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KENYA AGRICULTURAL DEVELOPMENT STATUS ASSESSMENT[1]

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KENYA

AGRICULTURAL DEVELOPMENT STATUS ASSESSMENT

The agenda of the 2014 Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods presents challenges given the number of commitments and goals. The original Maputo commitments of achieving a 6 percent annual agricultural growth rate and a 10 percent agricultural expenditure share were upheld by the Malabo Declaration and remain core CAADP commitments. The new commitments outlined in the Declaration include the goals of ending hunger and halving poverty, boosting intra-African trade in agricultural commodities and services, enhancing resilience to climate variability and other related risks, and mutual accountability to actions and results through a review process of the progress made in implementing the provisions of the Declaration.

The CAADP Results Framework 2015-2025 has been developed as a key tool for translating Africa's agricultural development vision and goals into tangible outcomes and for tracking, monitoring and reporting on progress as well as for facilitating mutual learning and accountability. A key challenge for operationalizing the Results Framework is ensuring adequate data is accessed and used, and credible analysis is undertaken, not only in monitoring progress but also in helping to inform future planning and programming.

Two sets of metrics in line with the above goals and commitments have been identified to measure targets, define milestones, and guide progress and performance tracking and review. The first set deals with overarching goals and targets such as achieving 6 percent agricultural growth, reaching a 10 percent agricultural expenditure share, eliminating hunger, and halving poverty. The second set covers metrics detailing goals and targets that are made under each of the specific thematic areas covered under Malabo, i.e. inclusive growth and value chain development, regional trade, nutrition, gender, climate smart agriculture, and mutual accountability. Relevant indicators in the Results Framework are considered and additional complementary metrics are proposed and used to ensure that status assessments and program and investment plan design are comprehensive enough to meet the vision outlined by Malabo.

In this assessment, the status and progress of Kenya on each of the metrics related to the Malabo goals and commitments is evaluated. The metrics defined here deal with goals and commitments at the continental level. Therefore, country-specific goals and targets as well as policy and institutional commitments that are defined in existing country investment plans need to be defined and assessed. For quantitative indicators, first a baseline measurement showing average values during a reference period is established. Second, the average level during the National Agricultural Investment Plan (NAIP) period is compared to the reference period. For qualitative indicators, such as those regarding policy and institutional quality and adequacy, current status is assessed as well as any available information on progress during the period of the NAIP.

1. Agricultural Investment and Growth and Poverty Reduction

The CAADP Results Framework identifies a number of overarching indicators or metrics to quantify key CAADP and Malabo commitments that are linked to achievement of goals and targets in all thematic areas. They are complemented by metrics and indicators linked to the specific targets and commitments stated by individual countries in their respective NAIPs as instruments for the implementation of CAADP. Discussion around the state of progress made in the overarching goals are organized in the below three categories, each including a number of metrics and indicators:

i) Government agricultural expenditure
- Government agricultural expenditure growth rate
- Share of government agricultural expenditure in total government expenditure
- Government agricultural expenditure as share of agriculture value added

ii) Agricultural productivity and growth
- Agriculture value added per agricultural worker
- Agriculture value added per hectare of arable land
- Productivity of major commodities
- Growth rate of output for major commodities
- Agriculture production index
- Agriculture value added
- Growth rate of agriculture value added

iii) Agriculture-led growth and poverty reduction
- Growth rate of agriculture value added per capita
- Growth rate of GDP per capita
- GDP per capita
- GNI per capita, PPP
- Gini coefficient
- Number of jobs created per annum
- Employment rate
- National poverty headcount, at national poverty line
- Rural poverty headcount, at national poverty line
- Extreme poverty headcount ratio, at international poverty line of $1.90/day

In this section, we assess the status and progress made in overarching indicators or metrics identified in the CAADP Results Framework and in other further discussions to quantify key CAADP and Malabo commitments that cut across, or are linked to achievement of goals and targets in all thematic areas. The assessment compares the state of overarching metrics before and during the implementation of the Medium Term Investment Plan (MTIP) in Kenya. It does not account for uneven performance triggered by crises that have occurred before and during MTIP implementation. Detailed results for Kenya are presented in Table 1.1.

The Government Agricultural Expenditure (GAE) growth rate increased significantly during MTIP implementation. The declining annual growth rate of -1.6 percent on average during the reference period of 2003-2007 was reversed during MTIP implementation to reach 5.6 percent. However, **GAE as a share of total expenditures** stagnated at 3.8 percent and **4.0 percent** before and during the MTIP period. It remained below the 10 percent CAADP target. A similar trend was observed in GAE relative to agriculture value added – i.e., spending intensity – as the ratio increased slightly from 3.3 percent before the MTIP to 3.9 percent during the MTIP.

Agriculture value added per agricultural worker and per hectare of arable land were 39.5 percent and 50.3 percent higher on average during the MTIP period as compared to the reference period. Yields of major crops declined or slightly increased between the two periods, except cassava, which showed a higher yield increase. This has led to a small increase in total agricultural production between the reference and the MTIP periods. The **growth rate of agriculture value added** increased from 3.6 percent per year on average during the reference period to **4.8 percent** per year on average during the MTIP period, but this rate is still below the CAADP target of 6 percent.

The growth rate of per capita agriculture value added increased from 0.9 percent per year on average in the reference period to 2.1 percent per year on average during the MTIP period. However, GDP per capita grew by 17.1 percent between the two periods, with an average growth rate of 2.7 percent per year prior to the MTIP and 3.2 percent per year during the MTIP. This indicates that GDP growth was led by non-agricultural sectors. The number of jobs created per annum increased by 17.8 percent between the reference and MTIP periods. The average employment rate reached 55.4 percent during the MTIP period against 54.0 percent during the reference period. Data limitations on poverty indices do not permit a discussion of the poverty outcomes of Kenya's **non-agriculture-led economic growth**.

Table 1.1-The status and progress of Kenya's agricultural investment, growth and poverty

Metrics	Data Source	Reference Period			MTIP Period	Change between MTIP and Reference	
		Average 2003-2007	2008	2009	Average 2010-2014	Value	Unit
Government agricultural expenditure growth rate (%)	ReSAKSS	-1.6	3.1	27.4	5.6	7.2	pp
Government agricultural expenditure (% of total government expenditure)	ReSAKSS	3.8	3.2	3.9	4.0	0.2	pp
Government agricultural expenditure (% of agriculture value added)	ReSAKSS	3.3	3.0	3.6	3.9	0.6	pp
Agriculture value added per agricultural worker (constant 2005 USD)	ReSAKSS	360	369	394	503	39.5	%
Agriculture value added per hectare of arable land (constant 2005 USD)	ReSAKSS	824	862	938	1,238	50.3	%
Yield for individual crops (Ton/Ha)							
Wheat	FAOSTAT	2.5	2.6	1.7	2.6	4.9	%
Cassava	FAOSTAT	9.0	13.7	11.6	11.4	26.2	%
Sugar cane	FAOSTAT	86.5	93.9	85.3	76.7	-11.3	%
Coffee green	FAOSTAT	0.3	0.3	0.3	0.3	6.6	%
Tea	FAOSTAT	2.3	2.2	2.0	2.1	-8.4	%
Growth rate of output for individual commodities (%)							
Wheat	FAOSTAT	1.6	4.5	-34.9	25.1	23.5	%
Cassava	FAOSTAT	5.1	88.8	9.2	15.8	10.6	%
Sugar cane	FAOSTAT	3.1	-1.8	9.8	3.2	0.1	%
Coffee green	FAOSTAT	1.0	-21.3	28.6	-5.6	-6.6	%
Tea	FAOSTAT	5.5	-6.4	-9.1	9.1	3.6	%
Agriculture production index (2004-2006=100)	ReSAKSS	99.1	110.5	115.8	121.1	22.2	%
Agriculture value added (Billion US$)	WDI	4.9	8.0	8.6	13.1	169.6	%
Growth rate of agriculture value added (constant 2005 US$)	WDI	3.6	-5.0	-2.3	4.8	1.2	pp
Growth rate of agriculture value added per capita (constant 2005 US$)	WDI	0.9	-7.5	-4.8	2.1	1.1	pp
Growth rate of GDP per capita (constant 2005 US$)	WDI	2.7	-2.4	0.6	3.2	0.5	pp
GDP per capita (constant 2005 US$)	WDI	526.9	551.1	554.3	617.1	17.1	%
GNI per capita, PPP (constant 2011 international $)	WDI	2,271.1	2,388.4	2,402.0	2,670.1	17.6	%
Gini coefficient	WDI	48.5					%
Number of jobs created per annum*	WDI	614,190	674,681	739,159	723,355	17.8	%
Employment rate (% of population)	WDI	54.0	54.3	54.6	55.4	1.4	pp
Poverty headcount ratio, national (% of population)**	ReSAKSS	43.4					
Poverty headcount ratio, national (% of rural population)**	ReSAKSS	49.1					
Poverty headcount ratio at $1.90 a day (2011 PPP) (% of population)**	ReSAKSS	43.4					

Legends: *ReSAKSS*: Regional Strategic Analysis and Knowledge Support System; *WDI*: World Development Indicators; *FAOSTAT*: FAO Statistical database; pp: percentage point; * Calculation from employment rate and population from the WDI database; **** Poverty measures for year 2005.

2. Inclusive Growth and Value Chain Development

This section establishes the baseline values for selected indicators to assess the status and progress made in achieving the CAADP goals on inclusive growth and value chain development for Kenya. The following indicators have been proposed for the theme of inclusive growth and value chain development:

- Yields for the top five priority commodities
- Percent share of output of top five priority commodities that is lost post-harvest
- Growth in private sector investment in agriculture and agribusiness
- Growth in sub-sector value added
- Share of agricultural output that is processed
- Overall employment in agricultural value chains and share of women and youth in total employment
- Number of brands of processed local staples
- Number of local brands of processed staples for sale in major supermarket chains

One challenge in establishing baseline values for the indicators is that secondary data on many of these variables are not available. Eventually, statistical agencies may begin to collect and disseminate these variables, but in the meantime, it is necessary to work with what is available. This note focuses on agricultural variables that are currently available from international databases, primarily those provided by the Food and Agriculture Organization (FAO) through its FAOSTAT database and those supplied by the World Bank in its World Development Indicators database.

For this analysis, we define the top five priority commodities in terms of the value of production. We also present information on the foods with the largest contribution to caloric intake in the diet. While there is substantial overlap between the two lists, there are also notable differences.

The food consumption data are based on the FAO Food Balance database for the most recent year available, 2013. Data on the area, production and yield of crops is based on the FAO Crop Production database, taking the average of 2009-2011 in view of the weather-related volatility of these statistics.

Table 2.2 shows the top five food items in Kenya in terms of contribution to caloric intake in the diet. Maize is the most important staple food, accounting for 31 percent of total caloric intake. Wheat, milk, sugar, and beans are also in the top five. Together, they represent 63 percent of the caloric intake of the Kenyan population. Kenya is one of the few African countries with a large wheat growing sector, although domestic production is supplemented by imports. The presence of milk as one of the five most important food items in the diet reflects the unusually large and dynamic dairy sector in the country.

Table 2.2-Food items in Kenya ranked by caloric contribution to the diet

Food item	Caloric intake (kcal/day/pers)	(percent)
Maize	671	30.9
Wheat	255	11.7
Milk	173	8.0
Sugar	152	7.0
Beans	115	5.3
Other		37.1
Total		100.0

Source: Analysis of FAO Food Balance Sheet data (FAO, 2016d)

Maize is also the most important crop in terms of the value of production, as shown in Table 2.3. On the other hand, the other four crops (potatoes, bananas, tea, and mangoes) do not appear in the top five by caloric intake. Tea is a major export crop, and mango exports have been expanding rapidly in recent years, although most mangoes are produced for domestic consumption. Potatoes and bananas are produced primarily for domestic consumption.

Table 2.3-Crops in Kenya by value of production

Crop	Value of crop production (US$ million)	Share of the value of crop production (percent)
Maize	491	12
Potatoes	460	11
Bananas	446	11
Tea	424	10
Mangoes	332	8
Other crops	1,942	47
Total	4,095	100

Source: Analysis of FAO data on value of crop production (FAO, 2016b)

The area, yield, and production of the five most valuable crops in Kenya are shown in Table 2.4. Maize is grown on over 2 million hectares in Kenya, reflecting its status as the main staple crop in the country. The yield is 1.5 t/ha, resulting in production of about 3 million tons of grain. Tea is grown on less than one-tenth of the area and has a similar yield, resulting in a harvest of 363 thousand tons. It maintains a place among the five most valuable crops because of its high unit value. Potatoes, bananas, and mangoes are grown on even smaller areas, but have much higher yields, ranging from 14 t/ha for mangoes to almost 21 t/ha for bananas.

Table 2.4-Production of major crops in Kenya

Crop	Harvested area (1000 ha)	Yield (t/ha)	Production (1000 t)
Bananas	72.21	20.68	1,489.35
Maize	2,008.20	1.53	3,093.47
Mangoes	36.82	14.02	512.46
Potatoes	121.73	20.24	2,463.43
Tea	172.69	2.11	363.71

Source: Analysis of FAO crop production statistics (FAO, 2016b)

Table 2.5 shows the yield trends of the five most valuable crops in Kenya. Bananas, mangoes, and potatoes show a clear trend toward increasing yields over the past 15 years, but maize and tea show do not show any apparent trends.

Table 2.5-Yield trends for major crops in Kenya

Year	Crop Bananas	Maize	Mangoes	Potatoes	Tea
2000	13.83	1.44	7.49	6.18	1.96
2001	13.98	1.70	10.86	9.16	2.37
2002	13.73	1.51	10.59	7.71	2.18
2003	12.81	1.62	7.50	9.67	2.23
2004	12.68	1.93	7.38	8.44	2.37
2005	15.00	1.64	14.33	20.00	2.32
2006	15.00	1.72	11.69	20.00	2.11
2007	15.00	1.81	16.42	20.00	2.48
2008	20.38	1.39	17.70	21.48	2.19
2009	24.14	1.29	14.57	19.12	1.98
2010	18.97	1.73	15.99	22.43	2.32
2011	18.93	1.58	11.51	19.17	2.01
2012	23.97	1.74	11.88	20.34	1.94
2013	23.24	1.69	12.36	14.43	2.18
2014		1.66		14.07	

Source: Analysis of FAO crop production statistics (FAO, 2016b).

