

SPATIO-TEMPORAL INTEGRATION OF PERIODIC MARKETS IN THARAKA-NITHI COUNTY, KENYA

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ABSTRACT

The study of spatial and temporal integration of periodic markets in Tharaka-Nithi County, Kenya was conducted between December, 2017 and April, 2018. The main objective of the study was to determine the distribution and integration of periodic markets in Tharaka-Nithi County. Descriptive cross-sectional research design was used in this study. The target population was 365,330 and the sample size was 384 respondents. Stratified random sampling technique was used to select the study sample. Respondents who include traders and buyers in each periodic market were determined and a sample of each market proportionately obtained. Data used in this study was obtained from topographical maps, questionnaires, archival records and information provided by market masters and fee collectors. The location and coordinates of markets were attained by use of a GPS (Germin-6 model). Data was analyzed using the Statistical Package for Social Sciences version 22. Distribution of markets analyzed using the nearest neighbor method yielded a Z-score of 10.183 indicating that distribution of periodic markets was regular. Spatio-integration of periodic markets was tested using Pearson product-moment correlation coefficients. The study established that there was a positive correlation between the number of markets and market days ($r^2=0.294$; $P>0.05$). Results of this study indicate that the distribution of periodic markets in Tharaka-Nithi County is inconsistent with the rapid growth of population. Distribution of the periodic markets has resulted to unequal distribution of commodities. This study will help to the County government and policy makers to decide suitable areas for establishment of new markets as well as periodicity. To enhance the contribution of periodic markets in promoting food security, the study recommends both institutional and infrastructural interventions that include improving the layout and quality of physical facilities in the market and road improvement and the construction of new feeder roads. Good rural transport network will ensure efficient flow of goods especially from surplus regions to deficit regions.

Keywords: Spatial, Temporal, Integration, Periodic Markets, Distribution

INTRODUCTION

Periodic market places perform three basic functions with respect to physical produce and manufactured commodities. These are importation of goods and retail distribution, bulking and export of goods and exchange of goods, especially in agro-ecological zones producing different products. The sharp increase in commodity prices constitutes an important opportunity as well as a challenge for natural-resource abundant economies (Kyaka, 1998). The degree to which producers profit from this opportunity depends on how integrated domestic markets are with world markets (how closely domestic prices move with world prices) and how integrated the different country markets are with each other (Gatobu, 2010).

Weak integration implies weak domestic supply responses to higher commodity prices. A non-integrated market is "blind". Producers that are not able to "see" what is highly appreciated in world markets and what is not, are unable to make the best possible decision, which leads to an inefficient outcome. It is estimated that over 60% of Kenya's population living

on the best agricultural land are isolated from the market and hence from the fundamental economic activity of the country (Tharaka-Nithi First Integrated Development Plan, 2017). The percentage is higher in Arid and Semi-Arid Lands because of their relative poor accessibility and lower comparative productivity. Such people do not have a chance of participating in the marketing process. The development and growth prospects of ASALs and their contribution towards total national development can be tapped and maximized by allowing them to have access to ready marketing. The outcome of market integration generates net welfare gains for the society; however, different groups may either gain or lose.

It is important to understand the degree of integration within Kenya, given its peculiar geographical characteristics, understanding what are the factors that explain why some counties are strongly spatially integrated, while others are weakly, or not integrated at all is. Surprisingly, the analysis of determinants of market integration has generally been neglected in the literature, and not much is known about it. In addition,

and to the best of my knowledge, there has been no systematic analysis of the determinants of food commodity price differentials especially the rural markets in Kenya which are built on a periodic market system. More often than not citizens lack proper marketing knowledge. This shortcoming has given the middle men and other scrupulous businessmen an opportunity to exploit the poor by accessing the markets on their behalf. To develop a thriving market economy in Kenya, internal trading patterns should be considered. As aspired, for Kenya to achieve vision 2030 the contributions of rural periodic markets are critical to achieve this goal. With the development of periodic markets, the vast majority of the rural population participates in the development process and therefore brings maximum development benefits to the country. Increased production of locally produced agricultural goods, large quantities of this produce should be marketed locally and regionally for all market participants to benefit (Nyirenda, 2016).

