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FAO/WFP CROP AND FOOD SECURITY ASSESSMENT - GUINEA

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HIGHLIGHTS

- The Ebola Virus Disease (EVD) outbreak, which has severely affected the country since the beginning of the year resulted in a serious shock to the agriculture and food sectors in 2014. The epidemic started to spread when crops were being planted and grew during the crop maintenance period and expanded rapidly during the critical harvesting period for the staple crops rice, maize and cassava.
- The aggregate food crop production in 2014 is estimated at 3.04 million tonnes (including cassava in cereal equivalent and rice in milled terms), about 3 percent lower than the record harvest of 2013. Of this total, milled rice production, estimated at 1.315 million tonnes, about 4 percent below the previous year, accounts for bulk of the cereal production. In the highly EVD affected province of N'zérékore, rice production declined by 8.5 percent compared to 2013.
- The cereal import requirement in 2015 is estimated at 444 000 tonnes of cereals of which rice accounts for 320 000 tonnes. With commercial imports estimated at 400 000 tonnes, the uncovered gap amounts to 44 000 tonnes.
- The significant impact of Ebola on export earnings is expected to have compromised the country's ability to pay for the increase in cereal import requirements thus requiring international assistance.
- According to remote surveys undertaken by WFP, Ebola appears to be a shock to an already precarious situation of chronic food insecurity, particularly in Forest Guinea.
- Based on WFP estimates, 970 000 people, or 9 percent of the population, are estimated to be severely food insecure in December 2014. The EVD effects account for 230 000. The number of food insecure is projected to increase to 1.2 million in March 2015, 470 000 of which are Ebola driven. Almost 90 percent of the Ebola driven food insecure live in rural areas. Among income groups, petty traders and unskilled labourers have the highest share of food insecure people.
- The analysis indicates that different type of food assistance will be required. In addition to covering the import gap, cash/voucher transfers can assure food access for some segments of the population. Given the reductions in trader activity, local purchase in surplus areas can also be recommended.
- Frequent food security monitoring activities must continue as the situation is very fragile and could further flare up. The loss of livelihoods coupled with this market uncertainties means that there is a need for flexibility both in the type and scale of interventions that will be needed in 2015.

OVERVIEW

Since the beginning of the year Guinea has been one of the most affected countries by the Ebola Virus Disease (EVD) epidemic. According to the World Health Organization (WHO) latest figures, (as of 3 December 2014) the number of cumulative cases of disease transmission has reached 2164 with 1327 reported deaths. The epidemic started to spread when crops were being planted and grew during the crop maintenance period and expanded rapidly during the critical harvesting period for the staple crops rice, maize and cassava.

FAO and WFP, in collaboration with the Government and partners have been actively carrying out field level rapid assessments to assess the impact of the EVD crisis on food production, supply situation and the overall food security primarily through rapid assessment. In addition, FAO/GIEWS has developed a Disease Impact on Agriculture – Simulation (DIAS) Model to provide estimates of the impact of EVD on crop production, while WFP has developed a framework to estimate the current and future number of food insecure people due to EVD and a light version of a shock impact simulation model (SISMod-Light). The main objective of this report is to provide the synthesis of the results based on the models and the rapid assessments and other relevant sources of information on 2014 food production, and the analysis of market dynamics and household food security for the coming marketing year 2015.

Based on the DIAS Model estimates of production loss due to Ebola, adjusted to take into account the findings of the limited Rapid Assessments carried out in the field, the aggregate food crop production in 2014 is estimated at 3.04 million tonnes (including cassava in cereal equivalent and rice in milled terms), about three percent lower than the record harvest of 2013. Of this total, milled rice production (using the milling rate of 66.7 percent) estimated at 1.315 million tonnes, about four percent below the level year before, accounts for bulk of the cereal production. Total coarse grains (maize, sorghum, millets and other small grains) and cassava in cereal equivalent (32 percent of fresh weight) are

estimated applying 3 percent and one percent reduction factors, resulting in 1.337 million tonnes and 386 000 tonnes of production, respectively.

Given that the weather pattern and the use of other inputs of production during 2014 agricultural season were not significantly different from those during 2013, the reduction in harvest this year can be attributed to the farm labour and associated material inputs reduction due to the direct and behavioural effects of Ebola epidemic in the country.

At the estimated level of cereal production, and assuming some stock build up to cope with natural disasters, cereal import requirement in the marketing year 2015 (calendar year) is set at 444 000 tonnes of cereals, of which rice requirements account for the bulk, at 320 000 tonnes. This total cereal import requirement is higher than the 412 000 tonnes imported during 2013.

Given the forecast for lower GDP growth and significant drop in cash crop export earnings, the commercial imports of rice (at 300 000 tonnes) and wheat (at 100 000 tonnes) are anticipated to remain at the level of 2013.

The assumed level of commercial imports during 2015 leaves about 44 000 tonnes of uncovered gap to be covered with international food assistance and/or additional budgetary allocation by the Government.

According to remote surveys undertaken by WFP, Ebola appears to be a shock to an already precarious situation of chronic food insecurity, particularly in the severely EVD-affected Forest Guinea. Wage rates and terms of trade are lower in this region compared to the rest of the country.

Based on the WFP estimates, the number of severely food insecure is estimated at 970 000 in November 2014 – 230 000 of these are food insecure because of EVD. The number of individuals vulnerable to food insecurity is estimated to be 3 million. In March 2015, 1.2 million individuals are estimated to be severely food insecure; the EVD effect accounts for 470 000. In addition, 2.9 million people are estimated to be vulnerable to food insecurity. Almost 90 percent of the Ebola driven food insecure live in rural areas. Among income groups, petty traders and unskilled labourers have the highest share of food insecure people.

1. ECONOMIC BACKGROUND

1.1 Overall economic performance

In Guinea, although the Gross Domestic Product (GDP) has been increasing at low rates of 2 to 4 percent over the last five years, given the population growth of about 2.5 percent per year, on per capita basis the economy is more or less stagnant (see Table 1). The GDP per capita adjusted with the Purchasing Power Parity was 1 255 (compared to almost USD 2 000 average for Sub-Saharan countries). In 2014 the country ranked one of the bottom 10 (179th) out of 187 countries on the United Nations Development Programme's (UNDP) Human Development Index¹ based on 2013 data.