3. Regional Trade

With regard to intra-African trade, the CAADP Results Framework includes the first two metrics listed below. In addition, complementary metrics have been suggested to better cover and inform NAIP design, appraisal and tracking. However, data availability permitted to cover only the first two indicators below in this assessment:

- Value of intra-African trade
- Domestic food price index volatility
- Changes in values and volumes of total imports and exports of key agricultural commodities
- Changes in values and volumes of intra-regional imports and exports of key agricultural commodities
- Share of formal/informal, registered/non-registered trade
- Share of women-owned businesses and their volume of transactions and cost and profit levels
- Symmetric trade introversion index (STJ)
- Nominal and effective rates of assistance for agricultural commodities
- Tariff equivalence of non-tariff barriers to trans-border trade

Value and change in intra-African agricultural trade profile

This section analyses the changes in the intra-African trade position of Kenya between the period preceding the launching of the CAADP process in Africa and the period of the implementation of Kenya's NAIP. It focuses on changes in the *net values of intra-African trade* – exports net of imports – of agricultural and food commodities. The latter are differentiated into 17 commodity groups, including staple food and cash-value commodities. The analysis also covers an assessment of the importance of African markets (versus non-African markets) as destinations for the country's exports and as origins for the country's imports of the different agricultural commodity groups. The resulting profile shows the particular progress made by the country during the NAIP implementation years in terms of its participation in African markets for agricultural and food commodities.

Kenya participates in intra-African trade both as an exporter and as an importer of most agricultural commodities, as can be seen in Table 3.1 below. The table presents the country's agricultural trade performance in African markets during the first NAIP period as compared to the period preceding the launching of the CAADP process. Due to data availability, the NAIP years are here restricted to 2010-2013, although the country's NAIP, the MTIP, actually covers the period 2010-2015. The table includes two panels. In the left panel, average values of intra-African exports and imports by the country can be compared within each period and between the two periods under analysis. In the right panel, the table captures how exports as well as imports have evolved during the MTIP period through growth multiplier indices, which measure by how much export or import values have been multiplied between 2010 and 2013. A multiplier index smaller (greater) than 1 indicates a contraction (an increase) in exports or imports between 2010 and 2013.

Comparing average export and import values, it appears that in 1998-2003 Kenya was a net exporter of agricultural products as a whole in African markets. However, the country's trade position in African markets is more nuanced for the different commodity groups under consideration in Table 3.1. Kenya was indeed a net exporter of live animals, live trees & plants, vegetables, coffee & tea, spices and edible oils in the sense that these products were exported to African markets in higher values than they were imported from the same markets. Still, the country was a net importer of many other commodities including, most notably, fish & animal products, edible fruits & nuts, cereals, and sugar. The country's net trade position in African markets remained unchanged between the periods 1998-2003 and 2010-2013 for all commodities,

except for live trees & plants and vegetables, for which Kenya became a net importer in African markets. Overall, Kenya's agricultural trade in African markets increased tremendously from US$ 62 million to 117 million in net exports, on average, between the two periods. Figure 3.1 below illustrates how Kenya's net trade position has evolved between the two periods for different groups of staple food products. The country has remarkably intensified its participation in African markets of edible fruits & nuts, cereals and oilseeds as a net importer and in African markets of live animals and edible oils as a net exporter. It has significantly reduced the size of its net imports of fish & animal products and has changed from a net exporter to a net importer of vegetables. Whether these trends have been observed between 2010 and 2013 while the NAIP was being implemented is now analyzed in the right panel of Table 3.1.

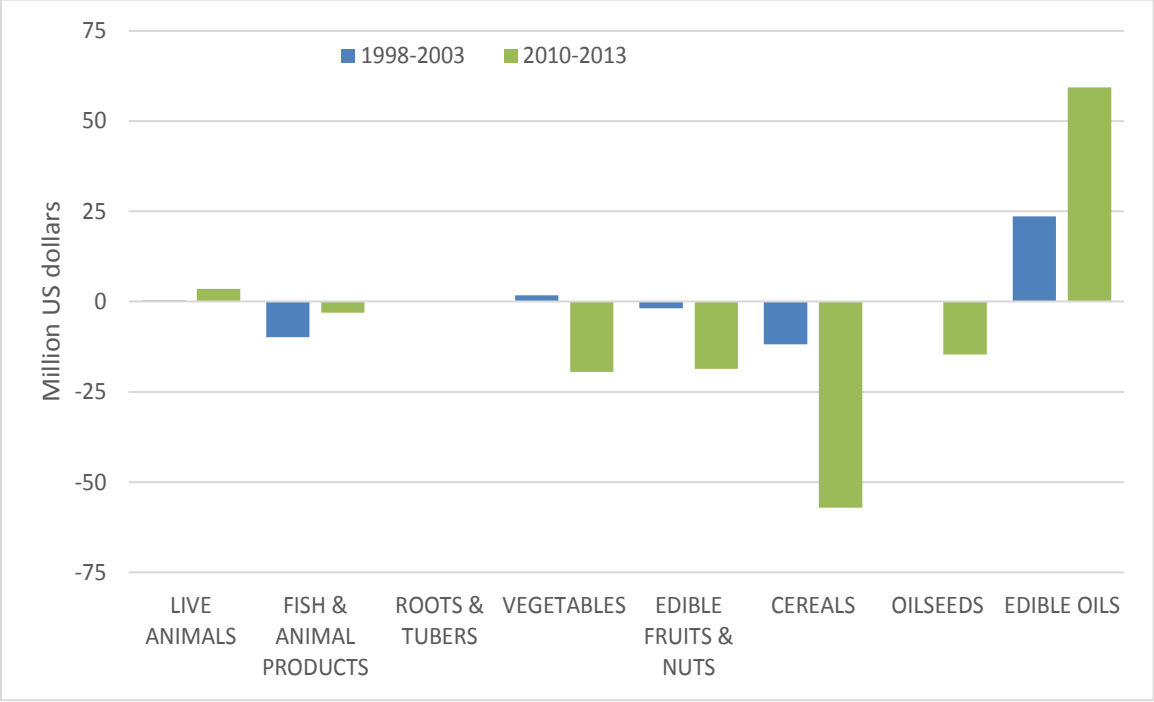
Kenya's aggregate agricultural exports to African markets fell by 10 percent between 2010 and 2013, while there was no significant change in aggregate agricultural imports from the same markets. More specifically, exports of live animals, cereals, oilseeds, edible oils and sugar declined by 10 percent-60 percent while imports of the same commodities increased less markedly or decreased. In contrast, exports of fish & animal products and vegetables increased more rapidly than imports. These trends show that Kenya's participation in regional and extra-regional markets in Africa is crucial not only for the Kenyan economy but also for the economies of its African partners. In Table 3.2 below we consider how important African markets are compared to non-African markets for Kenya's exports and imports.

Table 3.1-Change in Kenya's intra-African agricultural trade performance

	Average trade value (US$ 1000)				Average growth multiplier	
	1998-2003		2010-2013		2010-2013	
	Export	Import	Export	Import	Export	Import
Live animals	463	100	4177	620	0.8	1.1
Fish & animal products	2583	12433	21702	24741	1.4	1.0
Roots & tubers	19	9	198	27	0.0	
Other live trees and plants	2749	1402	3628	4864	1.0	0.7
Vegetables	3786	2011	11101	30614	1.5	1.1
Edible fruits & nuts	537	2392	1723	20341	1.0	1.6
Coffee & tea	107952	50499	292141	139312	1.0	1.7
Spices	751	261	3007	1664	1.1	1.6
Cereals	5915	17757	10475	67562	0.4	0.8
Oilseeds	579	597	368	15029	0.4	2.3
Edible oils	24446	867	66847	7467	0.9	1.3
Cane or beet sugar	5535	36845	895	86465	0.4	0.8
Cocoa beans	2	22	1	125		3.5
Hides & skins	511	645	570	3850	1.0	0.5
Cotton, not carded or combed	138	1504	24	1023		0.3
Cotton, carded or combed	103	2615	57	5035		1.7
Other agricultural products	62412	26355	256361	147189	0.8	1.2
Agriculture	218410	156302	673229	555915	0.9	1.0

Source: Author's calculations from COMTRADE data as adjusted in BACI database (1998-2013) (CEPII 2014).

Figure 3.1-Kenya's net trade position in intra-African markets of staple food products



Source: Author's calculations from COMTRADE data as adjusted in BACI database (1998-2013) (CEPII 2014).
Note: The bars that appear above (below) the horizontal axis denote the values of net exports (net imports) of the corresponding commodity groups.

Table 3.2 presents Africa's shares in Kenya's global exports and imports of agricultural products during the two periods under consideration. Prior to the launching of the CAADP process, African markets were the destinations of 16.7 percent of Kenya's global agricultural exports and origins of 29.0 percent of the country's global agricultural imports. In other words, Kenya's participation in African agricultural markets was weak compared to its participation in non-African markets. However, African markets enjoyed sizable shares as destinations of Kenya's exports of cereals, edible oils, sugar, and live animals, but also as sources of Kenya's imports of cocoa beans, cotton, coffee & tea, sugar, and edible fruits & nuts. Between the periods of 1998-2003 and 2010-2013, African markets have gained more importance as destinations of Kenya's exports of agricultural products as a whole. Indeed, Kenya has considerably increased the shares of its exports of live animals, fish & animal products, roots & tubers, coffee & tea, and spices to African markets, to the detriment of non-African markets. There has been no significant change in the shares of Kenya's aggregate agricultural imports that originate from African markets, but notable changes have occurred at the commodity-group level. For instance, African exporters have increased their shares as suppliers of Kenyan imports of live trees & plants, spices, and oilseeds, to the detriment of non-African exporters.

Table 3.2-Change in intra-African trade share of Kenya's global agricultural trade

	Intra-African trade share (%)			
	1998-2003		2010-2013	
	Export	Import	Export	Import
Live animals	58.3	17.4	82.1	23.3
Fish & animal products	3.3	42.0	19.7	38.7
Roots & tubers	17.9	0.8	60.1	0.8
Other live trees and plants	1.5	28.0	0.5	84.5
Vegetables	3.1	18.6	4.2	47.1
Edible fruits & nuts	1.4	65.3	2.1	69.7
Coffee & tea	17.6	79.2	22.7	79.4
Spices	33.0	27.6	41.9	40.3
Cereals	96.6	12.1	85.4	10.5
Oilseeds	42.3	44.8	19.0	91.1
Edible oils	95.0	0.7	93.6	3.1
Cane or beet sugar	69.9	75.1	21.1	46.6
Cocoa beans	1.3	91.2	0.1	80.4
Hides & skins	2.7	64.9	5.8	
Cotton, not carded or combed	7.9	83.0	1.2	
Cotton, carded or combed	34.9	79.0		83.0
Other agricultural products	29.8	27.4	49.2	33.0
Agriculture	16.7	29.0	22.1	29.4

Source: Author's calculations from COMTRADE data as adjusted in BACI database (1998-2013) (CEPII 2014).

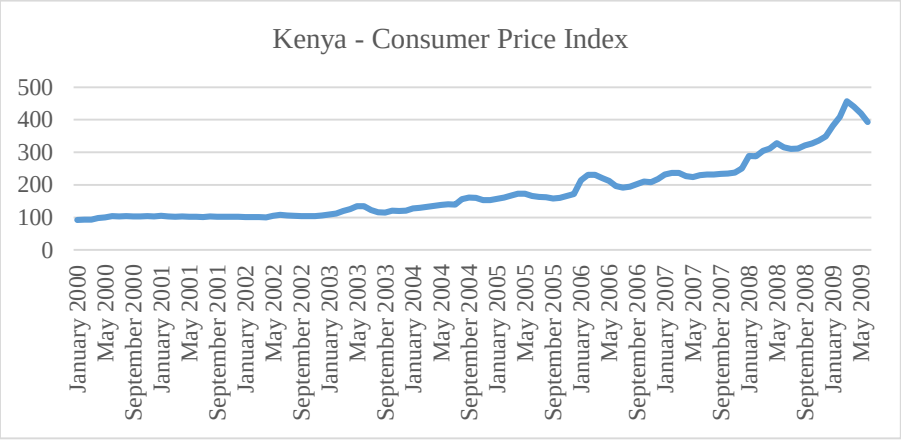
Consumer Price Index volatility

Food price volatility is the other metric used to gauge the role of trade in stabilizing local food prices and contributing to food security. Price volatility is an indirect measure of market integration as a consequence of trade. Food (Consumer) Price Indexes are assessed for several periods. Then, for each period, the volatility of the index is determined through one of two methods, depending on whether or not there is a unit root. When there is no unit root, the volatility of the index is determined by calculating the coefficient of variation corrected from the linear trend. When there is a unit root, the volatility of the index is determined by the standard deviation of the returns of the index, and a corrected volatility measure.

Though the MTIP was implemented from 2010-2015, data[2] are only available from 2000 to 2009. Therefore, we can consider only the two sub-periods before the program: 2000-2003 and 2004-2009. Figure 3.2 below shows the monthly Consumer Price Index of Kenya from 2000 to 2009.

[2] Data are for Nairobi, the capital of Kenya

Figure 3.2-Consumer price index trends in Kenya



Source: FAOSTAT (2016c)

The Kenya series presents a unit root; thus, we use the second method to determine the volatility of the index by calculating both the standard deviation of the index's growth rate and the volatility measure τ. Table 3.3 shows the coefficients for the two considered sub-periods. We note that the two measures are close to each other. Overall, volatility was higher during the period 2004-2009. Unfortunately, the data are not yet available for the MTIP period.

