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STATUS, CHALLENGES AND MARKETING OPPORTUNITIES FOR CANNING NAVY BEAN IN KENYA

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ABSTRACT

Navy bean (white bean) is an export crop with potential to signficantly improve incomes of smallholder farmers in Kenya; its production and marketing has, however, stagnated. A study was conducted to determine the status, challenges and marketing opportunities for navy bean. Primary data were obtained by interviewing white bean producers, processors, key resource experts, regulators and consumers using category-specific semi-structured questionnaires. Secondary data were collected from published work and available statistics. The study demonstrated that navy bean production in several parts of Kenya dates back to the 1950s, but it is now confined (though with very low production levels) to Nakuru County districts of Rongai and Nakuru north. Decline in production is partly attributed to the collapse of contractual arrangements between producers and processors. Currently, local processors import most of their navy beans from Ethiopia. There are two navy bean market channels: local channel initiated by local chain actors and an Ethiopian channel initiated by wholesale traders who supply current processors and other traders. Main challenges include low producer prices, poor agronomic and postharvest practices, low value addition and processing and lack of market information, particularly to farmers. Opportunities identified for participants in the value chain include the presence of the Kenya Plant Health Inspectorate Service (KEPHIS) for seed inspection and certification, increase in processing capacity, improved breeding and seed production systems and the exploration of new markets coupled with innovative crop promotion stategies. Strategies for improving the competitiveness of navy bean subsector hinges on accelerated navy bean breeding and seed systems (including informal seed systems), processing/canning and sufficient market information to all participants in the value chain. Evidence shows that the International Center for Tropical Agriculture (CIAT) in collaboration with the University of Nairobi are doing some breeding work on navy beans. Moreover, several materials are under farmer participatory evaluation trials in historically navy been producing areas in the rift valley, central and upper eastern.

Key words: navy bean, canning, production, marketing

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INTRODUCTION

Navy beans (*Phaseolus vulgaris L.*) are dry oval pea sized white haricot beans that are grown almost exclusively for the canning industry [1]. The importance of canning navy beans is driven by increasing demand for pre-cooked/baked and fast-cooking foods in cities both locally and globally. Intensive cultivation of navy beans in the Kenya dates many years back when it was cultivated in Thika in 1950's and later spread to Nakuru and Meru regions in the late 1980's under contractual agreements with the processing companies. Mexican 142 was a common variety because of its resistance to rust and its high canning quality. This variety was introduced in Kenya in 1950's and moved to Ethiopia in the 1970s where it became a dominant variety in the Ethiopian rift valley especially in Oromia and north of Lake Ziway regions. Since 1973, Mexican 142 and other improved white beans have been released for production in Ethiopia [2].

Growing of navy beans for canning is an important industry in Eastern Africa with Ethiopia taking the lead where the industry has grown tremendously to be a major export earner. Until recently, little work has been done to support the bean canning industry in the region. Germplasm was introduced from the International Centre for Tropical Agriculture (CIAT), Colombia in the 1970's through 1990's and screened for biotic and abiotic stresses especially in Ethiopia. Two varieties (Awash Melka and Mexican 142) with better agronomic and disease tolerance traits had good canning quality. In 2001, the Eastern and Central Africa Bean Research Network (ECABREN) launched a market-led breeding program, which focused on seven most important market classes, of which one is navy bean, according to 2000 regional bean market survey [3]. Crosses were made at Melkassa in Ethiopia and at Kabete (University of Nairobi, Kenya) to develop breeding populations segregating for important agronomic, disease resistance and quality characteristics. These populations were based on correcting deficiencies in the canning industry stand varieties, Mexican142 and Ex-Rico-23. Marketing opportunities for navy beans in Ethiopia have recently been evaluated [4]. However, no such studies have been conducted in Kenya. Besides, there is little evidence of large scale navy bean farming in Kenya. A study was, therefore, conducted to determine the status, constraints and marketing opportunities for canning navy bean in Kenya.

