

## FOOD SECURITY IN EAST AFRICA

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**Abstract** The article discusses the current state and dynamics of food security in East Africa. This region stands out in Africa not only as the most populous, but also as the fastest developing one, mostly due to its advanced economic growth and infrastructure construction in Ethiopia, Djibouti, Kenya, Rwanda, Tanzania, and Uganda. East African countries are particularly vulnerable to disruptions in food supplies from Russia and Ukraine. To assess food security in the region, the authors apply two methods designed by the World Bank and by the Food and Agriculture Organization of the United Nations (FAO). These methods focus, correspondingly, on per capita incomes and malnutrition indicators. The authors further examine the impact of the Millennium Development Goals and the Sustainable Development Goals on food security in East Africa, investigate the main causes of food insecurity, and put forward policy recommendations for enhancing regional food security. Although achieving sustainable food security in East Africa appears unrealistic in the foreseeable future, intensification and digitalization of agriculture are critical to enhance food self-sufficiency of the region. The primary data sources for the article include FAO's 2015–2021 surveys on food security and nutrition in Sub-Saharan Africa and statistical databases by FAO and the International Trade Center.

**Keywords** East Africa, food security, agriculture, malnutrition, agricultural policy, digitalization, Food and Agriculture Organization of the United Nations, food availability, nutritional standards, Millennium Development Goals, Sustainable Development Goals.

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**Название статьи** Продовольственная безопасность в Восточной Африке

**Аннотация** В статье представлен анализ современного состояния и динамики продовольственной безопасности в Восточной Африке. Данный регион Африки не только лидирует на континенте по численности населения, но и является самым быстроразвивающимся, благодаря опережающему

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экономическому росту и инфраструктурному строительству в таких странах, как Эфиопия, Джибути, Кения, Руанда, Танзания и Уганда. Страны Восточной Африки особо чувствительны к перебоям с поставками продуктов питания из России и Украины. Для оценки состояния в сфере продовольственной безопасности Восточной Африки применены две методики: Всемирного Банка (страновая классификация по уровню дохода на душу населения) и Продовольственной и сельскохозяйственной организации (ФАО) ООН (анализ ключевых показателей недоедания). В статье рассматривается влияние «Целей развития тысячелетия» и «Целей устойчивого развития» на состояние продовольственной безопасности в Восточной Африке, исследуются основные проблемы с обеспечением населения полноценным питанием и предлагается ряд мер по укреплению продовольственной безопасности в регионе. Представляется, что в ближайшей перспективе добиться устойчивой продовольственной безопасности в государствах Восточной Африки нереально, однако интенсификация и цифровизация сельскохозяйственного производства могут значительно поднять уровень самообеспечения населения этого региона продовольствием. Эмпирическая база исследования в основном представлена обзорами ФАО ООН по продовольственной безопасности и питанию в странах Африки южнее Сахары за 2015–2021 годы и данными статистических баз ФАО ООН и Международного торгового центра.

**Ключевые слова** Восточная Африка, продовольственная безопасность, сельское хозяйство, недоедание, аграрная политика, цифровизация, Продовольственная и сельскохозяйственная организация (ФАО) ООН, доступность продовольствия, нормы питания, Цели развития тысячелетия, Цели устойчивого развития

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## I. Introduction

On 8 September 2000, when world leaders reached a consensus on the path toward reduction of poverty in the world, the UN General Assembly adopted the United Nations Millennium Declaration which set eight Millennium Development Goals (MDGs) for the year 2015. The first of the MDGs was the goal of eradicating extreme poverty and hunger.<sup>1</sup> Fifteen years later, progress towards the MDGs was thoroughly assessed and their implementation was rated as successful. In particular, with regard to the first MDG, the result was undeniably impressive: while in 1990 the share of the population of the developing world living below the poverty line was 47 percent (1.9 billion people), by 2015 this figure dropped to 14 percent (836 million people).<sup>2</sup>

