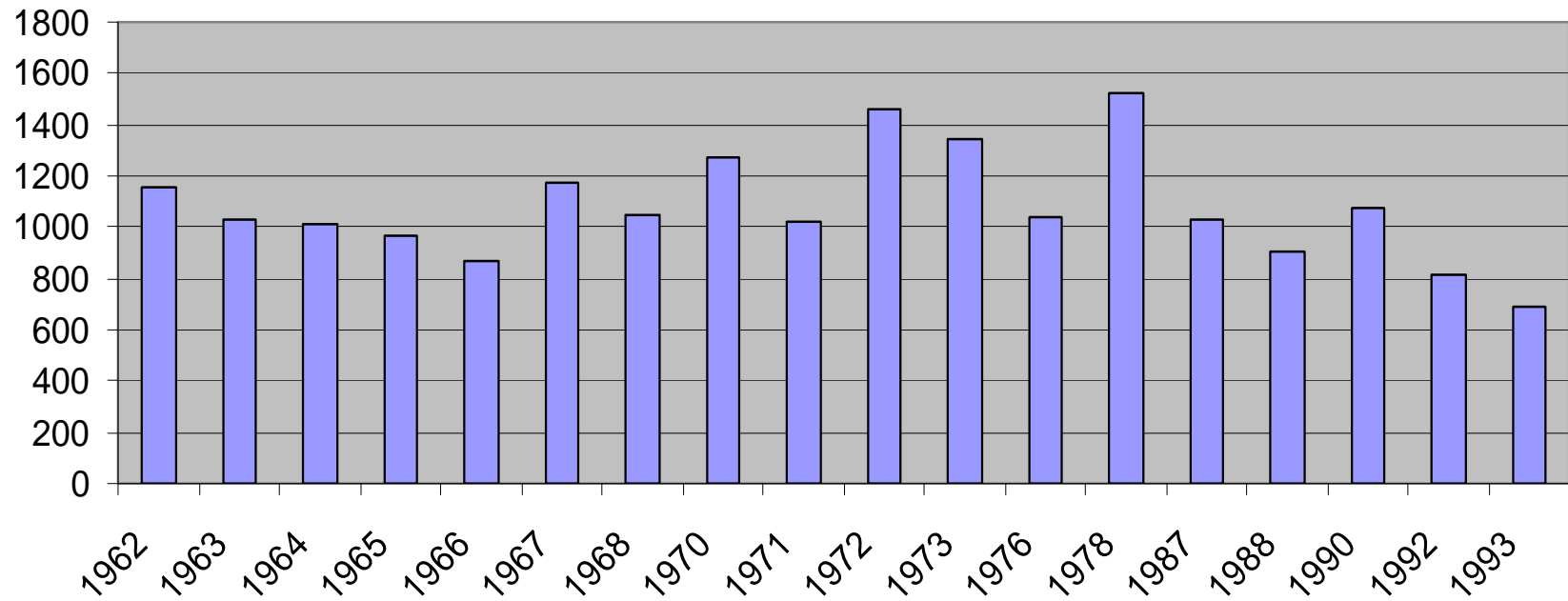
- **Insufficient soil moisture in root zone due to**

Erratic rainfall, recurrent drought periods (climate variability), poor distribution of rains within the crop growing period and).