SURVEY METHODOLOGY

A survey was conducted along the navy bean product value chain as previously defined [5]. The survey took place during January-February 2010 growing period. Primary data were collected by interviewing producers, processors, key resource experts, regulators and consumers using category-specific semi-structured questionnaires. Random sampling was done for farmers, traders and consumers while all available processors, regulators and experts where interviewed without sampling due to the limited number of respondents. Secondary data and available statistics were collected from published works. Fifteen farmers were interviewed in each of Rongai and Nakuru North districts within Nakuru County. A survey of import entry

points of Namanga and Moyale, dry beans open market centres of Nyamakima in Nairobi and Jamhuri in Thika, cereal markets in Nakuru town and trading centres in Rongai and Nakuru North districts was conducted. In each of these surveyed areas, 15 traders and equivalent number of consumers were interviewed. Major processors comprising Njoro canners, Kabazi canners and Premier foods, regulators comprising KEPHIS and Horticultural Crops Development Authority (HCDA), and supermarket retail outlets consisting of Uchumi, Nakumatt and Tuskys were surveyed. Data collected included potential markets, market chains, chain actors, constraints/gaps and opportunities in the value chain.

RESULTS

Status of Navy Bean Sub-sector

Navy bean production has declined drastically since the 1990s [3]. Currently the crop is produced sporadically in Nakuru County on less than 0.125 ha farm land. The few farmers who grow the legume, in the hope of its revival, used to be contracted by Kabazi and Njoro canning factories in the late 1990s. During the contractual years, companies provided producers with seed and other inputs whose cost was recovered from the farmers' produce. Navy bean seed systems were informal, and still are; hence, the contracting companies imported navy bean seed as food and gave it to farmers to grow the crop for them. Focused discussions with key informants revealed that in 1994, the farmer-processor contractual arrangements collapsed due to stringent product quality requirements which the farmers could not meet as well as limited absorption capacity of the processing companies. Consequently, there were high reject rates of up to 75% and low prices that could not cover production costs. To maintain their processing capacity, processors resorted to importing beans from Ethiopia for direct processing (canning and baking).

Current Navy Bean Production in Kenya

Navy bean production is currently confined to Nakuru County especially Rongai and Nakuru north districts. In Rongai district, major production areas include Solai (30%), Ndungiri (30%), Ngata (20%), Menengai (10%) and Wanyororo (10%). In Nakuru north district navy bean is produced in Kabazi and Bahati divisions. Average plot sizes are less than 1/8 acre and grain yield per unit area is significantly low (Table 1). Navy bean growers do not use chemical inputs such as fertilizers and pesticides.

Navy Bean Production Constraints

Farmers growing navy beans in the Rift Valley cited several constraints to production (Table 2) despite the high potential of the crop in the region. Most respondents emphasized that navy beans crop yields are relatively higher than those of the common beans. A large proportion of respondents cited low prices and unstable markets as the major constraints. This constraint has been exacerbated by the collapse of producer-processor contractual agreements. In addition, majority of farmers interviewed did not receive extension services in navy bean production and post-harvest handling. Equally constraining is lack of formal navy bean seed in the country that hinders growth of the navy bean canning industry. Management at the Njoro

