

**SUITABILITY ANALYSIS FOR LOCATION OF POTATO SUPPLY CHAIN ENTITIES USING GIS AND REMOTE SENSIG IN NYANDARUA CUNTY**

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**Chapter 1: Introduction**

**1.1 Background Information**

Potato (commonly known as Irish potato) is the second major source of income and revenue after dairy production in Nyandarua County. Potatoes are fast growing and take much shorter period (75 days) to mature compared to other food crops such as maize and wheat which take up to six months or even one year. This makes it more adaptive to the fluctuating climatic conditions of Nyandarua County that are usually cold and unfavorable for most food crops like maize and beans. Its production in Kenya has been constantly increasing following the call to farmers from the government to diversify their production.

The population of the County as at the last population census of 2009 was 596,268 persons, comprising of 292,155 (49%) males and 304,113 females (51%) (Kenya National Population and Housing Census, 2009). The projected population in 2018 was 712,596 persons; comprising of 349,152 males and 363,443 females (CIDP2, 2017).

In Kenya, potato is the second most important food crop after maize. Its ability to grow in the high-altitude areas where maize does not do well, and its high nutritive value, make it an important food and cash crop for people living in these areas (FAO, 2008). In Nyandarua County, it is the leading cash and food crop.

Despite the fact that there are other counties such as Nakuru, Bomet, Meru and Narok that grow potatoes, Nyandarua County produces about 33% of the total potato production in Kenya (Waithaka M. 2017). This is due to its cool and wet climate with well distributed rainfall all year round and potato varieties that mature fast thus enabling farmers to plant and make a harvest up to three times in one year.

However, the residents face a challenge in the marketing of their produces because of the poor value chain entity facilities and system. The farmers are faced with difficulties in marketing their products due to poor road conditions, lack of specialized storage units, limited processing firms with limited capacity and highly inaccessible marketplaces especially in rainy season. This most of the time leads to exploitation and poor prices given the high perishability nature of the unprocessed potatoes, resulting to great physical and financial loss. The prices also escalate during the recess period, which is usually after prolonged dry period of January which is accompanied by frost that destroys crops in the field, leaving farmers without a harvest and without seed. This situation creates shortages in supply thus making the potatoes too expensive for traders and consumers. There is therefore a need for development of **value addition industries, storage facilities, modern market outlets, and good feeder roads** near the farmers which will ensure controlled and consistent supply that will create some balance and stability in the market price which in turn will ensure that farmers get good returns and traders get reasonable return for their investment and in turn generate more revenue for the county. This should be done because “these facilities are mostly concentrated in and around the consumer markets which provide very little services to the marginal farmers during harvesting” (Kanali C. 2017).

Despite the high potential to contribute in improving welfare of many farmers, potato industry has faced a number of challenges ranging from production, processing, trading and wholesaling and marketing. Potato marketing in particular is poorly structured and farmers generally get very low marketing margin compared to other actors in the value chains. The industrial processing of potatoes is limited to the production of snack type foods such as crisps and other types of snacks specifically for Asian consumers (Kanali C. 2017). The available crisps enterprises are located in Nairobi, over 87km from the County.

The industries will also increase the varieties of products obtained from the potatoes, both the food and non-food products.

This study aims at performing suitability analysis of site allocation on where the different supply chain entities can be established in an effort to reduce the post-harvest loss. The industrial allocation factors will be put into consideration so that the selected locations will have the highest economic value and rate of return.

**1.2 Problem Statement**

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**1.3 Research Questions**

This study will be trying to answer the following questions.

1. What is the state of the current distribution of the supply chain entities in the county?
2. What is the effectiveness of the available supply chain entities on post-harvest loss?
3. How can suitability analysis be used to locate new supply chain entities in order to reduce postharvest loss?

**1.4 Objectives**

The main objective of this study is to perform a suitability analysis for the allocation of additional post-harvest supply chain entities in Nyandarua County in an effort to reduce potato post-harvest loss. The specific objectives will be:

1. To analyze the spatial distribution of the available supply chain entities in county.
2. To determine the relationship between the available supply chain entities and post-harvest loss.
3. To identify suitable locations for additional supply chain entities.

**1.5 Justification of the study**

For every economy to thrive well, good planning has to be undertaken in order to ensure that establishment of industries does not conflict with consistent food production or create ecological imbalance. Sarah (2018) states that the establishment of industries is in the very interest of the societal development but not for individual or political gain.

The population is consistently increasing while the arable land is continually reducing as an effect of desertification, urbanization and demand for more housing even in rural areas. This increased demand for food while the productive land is reducing escalates the risk of a country sustaining itself, to an extent where they have to import food products to satisfy surplus demand, thus creating a need for food security measures.

In its nature, land has vast dynamics that render its utilization uneven. Some areas are more suitable for one type of land use while others are suitable for another and some areas are not suitable at all.

It is in this essence that there is a need to conduct site suitability analysis in Nyandarua County for the possible areas that can be used to serve the different supply chain entities.

This project will be in a position to provide an applicable network analysis that can provide an optimized service area with capabilities to significantly reduce overall production cost while greatly improving quality and availability of potato products.

**1.5 Scope**

This study will cover the confines of Nyandarua County. It will target both the small-scale farmers and large-scale farmers in order to determine how the two categories handle their products after the harvest, to who do they sell and how long do they store their potato after harvest before selling. This study will be carried out in samples with an assumption that the handling in uniform across different farmers and regions.