Although it is true that periodic markets play a critical role in the spatio-temporal articulation of economic exchange and social activities, the changing role for both rural and urban environments as well as different groups of population should be evaluated in the context of the general stage of development of a particular region. Markets which are basically interrelated with different geographical aspect perform their functions deeply involved with the behavioral approach of different market mechanisms, growth and its process depending upon the nature and services from hinterland (Wambugu, 1995). These markets provide for exchange not only the required goods and services but also integrate the socio-cultural and economic aspect of the people in that market area. In any country a market place is an important place for commodity exchange. Market places are important and fundamental focal points of economic and social life. A considerably large proportion of the population may be cut-off from markets hence lack opportunity of participating in the market exchange process both locally and nationally.

Spatial market distribution pattern over the geographic space is more important than their absolute number. It is this pattern of distribution which when clustered and concentrated in a few places produces unequal access opportunities for marketing within a region. To facilitate growth of the small market and trade centers and in order to equally benefit the agricultural sector and other productive activities, the government should see to it that it concentrates on providing the badly needed infrastructure. This in turn ensures the development of a prosperous agricultural-market economy (Susan, Wambugu and Calvine, 2018). As long as the majority of the rural population has no

access to markets no meaningful development can be expected to take place. Areas where markets meet frequently and roads are passable, markets operate effectively for both producers and consumers. Periodic markets should be thoroughly understood because they are an important component of the total exchange mechanism in the rural areas of the third world countries. The bulk of in the rural economy majority of less developed countries is primarily dependent on periodic market exchange systems. These markets play a fundamental role of supplying inputs into the small-scale farming and informal manufacturing sectors and are an important location for sales of produce and purchase of low-order goods and services.

Statement of the Problem

Majority of people in the study area depend on rain-fed agriculture. Despite increased agricultural production, people in Tharaka-Nithi County have continued to encounter difficulties in accessing food. This has been attributed to the fact that the upper region of the county receives more rain and thus there is surplus production. The lower zone of Tharaka South and Tharaka North are semi-arid and most often than not the areas experience incidents of food deficits. The scenario has been that areas of surplus have remained with food while areas of deficits have continued to have limited supplies. This point raises the question whether periodic markets amply serve the region efficiently. The scope of the problem is captured by the questions: are the periodic marketing system well integrated? If so, what are spatio-temporal characteristics that enable this? If not what are the limiting factors?

Study Objectives

The objectives were to map spatial and temporal distribution of periodic markets and to determine the spatial and temporal integration of the periodic markets in Tharaka-Nithi County, Kenya.

METHODOLOGY

Study Area

The study was done in Tharaka-Nithi County, Kenya, which is divided into four sub-counties: Meru South, Maara, Igambang'ombe and Tharaka. It covers 2610 km² with a population of 365,330 according to 2009 census. It lies between 00⁰ 07' and 00⁰ 26' South and between longitudes 37⁰ 19' and 37⁰ 46' East (Tharaka-Nithi County First Integrated Development Plan, 2017). Tharaka-Nithi County is one of the 47 counties in Kenya. It borders the county of Embu to the South and South west, Meru to the North and North East. Kirinyaga and Nyeri to the West and Kitui to the East and South East. Embu and Meru Counties are predominantly agricultural counties, while Kitui

County is predominantly pastoral county. The location of Tharaka-Nithi County is depicted in Figure 1.