In September 2015, the UN General Assembly adopted a new development agenda known as the Sustainable Development Goals (SDGs). The first two of 17 SDGs focused on interrelated issues of “ending poverty in all its forms everywhere” and “ending hunger, achieving food security and improved nutrition, and promoting sustainable agriculture” by 2030. The second SDG emphasized expanding access to food for all people, but especially for the poor and for those in vulnerable situations. It also emphasized facilitating optimal nutrition all year round.<sup>3</sup>

In 2015, a FAO report that evaluated the progress towards achieving the MDGs noted that while in Africa between 1990 and 2014 the number of undernourished people increased from 181.7 million to 232.5 million, their share in the total African population fell from 27.6 percent to 20 percent.<sup>4</sup> In 2022, the intermediate progress towards the SDGs was assessed at the regular session of the African Regional Forum on Sustainable Development.<sup>5</sup> The “2020 Africa Sustainability Report” pointed at the

increase in the absolute number of poor people in the continent and acknowledged that almost 40 percent of the Africans still lived in extreme poverty.<sup>6</sup> Indeed, hunger in Africa and impoverishment of the African population are among the most serious vulnerabilities of international economic security system.

In this regard, it is important to consider the situation in East Africa<sup>7</sup> that is Africa's most populous region (473 million people as of October 2022).<sup>8</sup> Currently, 33.3 percent of all Africans live in East Africa, while West Africa accounts for 30 percent, North Africa – for 18.1 percent, Central Africa – for 13.7 percent, and South Africa – for 4.9 percent of Africa's population.<sup>9</sup>

## **II. Assessment of food security in East African countries**

A range of methods may be employed to assess the state of food security. Two of these methods are most relevant for this study.

The first methodology was developed by the World Bank and is based on the categorization of countries by their per capita incomes. The key assumption of this methodology is that the higher the level of a per capita income, the more likely it is that adequate food is available to that country's residents. Most of East African countries are not rated high by the World Bank: only three countries (Djibouti, Kenya and Tanzania) fall into the category of lower-middle-income economies, while the rest belong to the category of low-income economies.<sup>10</sup> The ascension of Kenya (in 2014) and Tanzania (in 2019) from the group of low-income economies to the category of lower middle-income economies reflects slight improvement of the food security situation in the region as a whole. However, in 2019 the rating of Sudan was downgraded. In general, based on this classification, the entire region suffers from insufficient access to food markets and thus, according to the World Bank methodology, the level of food security in East Africa may be considered as low.

The second methodology employed in this article was developed by the Food and Agriculture Organization of the United Nations (FAO) that introduced a number of indicators and a database to collect the relevant statistical data. FAO also issues regular analytical reports on the prevalence of hunger in the world. Since 2015, FAO has been publishing annual reviews on food security in African countries. The first FAO report on food security and nutrition in Sub-Saharan Africa (SSA) highlighted the progress of West Africa where the number of undernourished people decreased noticeably between 1990 and 2015. However, in all other regions of the continent, food insecurity increased. For instance, in 1990–1992, East Africa accounted for 59 percent of Sub-Saharan Africa's total undernourished population of 176 million. Although by 2014–2016 the region's share fell to 57 percent, the absolute number of undernourished East Africans increased significantly from 103.9 million to 124.2 million. Unfavorable climate conditions and droughts were cited as the main reasons for deteriorating food security in East Africa.<sup>11</sup>

FAO uses several indicators to measure food security, the first of which is the prevalence of undernourishment (see Table 1).

Based on the information provided in FAO's database, it is possible to scrutinize the number of undernourished people in different regions of the world. Until 2015, virtually all countries in East Africa (except Rwanda) witnessed a reduction in the share of undernourished population. However, Table 1 demonstrates that the movement towards zero hunger in the region has reversed since 2015 and that the percentage of food insecure people has started to rise again. Still, over the past 20 years, the overall food security dynamics in East Africa has been positive (see Table 2).