Guinea has the world's largest reserves of bauxite and is the second largest global producer ore; however, the economy has little diversity and is heavily dependent on the performance of the mining sector. Mining, comprising of gold, bauxite, aluminium and diamonds, contributes highly to government revenue and to exports; according to the Economist Intelligence Unit (EIU) it is responsible for 20 percent of GDP and well over 90 percent of recorded exports.

According to the EIU a more rapid expansion of the economy is constrained by deteriorating national infrastructure as well as declining state funding for both the development and for the provision of public services. In particular, poor roads, water and electricity supply have been impacting heavily on commercial agriculture.

¹ UNDP: 2014 Human Development Report.

Table 1: Guinea - Key economic indicators, 2009 to 2013

	2009	2010	2011	2012	2013
Overall GDP					
GDP (million USD)	3 206	3 268	3 395	3 529	3 617
GDP growth (annual %)	-0	2	4	4	3
GDP per capita, PPP (USD)	1 157	1 163	1 200	1 237	1 255
GDP per capita growth (annual %)	-3	-1	1	1	-0
Agriculture sector					
Value added (million USD)	748	771	807	-	-
Value added (annual % growth)	3	3	5	-	-
Value added (% of GDP)	26	22	22	21	20
Trade					
Imports of goods and services (million USD)	987	1 194	1 634	2 187	1 960
Exports of goods and services (million USD)	851	926	1 027	1 049	1 021
Trade balance: deficit(-)/surplus(+)	-136	-263	-607	-1 138	-939
Current account balance (million USD)	-403	-327	-1 161	-1 039	-

Source: Economist Intelligence Unit (EIU), November 2014 Country Report and earlier issues; World Bank, November 2014.

In 2014, the GDP is expected to slow down due to the Ebola outbreak and other compounding infrastructural causes. The World Bank has estimated the country's growth rate to drop from 4.5 percent to 0.5 percent². The main Economic impacts of Ebola are likely to be on agriculture and services sectors.

1.2 Agriculture in the macro-economy

The share of agriculture sector in the national GDP has been steadily declining from 26 percent in 2009 to 20 percent in 2013, with an average of about 22 percent. Most Guineans depend on agriculture as their primary source of livelihood and income, however, the agricultural productivity is low. As earlier mentioned, poor roads, water and electricity supply hinder both storage and transportation of foods to markets; as a result in Guinea most agricultural production is for direct consumption.

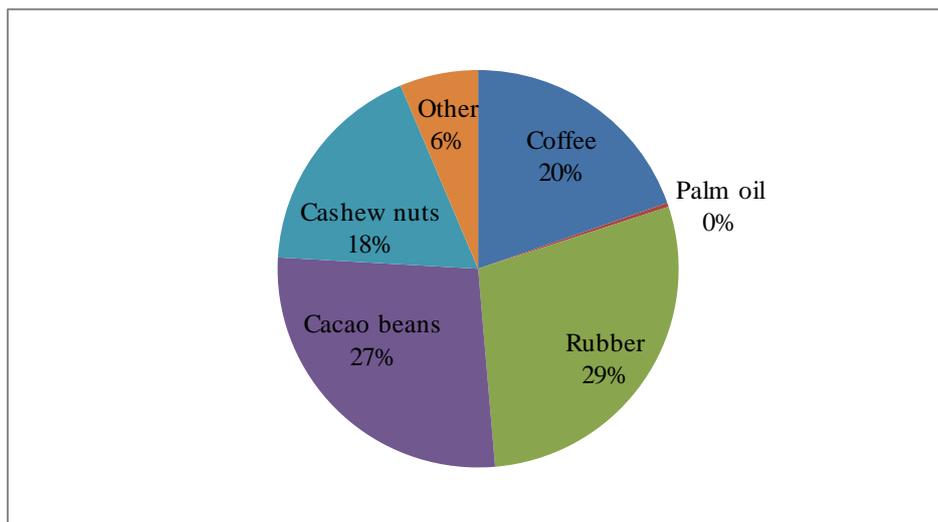
Table 2: Guinea – Cash crop commodity exports, quantity and value, 2011

	Quantity (tonnes)	Value (million USD)
Rubber	10 559	45.1
Cacao beans	16 393	42.8
Coffee	14 456	30.8
Cashew nuts	21 884	27.9
Other	22 354	10.4
Palm oil	468	0.5

Source: FAOSTAT.

² World Bank: Update on the Economic impact of the Ebola epidemic on Liberia, Sierra Leone and Guinea, 2 December 2014.

**Figure 1: Guinea - Share of commodity exports in Guinea
(in total cash crop export of USD 157 million in 2011)**



Source: FAOSTAT.

Rice is by far the most significant crop and it is grown on about 80 percent of all cereal cropped area and about 50 percent of irrigated land. Other food crops include Cassava and Maize. In addition Guinea also grows cash crops, particularly cashew nuts, cacao beans, coffee and rubber which make up the bulk of the country's agricultural exports. However, agricultural exports contribute less than 10 percent to the national GDP. Rubber exports are at the top of the list at about 30 percent of total cash crop exports (using 2011 data) followed by cacao beans at 27 percent (Table 2 and Figure 1). Food commodities, mainly, rice, and wheat at import levels of about 300 000 tonnes and 100 000 tonnes (2013 estimates), respectively, from the bulk of agricultural imports.

2. CROP PRODUCTION IN AGRICULTURAL SEASON 2013/14

2.1 Impact of Ebola on crop production

There are direct and indirect or behavioural effects of Ebola epidemic on the farm families and farm labour. Quantitatively, the direct impact in terms of the number people infected in relation to the size of the population of the area is very small. Much of the impact observed has been of the behavioural type due to border closures, restrictions/ban on people movement, people fleeing the area, reluctance to work in usual labour groups, breakdown of the traditional labour-sharing system (group/team work), etc.