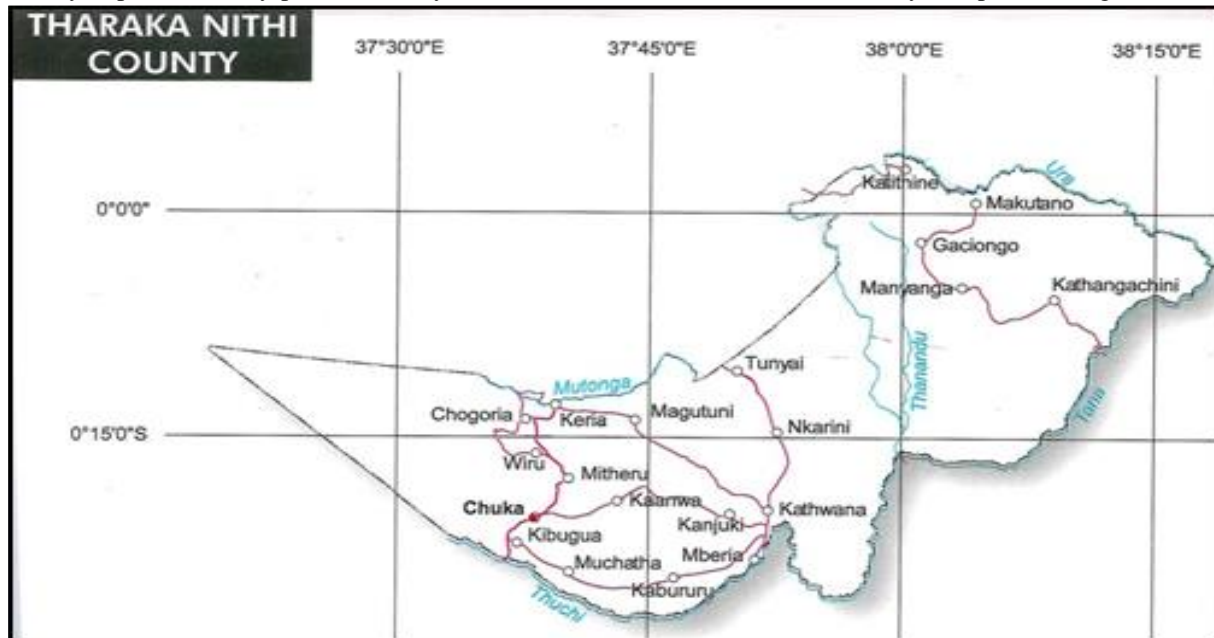


Figure 1. Map of Tharaka-Nithi County. Source: Foundation atlas 1st edition, 2017

Tharaka-Nithi County comprises of a multiplicity of physical and topographical factors which interact to produce average weather conditions. These factors include altitude, latitude, vegetation cover, prevailing winds and nearness to a large water body (Jaetzold, 2007). The highest point in the county is at 5,200m in Chuka Igambang'ombe and Maara while the lowest point is at 600m above the sea level in Tharaka East. The topography of Chuka Igambang'ombe and Maara constituencies is influenced by volcanic activities of Mt. Kenya where major of the rivers originate. Temperatures in the highlands range from between 14^oc to 30^o while that of the lowland areas ranges between 22^oc to 36^oc. The county has a bi-modal rainfall pattern with long rains falling during the months of April to June and short rains in October to December. The rainfall ranges from an average of 2200mm in Chuka forest while in Tharaka it is an average of 500mm. The high altitude areas experience reliable rainfall while middle areas of the county receive moderate rainfall. The low regions of the county receive low, unreliable and poorly distributed rainfall. The climate of the highland regions is favorable for the growth of tea, coffee, maize, beans and a variety of other food crops. However, there are unusual climatic variations arising from climatic change (Tharaka-Nithi County First Integrated Development Plan, 2017).

The county has two distinct broad climatic conditions of wet and dry. This gives the county an advantage of

