

Series 1 – Economic Pillar: Agriculture and Livestock

Cowpea Leaves: Feasible Solutions to Overcome Seasonal Availability

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Key Messages

Despite the critical role of cowpea leaves in the ASAL as a food security crop, drought, diseases and pests remain major challenges to be addressed. Prioritizing alternative water sources and extension services is recommended.

The gender of a household head influences the use of cowpeas leaves in the ASAL. There is need for food security initiatives to adopt gendered approaches in the promotion the value addition approaches and utilization of cowpea leaves.

Even though the cowpeas leaves are the main vegetables in ASAL households, the fresh forms are highly perishable; households in the ASAL areas need to employ the complementary utilization of both the preserved and fresh forms to assure food security.

Limited knowledge on value addition technologies coupled with lack of equipment remain major limitations on processing, preservation and improved consumption of cowpeas leaves.

Dehydrated products from cowpea leaves contain adequate amounts of limiting minerals and hence provide possible food vehicles for dietary diversification of the diets of the populations vulnerable to micronutrient deficiencies.

Context

Efforts of improving food and nutrition security which is one of the Big Four Agenda of the Kenyan Government are constrained by the massive postharvest losses evidenced in various value chains. Whereas the set target of reducing postharvest losses (PHL) from 20% to 15% in the dominant value chains of cereals by 2022 still remains on course, Gogo et al. (2017) estimates the losses in the African leafy vegetables (ALVs) in the country to be as high as 71.8%. The situation is evidently a development priority especially for counties with limited arable land such as the arid and semi-arid lands (ASALS) which constitute the major food and nutrition insecurity hotspots in the country. Moreover, micronutrient deficiencies such as vitamin A and iron deficiencies have also been found to be invariably high in the rural areas than the urban in the country, in as much as these areas serve as the producing areas of the micronutrient-rich ALVs.

Cowpea leaves (Figure 1) is the most produced ALV in the country and has been promoted as a food security crop due to its rich micronutrient content (Owade et al., 2020). However, seasonal availability of the crop constrains its extensive utilization. Moreover, during the long and short rains in ASALS, the vegetables is in abundance but this is followed by scarcity in the off-season. The leafy vegetable has been promoted over the grains of the crop as a cheap alternative source of micronutrients (Mamiro et al., 2011).

Value addition of fresh produce is deployed for product diversification and postharvest management of produce. Without postharvest management, Gogo

et al. (2017), reports economic losses of 12.6–34.4%, further limiting vegetable availability for household utilization and commercialization. Policy gaps with regards to cowpea leaves in the country are evident due to limited policy focus of this value chain as there is limited documentation of the postharvest losses of any vegetable in the African Postharvest Losses Information System.

Approach and Results

The study utilized components of field survey and experimental work in the assessment of possible innovations feasible for enhancing vegetable uptake and utilization in the producing areas. The field survey employed mixed method study of cross-sectional survey of systematically sampled 405 cowpea leaves producing households and focus group discussion with processor-farmer groups in the ASALS of Kitui and Taita Taveta Counties, with Kitui having more arid conditions. Twenty-four samples exhaustively sourced from processor-farmer groups were evaluated for micronutrient retention and trends.

The study results revealed that 72.3% of the cowpea leaves producing households were male-headed with farming as the major source of livelihood. Cowpea leaves were the priority vegetable over other leafy vegetables among 84.4% of the households. Households in the drier ASALS of Kitui County prioritized cowpea leaves more than those in the less dry ASALS of Taita Taveta County. Prioritization of the cowpea leaves over other leafy vegetables was due to the high yields of the harvested vegetables. The households planted the crop in dual seasons as per the two rainy seasons. The harvesting of the cultivated cowpea leaves began as early as two weeks upon emergence from the soils and



Figure 1 – Cowpea Leaves

the harvesting continued for six weeks. Households largely consumed cowpea leaves in fresh form, but complemented their consumption with preserved forms. The average availability of the fresh leaves for household consumption in each of the seasons was 1 month. Early initiation of the harvesting increased the availability of the vegetable among households. The average intake of cowpea leaves among the households was found to be thrice in a week in-season.

Households in more arid areas consumed cowpea leaves frequently, twice as much as those in the less arid areas. With reducing household sizes, the frequency of intake of the vegetables decreased. Moreover, male-headed households had decreased frequency of intake of the vegetables than the female-headed. Off-season consumption of the vegetables reduced among the households to a quarter of the households. Practise of traditional preservation increased the utilization of the cowpea leaves. Traditional preservation techniques practised among the households include sun-drying, shadow drying and combination of sun-drying and hot-water blanching (Figure 2). The preference of these techniques among the households and processor groups was informed by the sensory and texture profile, shelf-life and affordability

The three major challenges that constrained the production of cowpea leaves among the households in the ASAL areas were drought and crop diseases and pests. Yields of cowpea leaves realizable in each cropping season reduced due to increasing severity of drought in the ASAL areas. The stakeholders in the value chain perceived that the crop has received minimal attention among policy makers with limited coverage even in the extension system.

In the dehydration of cowpea leaves, the retention of beta-carotene, vitamin C, and minerals determine the efficiency of the technique. The least practised technique among the households that combined hot-water blanching and sun-drying yielded products with the highest retention of beta-carotene and vitamin C. Calcium, iron, sodium and zinc contents of vegetables

that were processed using the different traditional techniques was similar. Utilization of the technique combining hot-water blanching and sun-drying, resulted in increasing retention of beta-carotene, whereas the mineral losses increased. On other hand, reducing loss of minerals through use of sun-drying techniques only resulted to increased losses of beta-carotene. However, the preserved products of cowpea leaves still provided adequate nutrient content to aid meet the recommended dietary allowance.

Policy Recommendations

Short-Term

- There is need for increased promotion of the complementary use of the preserved and fresh forms of the vegetable in the ASALs.
- The current techniques of sun-drying and shadow-drying without the inclusion of the pre-treatment of blanching offer limited advantages in nutrient retention, thus food security initiatives should help fast-track transition to the hurdle technology concept that combines blanching as a pre-treatment in dehydration.
- Promotional activities on value addition approaches and capacity building at the farmer group levels need to be enhanced.

Medium-Term

- With agriculture as a devolved function, the devolved units should explore further and mechanized techniques coupled with capacity building of farmers in effort to address food and nutrition insecurity.
- The devolved units also need to improve the policy focus on cowpea leaves as one of the food and nutrition security crops. Strengthening of the extension system as a delivery mode of the value addition technologies is necessary.

- Long-term investments in the value chains of the ALVs (including setting up of processing plants) is necessary in order to help address the constraints of limited marketing and commercialization of their produce. Future plans should focus on irrigation and provision of extension services to assist farmers address the current challenges.

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References

- Gogo, E.O., Opiyo, A.M., Ulrichs, C., Huyskens-Keil, S., 2017. Nutritional and economic postharvest loss analysis of African indigenous leafy vegetables along the supply chain in Kenya. *Postharvest Biol. Technol.* 130, 39–47. <https://doi.org/10.1016/j.postharvbio.2017.04.007>
- Mamiro, P., Mbwaga, A.M., Mamiro, D.P., Mwanri, A.W., JL, K., 2011. Nutritional quality and utilization of local and improved cowpea varieties in some regions in Tanzania. *AJFAND* 11, 4490–4506.
- Owade, J.O., Abong, G.O., Okoth, M.W., Mwang'ombe, A.W., 2020. A review of the contribution of cowpea leaves to food and nutrition security in East Africa. *Food Sci. Nutr.* 8. <https://doi.org/10.1002/fsn3.1337>

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