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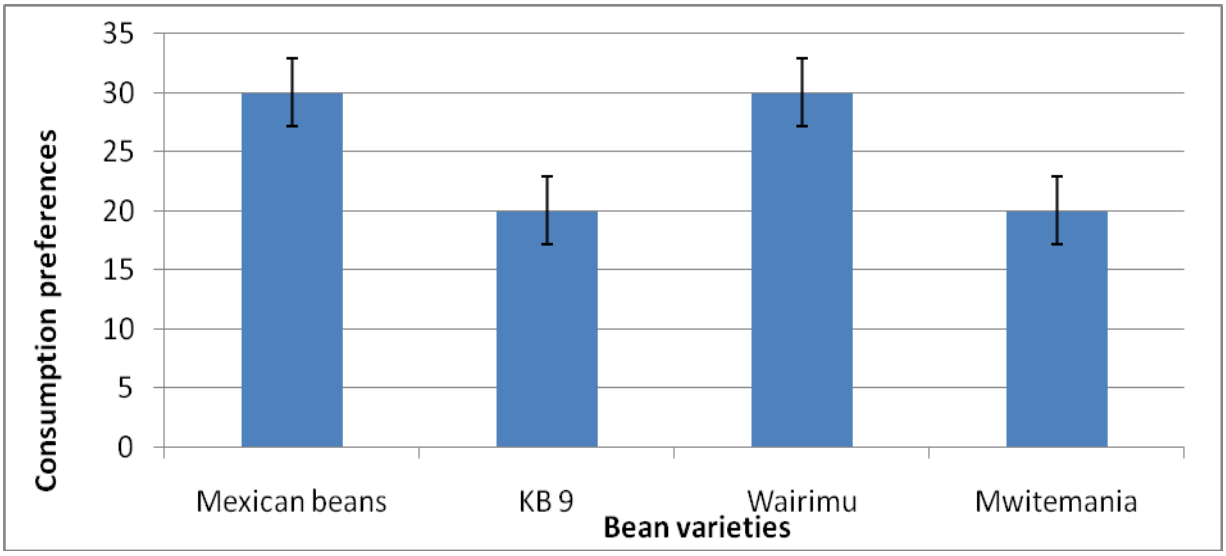
canning factory explicitly noted that lack of reliable local supplies and quality certified seeds were a major constraint to the canning industry. Navy bean materials that were grown during the boom years were not imported as seed but as food.

Navy Bean Consumption Patterns

Unlike red and mixed coloured beans, consumption of navy beans in Kenya mirrors its production. About 30% of the respondents preferred the white (navy) beans to other beans (Figure 1); this is because the beans blend well with rice, taste good and cook faster than other beans (Figure 2). The producers consumed 50% of their crop yields and sold the rest or kept it as seed. Consumption of canned navy beans is common in the upper income market segment. Retail outlets located in the upper markets of Westlands, Karen and Ngong and the Nairobi city centre stock a variety of canned beans brands (Table 3). Consumers prefer the pre-cooked and canned beans due to their quick preparation for a meal.



KB 9: Katumani bean 9

Figure 1: Bean variety consumption preferences

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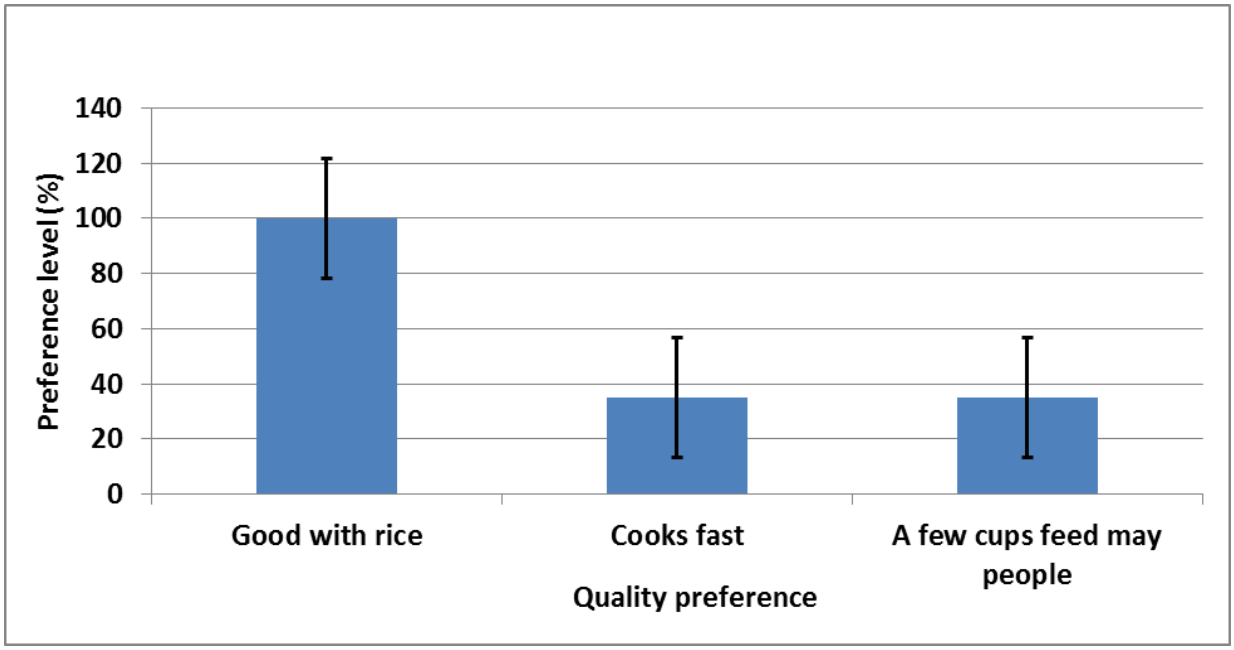

