

System of Rice Intensification (SRI): Towards Improving Rice Production and Saving Water in Africa

By:

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Importance of rice to Africa

- ▶ Rice is grown in 40 African countries
- ▶ Over 35 million smallholder rice farmers are engaged in rice production
- ▶ The continent doesn't produce enough rice for consumption
- ▶ Africa imports 32% of world rice, about 15 million tons/year
- ▶ Demand for rice is growing at over 6% per year
- ▶ Rice consumption in sub-Saharan Africa is set to overtake other staples (maize, cassava, sorghum and other cereals)
- ▶ Need to improve the productivity of rice at farm levels
(there is potential to achieve 15 tons/ha of rice)



Map source: <https://news.africa-business.com/post/india-china-poised-to-capture-the-market-for-rice-in-africa>

But productivity of rice is low in Africa

- ❖ The average rice yields in Africa are low, about 0.49 to 4.43 t/ha, depending on management
- ❖ Rice production endures poor agronomic practices with low inputs, pests & diseases
- ❖ Continuously flooded paddies which use too much water (3,000-5,000 litres/kg of rice)
- ❖ Flooded paddies become habitats for water-borne disease vectors,
- ❖ They pose health, ergonomic and environmental constraints.
- ❖ Yet flooded paddies do not achieve optimum rice productivity – *calling for a change of practices*



Introducing the System of Rice Intensification (SRI)

SRI is a package of practices especially developed to improve the productivity of rice grown in paddies

Some seven components distinguish SRI from conventional flooded paddy practice:

1. Transplant **younger seedlings**; i.e. at 10 to 14 days old, *(rather than 3-4 weeks old)*
2. Raising the seedlings in **un-flooded nurseries**, preferably with organic matter
3. Transplant seedlings in lines, at **wider spacings** (at least 20x20 cm);
4. Transplanting **only one seedling** per hill *(not clumps of seedlings)*;
5. Alternate **wetting and drying** of the paddy field *(do not continuously flood the soil)* to ensure aerating of the root zone,
6. **Weed control** preferably using a **mechanical/ rotary weeder**; and
7. *Use of organic manures/ fertilization.*