producing a diversity of crops and livestock. The county is also favoured as an agricultural products piloting zone. Irrigation agriculture is virtually unexploited and has huge potential. The County is rich in forests that are of the montane type and found in the Mt. Kenya forest, Kiera hills and Muunguni hills. The Kiera hills and Muunguni form part of the Nyambene complex. Other gazette forests are Ntugi and Kijege. There are also a number of ungazetted forests such Mutaranga, Mutijwa, Maatha, Tunyai, Nkarini, Kiagu, Gikingo, Muugi, Mariene, Kuiguni and Nyamantu Hills (Tharaka-Nithi County First Integrated Development Plan, 2017). The county is well endowed with several permanent rivers: Thuuci, Ruguti, Naka, Tunga, Nithi, South and North Maara plus lower Kathiita, Mutonga, Kithinu, Ura, Thingithu, Thanantu, Thangatha and Kuru. These rivers, which create great potential for farming and power generation, are tributaries of River Tana which drains into the Indian Ocean. The County has considerable ground water resources, springs and streams, earth and sand dams, rain water and rock catchments. There are a numbers of wetlands in the lower altitude areas (Tharaka-Nithi County First Integrated Development Plan, 2017). Tharaka-Nithi County has two main ecological zones. The upper zone comprises of Maara and Chuka Igambang'ombe which receive reliable rainfall for agriculture. The lower zone covers Tharaka and receives less rainfall suitable for livestock production. Poor farming methods, soil erosion and charcoal burning have left the land bare. The sloping areas have

received uncontrolled soil erosion which has resulted in deep gullies in Tharaka. The drainage consists of streams and rivers that drain into the Indian Ocean through River Tana (Tharaka-Nithi County First Integrated Development Plan, 2017). The choice of Tharaka-Nithi was paramount because it had several agro-ecological zones that gave a face of many regions in Kenya within a small area. This then meant that the information gained here can be generalized.

Study Population

The total population of the County was 306,443 in 1999 population and housing census and 365,330 in 2009 showing an increase of 19% over the 10 year period and an intercensal growth rate of 1.9% per annum. The demographic characteristics of the county are diverse depending on factors like agro-ecological zoning and urban influence among others. Given that these parameters vary in magnitude, both innate and acquired population characteristics such as population size, density, distribution structure, education and income have significant variations (Tharaka-Nithi First Integrated Development Plan, 2017).

Table 1. Population distribution and density in the Tharaka-Nithi Constituencies for 2009, 2012 and 2015

Constituency	2009	Density (km ²)	2012	Density (km ²)	2015	Density (km ²)
Tharaka	130,098	83	137,316	87	144,935	92
Chuka	128,107	205	135,215	216	142,717	229
Maara	107,125	230	113,069	242	119,342	225
Totals	365,330		385,600		406,995	

Source: KNBS, Population and Housing Census, 2009

The highest population density is observed in Maara followed by Chuka and Tharaka. These patterns are explained by the favorable or unfavorable climatic conditions in the relevant constituencies. The areas with high population densities have high agricultural potential as the climatic conditions and soils are suitable for agriculture. People have settled in these areas and the land has been extensively sub-divided.

Selection Criteria

The markets that were considered for the study were markets which were authorized by the county government, ministry of Trade, Industry and cooperative development and had designated market places and official market days. Traders and buyers who operate in these markets were considered eligible for participation in the study. Markets that had no official designated market places and not recognized by the county government were no considered eligible for this study. The study also disregarded all the other days other than official marketing days in a market week. Markets goers who do not participate in trade were also disregarded in this study. Data used was based on a research conducted between December 2017 and February 2018 in Tharaka The aspect of spatio-temporal distribution of periodic markets and the rate of integration of market integration were assessed.

Analytical Techniques

Analysis of spatial-temporal distribution of markets

In order to get statistical measure of the pattern of distribution of the market places the nearest neighbor technique was used as described by (Getis and Boots,

1978) a measure of spatial component helped to determine the location of markets, and indicates whether the market places are more clustered or uniform. The nearest neighbor co-efficient is represented by the formula:

$$R = \frac{\overline{Dobs}}{\overline{Dran}} - \frac{\overline{Dobs}}{1 \div (2\sqrt{N/A})}$$

Where

\overline{Dobs} = the observed mean is the nearest distance between the market places.

\overline{Dran} = the expected mean nearest neighbor distance between the market places, assuming a random distribution in accordance with a Poisson probability function.

N = the number of market places in the study region.

A = the area of study region

To calculate Rn it is necessary to measure the distance between each market place and the nearest neighbor the divide by the total number of measured pairs.

Rn is given by :

$$Rn = \frac{Dobs}{Dran}$$

Where Dran is the mean distance expected from the similar number of points distributed in the same area.