Figure 2: Navy bean consumption preferences

Navy Bean Global Markets

The European Union and the United States of America (USA) are the major consumers of canned navy beans. The USA, Canada, China and Ethiopia are the major suppliers of the bean. Many consumers are aware of the nutritional and health benefits of pulses as a source of dietary protein. The developed and developing countries and the higher income and health conscious consumers in Kenya are key *niche* markets worth exploring. The Asians are also potential consumers of canned navy beans. A large market base would mean higher processing volumes, increased navy bean production hence higher gross margins to the producer. The arrival of two international bean trading companies in Ethiopia in the past 2–3 years has introduced demand for internationally recognized varieties that are not grown in Ethiopia and increased demand for rapid evaluation of existing commercial varieties has placed additional demands on the national bean research system. Poortman Plc imported AR04 RGY, which has been released for production and a rival company (ACOS) is seeking permission to begin multiplication of two additional white bean varieties namely Avanti and Christod, and one red variety, McMillan. These varieties were developed for canning and are currently grown mainly in the USA. The export and processing companies particularly want supplies of these varieties as their canning factories are geared to process these specific varieties, and they suggest that it is easier to change production in Ethiopia to meet this market rather than change the processing system for the factories.

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Key Market Chains

Production and distribution of navy beans revealed two well defined channels (Figure 3). The first channel is initiated by the local producers while a second flow is generated by the Ethiopian producers.

Key Market Chain Participants

The government should invest significantly in activities geared towards promotion of market-oriented agricultural development. Government extension service personnel are in-post at location, division and district levels and need to play the central role of coordinating extension services for navy bean production and marketing.

Village traders/ assemblers

These traders are found in navy bean growing areas of Nakuru North and Rongai districts and they have well established links with the processing companies. They assemble navy beans among the small scale farmers and deliver for processing. These assemblers also act as brokers for local market retailers.

Retailers

These are small-scale traders who stock a few quantities of navy beans. They are found in the producing regions of Nairobi and Thika towns. They sell to local consumers especially the Asians in both Nairobi and Thika. Retailers get the produce from farmers or the village assemblers. On many occasions, the retailers sell to processing company assemblers or brokers.