Conventional paddy vs SRI practice: Nursery and at transplanting



Conventional flooded nursery

SRI
requires
less seed



SRI dry nursery, and 8-day old seedling



Transplanting conventional rice seedlings

Transplanting
only one
seedling



Transplanting SRI young seedling

Conventional paddy vs SRI: Field agronomic management



Conventional fully flooded paddy



SRI wetting & drying paddy field



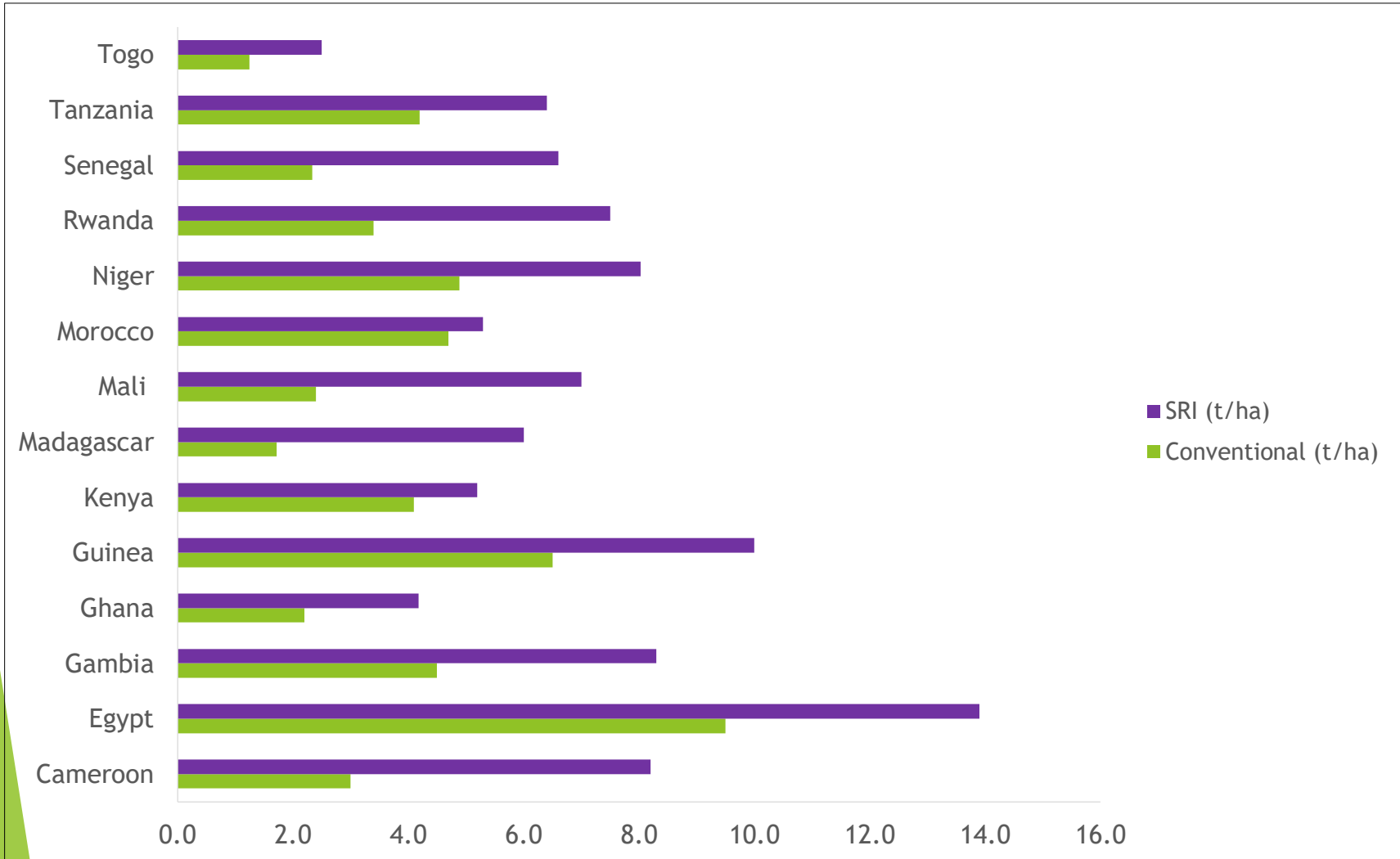
Women manually weed a conventional flooded paddy



Weeding SRI paddy with rotary weeder

SRI increases yields

Rice yields under SRI vs conventional practice in selected African countries



On average, SRI yields attains 7.1 t/ha, while conventional flooded paddies at 3.9 t/ha

SRI-grown rice has better grain quality

Properties	SRI	Conventional	SRI Advantage
Head rice (%)	90	81	+9
White rice (Kgs)	631	594	+37
Recovery (%)	63	59	+4
Broken (Kgs)	37	56	-19
Chicken feed (Kgs)	4.4	5.5	-1.1
Bran/dust (Kgs)	79	101	-22
Colour sorter (Kgs)	1.5	1.9	-0.4