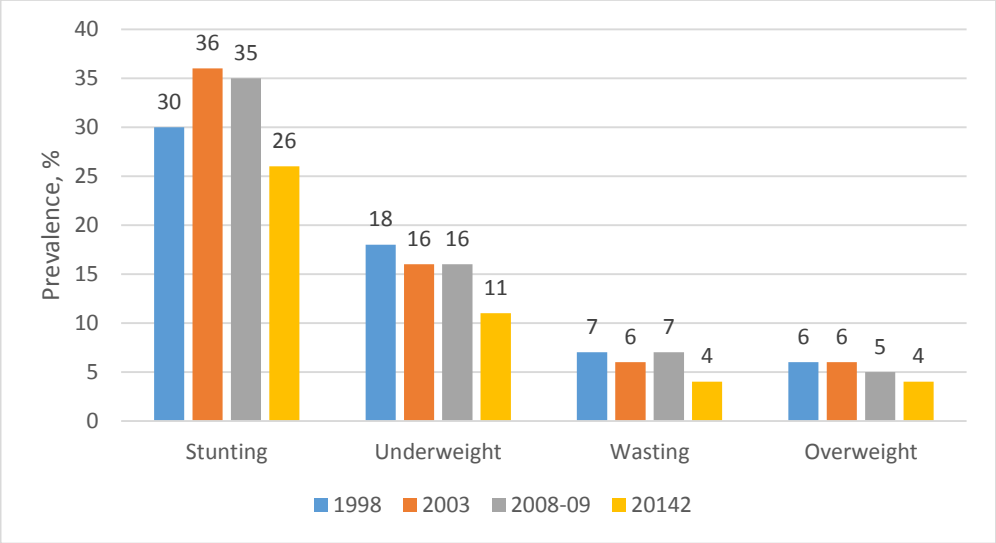
Table 3.3-Consumer price index volatility in Kenya (percentage)

Measures of volatility	2000 - 2003	2004 - 2009
standard deviation	2.81	5.13
volatility	2.70	4.93

4. Nutrition

Using the FAO undernourishment indicator (the proportion of the population not able to meet their energy requirement over a one year period) to reflect food security, Kenya has been able to reduce the prevalence of undernourishment from 32 percent in 1990-1992 to 23 percent in 2010-2012 (FAO, 2015). Micronutrient deficiencies of iron and vitamin A are still common and 49 percent of children 6-23 months were reported to be vitamin A deficient in 2013 despite the country having a national vitamin A supplementation programme. Stunting, underweight, wasting, and overweight for children under five have decreased over the past 15 years (Figure 4.1) and Kenya is said to be on course to meeting the five World Health Assembly targets used by the Global Nutrition Report (GNR) to track progress (IFPRI, 2016). However, only 22 percent of all children 6-23 months old had their minimum acceptable diet met based on the 2014 KDHS (KDHS, 2014). Kenya faces a double burden of malnutrition characterized by the fact that although progress is being made on reducing child undernutrition, 33 percent of women of reproductive age were reported to be overweight or obese, with the prevalence being higher in urban settings (KDHS, 2014). For example, overweight or obesity prevalence was as high as 48 percent in Nairobi, the capital city. The nutrition status profile of the country therefore warrants action in the agriculture sector to contribute to addressing malnutrition in all its forms.

Figure 4.1. Prevalence of under-five nutrition indicators from 1998 to 2014 in Kenya



Source: KDHS, 2014

The expectation is that the mainstreaming of nutrition in the Kenya Agricultural Sector Development Strategy Medium-Term Investment Plan (ASDS-agricultur) would contribute to addressing the malnutrition situation with respect to the indicators given above and more, with emphasis on diet related indicators. This appraisal reviewed the ASDS-MTIP to answer the following questions:

1. What nutrition objectives, if any, have been incorporated into the ASDS-MTIP, and how are these reflected?
2. What provisions have been made towards monitoring nutrition in the ASDS-MTIP?

The NAIP document was reviewed. An InVivo text search of nutrition and related terms was conducted to zero in on the exact ways in which nutrition was reflected in the document in order to suggest possible directions toward addressing nutrition in the next ASDS.

What nutrition objectives, if any, have been incorporated into the ASDS-MTIP, and how are these reflected?

The ASDS-MTIP was formulated as part of operationalizing the Kenya CAADP Compact. It has six investment pillars (Box 4.1), which do not reflect inclusion of a nutrition component. However, among several challenges and opportunities that are articulated as cross-cutting thematic areas, food security and nutrition are included.

Box 1 presents the ASDS-MTIP investment pillars. Six thematic area working groups are in place to guide related activities across investment pillars. Significant overlap exists between the working group on food security and nutrition and the first, second and fifth investment pillars. No specific activities related to nutrition are given, with the indication given that there is a separate food and nutrition policy that is focused on this aspect. There is also no specific budget allocation to nutrition reflected in the ASDS-MTIP and it is unclear how nutrition would be monitored because there are no outputs associated with it to which budget has been allocated. It would, for example, be important to leverage the extensive agriculture extension network for nutrition. These are areas that will need attention.

Box 4.1. Six investment pillars of the ASDS-MTIP 2010-2015

1. Increasing productivity, commercialization and competitiveness
2. Promoting private sector participation
3. Promoting sustainable land and natural resources management
4. Reforming delivery of agricultural services
5. Increasing market access and trade
6. Ensuring effective coordination and implementation

Finally, Annex IV of the ASDS-MTIP lists the ASDS-MTIP investment areas and existing agricultural sector projects at the time of formulation. Nutrition is not visibly reflected in this part of the document as well. It is possible that some of the projects listed may have nutrition components, but this cannot be ascertained from the given information. However, the projects also present opportunities for addressing nutrition objectives, and the extent to which this might have been a factor should be explored to inform the development of the next ASDS.

What provisions have been made towards monitoring nutrition in the NAIP?

The ASDS-MTIP indicates that the Government of Kenya had established a National Integrated Monitoring and Evaluation System (NIMES) to measure the efficiency of Government programmes as well as the effectiveness of its policies. It was indicated that activities implemented under the MTIP would be linked to the NIMES through a sector-wide M&E system that was at the time being developed. However, the lack of direct articulation of nutrition in the ASDS-MTIP indicated above may limit the likelihood of nutrition being effectively monitored as part of the NIMES process. It is important to include nutrition related objectives within relevant projects and programmes to ensure that it gets adequate attention, including adequate resource allocation.

This appraisal has not explored the possible synergy that may exist between the food and nutrition policy and the ASDS-MTIP to assess the likelihood of nutrition receiving adequate attention. A critical assessment of the two policy documents with regard to nutrition synergy is advised in informing the next ASDS formulation.

Given the above, the following actions are recommended for the next NAIP:

1. Deliberate and specific nutrition objectives need to be a part of the ASDS-MTIP to ensure adequate attention to nutrition within the agriculture sector.
2. There are no specific nutrition related outcomes/outputs and this makes it difficult to monitor progress on nutrition within the various relevant agriculture interventions of the ASDS-MTIP; future NAIPs need to include nutrition related outcomes and outputs.
3. It is important to ensure that nutrition is specifically budgeted for.
4. The nutrition related indicators included in the CAADP Results Framework are given in Box 4.2. These indicators are also of interest within the current Scaling up Nutrition (SUN) movement in Kenya. It is recommended that these indicators be tracked in the ASDS M&E framework.
5. Additional indicators have been suggested for the CAADP Results Framework and are shown in Box 4.2. These should be considered for the next ASDS-MTIP.
6. Capacity challenges within the current M&E framework that present barriers to effective implementation and M&E should be given adequate attention, as this is an area that is often overlooked.
7. It is important to ensure that the establishment and implementation of the Kenya SAKSS node also take into account the need to monitor nutrition. The status of the development of the necessary capacity should also be monitored.
8. A toolkit document entitled "Metrics, Analytical Questions and Tools for NAIP Design, Appraisal and Tracking" has been prepared by IFPRI and other technical institutions in collaboration with AUC and NPCA and can be used to guide a more detailed appraisal of the mainstreaming of nutrition in the ASDS process.

Box 4.2. Nutrition related indicators in the CAADP Results Framework (NEPAD, 2015)

1. Undernourishment (percent); prevalence of underweight, stunting and wasting in children under five disaggregated by gender
2. Minimum dietary diversity for women (15-49 years)
3. Minimum acceptable diet for children aged 6-23 months

Complementary metrics that should also be considered include:

4. Women's BMI
5. Women's anemia
6. Overweight for children under five
7. Agricultural production diversity
8. Share of staple food production that is biofortified
9. Prevalence of anemia in women and children under five
10. Rates of under-five and under-two years old zinc, vitamin A and iodine deficiencies
11. Growth in number and capacity of the nutrition work force in the agriculture sector

5. Gender

The Malabo Declaration and Results Framework do not provide specific metrics related to gender in one place. Indeed, gender is relevant to many development outcomes, and it is important to examine how gender issues affect and are affected by conditions and progress under each of the other thematic issues. Hence, several of the thematic issues include gender-specific indicators.

An important and complementary metric to use, in particular as it addresses the gender dimensions of production, welfare, and social engagement, is the Women's Empowerment in Agriculture Index (WEAI). The WEAI is a survey-based index designed to capture empowerment's multidimensional character. It builds on research to develop indicators of agency and empowerment that propose domain-specific measures of empowerment obtained using questions that can be fielded in individual or household surveys. The WEAI is an aggregate index based on individual-level data collected by interviewing men and women within the same household. The WEAI's five domains of empowerment (5DE) sub-index assesses the degree to which women are empowered in five domains in agriculture. These domains are (1) decisions about agricultural production, (2) access to and decision-making power about productive resources, (3) control of use of income, (4) leadership in the community, and (5) time allocation (Alkire et al. 2013). The WEAI's other sub-index, the Gender Parity Index (GPI), measures the relative empowerment of women compared to men in the same households (Malapit et al. 2014).

Food security remains a major concern for Kenya as food production is lower than consumption, and the country is forced to import staple foods like maize, wheat and rice. In order for this to change, women must be considered as key players in agriculture. Gender dynamics come into play regarding access to and control over productive resources including land, credit, labor and information as well as access to and control over the proceeds of production such as income. Although women make up 80 percent of Kenya's farmers, only half of them own their farms. Women mostly work on their husbands' land. Consequently, with the lack of land ownership and loans, they cannot really take advantage of agricultural cooperatives that would help them improve production or marketing of their produce. Rural dwellers seem to remain unaware of the new constitution drafted in 2010 stipulating equal rights for women – i.e. women can now inherit property and own land (Wasike 2013). An FAO study (2011) found that farms managed by men in Kenya are 8 percent more productive than farms run by women because of a gender gap in agriculture. The study concludes that if women had better access to the required resources such as land, machines and irrigation systems, they could have more productive farms and could even transform Kenya's farming sector.

This section describes the findings of a baseline WEAI survey conducted in the northern arid area of Kenya in July and August 2013 (Malapit et al. 2014). Data were collected for a sample of 1,760 households by Ronto Research Company, with the participation of TANGO International and Westat. The survey results are shown in Table 5.1. The overall value for the 5DE index is 0.71; values above 0.80 indicate that an individual has attained empowerment. 68.4 percent of women were found to be disempowered, and the average 5DE score of this group is 0.57. A similar proportion of women, 63.8 percent, have not achieved gender parity in their households. The mean empowerment gap between these women and the adult males in their households is relatively wide, at 0.29.

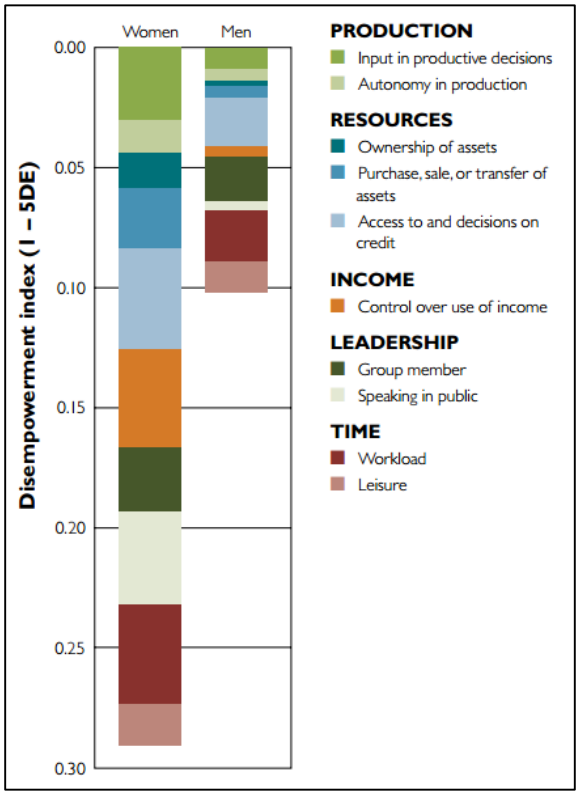
Table 5.1-WEAI score, FTF zone of influence in Kenya

Indicator	Baseline value
5DE score	0.71
Disempowerment score (1-5DE)	0.29
N (number of observations)	669
% of women achieving empowerment	31.70
% of women not achieving empowerment	68.40
Mean 5DE score for not yet empowered women	0.57
Mean disempowerment score (1-5DE) for not yet empowered women	0.43
GPI score	0.81
N (number of dual-adult households)	254
% of women achieving gender parity	36.20
% of women not achieving gender parity	63.80
Average empowerment gap	0.29
WEAI score	0.72

Source: Malapit et al. 2014

Figure 5.1. illustrates disempowerment among women and men for each of the ten indicators. Women are much less empowered than men, with an average score on the disempowerment index nearly three times than of men's. Women are more disempowered than men on each of the 10 indicators. The greatest barriers to female empowerment are reflected in the indicators that contribute the most to their disempowerment, namely workload, control over use of income, and access to and decisions on credit. Men are also disempowered along multiple indicators, with workload, group membership, and access to and decisions on credit contributing the most to male disempowerment. Autonomy in production and ownership of assets are among the indicators contributing the least to disempowerment for both genders, in addition to leisure for women and speaking in public for men. The largest gaps between male and female empowerment are in control over use of income, speaking in public, and input in productive decisions (Malapit et al. 2014).

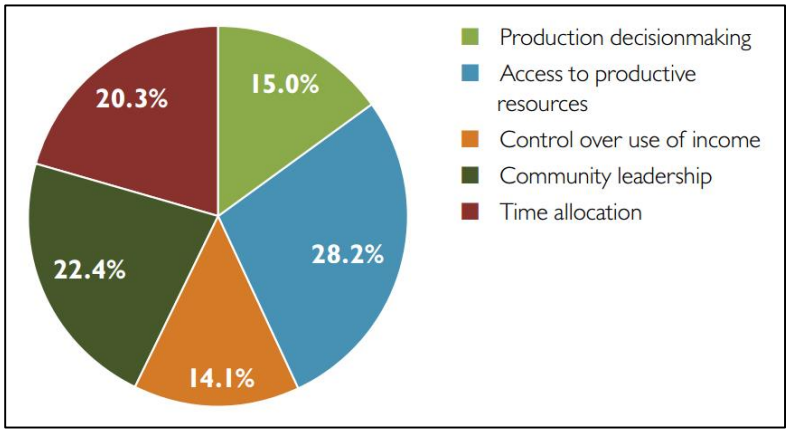
Figure 5.1- Contribution of each indicator to disempowerment in Kenya



Source: Malapit et al. 2014

Figure 5.2 shows the contribution of each domain to the disempowerment of women. Access to productive resources plays the largest role in women's disempowerment, at nearly 30 percent, with community leadership and time allocation accounting for around 20 percent each (Malapit et al. 2014).