The importance of nearest neighbor is that it provides a test for non-randomness and allows a continuous scale, comparisons to be made of two or more spatial distributions. The value of the index ranges from 0 to

2.15 However, R_n is a numerical descriptive statistical index of the spatial form of a pattern. An index to show how close to uniform the distribution of periodic markets is and the statistical evidence that it is not most unlikely that such a pattern arose from chance should be computed. This is standardized using a Z-score.

$$Z = (\text{Dobs} - \text{Dran}) \div \delta\text{Dran}$$

$$\delta\text{Dran} = 0.26136 \div (\sqrt{N(N/A)})$$

where

Z = normal standard variate to the nearest neighbor statistic, R_n .

δDran = standard error for expected mean distance between market places assuming a random distribution.

Weakness of R_n index is that it does not distinguish between a single and a multi clustered pattern. R_n also averages sub-patterns which may exist within the area and hide contrasting patterns which cancel each other out. The choice of a second nearest neighbor is possible and may produce different results.

Analysis of Spatio-Integration of Periodic Markets

Pearson product-moment correlation coefficients were used to analyze the spatio-integration of periodic

markets. Market days and the number of markets were correlated. This enabled the researcher to meaningfully describe the rate of integration of market and evaluate their efficiency in food distribution.

RESULTS AND DISCUSSION

Spatio-Temporal Distribution of Periodic Markets in Tharaka-Nithi County

The first objective of the study was to map spatio-temporal distribution of periodic markets in Tharaka - Nithi County. In this regard, a survey was carried out to locate the periodic markets (Figure 1.2). Tharaka-Nithi has a total of 19 urban centers majority of which have designated periodic markets. Out of 19 markets 11 are located in the upper zone of the county and the rest are sparsely distributed in the lower zone. This distribution can be attributed to high population in upper zone as compared lower zones thereby necessitating the need for more markets in the upper zone. Distance between respective markets, their location and elevation were determined using topographical maps and GPS.

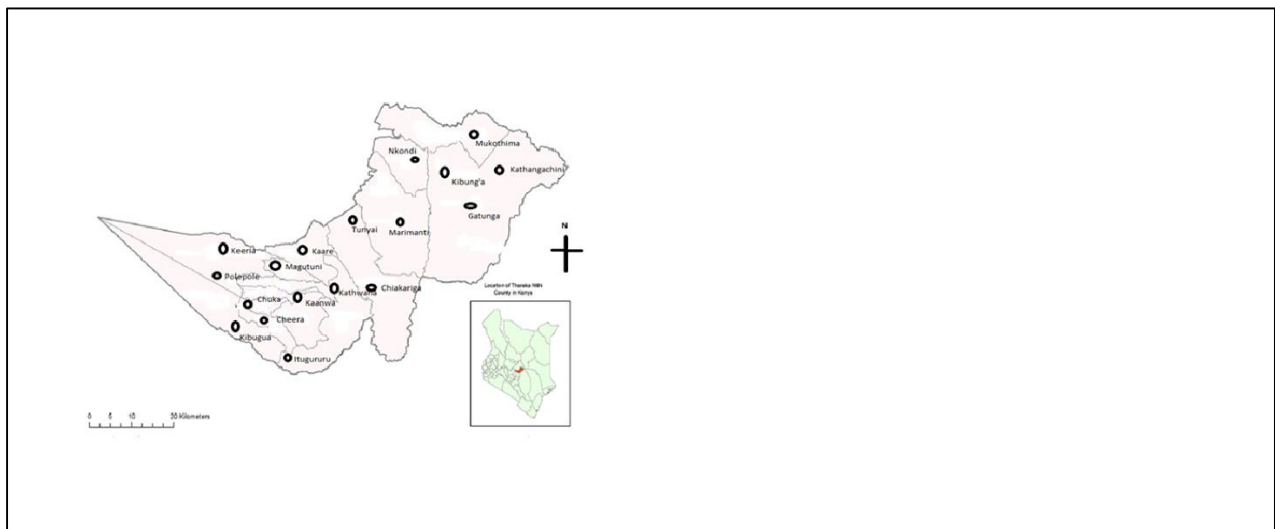


Figure 2: Periodic markets in Tharaka-Nithi County

Source: Tharaka Nithi Integrated Plan, (2017)