How does EVD affect agriculture?

The epidemic started to spread when crops were being planted and grew during the crop maintenance period and expanded rapidly during the critical harvesting period of staple crops rice, maize and cassava. There are two ways in which farm operations, inputs and then harvest is affected. One is through reduced farm labour. The disrupted/reduced farm labour affects land preparation/planting, crop maintenance/growth (weeding, fencing, application of chemicals, etc.), and harvesting. Secondly, through the labour-associated non-labour inputs - reduced use of material inputs such as applied quantities of fertilizer, irrigation, chemicals, etc. Depending on their use and the relative impact these changes affect crop output.

2.1.1 Field observations and rapid assessments

Following a request from the Government of the Republic of Guinea a rapid assessment was conducted from 14 October to 3 November 2014 by FAO, WFP and agencies of the Ministry of Agriculture (ANASA and BSD³). The overall objective of this assessment was to provide information on the impact of the Ebola Virus Disease (EVD) on agriculture, food security and household's livelihoods in the affected and unaffected areas. Specifically the study would provide the Government of the Republic of Guinea and its partners with guidance in defining the support to be given to communities directly or indirectly affected by the epidemic.

Data was collected in 17 prefectures affected by EVD and the city of Conakry. The choice of prefectures was based on the severity of EVD infection across the country. In each selected prefecture, affected and unaffected⁴ sub-prefectures were surveyed in addition to the capital of the urban commune. Three levels of collection were defined: 1) 64 Sub-Prefectures were covered of which 47 affected⁵ and 17 unaffected⁶ (focus groups with local communities); 2) 18 Prefectures were surveyed (decentralized government structures); and 3) national level. In addition to the decentralized government structures, the questionnaires were administered to community leaders, producer organizations (agricultural and livestock), traders and NGOs.

The preliminary results indicate that:

- EVD has led to the displacement of households from affected to unaffected areas of the country. In areas affected by EVD, agricultural production in the 2014-2015 season has been affected by a shortage of labour. Thus, production is expected to fall in particular for rice, maize and peanuts.
- Food crops, cash crops and vegetable value chains have been seriously affected by the disruption of commodity flows to areas of consumption. A sharp drop was recorded in the prices of rice, vegetable and livestock products in the affected areas producing these commodities.
- The use of coping strategies is increasing in the most affected areas, especially in Forest Guinea. The food security of households that depend on agricultural wages, petty trade, hunting and the sale of hunting products deteriorated sharply in the most affected areas.

2.1.2 The Disease Impact on Agriculture – Simulation (DIAS) Model

To simulate theoretical impact of EVD an Excel based model is developed. The model takes into account the following five components, as described in the schematic flow chart below. The calculations are completed in 8 steps which are detailed in Annex 1 as a Technical Note.

Of the two crucial technical steps, the first one has to do with the conversion of the relative cases of EVD infection into the impact on farm labour. Based on the logic that as the number of cases of infection rises, the impact is low at low number of cases but rises rapidly and then flattens out at some point, the impact is measured by using a logistic function representing the S-Curve, the actual cases per 100 000 were converted to a percentage of population (and thereby farm labour) that may be considered affected.

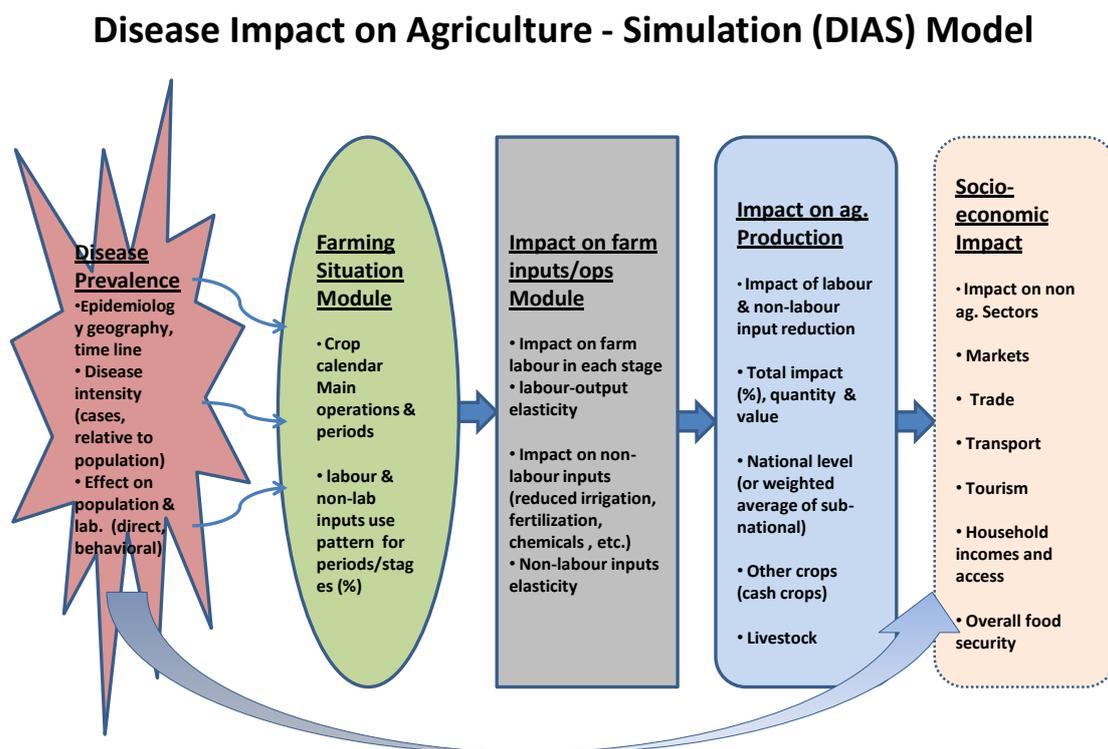
³ National Agricultural Statistics Agency (ANASA), Strategy and Development Bureau (BSD).

⁴ 0 cases recorded during the last 42 days.

⁵ Affected: at least one case.

⁶ Unaffected: 0 cases confirmed.