Ethiopian assemblers

Ethiopia has been a major supplier of red beans and white navy beans to the northern Kenya region. Ethiopia also supplies white beans to canning industries in the European Union and other European markets. Navy bean processing companies in Kenya rely on Ethiopian imports to meet their market demands. These Ethiopian traders assemble navy beans in the growing regions of Ethiopian rift valley and deliver the produce to the Moyale border in Kenya. The Southern region, especially Oromia and the Southern Nations Nationalities and People Regional State produce over 85% of Ethiopian haricot beans [7, 8]**.**

Border traders

The border traders are a key link between the Ethiopian collectors and the Kenyan markets. They are basically wholesalers who buy in bulk to distribute to Kenyan markets. The major traders are found in Thika's Jamhuri market.

Central market agents/ processing company agents

In Kenya the contribution of canned navy beans to foreign exchange is small or perhaps negligible compared to other bean varieties. The processing companies in Kenya have their agents who supply navy beans. These agents obtain the beans in bulk from Moyale, after which the seeds are then transported to processing companies. Njoro canning factory, a chief bean processing company, obtains the produce from Ethiopia through a broker. Despite the increasing demand for canned

beans in the European countries, canning capacity remains low in Kenya. Only three companies, Njoro canners, Kabazi canners and Premier foods are involved in canning navy beans with the former commanding a larger proportion. Upon improvement of the processing capacity of the existing processors, more farmers would engage in navy bean production. During the time of doing this survey, processing of navy beans was being done by the three aforementioned companies. However, Kabazi Canners Company was closing down its operations in Nakuru and its brands were being produced at Njoro canning factory. These processors need to be supported by the government in order to improve their production capacities. Incentives such as tax exemptions and withdrawal of export tariffs would provide a great impetus towards enhancing the growth of the canning industry.

Navy Bean Marketing Constraints

Producers cited marketing constraints such as low prices (52.4%), unreliable markets (38.1%) and lack of contracting companies (9.5%) (Table 4). Navy bean traders indicated that low prices (23.8%) and low demand (23.8%) were the major impediments in their business (Table 5). About 14% of the traders were constrained by the unavailability of the beans in the country. These constituted the large scale traders who sourced the commodity from Ethiopia through Moyale border. As shown in Table 5, cross-border traders particularly faced transport problems to get the produce to the market. They also indicated that the numerous intermediary brokers and police checks had negative effects on profit margins.

Low prices offered to producers made them withdraw from contractual agreements with the processing companies. During the time of doing this survey, navy bean farm gate prices were lower than the prices of the common beans and other pulses. During the contract production period, farmers reiterated that the white beans prices were comparatively low.

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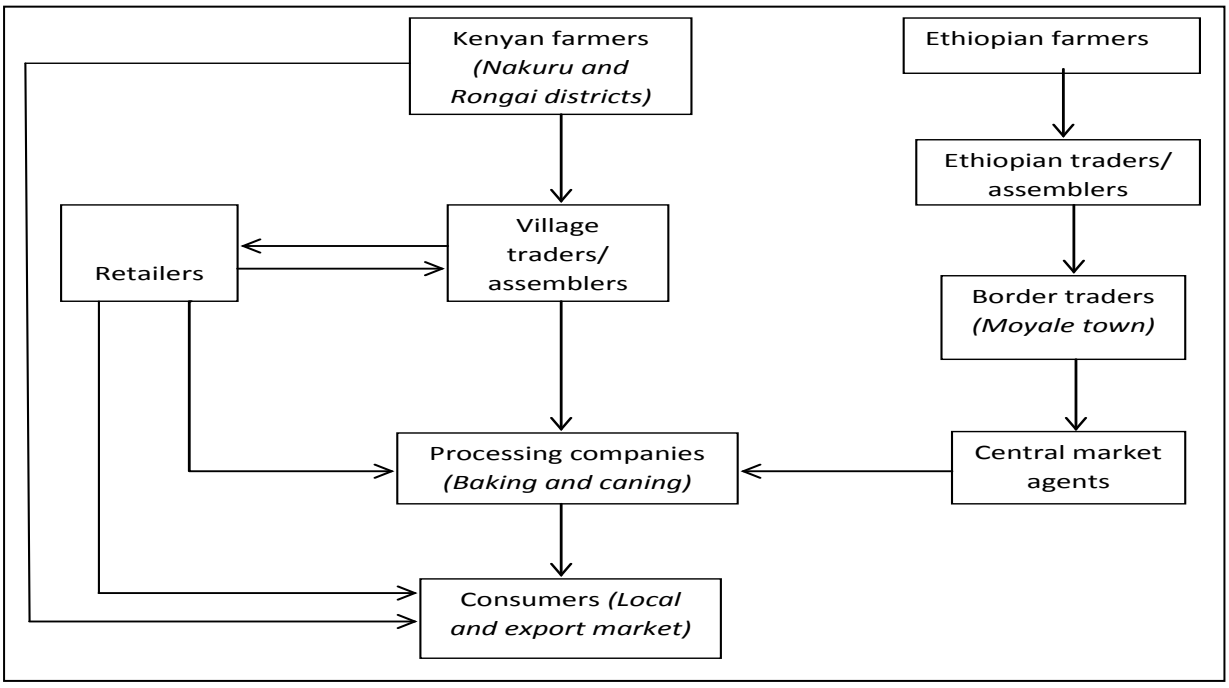