Figure 5.2-Contribution of each of the five domains to the disempowerment of women in Kenya



Source: Malapit et al. 2014

6. Climate Smart Agriculture and Resilience

The CAADP Results Framework includes the following indicators dealing with Climate Smart Agriculture (CSA) and resilience:

- Percent of households that are resilient to climate and weather-related shocks
- Share of agriculture under sustainable land management practices

Complementary indicators are proposed below, and the following assessment is based on the first two of these indicators:

- Share of population exposed to climate risk
- Share of land under small-scale irrigation by crop and by region
- Rate of adoption of soil fertility management practices
- Degree of awareness of climate change risk and impact among farming population
- Share of seeds adapted to heat and drought in major crops.

Share of area under irrigation by crop

In Kenya, eight crops were reportedly irrigated (Table 6.1). All rice areas were irrigated for both the reference year and the latest year with available data (100 percent), followed by citrus and sugarcane, both of which increased the irrigated area share between 2000 and 2010 by about 7 percent and 1 percent, respectively. About 19 percent of cotton area was irrigated in 2010, which was about double the 9 percent irrigated in 2000. For coffee, a 4 percentage point increase in irrigated area was recorded, from about 9 percent in 2000 to 13 percent in 2010. Irrigation for banana and tea was not expanded during the period and remained at about 1 percent and 5 percent of crop area, respectively. Maize area was also predominantly rainfed. Only 0.3 percent of total maize area was reportedly irrigated in both 2000 and 2010.

Table 6.1-Share of irrigated area by crop for Kenya

Crop	Year 2000 (percent)	Year 2010 (percent)
Banana	1.3	1.3
Citrus	28.0	35.4
Coffee	8.5	12.5
Cotton	9.3	18.6
Maize	0.3	0.3
Rice	100.0	100.0
Sugarcane	11.5	12.1
Tea	5.0	4.6
Total	**2.2**	**2.6**

Source: FAO AQUASTAT (FAO 2016a)

Share of population exposed to climate risk

To measure the share of population exposed to climate risk, using the gridded data layers of the rural population of 2005 from HarvestChoice and the descriptive statistics on annual rainfall from the University of East Anglia Climate Research Unit Database, first we analyzed the mean value of the coefficient of variation (CV) of rainfall in two time slices: 1991-2000 as the reference period and 2003-2012 as the NAIP period. We assumed that the population distribution was static during these two time slices, due to the lack of such data over time. Since this eliminates any socio-economic driver of change, changes in the indicator value are purely driven by changes in rainfall patterns during those two time slices. The gridded data were weighted by the 2005 rural population data.

When aggregated to the country level, the difference between the two time slices for each country was not noticeably significant. As shown in Table 6.2, the mean CV in Kenya decreased slightly by about 2 percent or 15 percentage points.

Table 6.2-Rainfall CV of each country, weighted by 2005 rural population

Country	1991-2000	2003-2012
Ghana	0.85	0.80
Guinea	1.06	1.03
Kenya	0.89	0.74
Malawi	1.29	1.22
Nigeria	1.02	1.04
Rwanda	0.61	0.57
Senegal	1.63	1.60

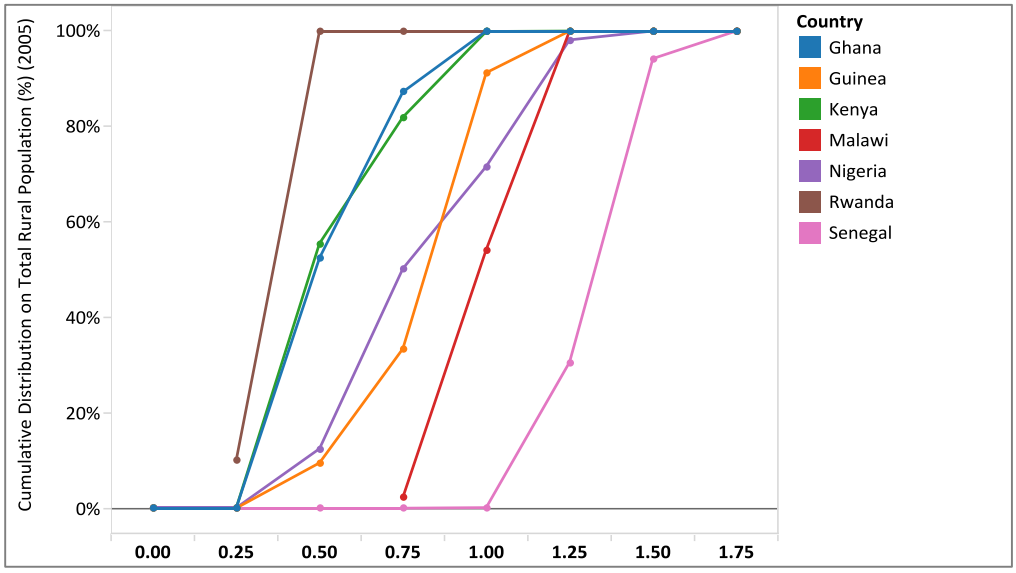
Secondly, we defined climate shock as the CV of annual total rainfall exceeding 0.75, and analyzed the share of rural population located in areas experiencing climate shock. The results of the analysis are shown in Table 6.3. The difference in the indicator between the two time slices was very noticeable in Kenya, where the indicator decreased by almost 50 percent, from 35 percent to 18 percent. Kenya performed better than all the other countries in terms of improvement between the time periods.

Table 6.3-Share of rural population located where the CV of rainfall exceeds 0.75

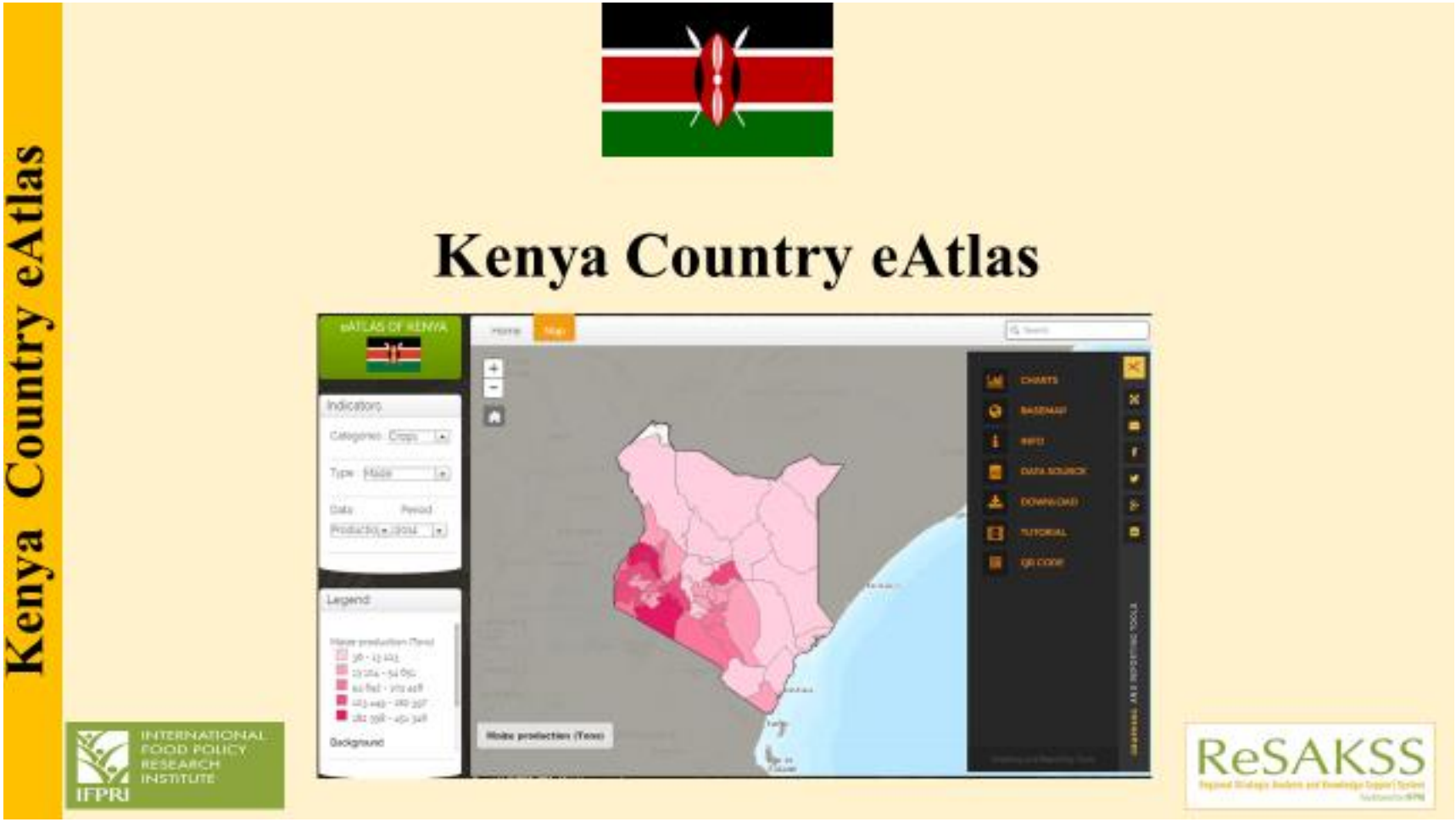
Country	1991-2000 (percent)	2003-2012 (percent)
Ghana	16	13
Guinea	68	67
Kenya	35	18
Malawi	100	98
Nigeria	44	50
Rwanda	0	0
Senegal	100	100

When the 2003-2012 data were graphed using the cumulative distribution functions of the CV of rainfall (Figure 6.1), it was clearly shown that about 50 percent of the rural population of Kenya lives in areas where the rainfall CV is 0.5 or higher. Kenya has a better profile than Senegal, Malawi, Guinea and Nigeria in terms of the extent of the rural population exposed to the highest level of rainfall variability, which was used as a proxy for climate shock in this analysis. However, it lags behind compared to Rwanda, where about 90 percent of the rural population lives in areas where the rainfall CV is 0.25 or less.

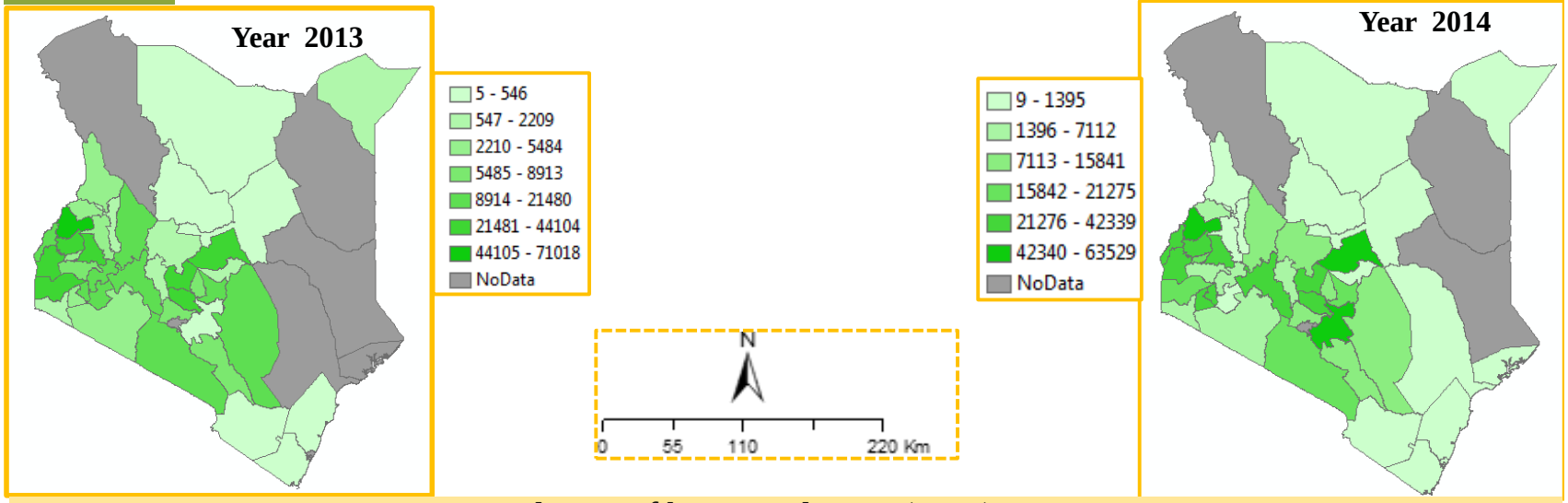
Figure 6.1-Cumulative distribution of rainfall variability, 2003-2012 (coefficient of variation of annual total rainfall)