Figure 2: Guinea- Schematic of EVD Impact on Agricultural Production Simulation



The second most critical set of information is about farm input elasticities and input use patterns. For example, the labour elasticities of production (0.5 for rice, 0.47 for maize and 0.3 for cassava) and the labour use pattern (38:38:24 for rice, 59:35:6 for maize and 28:46:26 corresponding to three equal periods from planting to the end of harvesting, respectively) are taken from the empirical scientific literature relevant for the crops and the countries in the region. Similarly, assuming that the reduction in farm labour would also reduce the use of other non-labour material inputs such as fertilizer, chemicals, irrigation, etc., the EVD would also impact agriculture through non-labour input reduction. Using the implicit constant unitary elasticity of production such as the one used in the Cobb-Douglas production function, the other than labour input elasticities are calculated as one minus the labour elasticities. The other input use pattern is assumed to be 50:50:0 for rice and maize. Cassava production does not involve much use of these other inputs, hence only labour impact is calculated.

Using these parameter values, the DIAS Model shows the potential impact of Ebola crisis on cereal production. The results, shown in Table 3, show that the decline in production would be about 4 percent for rice and also 4 percent maize. Reduction in potential production of cassava due to Ebola per se should be much less, estimated in the order of 1 percent in the model, however, given that cassava tubers can remain in the ground unaffected, the actual harvest of the crop this year may be affected more significantly as a result of Ebola in different parts of the country.

2.1.3 Results from the Model

The results of the DIAS Model indicate that in Guinea, the production of the main staple crop rice would be lower by 3.7 percent from the without Ebola scenario (see Table 3). As explained in the sections below, the 2013/14 agricultural season, by and large, was similar to the agricultural season of the year before the harvest of 2012/13 can be used as a proxy for without Ebola production this year. Thus, the potential harvest paddy for this year is estimated at 1.977 million tonnes, with a potential loss of about 77 000 tonnes of paddy.

The relatively low level of impact at the national level masks the sub-national production and food security impacts. For example, impact on county rice production is estimated as high as -8.5 percent in Nzerekore.

The impact on maize harvest is expected to be almost the same to that on rice at the national level and subnational level. However, reduction in cassava production is estimated to be much lower at 1.2 percent at the national level, ranging from 0 percent in Labe to 3 percent in Nzerekore county of the country.

It should be noted that the Ebola impact results are useful as they show the extent of potential losses of agricultural production due to the crisis and can serve as a guide for the type of and the areas for response interventions.

Table 3: Guinea - Impact of Ebola on 2014 crop production (tonnes)

County	2013 Production	FAO/GIEWS Simulation Model Result <u>1/</u> (%)	2014 Production estimate
Rice (Paddy)			
Boke	288 942	-3.1	279 877
Faranah	306 106	-3.1	296 602
Kankan	442 933	-3.2	428 862
Kindia	332 193	-3.4	320 809
Labe	115 102	0.0	115 102
Mamou	108 407	-3.1	105 040
Nzerekore	459 677	-8.4	421 222
National Production <u>2/</u>	2 053 359	-3.7	1 976 754
Cassava			
Boke	77 841	-0.9	77 109
Faranah	51 337	-0.9	50 859
Kankan	347 543	-1.0	344 235
Kindia	156 322	-1.1	154 635
Labe	206 686	0.0	206 686
Mamou	174 517	-0.9	172 869
Nzerekore	204 678	-2.9	198 779
National Production <u>2/</u>	1 218 925	-1.2	1 204 805
Maize			
Boke	67 993	-3.1	65 863
Faranah	78 014	-3.1	75 617
Kankan	137 284	-3.1	133 001
Kindia	59 330	-3.3	57 362
Labe	177 818	0.0	177 818
Mamou	68 642	-3.1	66 526
Nzerekore	83 164	-7.3	77 056
National Production <u>2/</u>	672 244	-3.5	648 742

1/ Based on average of low (no new cases) projections and WFP's high cases projections scenarios (for weeks 45 to 52).

2/ The sum of the county production may slightly differ from the national total due to the differences in population data sources at national and sub-national level in the model.

2.2 Other agricultural production factors

In order to estimate the production during the season, it is also necessary to assess the impact of changes in factors other than the Ebola epidemic, namely weather and other key factors of production.