**Table 1. Changes in the prevalence of undernourishment in select East African countries\***

Indicators/ Countries	2005		2015		2020	
	Prevalence of under-nourishment (%)	Change compared to 2000 (%)	Prevalence of under-nourishment (%)	Change compared to 2005 (%)	Prevalence of under-nourishment (%)	Change compared to 2015 (%)
Djibouti	31.3	−10.7	14.2	−17.1	13.5	−0.7
Ethiopia	37.1	−9.9	14.8	−22.3	24.9	10.1
Kenya	28.5	−3.7	21.5	−7.0	26.9	5.4
Somalia	18.9	−2.6	11.2	−7.7	12.8	1.6
Tanzania	28.4	−4.7	22.5	−5.9	22.6	0.1
Rwanda	35.3	−3.2	35.3	0	35.8	0.5
East Africa average	35.1	−4.9	24.7	−10.4	29.2	4.5

Source: Suite of Food Security Indicators // FAOSTAT. Food and Agriculture Organization of the United Nations (FAO) Database. 2022. URL: <https://www.fao.org/faostat/en/#data/FS> (accessed 19.11.2022).

\* Hereinafter some East African countries are excluded from the analysis due to the lack of quality data.

**Table 2. Dynamics of change in select food security indicators in East African countries**

Indicators	2000	2005	2010	2015	2020	2020 compared to 2000 (%)	Positive/negative change
Percentage of population using safely managed drinking water services, %	10.5	12.5	16.1	20.3	25.5	15.0	+
Percentage of population using at least basic drinking water services, %	33.7	39.3	45.4	51.5	57.5	23.8	+
Percentage of population using safely managed sanitation services, %	12.9	15.1	17.2	18.9	20.7	7.8	+
Percentage of population using at least basic sanitation services, %	15.9	18.4	20.8	23.0	25.4	9.5	+

Source: Suite of Food Security Indicators // FAOSTAT. 2022.

The sanitation environment in East Africa has improved visibly, but, admittedly, the pace of progress in this area has been slow and insufficient: up until the present date, only one in two people has access to drinking water and only one in five uses at least basic sanitation services.

According to FAO's definition, food security means not only the availability of food products, accessibility and stability of their supply, but also their qualitative composition that must fully meet the need of people to lead a full life. Table 3 allows us to assess the depth of food shortages in East African countries.

**Table 3. Changes in the daily diet in East African countries, 2000–2018\***

Indicators	Norm	2001		2010		2018	
		Value	% of nutritional norm	Value	% of nutritional norm	Value	% of nutritional norm
Average protein supply (g/cap/day)** (3-year average)	63	45.0	71.4	52.1	82.7	54.1	85.9
Average supply of protein of animal origin (g/cap/day) (3-year average)	30	7.1	23.7	8.6	28.7	8.8	29.3
Dietary energy supply used in the estimation of the prevalence of undernourishment (kcal/cap/day)*** (3-year average)	2000	1997	10.0	2163	108.2	2226	111.3

Sources: Suite of food security indicators // FAOSTAT. 2022; Healthy diet // World Health Organization (WHO) web-site. 29.04.2020. URL: <https://www.who.int/news-room/fact-sheets/detail/healthy-diet>; Protein and Amino Acid Requirements in Human Nutrition: Report of a Joint FAO/WHO/UNU Expert Consultation. – Geneva: WHO, 2002 URL: [https://apps.who.int/iris/bitstream/handle/10665/43411/WHO\\_TRS\\_935\\_eng.pdf](https://apps.who.int/iris/bitstream/handle/10665/43411/WHO_TRS_935_eng.pdf) (both accessed 20.11.2022).

\* The latest data available for analysis is dated 2018.

\*\* g/cap/day – daily wet and dry mass of feces produced by human populations

\*\*\* kcal/cap/day (kilocalories per person per day) – average daily supply of calories.