Figure 3: Navy bean flows in Kenya

A shown in Figure 4, 50% of the traders interviewed were within 100 km to the market while 16.7% were within 500 to 700 km to the market. About 33% of the traders covered more than 700 km to get their commodities to the market. All cross-border traders covered more than 700 km to get their commodities to the market. These are the traders who obtain navy beans from Ethiopia. They use trucks over long distances to the Kenyan border town of Moyale.

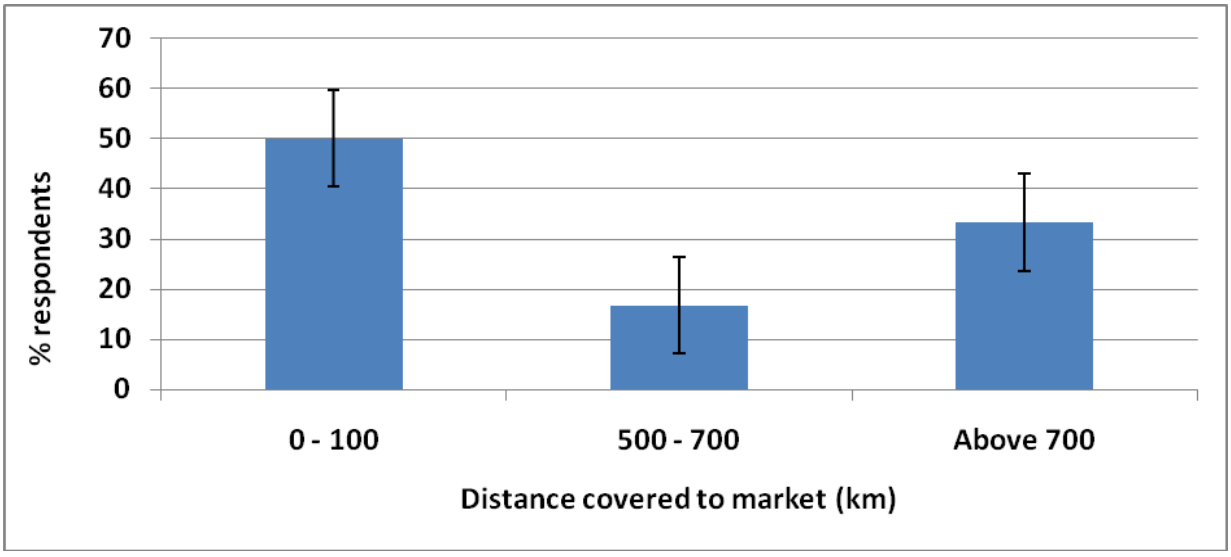

Figure 4: Average distances covered by navy bean traders to the market

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Market Information

A significant number of traders (87.5%) obtained market information from other traders through telephone conversations while 12.5% of the traders got market information at the market place. Information on navy beans is not aired by the local radio stations. The Kenya Agricultural Community Exchange (KACE) did not have any information on market prices of navy beans. However, KACE holds enormous market information on the common beans. Through the local media, KACE gives daily market prices of the major common bean varieties. These prices are gathered from the cities and major towns. In the Nakuru District Agricultural Office, updated price statistics of the common beans were pinned on the public notice boards. Apparently, the prices of navy beans could not feature anywhere in the statistics. This was a clear indication that the crop's production was common with the farmers. In addition, producers mentioned that they obtained market information from fellow producers who were several kilometers away. Such kind of information flow is highly susceptible to distortions from individual to individual.

Grades and Grading of Produce

Only 12.5% of the traders interviewed cleaned their commodities. Cleaning involves sorting out broken seeds, rotten seeds, debris and other foreign matter. Cleaning or sorting improves the marketability of the beans. Processing companies go for the best quality beans, a standard usually defined as grade one. Lack of grades in the market is a clear indication of how the crop is not well developed in the consumer economy.

DISCUSSION

Decline in navy bean production in terms of total acreage is attributed to collapse of contractual agreements between processors and producers. Individuals and farmer groups used to produce large navy bean quantities for canning factories especially Njoro and Kabazi canners in Nakuru County. Current navy bean farmers, though under very small land parcels, are found around the canning factories in Nakuru County. As cited by the farmers and the canning factories, lack of quality produce led to the collapse of the crop sector. Common economically important diseases such as angular leaf spot and anthracnose and pests including bean stem maggot (bean fly) [6] substantially reduce bean