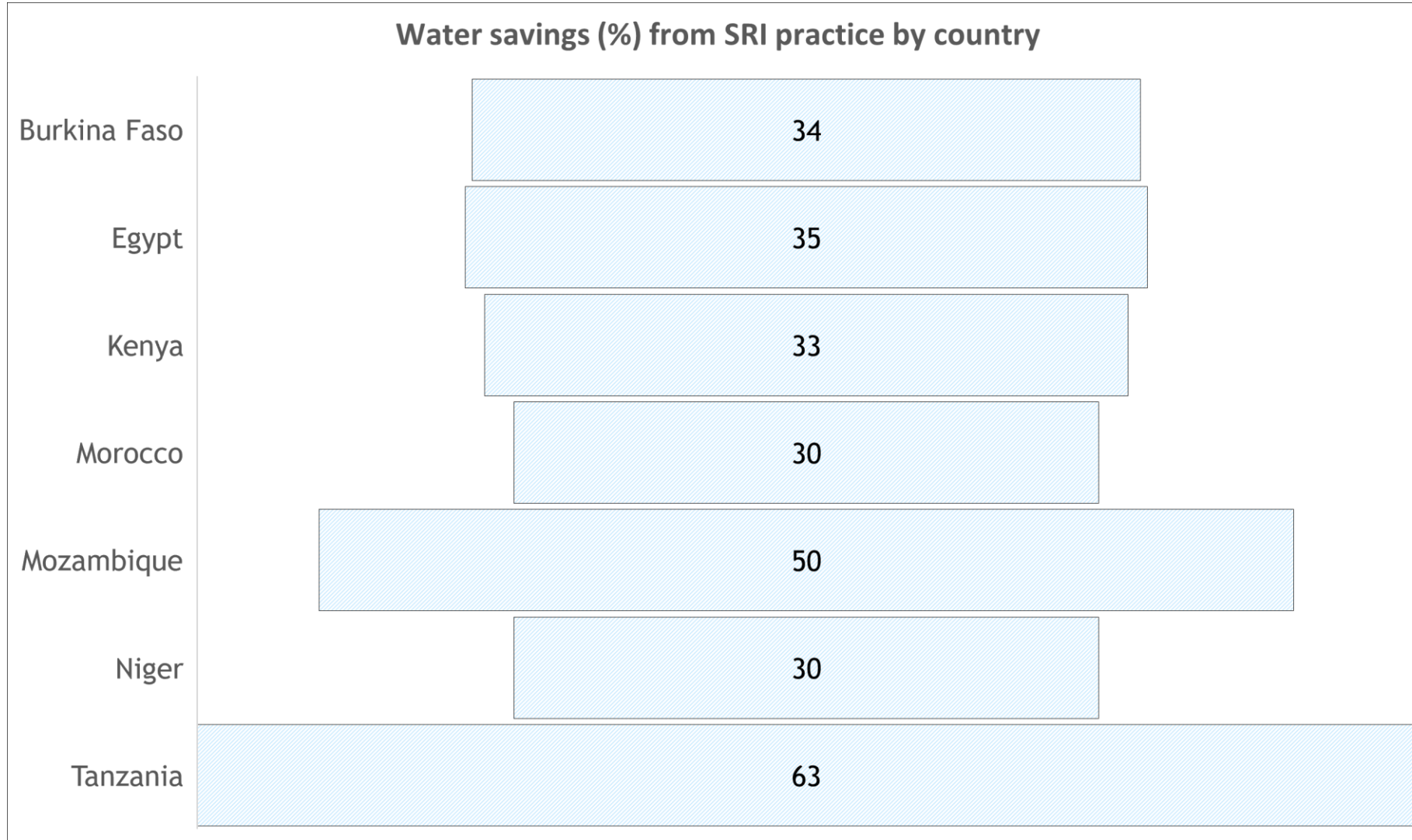
Source: Mati et al, 2021: <http://ojs.jkuat.ac.ke/index.php/JAGST/article/view/178/179>

Note: SRI has superior milling qualities in all the categories

This is because the SRI grown rice has a harder grain, thus less breakage during milling,