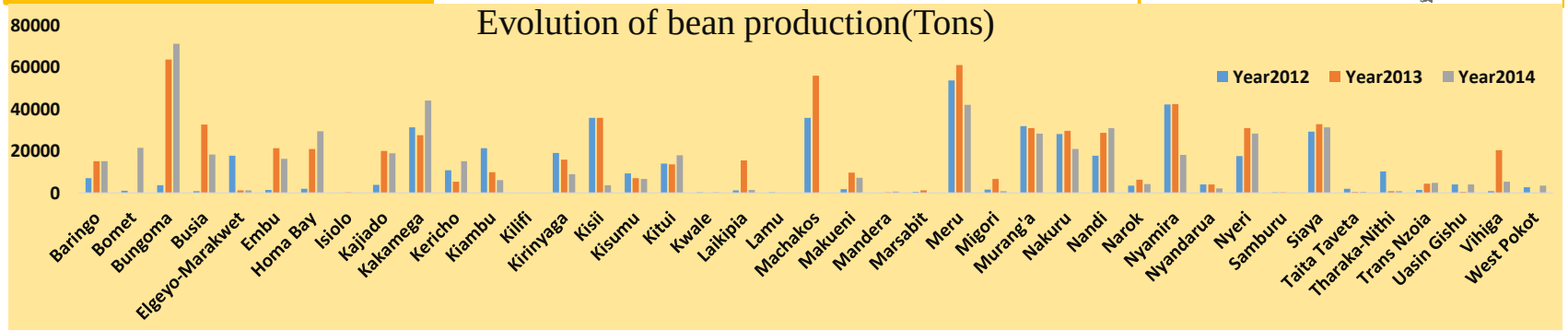


Annex: Selected Indicators from the Kenya County eAtlas

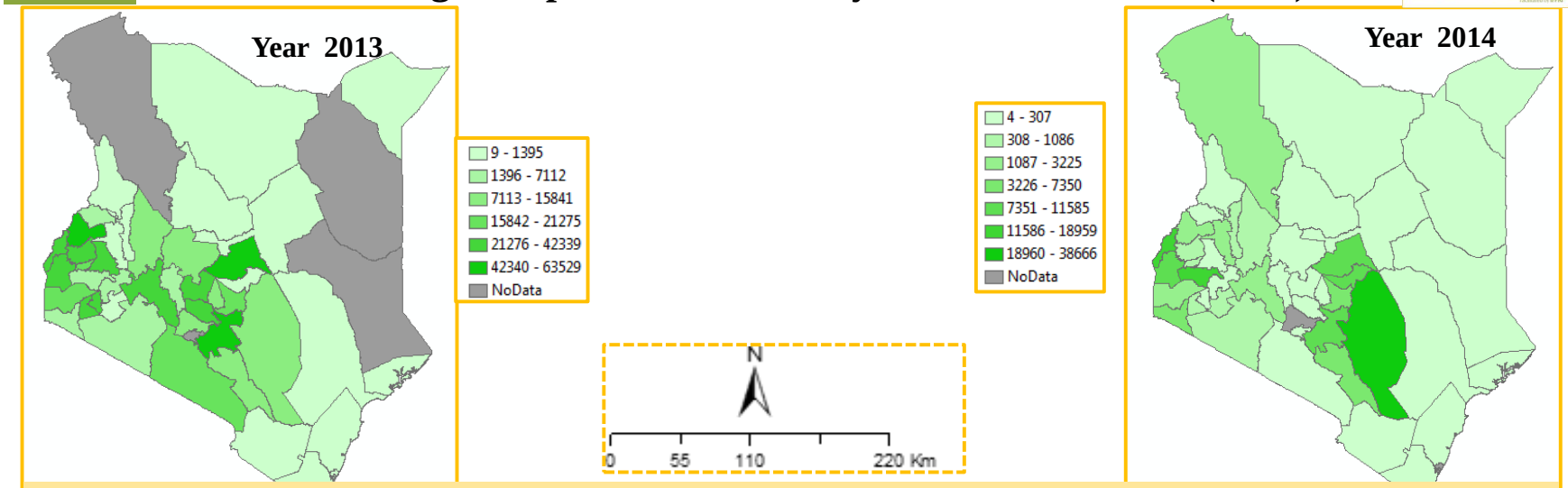


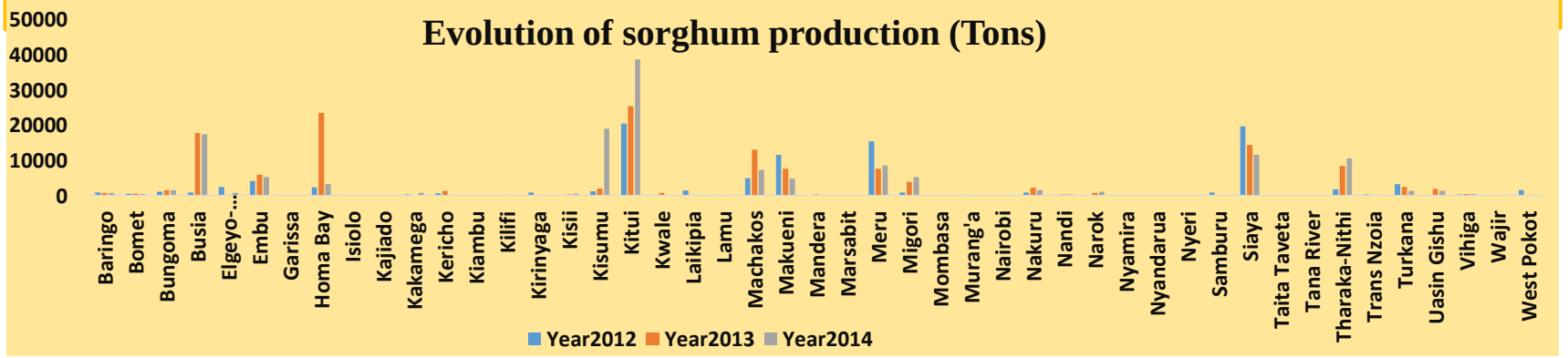
Bean production in Kenya in 2013 and 2014 (Tons)



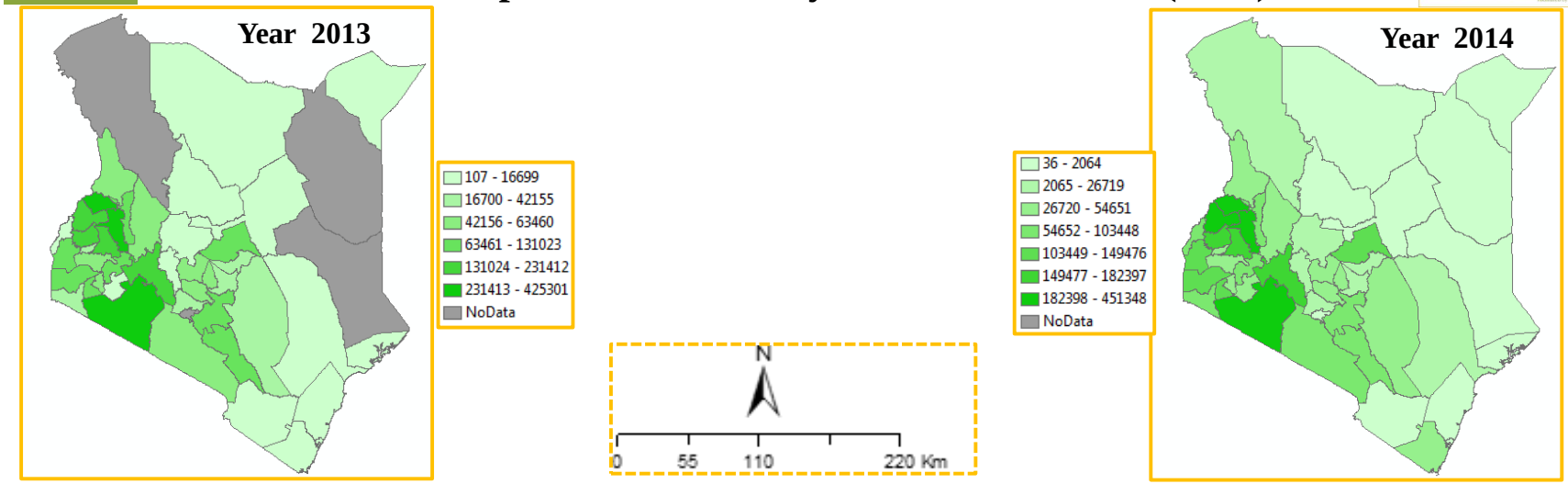


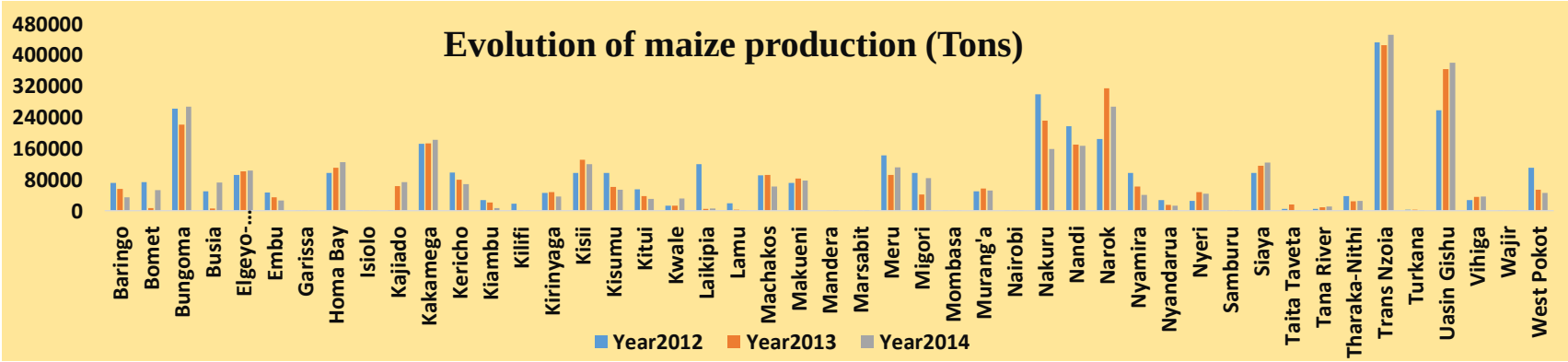
Sorghum production in Kenya in 2013 and 2014 (Tons)



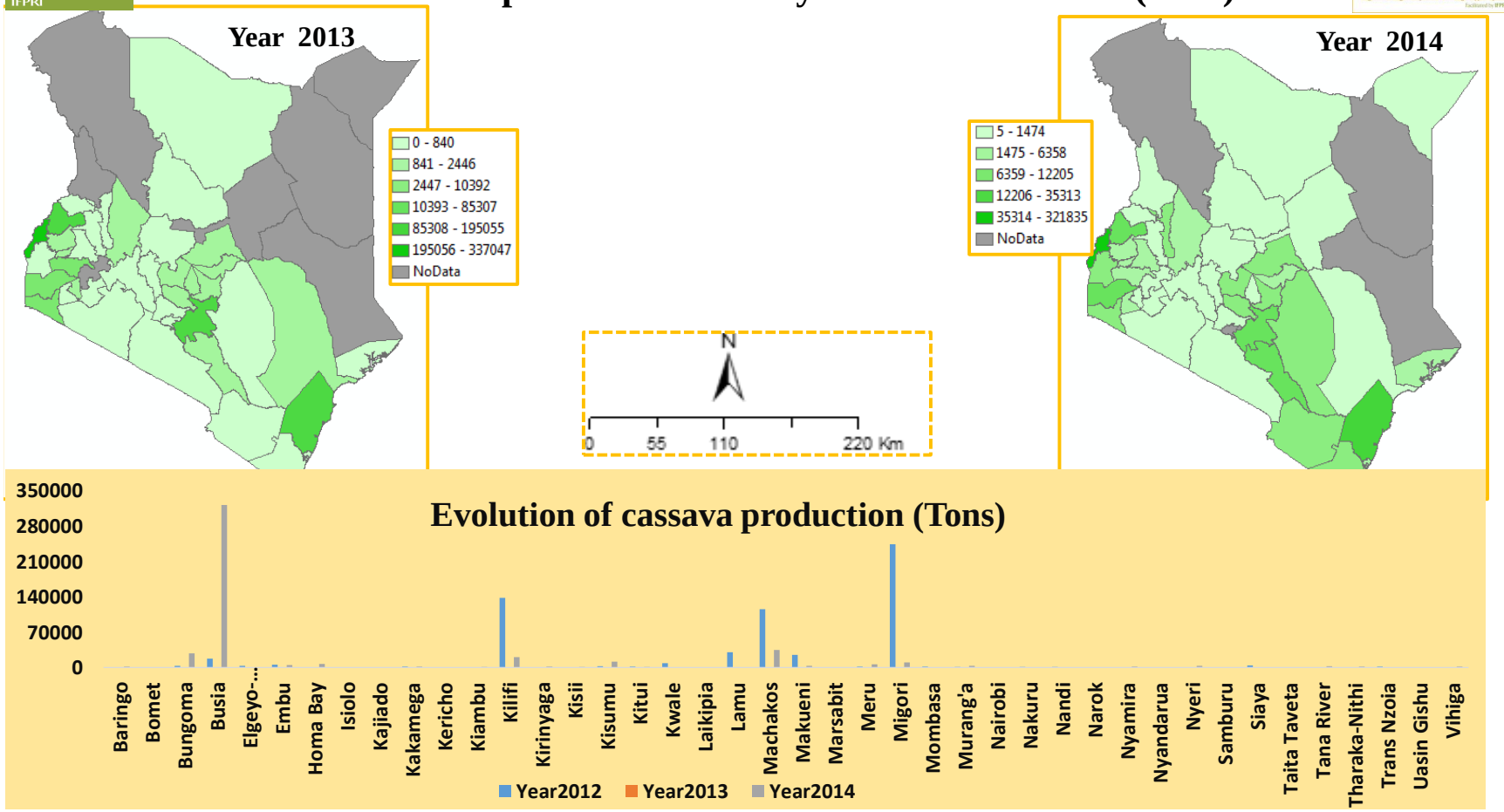


Maize production in Kenya in 2012 and 2013 (Tons)