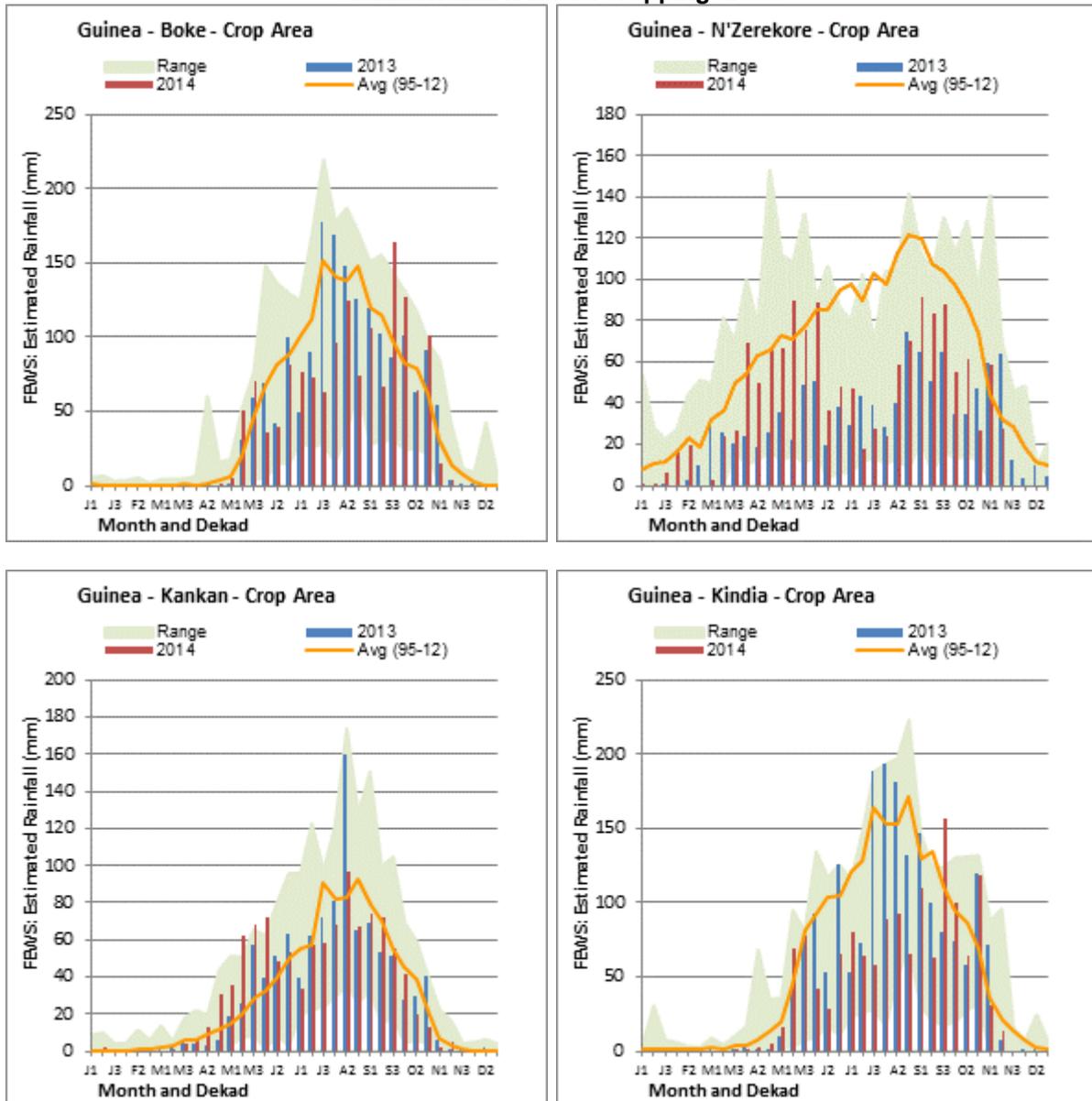
2.2.1 Weather

Guinea normally enjoys abundant rainfall and does not suffer from drought like in its neighbouring Sahel countries. Most agro-ecological zones receive between 1 500-2 000 mm of rainfall per year. Annual rainfall in the Forest Zone, the most important agricultural zone in the country, ranges between 2 000-2 500 mm (from April to October). Rainfall in 2014 was good compared with recent years. As is

shown in Figure 3, estimated rainfall exceeded or is similar to last year's level in most provinces. Rainfall was also similar to average in general. However, above-average and excessive precipitation was recorded in parts in September and early October, the beginning of the harvesting period, raising concerns about both crop yield and quality. Although estimated rainfall level in N'Zerekore has remained below-average for most dekads, precipitation was adequate for normal crop development in view of the high level of rainfall in a normal year.

Figure 3, which shows the agricultural stress index (ASI) derived from satellite imagery, gives a favourable picture for most of the country with ASI at less than 10 percent during the cropping season.

Figure 3: Guinea - Estimated rainfall in Eastern, Northern, Southern and Western cropping areas



2.2.2 Seeds and other inputs

Guinean farmers commonly use their own seed saved from the previous year's harvest and use of commercial fertilizers, pesticides or herbicides is limited. This year is no exception. Overall seed availability was adequate following the 2013 good harvest.

Labour shortage is the main factor that affected crop production in 2014. Movement restrictions and migrations to other areas have disrupted important farming activities including crop maintenance (weeding, fencing, application of chemicals, etc.) and harvesting with negative impact on yield. Planted area was not affected due to the timing of the outbreak.

2.3 Conclusions

Table 4: Guinea - Estimated impact of Ebola on national production of the main food crops

County	Reduction in production due to Ebola ('000 tonnes)	Value of production loss (million USD) 1/
Rice (milled) 2/	55	23
Maize	24	4
Cassava in cereal equivalent 3/	4	0.4
Small grains	21	2
Total	103	30

1/ Using international equivalent prices: Thai 100% broken rice at USD 425/tonne; US yellow maize at USD 175/tonne; average local price of cassava from Liberia and Sierra Leone, approximately USD 100/tonne; small grains (sorghum, millets, others) approx. USD 100/tonne.

2/ Milling rate of 66.7 percent.

3/ Cereal equivalent factor of 32 percent.

2.4 Impact on other cash crops

The Ebola epidemic has affected the key cash/export commodities. Similarly to food crops, due to foregone labour in Ebola affected areas, production of cash crops has dropped significantly. As evident in the figure above, coffee and cacao beans make up for a significant part of export commodities in Guinea. The decline in these crops has further contributed to reduced household incomes and ultimately reduction of purchasing power and inhibited food access.

Furthermore, aside from crop losses, the Ebola epidemic will also further impact the export of cash crops. Ebola has led to closure of borders, and significant restrictions of international movement of commodities. These aforementioned factors have decreased trade flows and cause the cost in transportation to double. For example, Guinea exports significant amount of palm oil, potatoes, fruit and coffee to Senegal. The closure of the border between both countries has had a large impact on exports, prices and producers income. Depreciation of the exchange rate is unlikely to increase exports but on the other hand it will certainly reduce purchasing power at household level.

2.5 Livestock

Livestock is ranked second among the activities of the Guinean population. Livestock farming is mostly extensive. Most of the livestock wander freely throughout the year except during the growing season. In the dry season the animals are free to roam both day and night, moving around the fallow land on the plains and mountains.

Moreover, an important livestock transhumance takes place from the higher parts of Fouta Djallon towards the Guinean coast. There is cross-border transhumance to Mali, Côte d'Ivoire and Guinea Bissau. Government and private veterinary services present throughout the national territory provide advice to farmers and care for all the species raised in Guinea.

To improve the livestock system, many reforms have been initiated by the Government in recent years through projects and programmes in collaboration with partners. These included the restructuring of livestock services, the establishment of pastoral and commercial infrastructure, the placement of private veterinarians in the country, and the promotion of short-cycle animal husbandry and peri-urban farms, etc. All these achievements that seemed to be boosting the livestock sector have been severely compromised by the unexpected outbreak of the Ebola Virus Disease.