quality. If the contractual agreements were revived and farmers provided with certified quality seeds, production levels would definitely rise. Participatory evaluation of navy bean germplasm involving all those engaged in the production, supply and processing chain would enhance links between research institutions, the producers, the traders and the processors. Improved seeds should be multiplied and released to farmers in the Kenyan Rift Valley which has similar agro-ecological conditions with the Ethiopian rift valley, a leading producer of navy beans in the world. This improved germplasm should be accompanied by an agronomic package which may include plant nutrition and protection protocols. Without such good agronomic practices, development of an elite genotype would definitely fail. Furthermore, farmers in the Kenyan Rift Valley especially in the larger Nakuru district, where the crop has a history of large scale production should be supported in all areas of agricultural systems.

Navy bean has a high potential of good gross margins if it is well promoted and sustained. Innovative crop promotion strategies involving health benefits of dry and/or canned navy bean consumption would be an incentive towards increasing its demand. The consumer is becoming more health conscious and thus would be comfortable picking a product that has positive health implications. Navy beans cause less flatulence than red and mixed coloured beans and, therefore, are suitable for flatulence intolerant consumers. Bean breeding programs in Kenya require additional support to accelerate evaluation and release of new varieties. Improved seed production techniques would yield high quality canning beans with good agronomic traits. To achieve sustainable navy bean seed systems, the farmer needs to be supported by both the government and relevant non-governmental organizations. On the other hand, under market-led agriculture, the government should promote export of white beans and, to a lesser extent, red beans, through investment incentives to local and foreign investors. To improve and protect local production from competition, regulation of navy bean imports would be essential. The processing companies would thus require mobilizing the local farmers to supply the bean through well managed contractual agreements.

CONCLUSION AND RECOMMENDATIONS

Navy bean seed systems

KEPHIS needs to establish regulations to certify navy seed multiplication in the country. Currently, there is no navy bean seed multiplication regulation. Imported navy bean seed is usually regarded as food and, therefore, is not authorized to be used for crop production in the country. Meanwhile, KEPHIS can evaluate and certify the current varieties from Ethiopia and other countries for release to the market. Navy bean materials held by the University of Nairobi Bean Project can be released to farmers upon inspection and certification by KEPHIS.

