Options for intensifying vegetable production

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Key messages

✓ Small-scale farmers in the West Africa grow fruit and leafy vegetables (e.g. onion, okra, tomato, pepper and roselle) in either pure or mixed stands with cereals (maize, sorghum or millet) and legumes (cowpea, groundnut and soybean) under rainfed and irrigated conditions for home consumption and cash (Photo 1).

✓ Yields are low due to several factors including access to improved varieties, poor agronomic practices, limited use of inputs, declining soil fertility and pest and diseases.

✓ Identification, dissemination and adoption by farmers of good agronomic practices (GAPs) can diversify and sustainably intensify small-holder vegetable production.

Objectives

To identify and disseminate farmer-preferred varieties of okra, roselle, pepper and egg plant and GAPs (spatial arrangements and planting density) to intensify sole and cereal-legume production in Africa RISING intervention communities in Ghana and Mali.

Approach

- The Community-based Technology Park (TP) approach was used. A CTP consists of a series of trials established and managed by researcher and farmers' groups in the community. It is used to evaluate, demonstrate and disseminate new technologies, provide hands-on training for farmers and students, and a forum for information exchange among partners.

- The trials involved a minimum of three SI systems randomly replicated in four intervention communities over a period of 2-3 years. Farmers' preferences for technologies within a trial were determine during farmers' field days.

Key results

- Farmer-preferred high-yielding varieties of the various vegetable species were identified (Fig. 1).
- Maize-roselle intercrop at 2 rows of maize at high density (133 000 plants/ ha) and 2 rows of roselle at lower density (99 000 plants/ ha) was recommended (Table 1).
- Maize-pepper intercrop at 2 rows of maize at recommended density (67 000 plants/ ha) and 2 rows pepper at lower density (19 000 plants/ ha) saved land (Table 2).

Significance and scaling potential

High-yielding vegetable varieties and good agronomic practices identified could increase vegetable production for home consumption and sale of the excess to generate income. The be scaled to about 30,000 farm households.

Partners

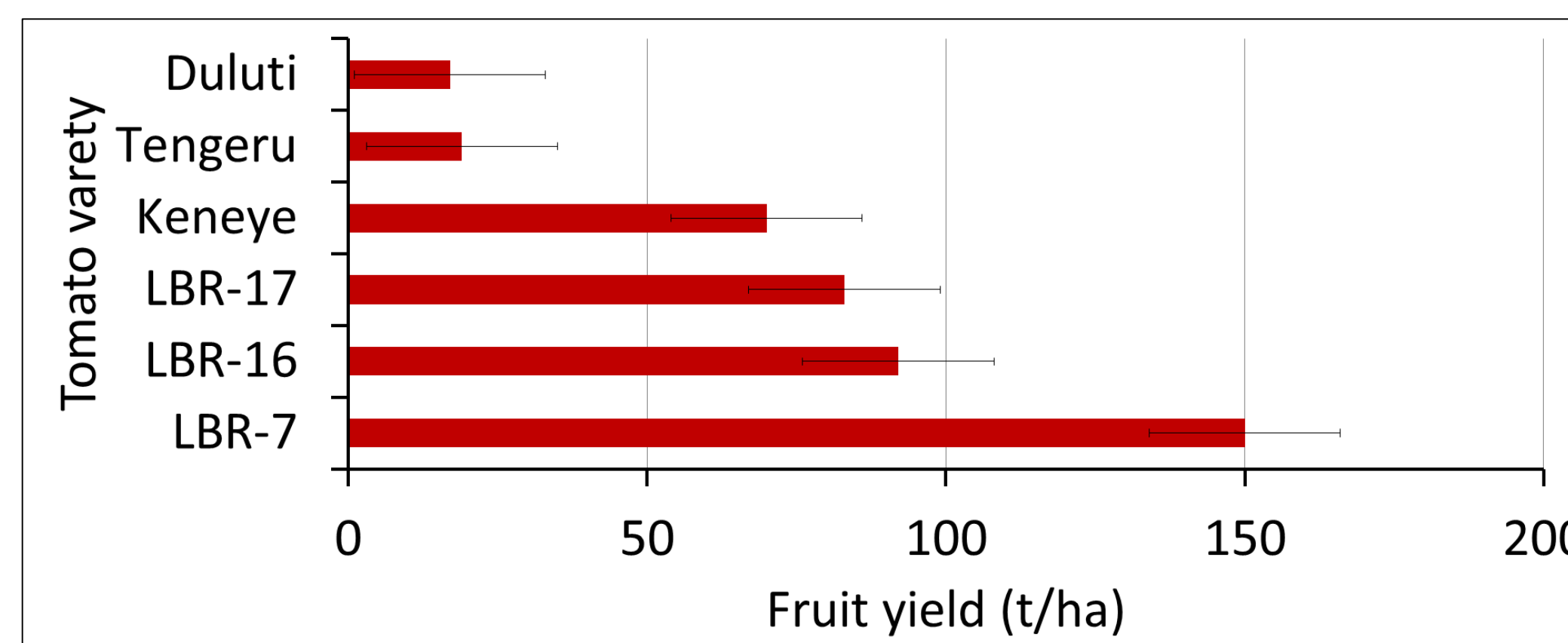Photo 1. Vegetable production and marketing systems in northern Ghana.