The average calorie intake for East African countries is in line with the norm, which indicates sufficient food for population on average. Yet if one takes into account that a significant portion of the region's population is engaged in agricultural production, then the figures presented above are no longer considered the norm: a person who is engaged daily and year-round in heavy physical labor should consume 1.5–2 times more calories. Also, if one considers other indicators, the imbalance of the existing diet becomes obvious. For example, the average level of protein intake has only recently started to approach the norm, but still has not reached it. In fact, the need for proteins is met by a high intake (about two thirds of the diet) of vegetable proteins contained, for example, in cereals, root crops, and tubers. A further comparison of animal protein intake with the norm of 30 g reveals an extreme nutritional imbalance that inevitably entails

severe health repercussions. It is thus instructive to examine data about the impact of food security on the health situation of East African populations (Table 4).

**Table 4. Changes in certain indicators of food security that affect the health of the population**

Indicators	2000	2010	2020	2020 compared to 2000 (%)	Positive/negative change
Percentage of children under 5 years of age who are stunted, %	49.1	40.8	32.6	-16.5	+
Number of children under 5 years of age who are stunted, million	22.6	23.6	22.1	-0.5	+
Percentage of children under 5 years of age who are overweight, %	5.3	4.3	4.0	-1.3	+
Number of children under 5 years of age who are overweight, million	2.5	2.5	2.7	0.2	-
Prevalence of anemia among women of reproductive age (15–49 years), %	38.8	32.2	31.9	-6.9	+
Number of women of reproductive age (15–49 years) affected by anemia, million	22.8	25.5	33.8	11.0	-

Source: Suite of Food Security Indicators // FAOSTAT. 2022.

The data above demonstrates that positive changes are observed in all relative indicators under discussion. In recent years, Africa has experienced a very high population growth rate,<sup>13</sup> and this has provoked the deterioration of absolute indicators in the field of food security. Despite some progress in improving the nutrition of the region's population, East Africa continues to be characterized by high rates of food insecurity. A monotonous unbalanced diet causes micronutrient deficiencies, known as "hidden hunger", and adversely affects the health of the population. Assessing food security through the use of the FAO methodology dictates the need to pay special attention to the lag in the growth and development of children: a significant share of them is stunted or overweight and lags behind in growth and development. The state of health of women in reproductive age, more than half of whom are prone to anemia, also raises concern.

The combination of malnutrition with poor sanitation greatly increases the vulnerability of rural areas and leads to widespread disease. The media annually report that epidemics of certain diseases, long forgotten in developed world, break out in Africa. As a result of these epidemics, the continent is not only experiencing high mortality, but also has a growing number of disabled people who are incapable of full-fledged work. Consequently, the unbalanced diet of the populations of East African countries negatively affects not only the health and physical condition of people, but also the economy of the region in general.

### III. Root causes of food insecurity

To assess the causes of food insecurity in East African countries, such key indicators as composition and structure of their exports and the state of their agriculture (which is the main source of food) have to be considered.<sup>14</sup> Until the 1960s, when African countries started to gain independence one after another, food security had barely been an issue.<sup>15</sup> This has changed over time, as foreign exchange earnings of African states have become dependent either on a single commodity, or on a group of commodities (see Table 5).

**Table 5. Composition and structure of exports of East African countries**

Indicators/Countries	2002		2021	
	Commodity	Export share, %	Commodity	Export share, %
Burundi	Coffee, tea, spices	67.6	Coffee, tea, spices	46.1
Kenya	Oil and oil products	30.7	Coffee, tea, spices	21.8
Somalia	Coffee, tea, spices	67.5	Coffee, tea, spices	46.1
Tanzania	Pearls, gemstones etc.	34.5	Pearls, gemstones etc.	46.5
Rwanda	Oil and oil products	67.7	Pearls, gemstones etc.	27.7
South Sudan (from 2012)	Oil and oil products	99.55 (2012)	Oil and oil products	98.6
Ethiopia	Coffee, tea, spices	40.0	Coffee, tea, spices	40.0
Uganda	Coffee, tea, spices	29.0	Coffee, tea, spices	39.0

Source: List of exported products for the selected product // Trade Map Database. International Trade Center. URL: [https://www.trademap.org/Product\\_SelProduct\\_TS.aspx?nvpm=1%7c%7c%7c%7c%7cTOTAL%7c%7c%7c2%7c1%7c1%7c2%7c2%7c1%7c1%7c4%7c1%7c1](https://www.trademap.org/Product_SelProduct_TS.aspx?nvpm=1%7c%7c%7c%7c%7cTOTAL%7c%7c%7c2%7c1%7c1%7c2%7c2%7c1%7c1%7c4%7c1%7c1) (accessed 20.11.2022).