The outbreak of EVD in the major production and transhumance areas of Boffa, Téliimélé, and Fria has resulted in the closure of borders and markets, confinement of goods and persons, and a ban on the regrouping of livestock. This has forced large herds to settle on land intended for intensive farming,

leading to the overuse of water and grazing resources and of other facilities, causing conflicts between farmers and herders.

Other important effects of EVB include the closure of large livestock markets such as Konkouré in Téliimélé as well as all the markets in Pita and Dalaba; the stigmatization of products from the affected areas, which are the large supplier prefectures (Téliimélé, Fria, Beyla, Kérouané, etc.); and the massive departure of the big consumers of livestock products from the affected areas following the slowdown or interruption of activities at the bauxite mines. All these factors have had the following consequences:

- Decline in the purchasing power of the stakeholders in the livestock sector;
- Drop in sales of livestock products (eggs, meat, manure, etc.) with negative impact on farmers income;
- Decline in turnover for importers of poultry following the ban on large ceremonies and gathering;
- Reduction of road and air traffic connected with haulage of livestock products;
- Increase in the cost of products to treat animal diseases;
- Disruption of the treatment and vaccination campaigns in the prefectures;
- Interruption of the supply chain for livestock products and inputs from Côte d'Ivoire and Senegal (vaccines, maize, smoked fish, shellfish, etc.).

The entire value chain, from production to consumption through marketing, has been affected.

3. ANALYSIS OF FOOD SUPPLY AND DEMAND

3.1 Food Supply/Demand Balance for 2015

A national food supply/demand balance sheet, including cereals, milled rice and cereal equivalent of cassava for the 2015, is presented in Table 5. In preparing the balance sheet, the following assumptions are made:

- Population:** The total national population in 2013 was 11.745 million (UN Population Division estimates cited in FAO/CCBS). Using the implicit annual growth rate of 2.5 percent from the same source, 2015 population is estimated at 12.340 million for the purpose of this report.
- Food consumption:** Based on the last five year average from the FAO/CCBS, the annual per capita consumption of 175 kg of cereals, including 104 kg of milled rice, 34 kg of maize, 10 kg of wheat, and 27 kg of sorghum, millets and other cereals is assumed to be the level of consumption during 2015. In addition, given that cassava forms an important part of the national diet, 50 percent of production of cassava (i.e. about 16 kg of cereal equivalent) per person per year is assumed. The remaining energy and other nutrients required are assumed to be derived from the limited quantities of available poultry, meat, sweet potatoes, vegetables, fruits, and other items.
- Feed use:** Use of grain for feeding animals is very limited in the country. Although given the rising importance of poultry in the country some coarse grains and root crops are used for supplementary feeding. Hence, 10 percent of maize, 5 percent of small grains and 25 percent of cassava is assumed to be used as animal feed.
- Seed requirements:** These are calculated by using the most commonly used per hectare seed rates of 65 kg for rice, 30 kg for maize and 10 of small grains, together with the projected areas to be planted based on the trend of past five years.
- Post-harvest losses and waste:** There is no country specific information on the losses. Hence, based on the standard rates of the post-harvest losses in the region or typically for developing countries, a rate of 15 percent for rice and maize, 10 percent for small grains and 25 percent for cassava of production including handling and storage losses are used.
- Opening and Closing Stocks:** For lack of the reliable data on stock levels, it is assumed that there will be no significant differences in the beginning and the ending stock levels. Very small amount of cereal stock build-up, equivalent of about two weeks' worth of domestic utilization use is assumed.

Table 5: Guinea - Food balance sheet for marketing year 2015 ('000 tonnes)

	Rice (milled) ^{1/}	Maize	Sorghum, millet, others	Wheat	Total cereals	Cassava C.E. ^{2/}	Total cereal equivalent
Domestic availability ^{3/}	1 315	652	685	0	2 652	386	3 038
Production	1 315	652	685	0	2 652	386	3 038
Total utilization	1 635	652	684	123	3 095	386	3 481
Food use	1 283	420	333	123	2 159	193	2 353
Feed use	0	65	34	0	99	97	196
See requirement	66	3	2	0	70	0	70
Post-harvest losses and waste	197	98	68	0	363	97	460
Usual cross-border exports	50	50	200	0	300	0	300
Stock build-up (+)/draw-down(-)	39	17	47	0	103	0	103
Import requirements	320	0	0	123	444	0	444
Anticipate commercial imports	300	0	0	100	400	0	400
Uncovered deficit	20	0	0	23	44	0	44

^{1/} Using the milling rate of 67 percent.

^{2/} In cereal equivalent using 32 percent conversion rate based on the caloric content.

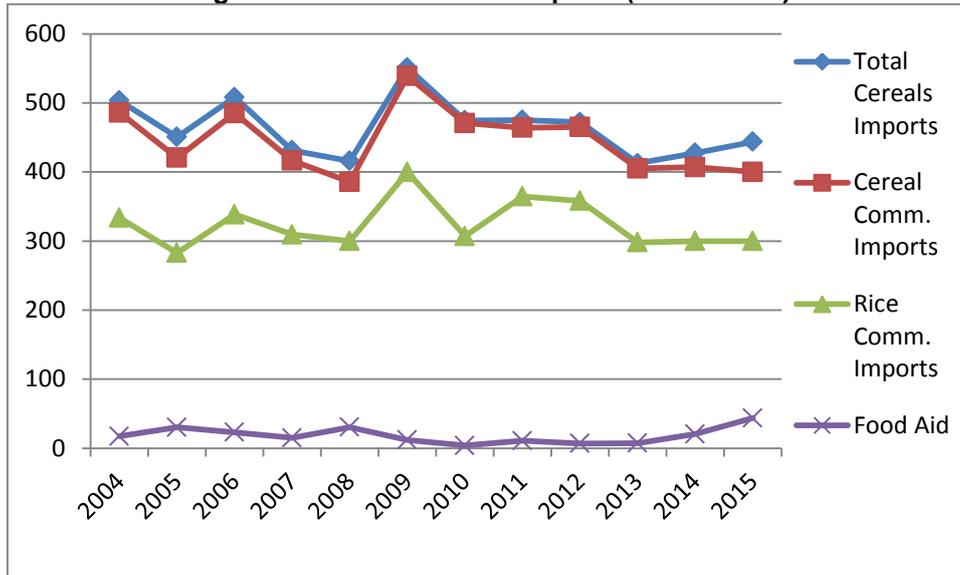
^{3/} Not including opening stocks, as only yearly net stock changes are included under Utilization section of this balance sheet.

