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Factsheet Resilience Solutions for the **Potato Sector** in **Kenya**

This Factsheet is a part of the Private Markets for Climate Resilience (PMCR) project to evaluate systematically the potential market for climate resilience solutions in the private sector. Focusing on agriculture and transportation, current practices and opportunities highlight products, services and finance in six emerging markets — Colombia, the Philippines, South Africa, Nicaragua, Kenya, and Vietnam.



Nordic Development Fund

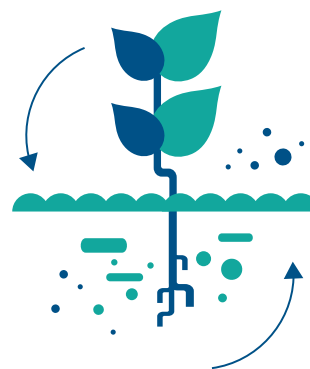


Potato sector in Kenya

Potato is the second most important food crop after maize and a key component within national food security in Kenya. As a potential answer to the challenges of food insecurity, poverty and climate change in the country, potato is attracting great interest. It is an ideal candidate for crop diversification and nutrition-sensitive agriculture programs given its richness in protein, calcium, potassium and vitamins.

The sector employs an estimated 2.5 million people and the entire value chain indirectly employs 3.3 million. In 2016, annual potato production was worth USD 400-500 million, which compares well with annual maize production worth USD 1.2 billion, especially considering that maize is grown in a much larger area. Potato production is an important source of rural income and food security, as 90% of total production is produced by small-scale farmers. As a potential source for sustainable revenues, potato is less affected by international commodity price fluctuations and is less vulnerable to speculative activity than other crops. As potato-based products and consumption patterns are diversifying rapidly, these trends are being translated into increased attention on the sector from private sector actors.

However, the potato sector is not without challenges, notably the unavailability of quality and certified seeds, the unavailability of adequate inputs and equipment, low production yields, high disease incidence, fragmentation of actors in the value chain, a lack of value-add and new product development, as well as a lack of cold storage facilities. For example, due to an inadequate supply of quality and certified seed, only 5% of potato



farmers use certified seeds and the majority recycle seeds from previous seasons. Production is not market-oriented and yields are still low, ranging between 4 and 10 tonnes per hectare. In comparison, yields in Egypt amount to an average 40 tonnes per hectare.

Farmers use various agronomic practices depending on their geographical location. The increase in production has been largely attributed to the expansion of production areas. The level of mechanization remains low, except in land preparation, and there is limited post-harvest value add made by farmers at the farm level (cleaning, sorting, grading, and packaging). In the area of potato production, many concerted efforts and programs, both private and governmental, have been put into seed production, agronomic practices, value addition and market development.

Sector facts (2014)

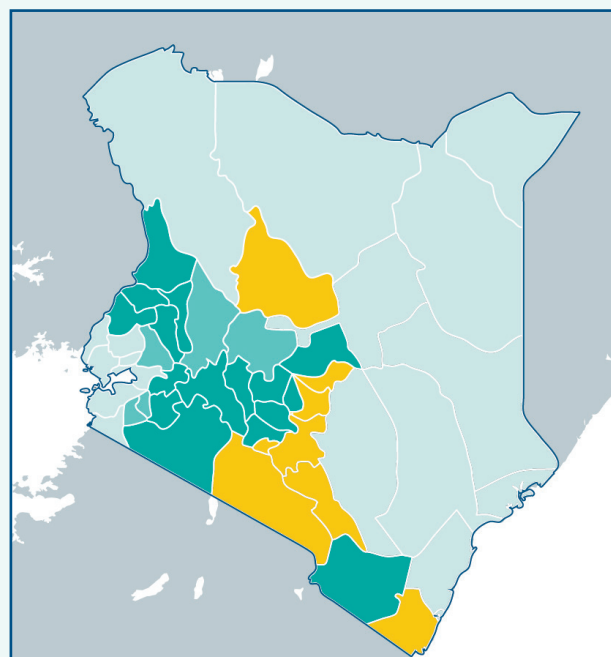
Total production: 3 million tonnes

Total area of production: 161,000 hectares

Number, size and types of producers: 800,000 farmers. An estimated 90% of total production is grown by small-scale farmers as a cash and food crop, and only surplus is sold to the market. Middle-scale farmers are fewer and practice some form of mechanization. There are very few commercial farmers in the industry (0.05%), specifically targeting the market, with operations almost entirely mechanized and higher yields thanks to the adoption of best agronomic production practices.