Figure 1: Variation in fruit yields of tomato varieties, Managa and land saved, northern Ghana

Table 1: Grain and fruit yields and land equivalent ratio (LER) and land saved in maize-roselle intercrops, northern Ghana

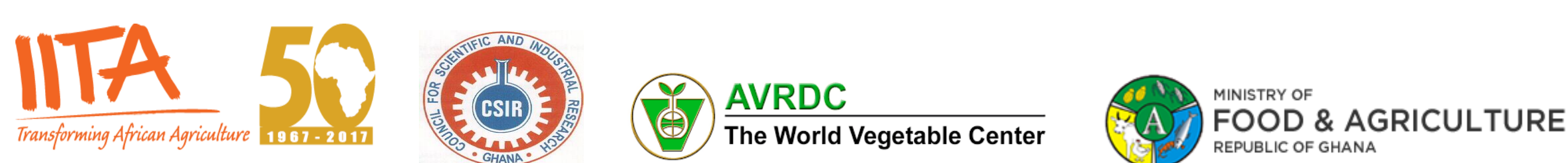| Intercrop	Yield (kg ha^{-1})		LER[5]	LS[6] (%)
	Maize grain	Roselle fruit		
MR[1]	2437.1	-	-	-
MH[2]	2476.1	-	-	-
RR[3]	-	2422.7	-	-
RL[4]	-	2259.7	-	-
1MR[1] : 1RR[3]	1799.0	2759.5	2.0	39.4
1MR[1] : 2RL[4]	1965.1	2270.7	1.8	36.2
2MH[2] : 1RR[3]	2418.5	2153.2	1.8	27.6
2MH[2] : 2RL[4]	2122.7	2188.7	1.9	36.7
s.e	421.37	612.73	0.24	5.63

[1]Maize at recommended density (67 000 plants/ ha), [2]Maize at higher density (133 000 plants/ ha), [3]Roselle at recommended density (296 000 plants/ ha), [4]Roselle at lower density (99 000 plants/ ha), [5]Land Equivalent Ratio, [6]LS= Land Saved, ns= not significant at 0.05, s.e= Standard error

Table 2: Grain and fruit yields and land equivalent ratio (LER) and land saved in maize-pepper intercrops, northern Ghana

Intercrop	Yield (kg/ ha)		LER[5]	LS[6] (%)
	Maize grain	Pepper fruit		
MR[1]	2368.9	-	-	-
MH[2]	2645.8	-	-	-
KR[3]	-	1038.9	-	-
KL[4]	-	1113.0	-	-
1MR[1]: 1PR[3]	1807.6	733.2	1.3	22.4
1MR[1]: 2PL[4]	2268.1	625.9	1.6	30.2
2MH[2]: 2PR[3]	2552.6	522.4	1.4	25.3
2MH[2]: 2PL[4]	2341.2	575.7	1.4	25.6
s.e	247.13	133.76	0.10	4.15

[1]Maize at recommended density (67 000 plants/ ha), [2]Maize at higher density (133 000 plants/ ha), [3]Pepper at recommended density (28 000 plants/ ha), [4]Pepper at lower density (19 000 plants/ ha), LER= Land Equivalent Ratio, LS= Land Saved, ns= not significant at 0.05, s.e= Standard error