A measure of spatio-temporal distribution is useful in determining whether the market places are clustered or uniform. Spatio-temporal distribution of periodic markets in Tharaka-Nithi was determined using data on the number of markets as shown in Table 2 and the nearest distance between the markets was worked out. Nearest neighbor hypothesis was used to test the

hypothesis that “periodic markets in Tharaka-Nithi County are not uniformly distributed.

$$\sum \text{NNI} = 247.3$$

$$N = 19$$

$$(\text{NNI}) \div N = 13.0158 (\text{Dobs})$$

$$\text{Area} = 2610 \text{Km}^2$$

$$\text{Dran} = 5.8602$$

Rn = 2.140

Theoretically, the nearest neighbor statistic varies from 0.00 complete aggregations through 1.00 random distributions to 2.140 regular arrangements of markets in a hexagonal pattern (Wambugu, 1995). The computation tends to suggest that there is disparity in the distribution of periodic markets. An Rn of 2.140 suggests a regular distribution of periodic markets. The regular distribution of these markets could be affected by the distribution of the population and surpluses in production and other economic factors. The Rn of 2.140 may be meaningless unless it is standardized

using the Z-score. The Rn is used to check if the observed pattern has arisen from pure chance.

The Z-score is computed as shown below:

$$Z = (\text{Dobs} - \text{Dran}) \div \delta\text{Dran}$$

Where

$$\delta\text{Dran} = 0.26136 \div (\sqrt{N(N/A)})$$

$$Z = (\text{Dobs} - \text{Dran}) \div \delta\text{Dran}$$

The computed Z = 10.183. The value is large and therefore we reject the null hypothesis and conclude that the distribution of periodic markets is regular. This is due to the nature of population distribution.

Table 2. Elevation and co-ordinates of periodic markets in Tharaka-Nithi County

Markets	Elevation	Southings	Easting
Kaanwa	1109m	00°19.308'	037°43.149'
Kathwana	726m	00°19.918'	037°52.102'
Ciakariga	803m	00°16.11'	037°55.484'
Marimanti	593m	00°10.512'	037°50.227'
Tunyai	898m	00°09.32'	037°49.10'
Magutuni	1121m	00°13.03'	037°44.093'
Keeria	1381m	00°12.824'	037°39.404'
Polepole	1410m	00°13.780'	037°38.895'
Itugururu	1153m	00°25.047'	037°42.586'
Kibugua	1183m	00°22.151'	037°37.194'
Nkondi	540m	00°04.996'	037°55.384'
Chuka	1402m	00°19.33'	037°54.167'
Mukothima	532m	00°01.120'	037°57.090'
Cheera	1320m	00°22.314'	037°38.236'
Kaare	1110m	00°06.52'	037°47.49'
Kathangacini	500m	00°05.089'	038°13.111'
ShauriYako	511m	00°06.125'	038°15.236'
Kibung'a	980m	00°04.34'	037°55.06'
Gatunga	600m	00°10.630'	037°50.677'

Source: Field work (2018)

Table 3. Periodic markets and their distances to the nearest neighbour

Market	Nearest Neighbour	Distance in km
Chuka	Kibugua	6
Kibugua	Itugururu	11
Chuka	Kaanwa	8.9
Cheera	Chuka	10
Kaanwa	Kathwana	22.4
Kathwana	Chiakariga	12
Keeria	Polepole	3
Magutuni	Keeria	10
Kaare	Magutuni	10
Kathwana	Tunyai	21
Marimanti	Kibung'a	10
Nkondi	Marimanti	15
Marimanti	Gatunga	10
Mukothima	Marimanti	22
Marimanti	Shauriyako	10
Kathwana	Marimanti	30
Itugururu	Cheera	8
Cheera	Kaanwa	10

Polepole

Chuka

18

Source: Field work (2018)**Spatio-temporal Integration of Periodic Markets**

The second objective of this study was to examine the spatio-temporal integration of periodic markets. Data on the number of markets and respective market days is shown in table 1.3. Periodic market days need to be scheduled in such a way that a single market excursion enables a trader to visit as many markets as possible (Berry, 1967). This is possible if each day of the marketing week a market is assigned. The temporal spacing of markets should be in such a way that maximum flow of goods and services let traders move to most markets as they can get large number of buyers. Lado (1990) periodic markets are supposed to be arranged in such a way that they are both are spatially and temporally integrated so as to enhance the long term areal demand in order to avoid competition of several markets operating the same day.