As Russian researchers E.Krylatykh and T.Belova argue, “the composition and structure of food exports and imports very eloquently testifies to the priorities and principles of the country’s economic policy and its role in shaping both the world and domestic food markets”.<sup>16</sup> Most countries in the region are exporters of coffee, tea, and spices, which are agricultural products. It means that their operations are riddled with additional production risks – biological (pest invasions, plant diseases etc.) and climatic (excess or lack of precipitation, hurricanes, storms etc.). The problem of agricultural production in Africa is that likelihood and consequences of any of these risks increase due to an underdeveloped management system and inadequate technological equipment of the industry.<sup>17</sup> This means that in the event of unfavorable natural conditions one-crop exporting economies may abruptly lose most of their foreign exchange earnings, which, as a rule, serve as a source of hard currency for purchasing the lacking food from the global market. Besides that, the volatility of international market prices for such commodities may also adversely affect these countries’ incomes. Thus, the undiversified nature of exports from East African countries is a major risk to the food security of the region.

#### IV. The role of the agricultural sector

For East African countries, agriculture is particularly important due to the rapid growth of population and the increasing demand for food.<sup>18</sup> Correspondingly, agriculture plays a significant socio-economic role for the East Africans and is a major element of food self-sufficiency (see Table 5).

**Table 5. Role of agriculture in socio-economic situation of East African countries**

Indicators/ Countries	Share of agriculture in GDP, %			Employment in agriculture, % of total employment		
	1990	2020	2020 compared to 1990 (%)	1991	2019	2019 compared to 1991 (%)
Burundi	51.1	28.6	-22.5	92.1	86.2	-5.9
Kenya	25.3	22.6	-2.7	44.5	54.3	9.8
Somalia	62.7	n/a		83.0	80.3	-2.7
Tanzania	42.0	26.7	-15.3	67.5	60.4	-7.1
Rwanda	32.5	26.6	-5.9	89.2	62.3	-26.9
South Sudan	n/a	9.6		76.8	66.6	-10.2
Eritrea	n/a	n/a		72.3	72.1	-0.2
Ethiopia	49.5	35.6	-13.9	71.8	63.1	-8.7
Uganda	53.3	23.9	-29.4	84.7	65.1	-19.6

Source: Employment in agriculture (% of total employment; modeled ILO estimate) // International Labor Organization (ILO), ILOSTAT Database. Data as of January 2021.

URL: <https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS> (accessed 20.11.2022).

**Table 6. Agricultural productivity, value added per worker\* in 2010, U.S. dollars**

Regions and countries	2000	2018	Change	Positive/negative trend
World	1977.0	3869.1	1892.1	+
Europe and Central Asia	6808.8	4748.6	13366.1	+
Latin America	4107.6	6512.8	2405.2	+
High income countries	24587.1	39043.9	14456.8	+
Africa	1002.2	3021.5	2019.3	+
Sub-Saharan Africa	869.0	1501.4	632.4	+
Burundi	448.7	234.8	-210.9	-
Kenya	2048.9	1760.8	-288.1	-
Rwanda	281.8	610.5	328.7	+
Tanzania	515.7	859.1	343.4	+

Source: Table 3.3. World Development Indicators: Agricultural Output and Productivity // The World Bank Data. 2020. URL: <http://wdi.worldbank.org/table/3.3#> (accessed 20.11.2022).

\* Value added per worker is calculated by dividing the value added of the sector by the number of people employed in it. It is used to assess a country's economic ability to create and maintain decent employment opportunities with fair and equitable remuneration.