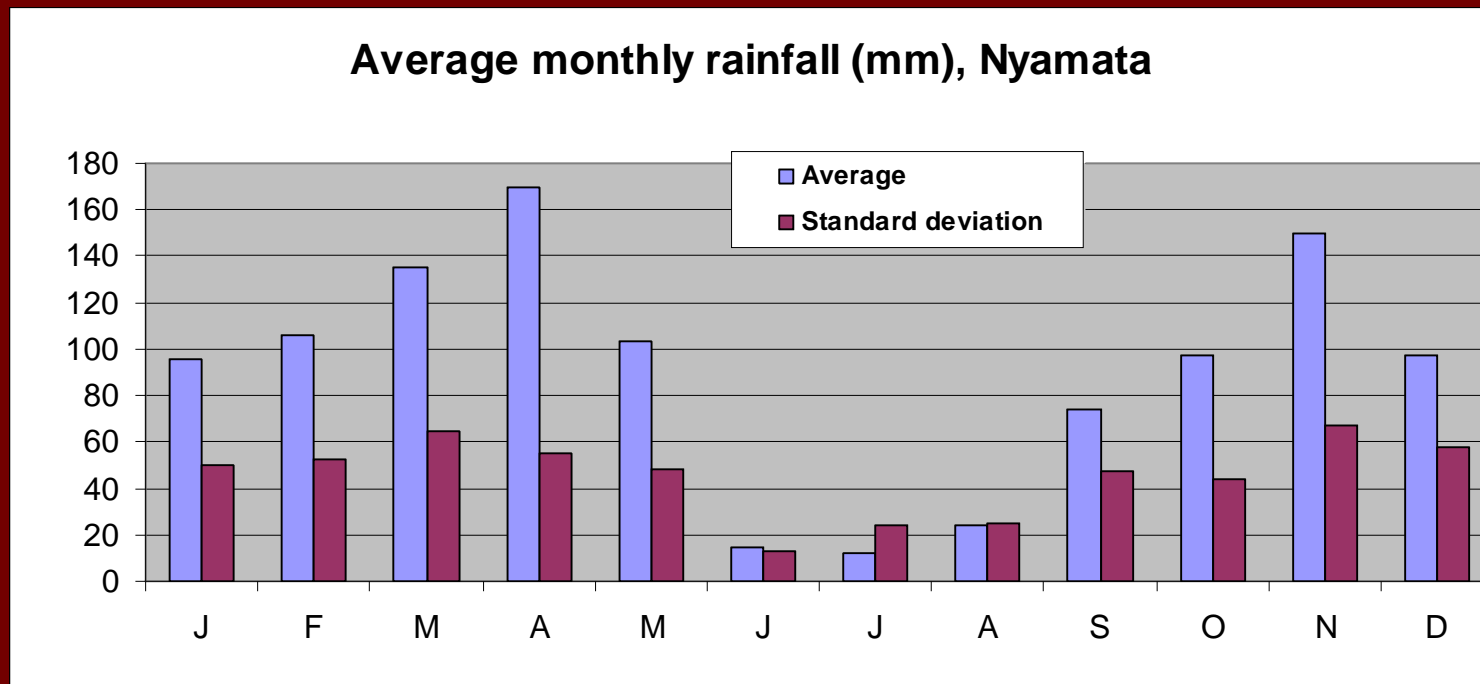
Inadequate infrastructures (no irrigation schemes for artificial water supply to supplement rainfalls

Water scarcity ?