National breeding systems should be supported to breed new materials with good agronomic traits and good canning quality [9]. Breeding programmes would require a participatory innovation systems approach among the stakeholders in order to release materials that are acceptable. The National Agricultural Research System (NARS) should be encouraged to develop and produce navy bean seed. Support for farmer group-based seed supply systems would thus be essential.

Market information

For the success of the Kenyan navy bean subsector, efforts should be made to provide clear and up to date information on local and export markets. Information on the competitiveness of other leading markets should be well understood. Studies of Haricot bean systems in Ethiopia recommended an enhanced smallholder participation in produce marketing. This aspect can be accomplished through provision of timely and adequate information to farmers [10].

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Improve production processing by supporting producers and processors

Beans are usually produced by small-scale farmers, thus any public and private sector investment in the canning of navy bean seeds will have strong economic benefits for rural economies. Such investments should be considered as high priority in market-led agricultural development. Win-win contractual agreements between the processing companies and farmers should be encouraged. Incentives to processors and exporters also need to be developed. Similar recommendations have been made by Karanja *et al*. [6] in their work towards value added bean technologies for enhancing food security, nutrition and income in the wake of climate change and variability.

To overcome the constraints and to exploit the opportunities in the navy bean value chain, the following strategies are recommended:

1) A systematic value chain participatory diagnosis of the canned navy bean seed subsector;
2) Evaluation of existing and new germplasm within the NARS in various agro-ecological zones;
3) Strengthening the links between local farmers and processors to reduce over-reliance on importing beans from Ethiopia. The Ethiopian imports are dampening production in Kenya and, therefore, should be regulated;
4) Strengthening partnerships, networking and linkages amongst stakeholders in the navy bean value chain;
5) Promote domestic consumption of navy beans;
6) Enhance availability and accessibility of information on navy bean;
7) Genetically improve agronomic, canning quality and pest tolerance traits of navy bean seeds. The University of Nairobi in collaboration with CIAT is running several demonstrations in the country to revive the historically valuable cash crop;
8) Promote improved navy bean crop management technologies.

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Table 1: Farm characteristics, yield and farm-gate producer prices

Farm characteristics	plot size (acres)	Average yield (kg/acre)	crop seasons	proportion sold	Unit price (Kshs/kg)	input use
Medium size	1/8 to 1/4	50-100	1	50%	60	None
Low size	<1/8	25-50	1	50%	60	None

Kg: Kilogram; Kshs: Kenya shillings

Table 2: Constraints to navy bean production

Constraint	Percentage of respondents
Low prices	19.7
Unstable market	15.8
Pests	14.5
Diseases	14.5
Drought	14.5
Transport	11.8
High market/export tariffs	9.2
Total	100

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Table 3: Canned navy bean brands in the Kenyan market

Brand name	Company	Average unit price (Kshs)
Golden valley	Njoro canning factory	81 per 420 grams can
Kenylon baked beans	Kabazi canners/Trufoods	81 per 420 grams can
Peptang baked beans	Priemier foods limited	87 per 420 grams can
Heinz baked beans	Gulf food industries (Dubai) (Imported by Fashion 99)	99 per 415 grams can
Americana garden baked beans	Imported from U.S.A	77 per 400 grams can

Kg: Kilo gram; Kshs: Kenya shillings; U.S.A: United States of America

Table 4: Navy bean producers' marketing constraints

Constraint	Percentage reporting
Low prices	52.4
Unreliable market	31.8
Lack of contracting companies	9.5
Total	100

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Table 5: Navy bean traders' marketing constraints

Constraint	Percentage reporting
Low prices	23.8
Low demand	23.8
Market instability	19.0
Unavailability of the beans locally	14.2
High market/export tariffs	4.8
Transport	4.8
Brokers	4.8
Police check-points	4.8
Total	100.0

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