With the above mentioned assumptions, total production for the coming marketing year (2015) is estimated at 3.038 million tonnes of cereals (including rice in milled and cassava in cereal equivalent terms). The total utilization is estimated at 3.481 million tonnes, leaving an import requirement of 444 000 tonnes of cereals, including 320 000 tonnes of rice and 123 000 tonnes of wheat. The total cereal import requirements are projected to be higher than the 412 000 tonnes imported during 2013.

The impact of Ebola on the country's export earnings is likely to be significant, compromising the ability of the country to pay for the increase in cereal import requirements. Given the forecast for lower GDP growth down by 2.1 percentage points (from 4.5 percent to 0.5 percent, according to a World Bank study⁷) and a significant drop in cash crop export earnings, the commercial imports of rice (at 300 000 tonnes) and wheat (at 100 000 tonnes) are anticipated to remain at the level of 2013. However, they are lower than the 512 000 tonnes reportedly imported so far during this year, which would seem to be higher than the usual import level, possibly as a strategy to cope with the anticipated adverse impact of the ongoing Ebola crisis.

⁷ World Bank: Update on the Economic impact of the Ebola epidemic on Liberia, Sierra Leone and Guinea, 2 December 2014.

Figure 4: Guinea – Cereal imports ('000 tonnes)



Source: 2004 to 2014 FAO/GIEWS CCBS, 2015 CFSA.

Historically, the total cereal import requirement is met through commercial imports and some food aid (see Figure 3). The assumed level of commercial import level, leaves about 44 000 tonnes of uncovered gap to be filled with international food assistance and/or additional budgetary allocation by the Government. This level of food assistance is more than double the level received in the country in 2014 and higher than the historical high of food aid was 30 000 tonnes in 2008. This would be, especially aimed at providing food assistance to the most vulnerable people affected by Ebola crisis as detailed in the following sections.