The system of periodicity provides an adjustment to the agricultural system only one marketing day in a seven-day- week means six rest days or days of other agricultural activity and rural folk get sufficient time for relaxation as well as for preparation for the next visit to the market. The frequency of occurrence of these markets varies widely, so that meeting occurs at a given place every second, third or nth day where n rarely is greater than three. In order to perform these special functions the markets are held at predetermined

specific sites according to set of temporal schedules on every second, third or nth day where rarely is greater than seven. The periodic markets studied in the Uttar Dinajpur District have specific market days, where the dominant economic function is bulking and distribution of farm produce and local food processing products. So from functional organization, periodic markets are one of the most important characteristics of the functioning of the marketplace sub-organizations.

During field study it was very much critical to judge which factors are responsible for the occurrence and persistence of the periodicity regime. Otherwise, these market sites are deserted during the workweek. The frequency of market meetings varies from market to market. 35.9% of the markets meet weekly, 61.2% meet twice weekly, 2.4% meet three times weekly. It has been investigated that weekly markets are more dominant and simultaneously the mean attendance in weekly market places is larger than those of the bi-weekly market places. On the basis of the above inference it has been investigated that weekly markets serve a wider area because the availability of a variety of goods and services that encourage the client to visit maximum range. As a result threshold surpasses the limit of services in market places. Later on the periodicity of market places also is an expression of the combined consequence of socio-ethnic views.

Table 4. Periodic markets marketing days

Periodic Market	Market Day	Periodic Market	Market Day
Kaanwa	Monday and Thursday	Nkondi	Tuesday
Chiakariga	Monday	Mukothima	Friday
Magutuni	Wednesday and Saturday	ShauriYako	Saturday
Kaare	Monday and Thursday	Kathangacini	Wednesday
Kathwana	Wednesday and Saturday	Cheera	Sunday
Itugururu	Wednesday	Kibugua	Saturday
Tunyai	Friday	Chuka	Tuesday and Friday
Gatunga	Wednesday	Keria	Tuesday and Friday
Kibunga	Sunday	Polepole	Sunday

Source: Researcher (2018)**Temporal Distribution of Periodic Markets in Tharaka-Nithi**

After examining the spatial and temporal distribution patterns, they are analyzed together to establish how well they are integrated in the market system. After analysis of separate components of spatial and temporal distribution in the county together, the complex relationship between spatial location and temporal periodicity indicates the relationship of how the marketing systems are integrated. Highly integrated

marketing systems have inverse relationships between spatial and temporal while poorly integrated markets have direct relationship. This relationship indicates the efficiency of the market network. The higher the degree of spatio-temporal integration the higher the efficiency of the marketing network. Many factors determine which centers are to be designated as market centers. Factors like population density and accessibility also play a significant role. As shown in the Table 4 and Figure 3. Friday is the most popular marketing day with

a temporal distribution of 5 days. Monday, Tuesday and Thursday have a temporal distribution of 3 while

Saturday, and Wednesday have a temporal distribution of 5.