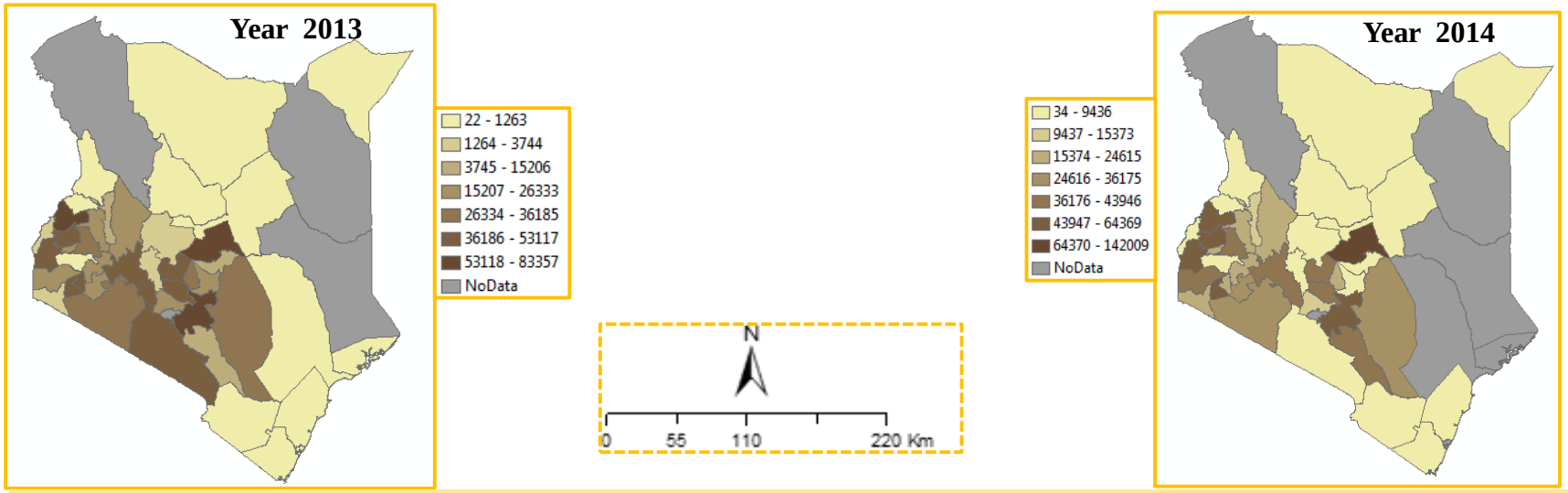


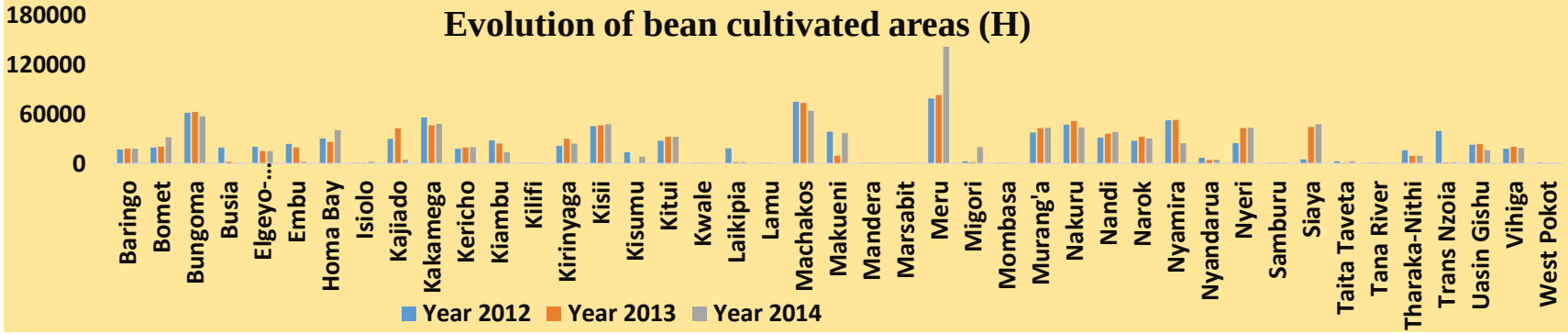


Cassava production in Kenya in 2012 and 2013 (Tons)

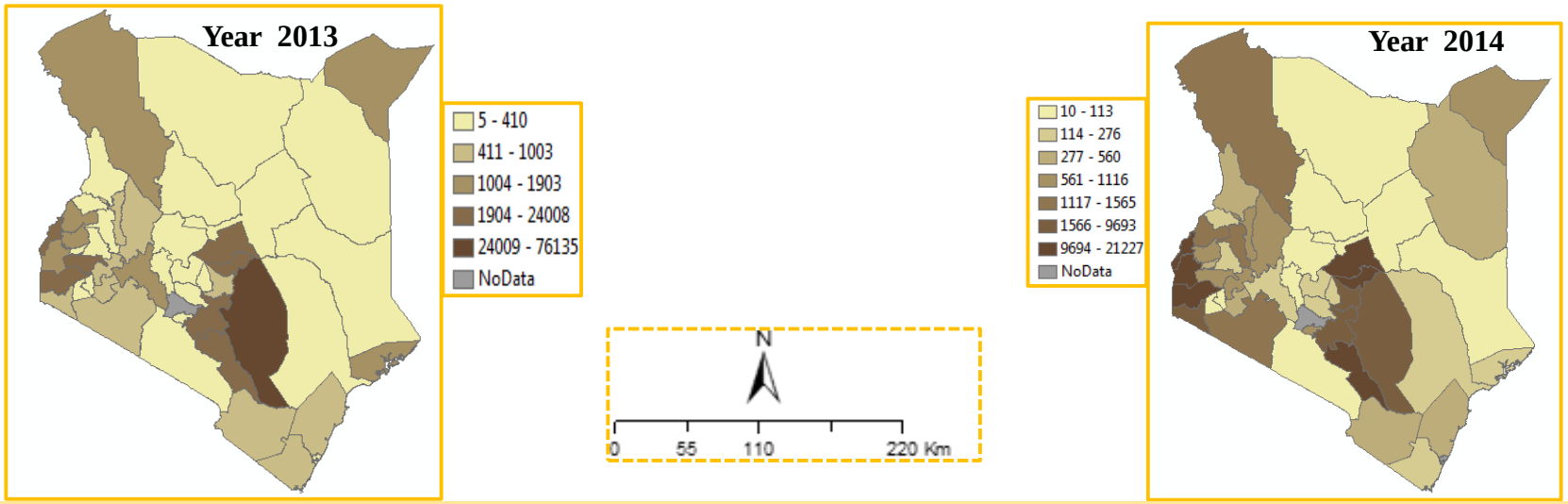


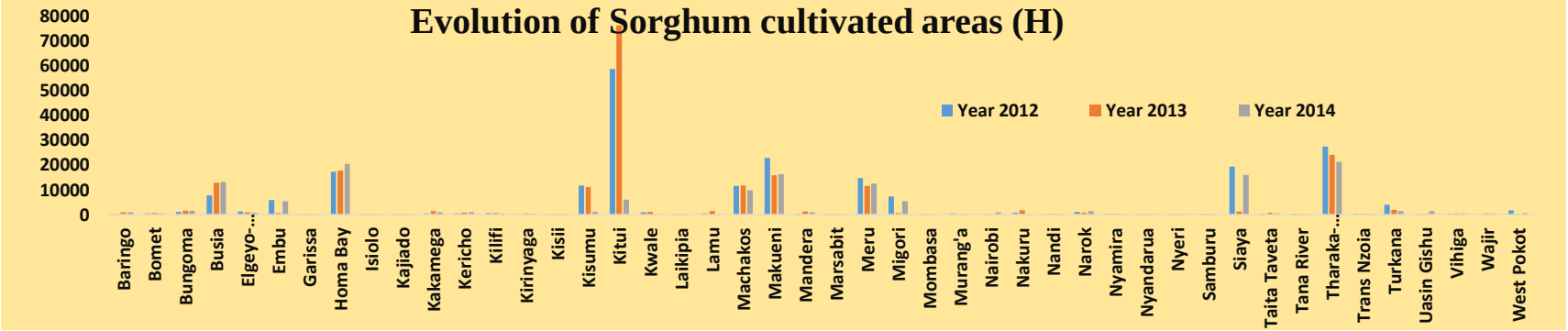
Bean production in Kenya in 2012 and 2013 (Tons)



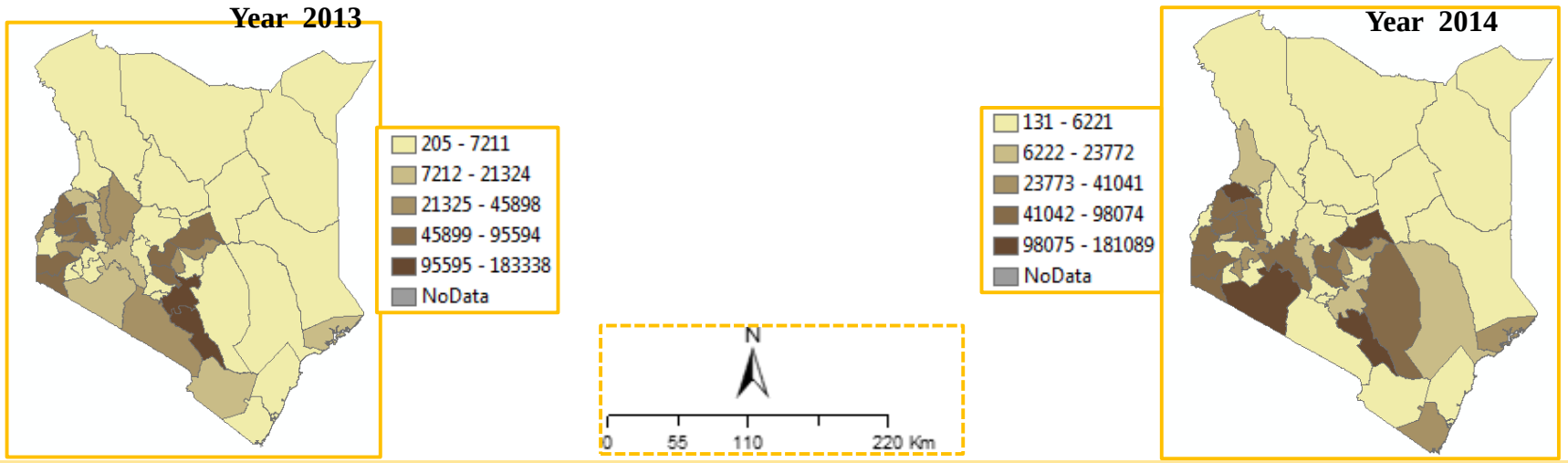


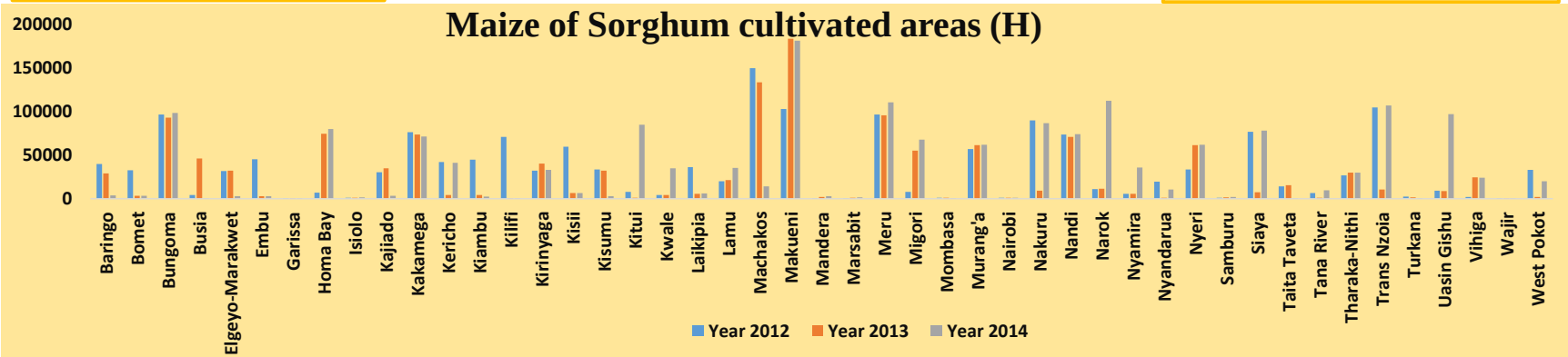
Sorghum cultivated areas in Kenya in 2013 and 2014 (Tons)



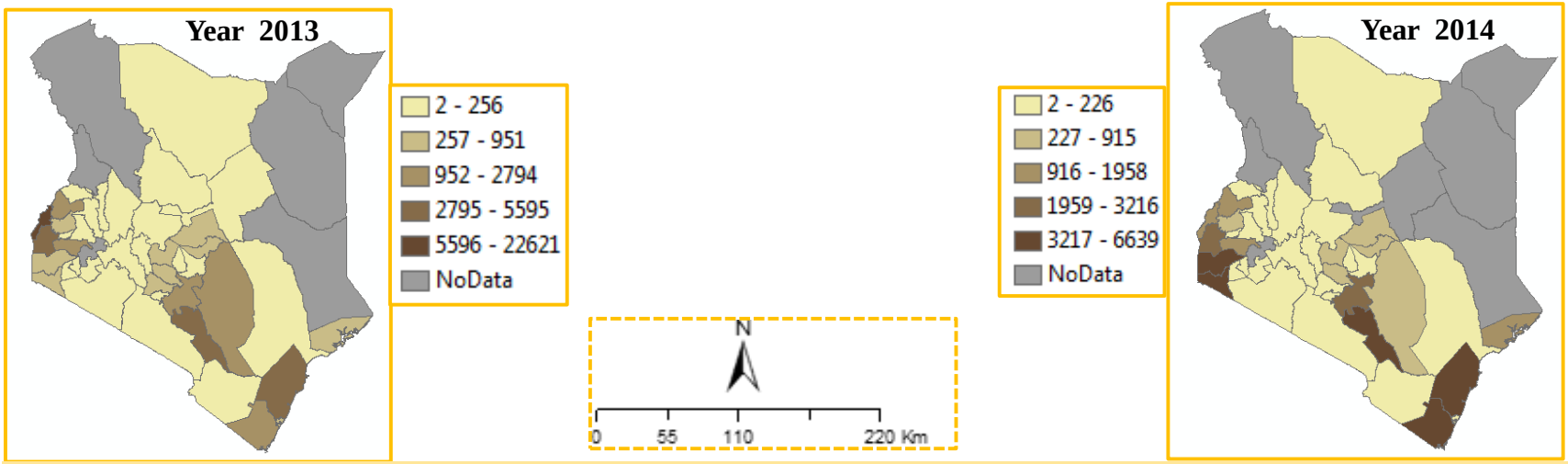


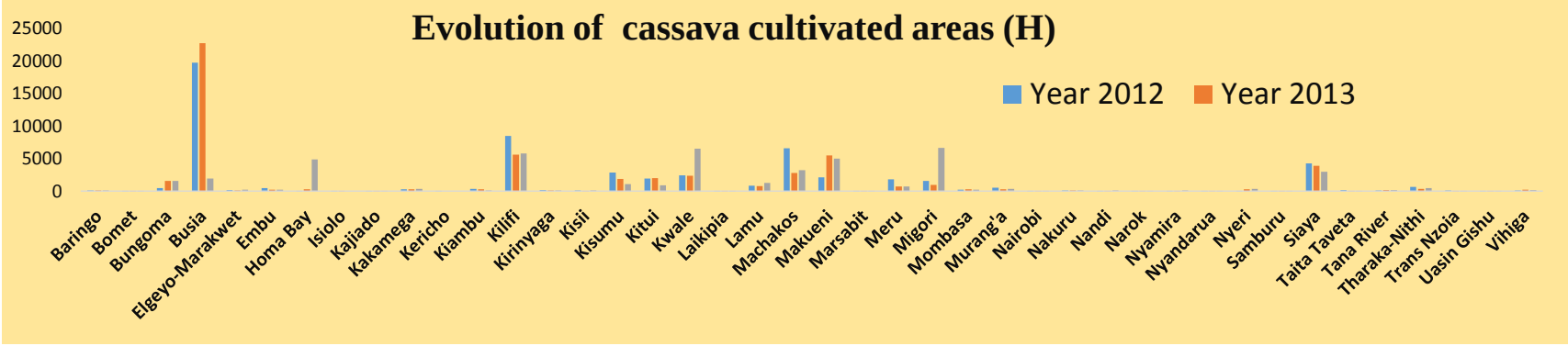
Maize cultivated areas in Kenya in 2013 and 2014 (Tons)