The main reason for decline in the share of agriculture in East African economies is the priority development of other sectors, whose importance for these countries is growing.<sup>20</sup> This leads to redistribution of workforce that is transferred to rapidly developing sectors, while employment in agriculture is declining. The shortage of workers in agriculture is aggravated by urbanization and changed lifestyles of the East Africans: young people prefer to live in cities and look for work in more technologically advanced domains than in the agricultural sector.

While more than half of the populations of East African countries are still employed in agriculture, such a significant mass of people produces, on average, less than a third of the regional Gross Domestic Product (GDP). Thus, labor productivity is low while labor intensity of production is high. To assess these parameters, the World Bank employs the Agricultural productivity indicator (see Table 6).

Countries with a developed agricultural sector try to focus on intensifying their agricultural production, mainly through the use of the latest technologies and equipment, as well as through cutting the number of people employed in the industry. Although the agricultural sector is of paramount importance for East African countries, intensification of production is slow as the industry develops mostly through increases in quantitative characteristics (crop cultivation areas and livestock numbers) rather than qualitative ones (such as raising yields and reducing costs). In Table 7, the intensity of cultivation of agricultural crops in East African countries is compared with the same indicator in other regions of the world.

**Table 7. Gross value of annual domestic agricultural production of East African countries, U.S. dollars per capita**

Regions	2000	2005	2010	2015	2020
World	427.5	450.2	476.5	504.7	509.5
Africa	201.9	223.1	237.1	243.1	238.1
<b>East Africa</b>	<b>147.4</b>	<b>157.0</b>	<b>178.3</b>	<b>168.2</b>	<b>177.3</b>
Americas	632.0	664.3	706.3	749.9	775.2
North America	819.6	815.1	842.3	877.1	906.8
Central America	319.3	329.9	341.4	352.1	377.7
South America	632.8	714.2	788.6	860.0	886.5
Asia	388.3	418.9	456.1	489.1	498.0
East Asia	595.1	662.6	737.3	805.2	804.5
South Asia	200.1	207.7	228.6	246.1	269.4
Southeast Asia	316.3	352.1	393.1	424.1	439.4
West Asia	452.1	449.9	428.3	431.0	459.2
Europe	606.5	607.9	605.8	651.5	662.5
Oceania	1357.7	1276.7	1137.6	1228.6	1029.3

Source: The State of Food Security and Nutrition in the World: Transforming Food Systems for Food Security, Improved Nutrition and Affordable Healthy Diets for All. – Rome: FAO, 2021.

URL: <https://www.fao.org/documents/card/en/c/cb4474en> (accessed 20.11.2022).

In comparison with other regions listed in Table 7, East Africa ranks last in per capita agricultural production. For instance, in 2020, East Africa produced two times less agricultural products per capita compared to Asia, three times less than Europe, and five times less than Oceania. It should be taken into account that many East African countries produce tea, coffee, and spices that are not used to meet the domestic food demand. Thus, the actual gross value of food produced is even smaller, i. e. the region is distinguished by extremely low level of food self-sufficiency. This is partly due to the low

productivity of agriculture (low yields, outdated cultivation technologies, and low mechanization of production processes) and partly due to unfavorable climate conditions. To solve this problem, East African countries resort to massive imports of food.

## V. Food imports dependence

The worsening food problem in East Africa is manifested in a significant increase in dependency on food imports, especially on the import of grain (see Table 8).

**Table 8. Dependency of East African countries on grain imports, %**

Regions and countries	2000–2002	2016–2018	Change	Positive/negative trend
Africa	28.2	31.1	2.9	–
East Africa	13.9	16.3	2.4	–
Burundi	–	25.6	–	
Djibouti	100.0	100.0	0	–
Kenya	23.9	46.1	22.2	–
Rwanda	20.1	36.8	16.7	–
Tanzania	9.4	3.6	–5.8	+
Uganda	5.9	5.4	–0.5	+
Ethiopia	10.2	8.3	–1.9	+

Source: SDG Indicators // FAOSTAT. 2022. URL: <https://www.fao.org/faostat/en/#data/SDGB> (accessed 20.11.2022).