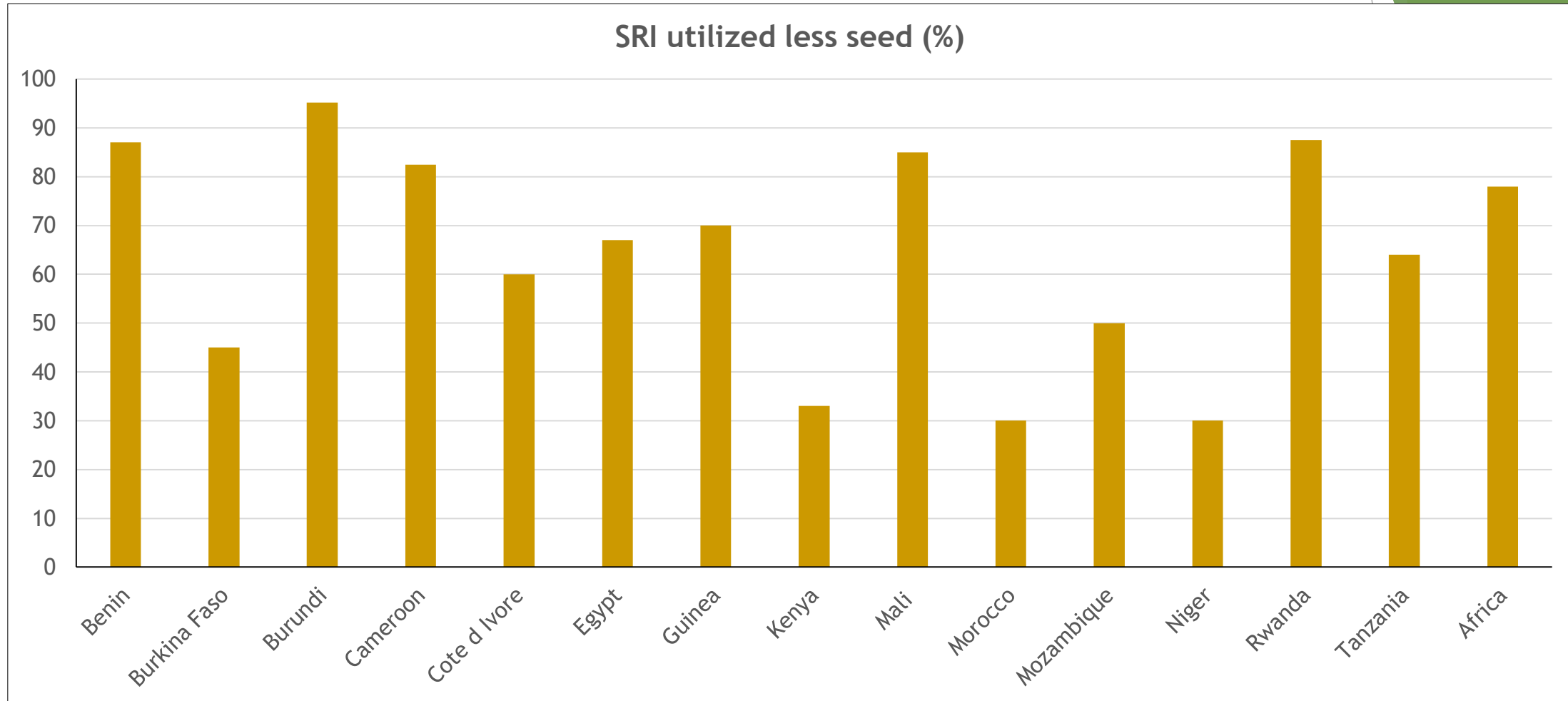


Water savings from SRI practice in selected African countries



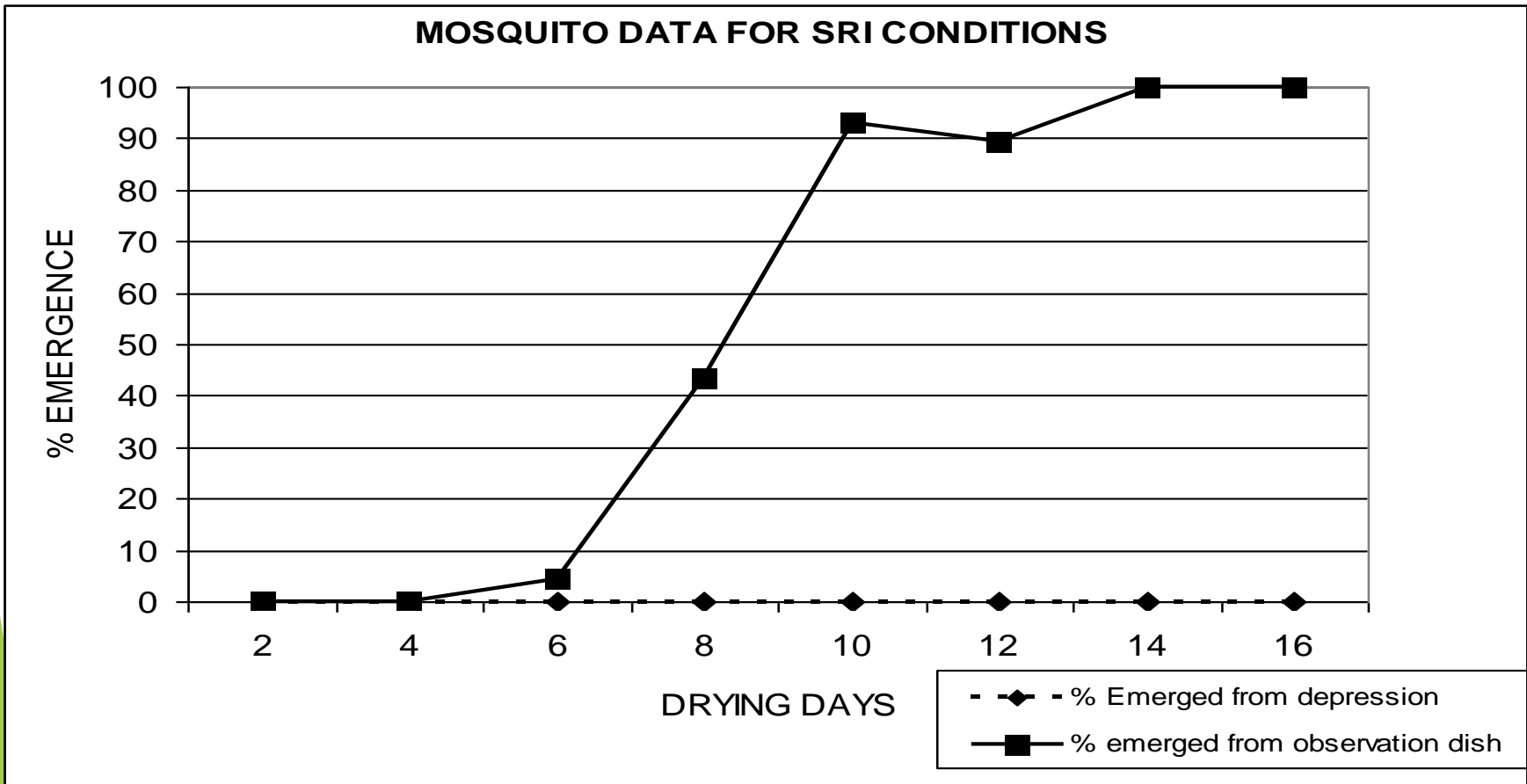
Drying paddies for between 4 -12 days under SRI saves water by 27% - 42% and increases rice yields