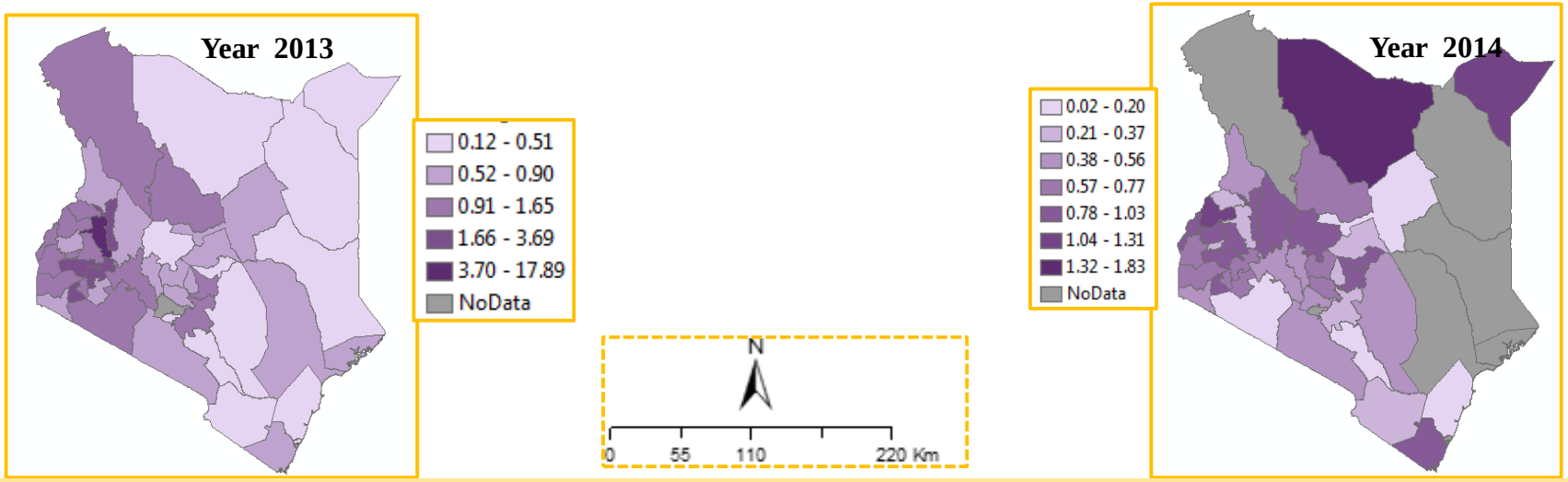


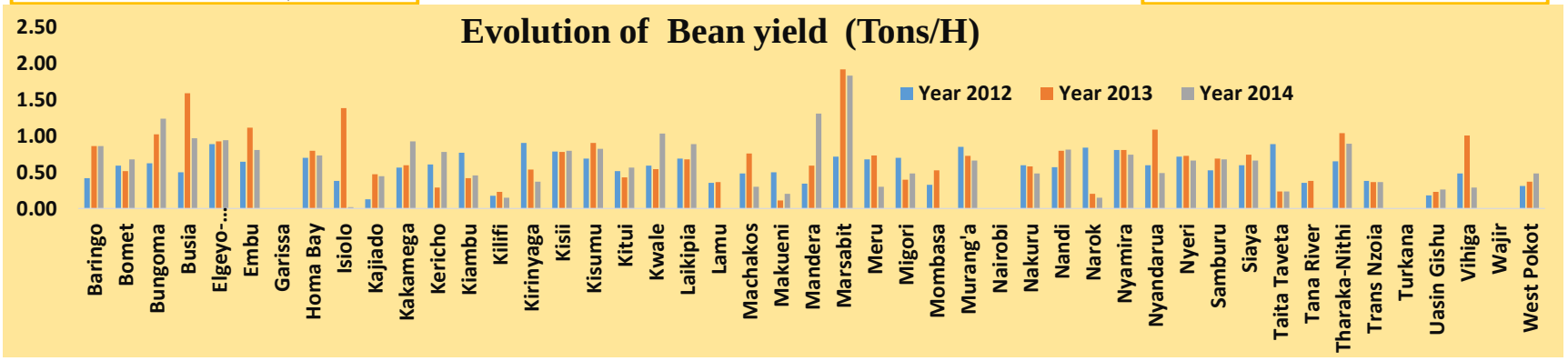
Cassava cultivated areas in Kenya in 2013 and 2014 (Tons)



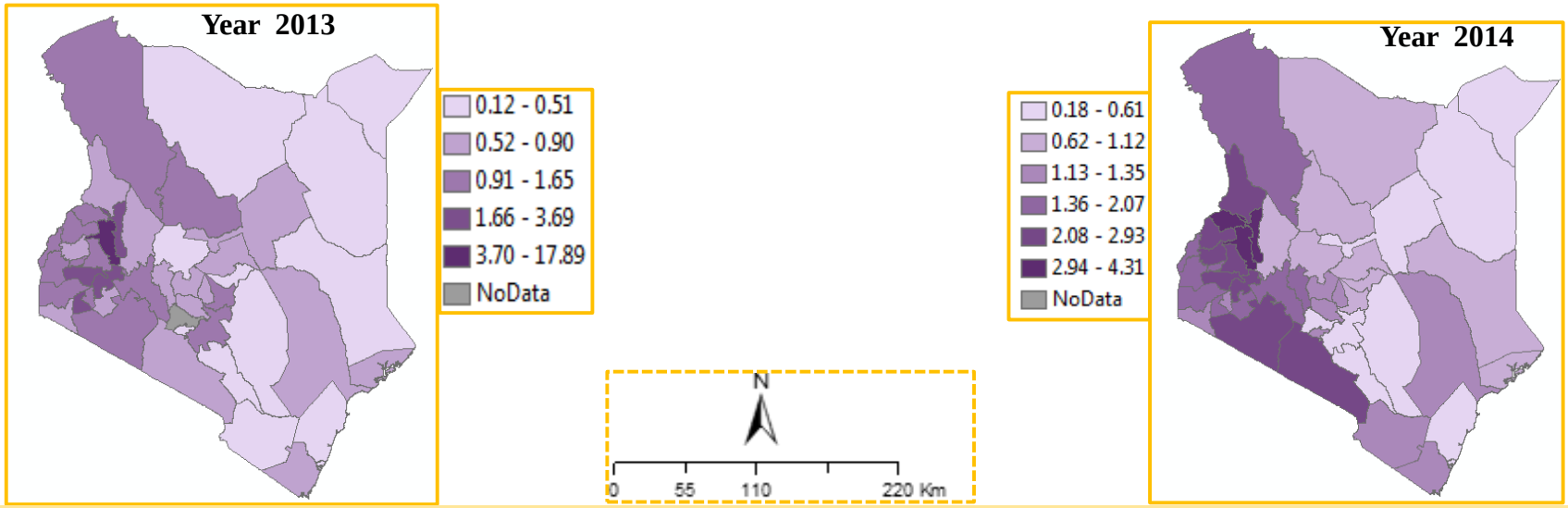


Bean yield in Kenya in 2013 and 2014 (Tons/H)

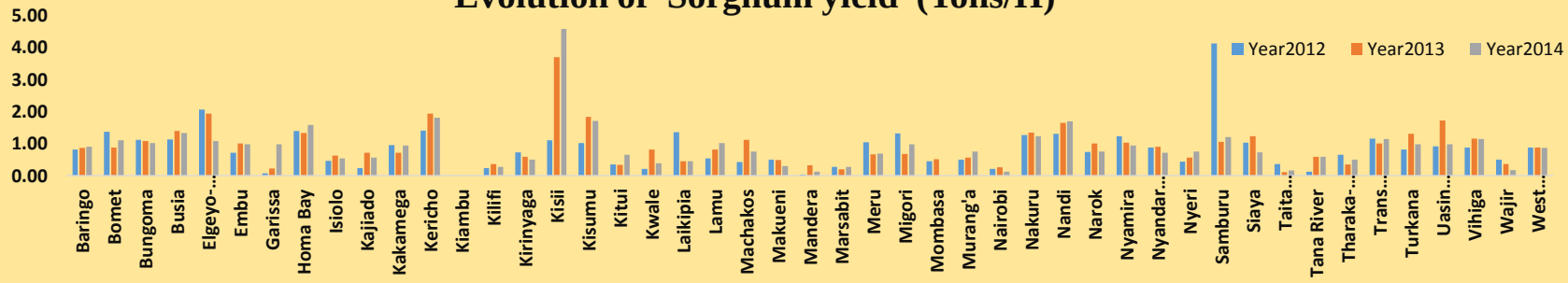




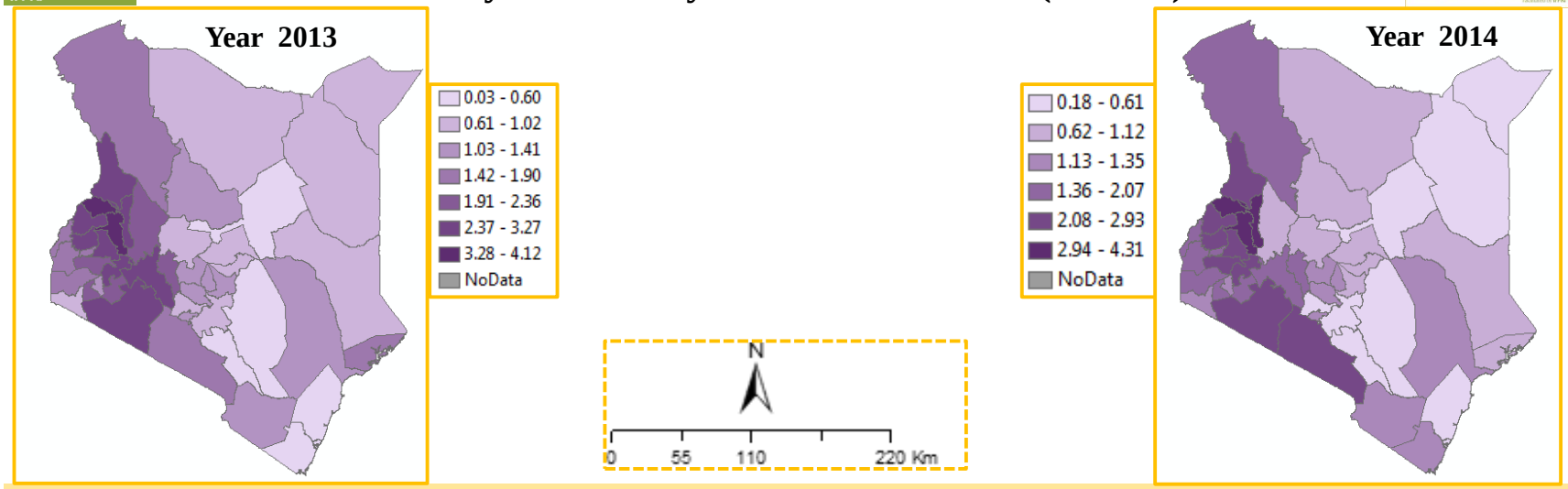
Sorghum yield in Kenya in 2013 and 2014 (Tons/H)



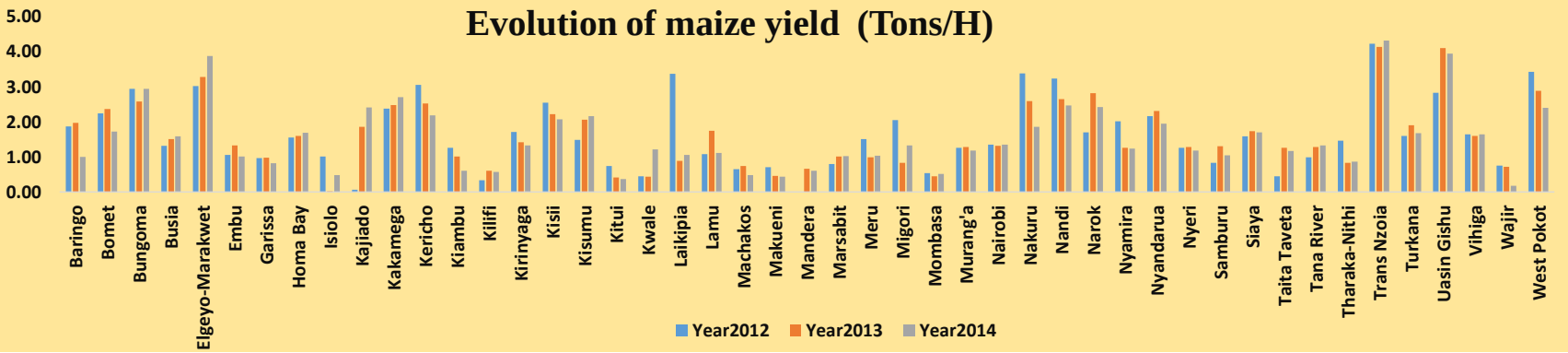
Evolution of Sorghum yield (Tons/H)