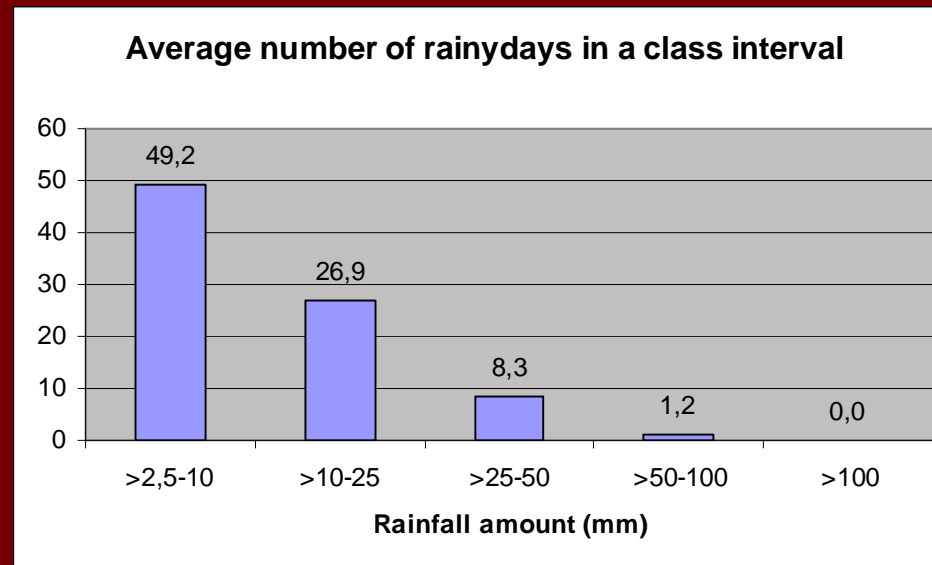
Annual rainfall (mm), Nyamata

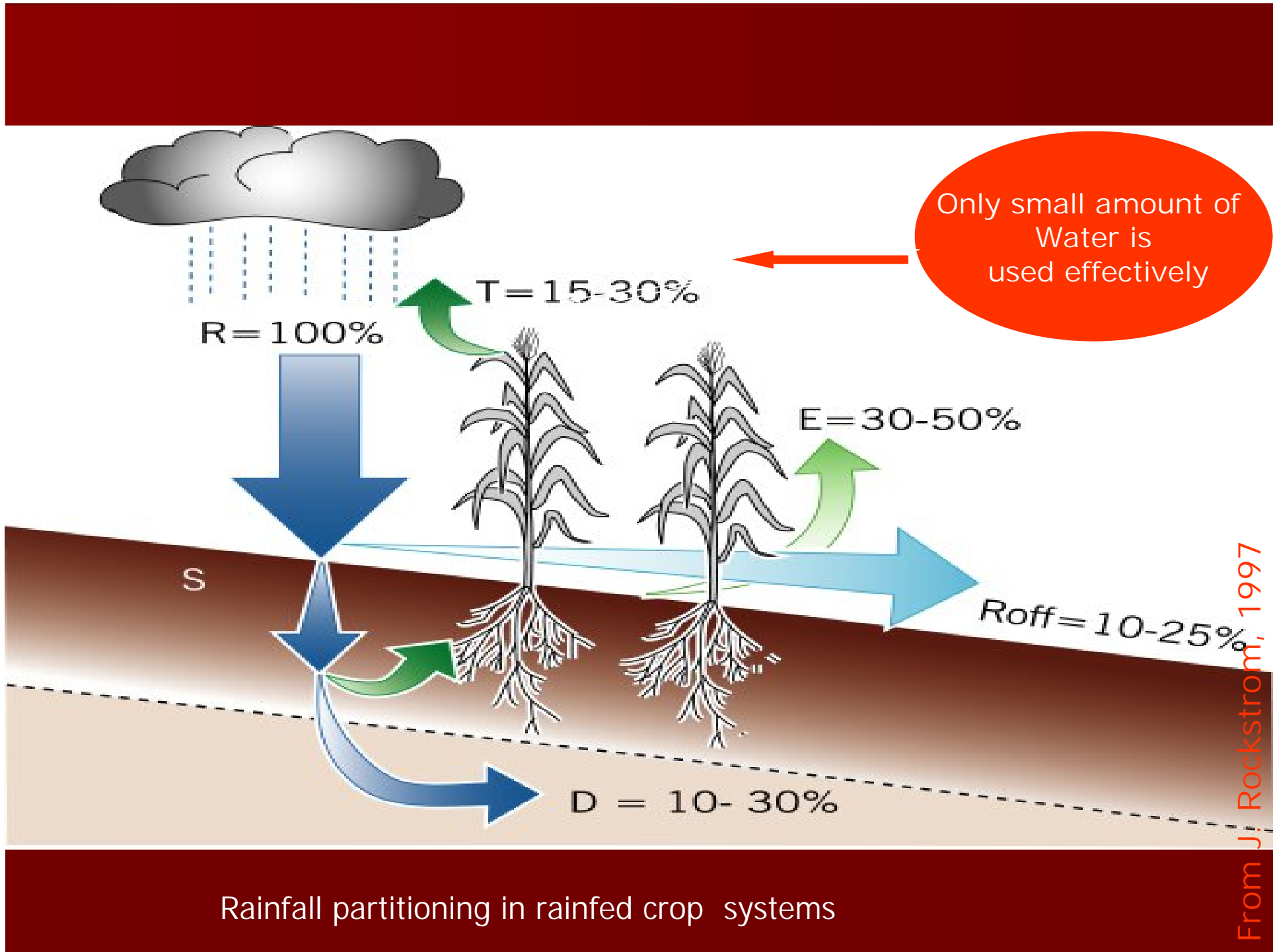


RAINFALL DISTRIBUTION IN BUGESERA



RAINDAYS IN NYAMATA





Participatory diagnostic process
Priority of SWM in semi arid region
Bio-physical characterization for

Low productivity of land con'd

- Land degradation and low soil fertility

Over exploitation without soil amendments (imbalance between fertilizers/manures inflow and out flow), and without proper crop rotation and fallowing has depleted the soil.

Low N, P in general

Removal of natural vegetation, over grazing, cutting of trees have accelerated erosion of these unstable soils resulting in siltation that affect negatively the fertile valley bottoms and water bodies.

Low productivity of land con'd

- Poor cultural practices

Advised agronomic practices that reduce soil erosion such as contour cultivation, strip cropping, Intercropping, optimal crop density, plants spacing etc.. are not well practiced by traditional producers.

Low productivity of land con'd

- Poor genetic stock

Lack of high yielding, early maturing, and drought resistance materials .

- Losses due to pests and diseases

Best-bet options and research priorities

Rain water management

- Rainwater may be harvested from intermittent or ephemeral water courses(runoff). Instead of leaving runoff to cause erosion, it is harnessed, stored and utilized. In the semi-arid and drought-prone areas, water harvesting enhances yields and reliability of production while also conserving the soil.

- Management of rain water (600mm-800m annual rainfall)

... retaining water upstream is easier and protects the land better



It is **Child's play** in the highlands with sheet flow in small channels



Then muscles are needed once water is in gullies



In trouble once large gullies and streams fill with water

Nov. 2005

SWMnet and SEI

Rain water management con'd

- In many parts of the world, rainwater harvesting provides a source of water for household use, for agriculture and livestock production
- it provides full or supplemental irrigation, environmental conservation and prevention of flood damage.
