

Research Application Summary

Farmer practices influencing sweetpotato – soy bean production and rabbit farming in selected sub-counties in Elgeyo Marakwet and Kakamega, Kenya

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Abstract

Sweetpotato (*Ipomea batatas*), is a tuber crop that plays a significant role in soil fertility, provides animal protein, improves human nutrition and generates income. Sweetpotato has however remained under low production with little attention on the crop's contribution to soil fertility improvement through biomass accumulation. In addition, sweet potato-soybean intercropping and the role of the sweetpotato vines in regard to rabbit farming among smallholder farmers is not a common practice. The study assessed the farmers' perceptions on factors affecting sweet potato – soybean production and their significance as forage and protein source respectively. Instruments for data collection included semi-structured questionnaires, observations and interviews of key informants. Results showed high cost of fertilizer, low soil fertility with poor replenishment as well as soil erosion as the major challenges facing their production. Results further indicated the need to promote sweetpotato – soy bean production among the smallholder farmers to cushion against hunger and to research on the contribution of the intercrop on soil fertility improvement and the feasibility of inclusion of sweetpotato vines and soybean cake in development of a ration for rabbit production.

Key words: Kenya, rabbit farming, soil fertility, sweetpotato – soybean intercropping

Resume

La patate douce (*Ipomea batatas*) est un tubercule qui joue un rôle important dans la fertilité des sols. Il fournit des protéines animales, améliore la nutrition humaine et génère des revenus. Cependant, la production de la patate douce demeure faible avec peu d'attention sur la contribution de la culture à l'amélioration de la fertilité des sols à travers l'accumulation de la biomasse. En outre, les cultures associées patate douce - soja et l'utilisation de la vigne de la patate douce dans l'élevage de lapins parmi les petits agriculteurs ne sont pas des pratiques courantes. L'étude a évalué les perceptions des agriculteurs sur les facteurs qui affectent l'association patate douce-soja et leur importance en tant que source de fourrage et de protéines. Les outils de collecte de données utilisés étaient les questionnaires semi-structurés, les observations et les entretiens avec des informateurs clés. Les résultats ont montré le coût élevé des engrais, la faible fertilité du sol avec une mauvaise reconstitution, ainsi que l'érosion des sols comme les principaux défis de production. Les résultats indiquent en outre la nécessité de promouvoir la production de la patate douce -soja afin de lutter contre la faim au niveau des petits agriculteurs et de rechercher sur la contribution

de cette association de culture à l'amélioration de la fertilité des sols et la faisabilité de l'inclusion de la vigne de la patate douce et du tourteau de soja dans le développement de provende pour la production de lapin.

Mots clés: Kenya, élevage de lapins, fertilité des sols, association patate douce - soja

Background and literature summary

Sweetpotato (*Ipomea batatas*) is ranked as one of the most important root crops (Okonya and Kroschel, 2014). However, its production is low (5.5 to 7.4 t/ha) against the potential of 20 – 40 t/ha due to low soil fertility (Kivuva *et al.*, 2014) resulting from mono-cropping. According to Mahasi *et al.* (2011), integrated cropping system has received little attention. Further to this, the contribution of sweetpotato biomass and soy bean litter to soil fertility improvement is not well documented. Luhefah (2008) pointed out the potential use of vines and soybean cake as animal feed in particular rabbits. However, rabbit farming is practiced on a low scale among the smallholder farmers yet year-round local availability of forage feed for rabbit production is feasible and could result in improved human nutrition, and income generation (Luyen and Preston, 2012).

In respect to the above gaps, this study was done to bring into limelight the prevailing farmer practices on sweetpotato – soybean production, soil fertility management and rabbit production in selected sub - counties in Elgeyo Marakwet and Kakamega Counties.

Study description

A cross sectional field survey was carried out in Elgeyo Marakwet, Kibargoi sub-County and Makunga sub-county in Kakamega. Data were collected using semi-structured questionnaires and interviews with key informants. Questionnaires were pretested before being administered. Purposeful sampling was done among mixed farming respondents targeting sweetpotato growing and rabbit keeping farmers.

Research application

Results showed that production of sweetpotato is below the potential yield of 20-40 t/ha (Table 1). This is in agreement with the findings by Kivuva *et al.* (2014) and emphasis the need to research on potential interventions towards increasing yield of the crop.

Table 1. Sweet potato – soy bean production in the study sub-counties

Crop	Number of farmers	Mean land size (ha)	Mean yield (t/ha)
Sweetpotato	130	0.53 (± 0.193)	3.12 (± 8.430)
Soybean	55	0.45 (± 0.138)	0.1 (± 45.980)

The results further highlight high cost of fertilizer, low soil fertility and soil erosion as

the main factors perceived by the respondents to impact on the low crop yields. Additionally, results points to low fertilizer application rate by the respondents. The findings corroborate with Kisinyo *et al.* (2012) who reported poor soil replenishment contributing significantly to soil fertility depletion.

Table 2. Farmers' perceptions on factors influencing crop yield in Kakamega, Kenya

	Percentage (n = 152)
High cost of fertilizers	35.8 %
Low soil fertility	33.8%
Soil erosion	28.5 %

Table 3. Fertilizer application rate among the respondents in the two counties of Kakamega

Amounts in kg /Acre	Number of farmers	Percent (n=95)
10.00	3	3.2
25.00	28	29.5
40.00	4	4.2
50.00	48	50.5
100.00	3	3.2
Total	95	100.0

Mean = 40.10 kg/acre

Std deviation = 17.063

Results also showed that intercropping and crop residue roles are not well understood by the smallholder farmers although the practices have been documented to be ancient in East Africa (Okonya and Kroschel, 2014). Results additionally indicated the need to carry out research to establish the extent to which sweetpotato – soybean rotation in combination to fertilizer use can contribute to soil fertility improvement aimed at improved crop yield.

Table 4. Farmer practices toward soil fertility management in Kakamega, Kenya

	Percentage (n = 152)
Rotational cropping system	58.6%
Use of animal manure	17.1%
Intercropping	12.5%
Use of inorganic fertilizers	7.9%
Use of crop residues	3.9%

It is also apparent that the use of sweetpotato vines and soybean as forage and protein source for enhancement of rabbit production requires attention as pointed out by Luhefah (2008).

Table 5. Use of sweet potato vines by the respondents in Kakamega, Kenya

	Percentage (n = 152)
Feeding material	72.7
Planting material	18.0
Soil fertility	8.6
Sell	0.7
Total	100.0

Table 6. Significance of soy bean to the respondents in Kakamega, Kenya

	Percentage (n = 152)
Improving soil fertility	91.5
Animal feed	8.5
Total	100.0

Thus, there is need to develop feed rations aimed at all year round provision for sustainability of the enterprise. Thus, research should be carried out in this regard to enhance rabbit production, improve family nutrition and income generation.

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