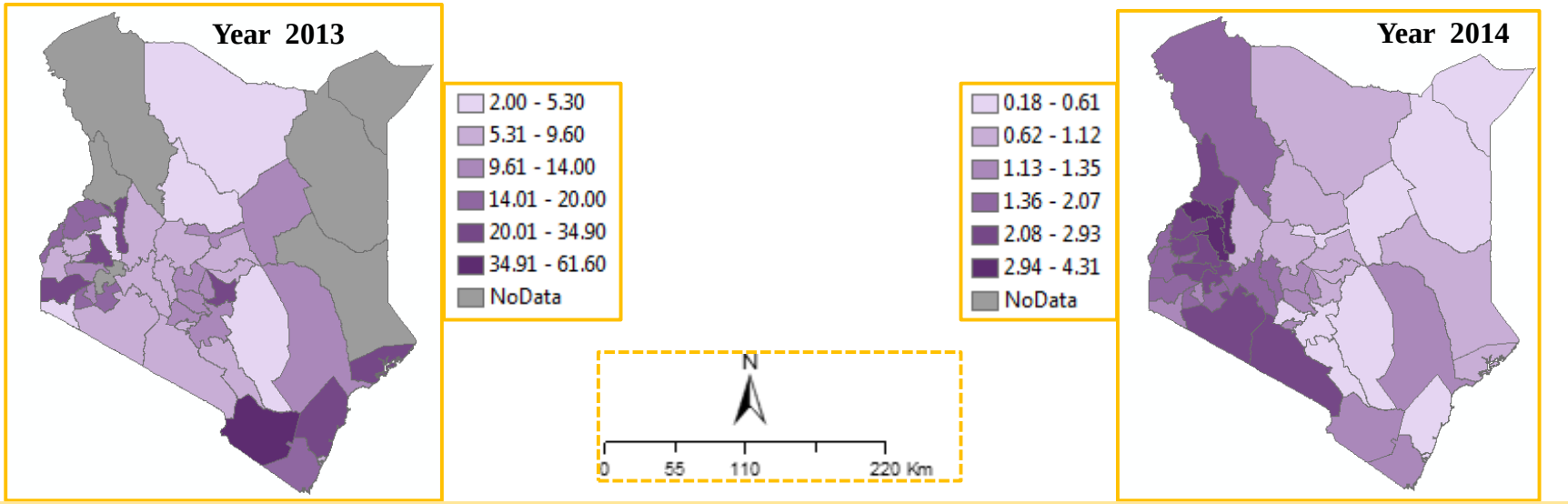
Maize yield in Kenya in 2013 and 2014 (Tons/H)

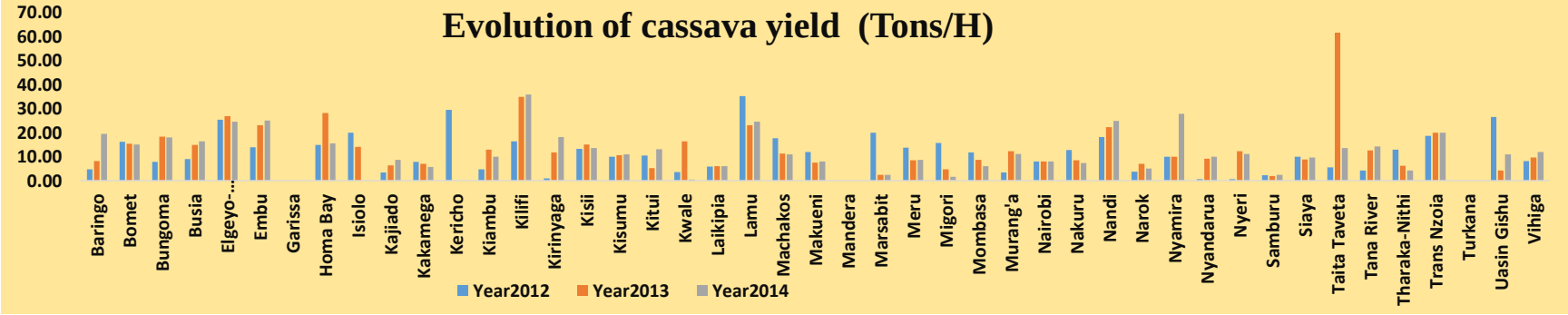


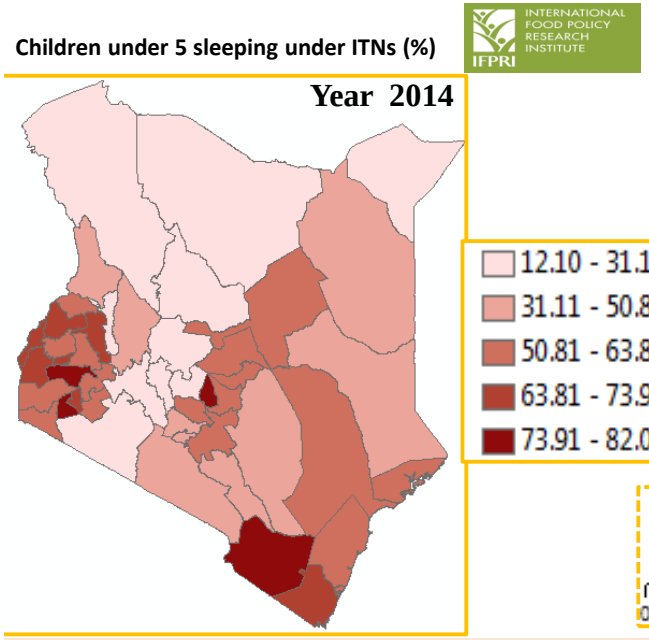
Evolution of maize yield (Tons/H)

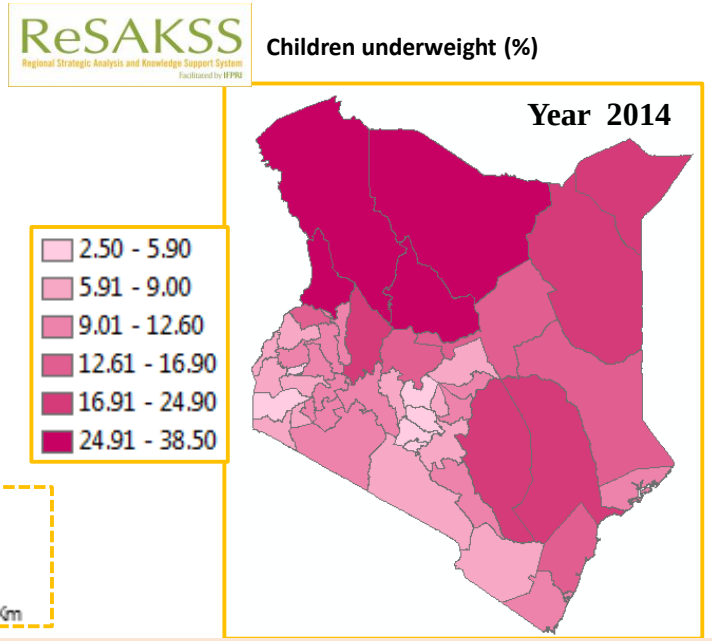


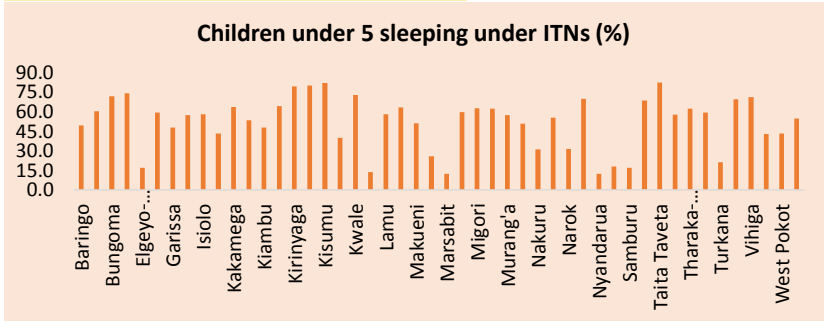
Cassava yield in Kenya in 2013 and 2014 (Tons/H)

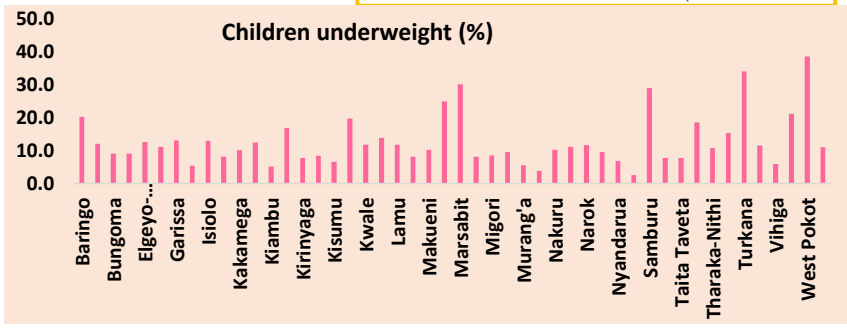




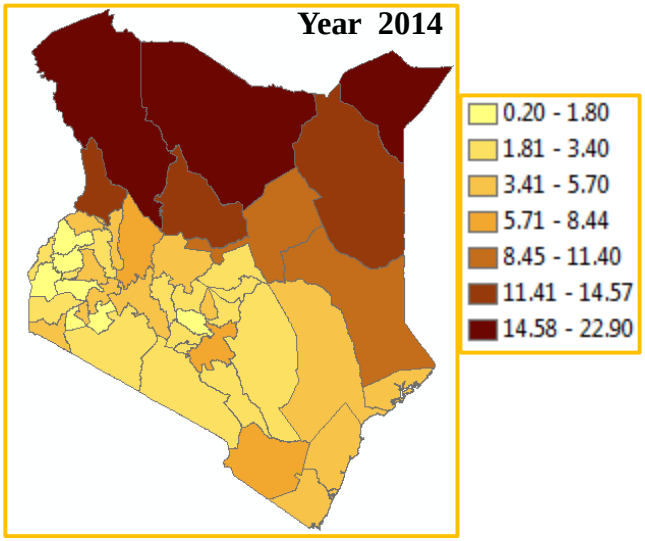

Children under 5 sleeping under ITNs (%)
INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
IFPRI
Year 2014
12.10 - 31.10
31.11 - 50.80
50.81 - 63.80
63.81 - 73.90
73.91 - 82.00
N
0
55
110
220 Km


ReSAKSS
Regional Strategic Analysis and Knowledge Support System
Children underweight (%)
Year 2014
2.50 - 5.90
5.91 - 9.00
9.01 - 12.60
12.61 - 16.90
16.91 - 24.90
24.91 - 38.50

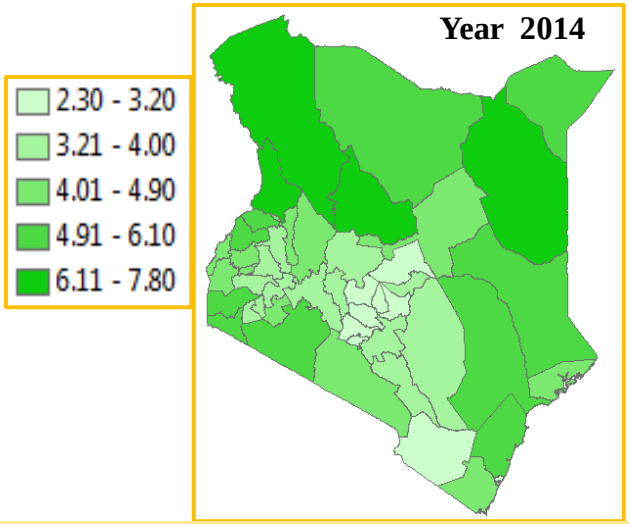

Children under 5 sleeping under ITNs (%)
90.0
75.0
60.0
45.0
30.0
15.0
0.0
Baringo
Bungoma
Elgeyo-...
Garissa
Isiolo
Kakamega
Kiambu
Kirinyaga
Kisumu
Kwale
Lamu
Makueni
Marsabit
Migori
Murang'a
Nakuru
Narok
Nyandarua
Samburu
Taita Taveta
Tharaka-...
Turkana
Vihiga
West Pokot

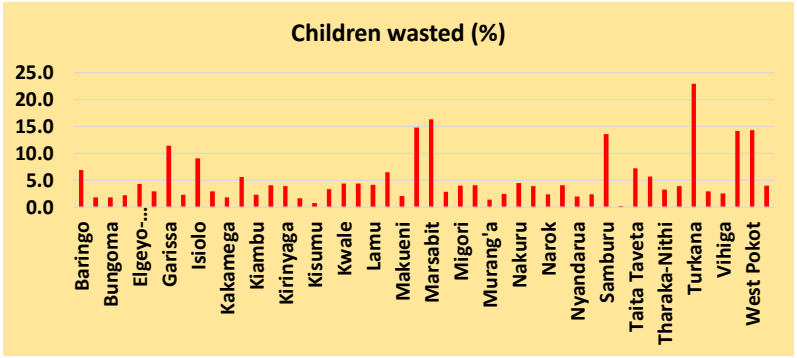

Children underweight (%)
50.0
40.0
30.0
20.0
10.0
0.0
Baringo
Bungoma
Elgeyo-...
Garissa
Isiolo
Kakamega
Kiambu
Kirinyaga
Kisumu
Kwale
Lamu
Makueni
Marsabit
Migori
Murang'a
Nakuru
Narok
Nyandarua
Samburu
Taita Taveta
Tharaka-Nithi
Turkana
Vihiga
West Pokot

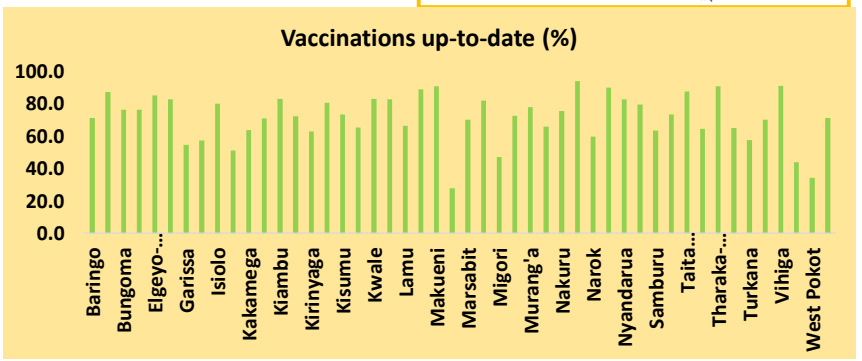
Children wasted (%)



Vaccinations up-to-date (%)







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