In general, the region has witnessed an increase in its dependence on grain imports. The cases of Kenya and Rwanda are especially notable. In Kenya, since the 2000s, there has been a significant increase in the area of grain cultivation: of corn – by 1.5 times (from 1500 thousand to 2888 thousand hectares) and of sorghum – by 1.8 times (from 122 thousand to 220 thousand hectares). However, the area of wheat cultivation has not expanded in 20 years, even though East Africa is badly dependent on importing it. Growing consumption of wheat flour products results from rising household incomes, as well as from urbanization and changing eating habits. Until recently, white bread was considered a delicacy, but now it is one of the key elements of the East Africans' diet. Chapati cakes that used to be a special occasion dish are now sold everywhere as a street fast food. Accordingly, the flour-grinding and baking industries have received a strong impetus for development. A study by the International Maize and Wheat Improvement Center (CIMMYT) mentions that flour milling and food processing companies in Kenya rely heavily on imported wheat to meet the high demand for wheat-based food. For example, a large industrial bakery can consume 15 thousand tons of wheat per month, but local production accounts for no more than ten percent, while the rest is imported.<sup>21</sup>

Against this background, the ongoing conflict between Russia and Ukraine, two of East Africa's most important sources of wheat imports, poses a serious threat to the region's grain supply (see Table 9). As it can be seen from the above tables, East African countries are heavily dependent on imported wheat to meet their high demand for wheat-based food. The conflict between Russia and Ukraine has had a direct impact on the

dynamics of global grain prices. The reasons for the increase in grain prices are associated with the closure of Ukraine's ports, Western sanctions against Russia (including Russian shipping and ports), growing security risks of shipping in the Black Sea region, higher costs of insurance, and difficulties with foreign exchange transactions. Prices for grain soared in February 2022 and reached their peak in March 2022 due to the introduction of a temporary ban on the export of cereals by Russia.<sup>22</sup> However, grain prices slightly decreased as a result of the "grain deal" that was reached in July 2022 and covered the grain export from Ukraine along the grain shipping corridor.<sup>23</sup> Still, prices remained at least twice as high as in 2018.<sup>24</sup>

**Table 9. Share of Russia and Ukraine in cereals imports of East African countries**

Countries	Share of a country in imports, %		Value of imports, million U.S. dollars		Country's position in imports	
	Russia	Ukraine	Russia	Ukraine	Russia	Ukraine
Ethiopia	7.6	24.8	127.9	418.2	4	2
Burundi	27.2	–	11.7	–	1	–
Kenya	10.3	7.6	106.3	78.6	4	7
Rwanda (latest data for 2018)	29.7	–	52.4	–	1	–
Somalia			10.1	8.5	3	4
Sudan (latest data for 2018)	86.7	1.9	474.2	10.3	1	4
Tanzania	39.0	16.9	95.0	41.1	1	3

Source: List of exported products for the selected product // Trade Map Database. International Trade Center. URL: [https://www.trademap.org/Product\\_SelProduct\\_TS.aspx?nvpm=1%7c%7c%7c%7c%7cTOTAL%7c%7c%7c2%7c1%7c1%7c2%7c2%7c1%7c1%7c4%7c1%7c1](https://www.trademap.org/Product_SelProduct_TS.aspx?nvpm=1%7c%7c%7c%7c%7cTOTAL%7c%7c%7c2%7c1%7c1%7c2%7c2%7c1%7c1%7c4%7c1%7c1) (accessed 20.11.2022).

According to the National Agricultural Agency, more than 150 million tons of grain had been harvested in Russia by the end of October 2022, which is 31 million more than at the same time last year and is an absolute record.<sup>28</sup> However, an unobstructed export of grain from Russia has still been under question at the time of writing. Uncertainty with the Russian exports keeps the world grain market prices high. Until the issue with extending the grain corridor deal gets a long-term solution (the “grain deal” has already been extended in November 2022), there are no prerequisites for lower prices. Meanwhile, governments of those countries that are dependent on wheat imports are considering short-term and long-term options to replace imported wheat and to reduce its consumption. To avoid famine and ensuing political unrest, East African governments should take urgent measures to restore and further develop their own agricultural production.