SRI utilizes less seed: Examples from selected African countries

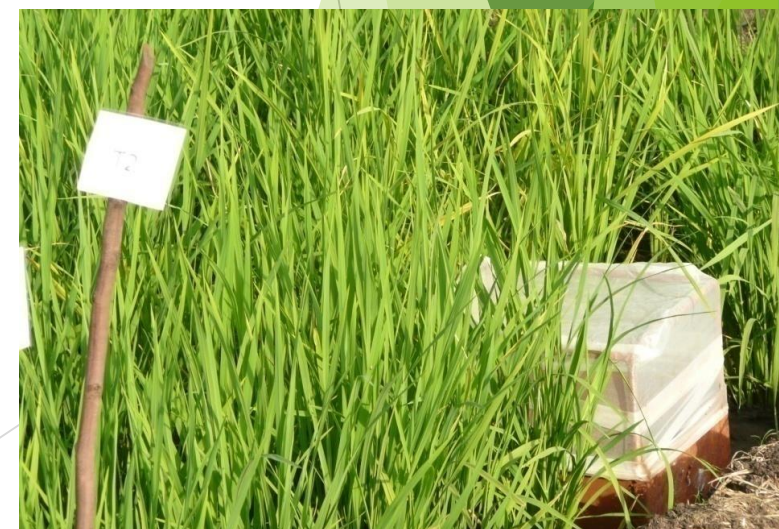


SRI required only 16 kg/ha as compared to conventional systems that used 73 t/ha of seed