- Water harvesting on croplands may be achieved through micro-catchment or macro-catchment systems or through floodwater

Rain water harvesting, storage and use for agricultural production



Roof water harvesting (Mayange)



Vegetable production
in Murama watershed

Farm pond (runoff water
harvesting)in Murama

Runoff water harvesting techniques

Bunding

Farm pond in Murama watershed

Half moon RWH structure in
Mayange millennium village

Ridges and furrows

Half moon RWH structure (nagarim)

Moisture conservation through Mulching and crop residue management

Water erosion control through

- Low cost check dams
- Terraces
- Contour bunds
- Contour trenches
- Diversion channels

SOIL FERTILITY MANAGEMENT

- Use organic and inorganic input
- Use FYM (especially farmers who have the livestock)
- Use micro-dose of inorganic fertilizers
- Improved composting (technologies exist)

Varietal improvement through

- Breeding and selection

Recurrent dry spells and erratic rainfall which is non uniformly distributed on the crop growing period made it urgent to develop early maturing and drought resistant varieties

Varieties tolerant to low soil fertility

- Diseases and pests management

Improvement of cultural practices

- Emphasise should be given to Cultural practices such as conservation tillage, and other agronomic measures to control soil erosion
- To allow the soil to recover its fertility status , managements like fallowing, crop rotation, green manuring (Tithonia, Lantana) and ammendements should be taken care of.

Conclusion

Soil, water

- Improve and adapt manure management techniques;
- Studies on improved fallows, crop rotations and intercropping;
- Improve and adapt techniques of soil moisture and rain water management
- Introduce and evaluate various methods of composting, mulching and crop residue;
- Try the use of microdose of inorganic fertilizer
- Studies on biological and physical soil erosion control techniques;
- Participatory development and characterization of diverse genetic sources of various drought and early maturing varieties