## VII. How to improve food security of East Africa

Some economists have emphasized the importance of an integrated multi-level approach to reduce the acuteness of the food problem. Reconstruction of the agricultural sector and diversification of key export commodities may be integral parts of this process.<sup>29</sup>

At the moment, all ongoing country programs for agricultural development are aligned with the SDGs, the African Union Agenda 2063, and the Comprehensive African Agricultural Development Program (CAADP), which is an outcome of the 2014 Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods. The latter focuses on improving the efficiency of agricultural production and ensuring food security of the continent by increasing public investment in the agricultural sector up to ten percent of national budgets, increasing production, reducing losses and expenses, improving nutrition, and promoting intracontinental trade.<sup>30</sup>

There are many theories of food security that consider its various economic, political, and social aspects.<sup>31</sup> Most of these theories emphasize the special role of agriculture as the main guarantor of food security. The most relevant one is the techno-ecological theory which claims that the challenges of hunger may be solved by adjusting agricultural methods in order to produce sufficient amount of food. The techno-ecological vision translates into the application of new technologies in agriculture, thus ensuring its intensification.<sup>32</sup>

Digital transformation that involves the introduction of digital technologies in agriculture can play a significant role in improving food self-sufficiency in East African countries.<sup>33</sup> At the turn of the century, such transformation has been codenamed “Information and Communications Technologies for Agriculture” (ICT4Ag). Currently, the preferred term is “Digital for Agriculture” (D4Ag). The widespread use of digital technologies in food production could improve food security in East Africa through raising self-sufficiency.

Many D4Ag technologies are already in use in Africa, but they have been insufficiently disseminated.<sup>34</sup> This is largely due to the low level of education of farmers. They are usually not able to obtain information about available digital solutions, so they need outreach and technical support. Results will not be achieved unless reconstruction of the road infrastructure, construction of irrigation systems, and development of cell networks are bolstered (as in rural areas they usually work poorly). East African countries should also pay more attention to support for research on innovative products to support farmers and to promotion of these products.<sup>35</sup>

## **VIII. Conclusion**

The issues of food security, hunger eradication, and optimal nutrition have been priorities for Africa since its independence. Nevertheless, the rapid population growth, the decline of agriculture, and growing food imports have all been negatively affecting the region’s food security for decades. Short-term improvement in the state of food security was observed during the period of the implementation of the Millenium Development Goals in 2000–2015: the share of hungry people decreased, the proportion of the population using sanitation services increased, and drinking water became available to more Africans. However, after that period, despite the adoption of the next set of global goals (Sustainable Development Goals), food insecurity started to increase in both absolute and relative terms. At the same time, under the impact of various geopolitical and geoeconomic events, the ability to import deficit food items has reduced significantly, which once again highlights the need to develop the region’s own agriculture.

The current food situation in East Africa is characterized by malnutrition and undernourishment in all their forms. Nutrition remains unbalanced and still does not meet the basic needs of the population.

Politicians and the public are aware of these food security issues. A number of global, regional, and national programs for the development of agriculture in East Africa provide for the optimization of the use of local resources, advancement of intraregional trade, and extended financial support for the agricultural sector. As the authors of this article adhere to the techno-ecological approach to food security, we see a way out of the current situation in the use of new technologies to intensify agricultural production. The introduction of modern technologies will contribute to the achievement of agricultural self-sufficiency and will make more balanced diets available. In addition, widespread implementation of these technologies should increase the resilience of public food systems against possible cataclysms.

In sum, while achieving full-fledged food self-sufficiency by East Africa is hardly possible in any foreseeable future, the introduction of measures discussed above should bring this vitally important goal closer.

## ENDNOTES

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