Mosquito larvae eliminated under SRI plots compared with flooded paddy



Source, Omwenga, 2014: <http://dx.doi.org/10.4236/jwarp.2014.610084>



Challenges faced with SRI Practice

- Farmers' traditional mindset, skepticism and thus, resistance
- A higher incidence of weeds occurs under SRI
- Availability (lack) of rotary weeders & equipment
- Lack of funding to maintain momentum of SRI projects and trainings
- Shortage of SRI trained personnel/ extension workers
- Lack of a dedicated SRI value chain as a premium brand to encourage adoption.



Why a Knowledge Sharing Portal for SRI in Africa

- ❖ The scientific basis for adoption of SRI has been proven in many countries in Africa;
- ❖ The main gap is knowledge flows- upwards to reach policy makers, laterally to reach many farmers and extension workers;
- ❖ *Because...* Africa is a continent fragmented by national boundaries, languages, geographic zones and cultural barriers;
- ❖ Technological divides between scientists and farmers, hence missed opportunities; and
- ❖ A continent-wide knowledge platform was formulated for bringing together SRI fraternity in Africa.

Introducing the SRI-Africa Knowledge Sharing Portal

- SRI-Africa is a web-based information and knowledge sharing portal launched on 10th August 2018.
- The main objective is to build a vibrant Africa-wide Community of Practice giving SRI visibility and convergence for action
- SRI-Africa puts together information, publications, happenings in the SRI nexus in Africa drawn from activities by countries.
- The services provided include: information, knowledge depository and policy advocacy for SRI in Africa, and the world
- This helps track the progress made by African countries in pushing forward with SRI, as a sustainable way to grow more rice, while also saving water.
- Meanwhile, we continue to grow a comprehensive knowledge base supporting SRI in Africa www.sri-africa.net

Countries which have adopted SRI in Africa

Some 25 countries are in the SRI-Africa database

SNo.	Country	SNo.	Country
1.	<u>Madagascar</u> - Origin of SRI	14.	<u>Mali</u>
2.	<u>Benin</u>	15.	<u>Morocco</u>
3.	<u>Burkina Faso</u>	16.	<u>Mozambique</u>
4.	<u>Burundi</u>	17.	<u>Niger</u>
5.	<u>Cameroon</u>	18.	<u>Nigeria</u>
6.	<u>Cote d'Ivoire</u>	19.	<u>Rwanda</u>
7.	<u>Democratic Republic of Congo</u>	20.	<u>Senegal</u>
8.	<u>Ethiopia</u>	21.	<u>Sierra Leone</u>
9.	<u>Egypt</u>	22.	<u>Tanzania</u>
10.	<u>Gambia</u>	23.	<u>The Gambia</u>
11.	<u>Guinea</u>	24.	<u>Togo</u>
12.	<u>Kenya</u>	25.	<u>Zambia</u>
13.	<u>Liberia</u>		

Countries listed in SRI-Africa website as at 10th December 2022

Lessons Learnt

- ▶ In Africa, recurring droughts affect nearly 80% of the potential 20 million hectares of rainfed lowland rice.
- ▶ Since SRI saves water and results in increased yields, there is need to upscale the practice.
- ▶ Overall, SRI is a better practice scientifically, because it promotes climate-smart, water-saving practices.
- ▶ SRI can be practiced on nearly all sizes of farms and is especially beneficial to smallholder rice farmers.
- ▶ The SRI-Africa collates data, information, publications and happenings on SRI and shares freely on its website(<https://sri-africa.net/>)
- ▶ SRI should be promoted as a sustainable crop intensification (SCI) practice.

THANK YOU



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For more information, visit:
<https://sri-africa.net/>