Type of production: Potato is an efficient crop. It has a short and highly flexible vegetative cycle. Compared with maize, potato crop cycle averages 3.5 months compared with 6 months for maize, and farmers can have 3 cropping cycles per year. Additionally, in terms of yield, data shows that the same quantity of yield can be achieved from 1/8 of a hectare of potato and 1 hectare of maize.

Potato Production

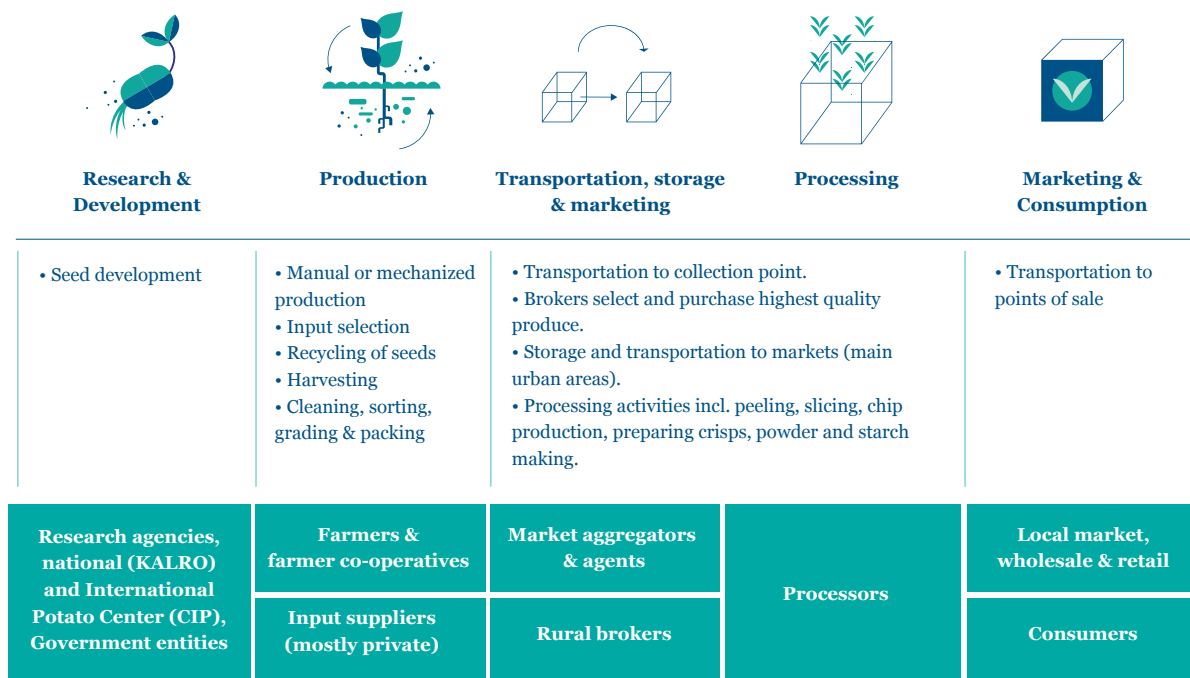


- Established major growing areas
- Emerging major growing areas
- Minor but potential growing areas

For a list of references, see the References Section of the PMCR Report.

The potato value chain

The potato value chain builds on five main processes from research and development to production, processing and consumption. Each process involves specific activities, which are conducted by direct actors and engage identified indirect actors.