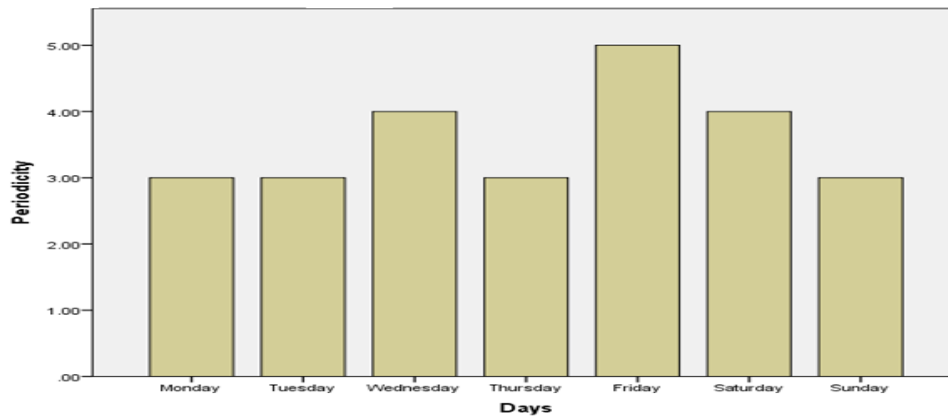


Figure 3. Temporal distribution of periodic markets in Tharaka-Nithi

The percentage distribution of market and marketing opportunities the sub-counties are as follows Meru-South sub-county accounts for 32% of total marketing opportunities in the sub-county Maara sub-county is the second largest with a total of 28 % of total marketing opportunities. Tharaka- North and Tharaka-South have 16% and 24% respectively of the total distribution. This high percentage of marketing opportunities in Meru-South sub-county can be attributed to the high population density in the sub-county. The low percentages of marketing opportunities in Tharaka-North and Tharaka-South were due to the sparse population in these areas

Pearson Correlation of Market with Marketing Days

A positive correlation value of positive ($r=0.294$; $P>0.05$), indicate that there is no significant relationship between spatial distances and temporal separation of periodic markets. Fagerlund and Smith (1970) revealed that relationships existing between spatial locational patterns and temporal periodicity of different markets have a degree of determining their spatio-temporal integration. The economic role of periodic markets has a major influence on the spatial organization of market places in a region. The economic roles of these markets transcend beyond the need for a localized neighborhood exchange process. Therefore, the development of periodic markets in Tharaka-Nithi County has been largely because of facilitating interregional trade. Spatial mobility of traders gave rise to market sites being strategically located and thus resulting to maximum spatio-temporal

integration. It can therefore be concluded that the physical spacing of periodic markets whose trading days are separated by different lengths of time do display a certain degree of order.

CONCLUSION

It is evident that there is disparity in distribution of periodic markets in Tharaka-Nithi County. This study established that Meru South Sub-County had the most markets at 32%, Maara 28%, Tharaka South 24% and Tharaka North at 16%. This study therefore recommends that the County should consider putting up new markets in areas where market participants have to walk long distances to access services and sell their produce. This is evident in Tharaka South and Tharaka North. Markets like Kathangacini and Shauriyako are located at the furthest end of the county. The high cost of transport affects the prices and availability of commodities Therefore establishment and expansion of periodic markets should follow considerable planning. This is because their establishment should be followed by social urban and economic developments like setting up of an administration, education and health facilities. The planning implications of this, is that, the success of periodic market is an indicator for potential establishment of a successful rural service center. On the spatial temporal integration of the periodic markets in Tharaka-Nithi county it was noted that areas with better road networks necessarily exhibited better market integration because of the important role played by the accessibility in the process of integrating markets. Incorporating more market days in the

marketing calendar especially in pockets of high population density is very paramount. This will increase more opportunities to the traders and ease congestion during market days. Improvements in the overall efficiency of periodic markets can be achieved in the presence of comprehensive local pricing policy that recognizes production realities of the economy. The study also established that very few markets have permanent structures and therefore priority should be given to these areas that lack basic infrastructural facilities. The county should consider organizing local and international trade exhibitions for effective networking to promote cross border trade. The county should put up industries that would help in value addition to the agriculture products to enhance better incomes. The residents of this county should embrace new farming technologies in order to increase more goods for sale hence diversify sources of income with appropriate infrastructure, the County has the capacity for value addition of its livestock and crop produce. A primary target for value added products would be markets in other parts of Kenya and beyond. For example, drier zones produce high quality honey which can be processed, branded and marketed locally and internationally to support the region's economy.

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