Impacts of climate change in the potato value chain

- Potato is clearly impacted by climate risks that disrupt supply and demand systems. At each phase of the value chain, the effect is traceable and does have negative impact on the whole value chain.
- The most vulnerable group are small-scale farmers, given the time period spent on the main processes and with their low capacity to adapt.
- According to the farmers interviewed, in cases of drought, as they don't practice irrigation, they are forced to either watch as their crop dies or replant, depending on the period within the cropping season.



B*Resilient Process Model

Each process of the potato value chain was assessed using the B*Resilient Process Model (BRPM), in order to identify the climate risks associated with each phase and the resilience options and tools available to address these risks, as well as to achieve specific resilience outcomes. The BRPManalysis of the **Production** process is presented below.

Resilience outcome

Climate resilient potato production



Phase I
Input selection and acquisition



Phase II
Crop management



Phase III
Harvesting

Risks

Unavailability of quality seeds
Drought
Flooding

Flooding & water logging
Drought & water stress
Soil erosion & degradation
Pests and diseases

Flooding
Droughts
Weather variability affecting operational conditions
Soil erosion & degradation

Main Actors

Farmers & input suppliers

Farmers

Options & Tools

Seed management, seed bulking & multiplication, seed storage facilities
Agro-dealers for quality and certified seed varieties
Climate monitoring & information services
Early harvesting of immature crops

Good agronomic practices
Mechanical land preparation, staggered planting, adequate application of fertilizers, integrated pest management
Partial irrigation, water harvesting & moisture conservation
Soil testing & precision agriculture, soil conservation practices & technologies
Mapping of flood related risks

Mechanical harvesting
Irrigation systems & partial irrigation
Organic manure
Soil moisture conservation technologies



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Resilience solutions

Leading resilience solutions: Seed development and storage facilities

Seed development

Seed quality and availability remains the highest priority for any impactful investment in the potato value chain. As, the use of recycled seeds by almost 95% of farmers is leading to progressively lower yields in the potato sector. The main reason behind the use of recycled seeds is the unavailability of certified seeds in the market. Policies on seed imports enforced by the government also contribute to these shortages, further increasing seed prices and blocking farmers from accessing them. It is estimated that the market opportunity in potato seeds and main inputs amounts to USD 75 million, representing a significant opportunity for climate sensitive seeds. Unlocking the seed subsector will translate to increased demand for related inputs including the need for mechanization, fertilisers and other agro-chemicals, representing a market value of USD 80 million.



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Storage facilities

Planting and harvesting occur almost at the same time country-wide, resulting in gluts and shortages at predictable times in the year. There is no storage sufficient to with the capacity to absorb the amount of potatoes during gluts, which would not only cushion consumers/processors against shortages, but also be crucial in stabilizing markets and therefore prices. Having adequate storage capacity also reduces post-harvest losses. Seed storage availability would also be needed for farmers to be able to plan their production and ensure timely planting, reducing their exposure to climate risks. The potato storage market value in Kenya is currently estimated at USD 45 million.

In addition to the identified resilience solutions, three **key investment opportunities** were identified within the potato value chain that could unlock the potential of the sector:

- 1. Transport and Logistics services** as key enablers to the potato value chain. In locations where potatoes are grown, poor road networks ground transport systems, leaving farmers aggregators with the challenge of getting their products to market. Moreover, improved transport system is key to accessing inputs and seeds.
- 2. Financial services** for all actors in the value chain. The high costs of financial capital due to high interest rates charged by financial institutions prohibit some producers especially small-holder farmers from investing in resilient and adaptive technologies like water harvesting and irrigation. Access could be improved by lowering the cost through reduced interest rates and making financial products available to value chain actors. To promote the adoption of adaptive technologies, there is an increasing push for eco-oriented financial products e.g. to ensure sustainable soil conservation. Insurance products are available in Kenya, however, uptake is still low due partly to a lack of awareness and the fact that products are costly for producers, who are the main targets. Banks and other financial institutions are also getting into the crop and livestock insurance business, further contributing to increasing availability of adequate financial instruments.
- 3. Climate information services** are becoming quickly crucial for the adequate management of cropping cycles and the overall value chain of potato.