4. **MARKETS**

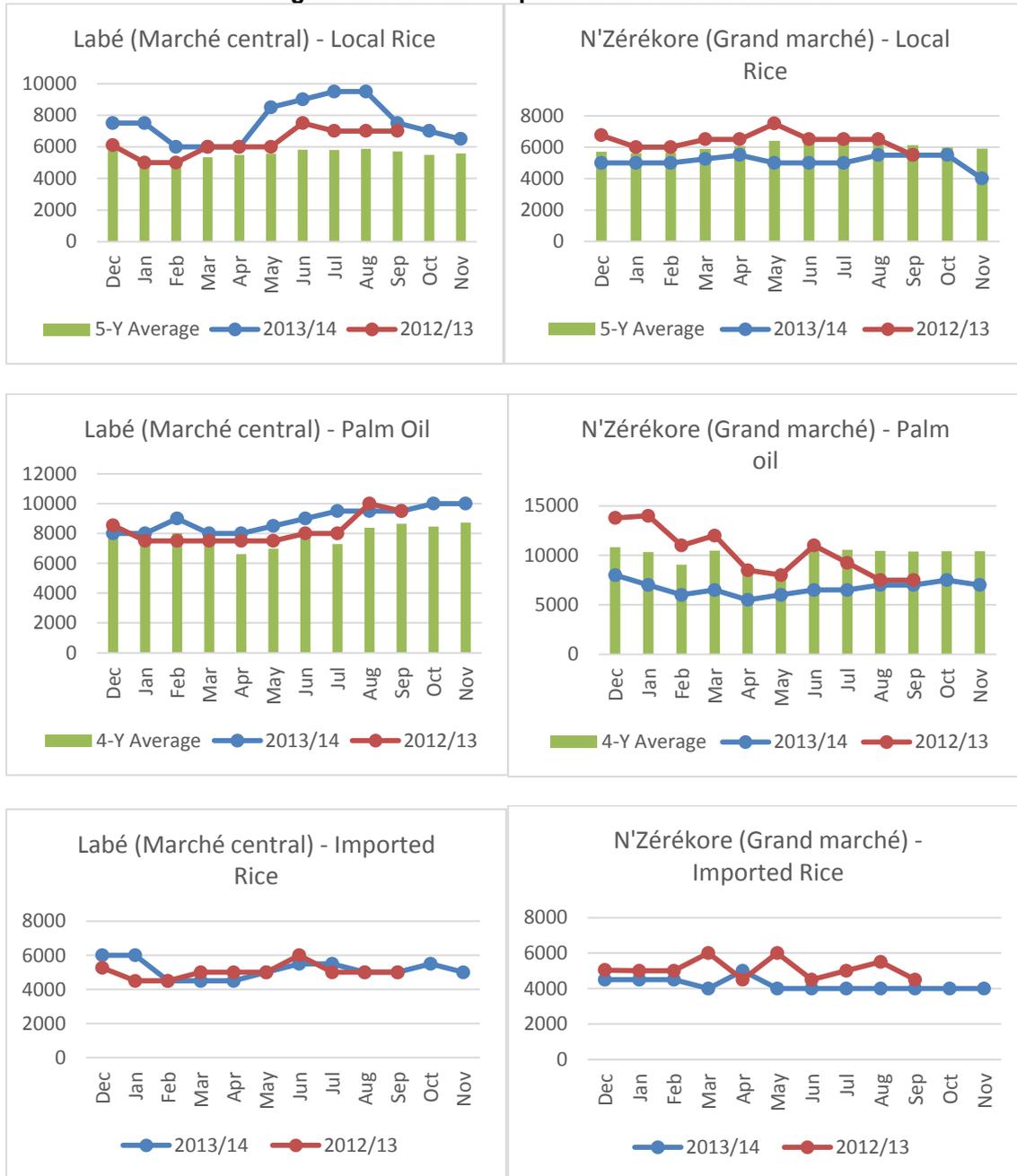
4.1 Prices

The border closures with neighbouring Senegal, Liberia, Sierra Leone and Guinea-Bissau have led to a decline of trade volumes of agricultural commodities between Guinea and neighbouring countries⁸. While this is the case, urban markets in the regional capitals are currently still well supplied with local produce and ports remain open. The World Bank reports⁹ that upward pressure on food prices due to disruptions in production and trade restrictions has been offset by the dampening effect of low domestic demand. According to WFP price monitoring, monthly retail prices for key food commodities remained stable between August and November 2014, with the exception of local rice in Labé, which after some months of dramatic increase dropped rapidly (Figure 5). The harvest period has also seen expected reduction in prices of local rice in the surplus province N'zérékore.

⁸ WFP 2014. West and Central Africa Markets Update: Special Issue on the Ebola Outbreak—29 September 2014

⁹ World Bank 2014. Update on the economic impact of the Ebola epidemic on Liberia, Sierra Leone and Guinea. 2 December 2014.

Figure 5: Price developments in Guinean markets



Source: WFP.

4.2 Incomes, purchasing power and livelihoods

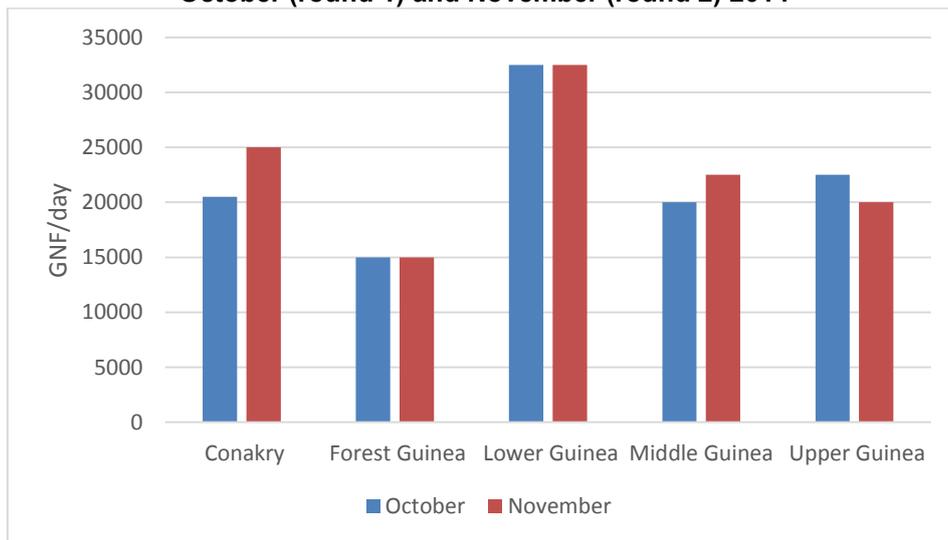
The World Bank reports that all sectors in the economy are affected by EVD¹⁰. Transport and commerce are stagnant. While the mining output itself has not been severely affected since many of the largest mines are not located in Ebola-affected areas, most foreign workers have been evacuated. This has an impact on the service sector. The general decline in economic activity has an impact on

¹⁰ World Bank 2014. Update on the economic impact of the Ebola epidemic on Liberia, Sierra Leone and Guinea. December 2, 2014.

wages and livelihoods. Findings from remote surveys under-taken by WFP (mVAM)¹¹ indicate that the wage rates for manual labour are lowest in Forest Guinea, the area most severely affected by EVD (Figure 6). Purchasing power shows slight improvements between October and November 2014 in line with seasonal trends (Figure 7). Forest Guinea has the lowest terms of trade in the country.

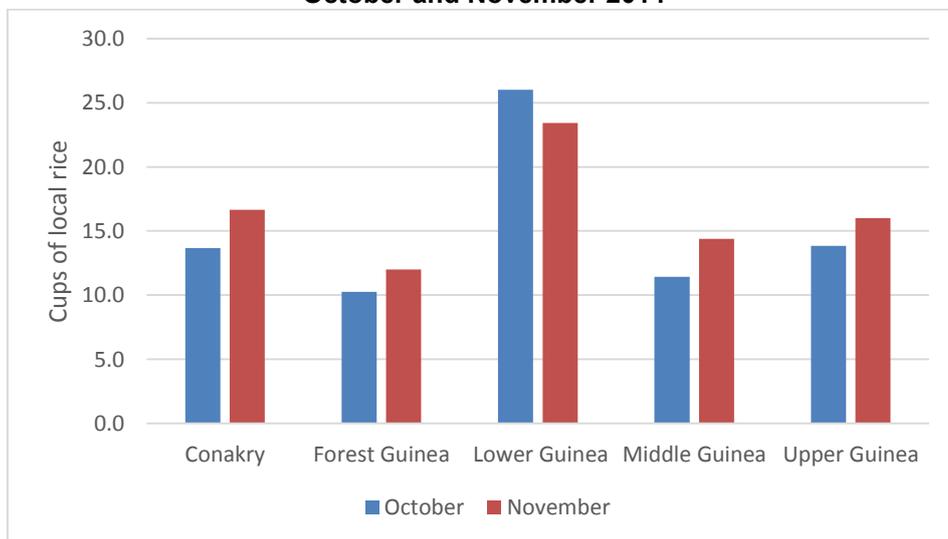
The production estimates presented in the sections above and the evidence of slow-down in economic activity suggests that the impact on food security of the Ebola outbreak is not predominantly driven by food availability but rather by food access.

Figure 6: Guinea - Median wage rates GNF/day manual labour, October (round 1) and November (round 2) 2014



Source: WFP mVAM.

Figure 7: Guinea - Wage-to-local rice terms of trade, October and November 2014



Source: WFP mVAM.

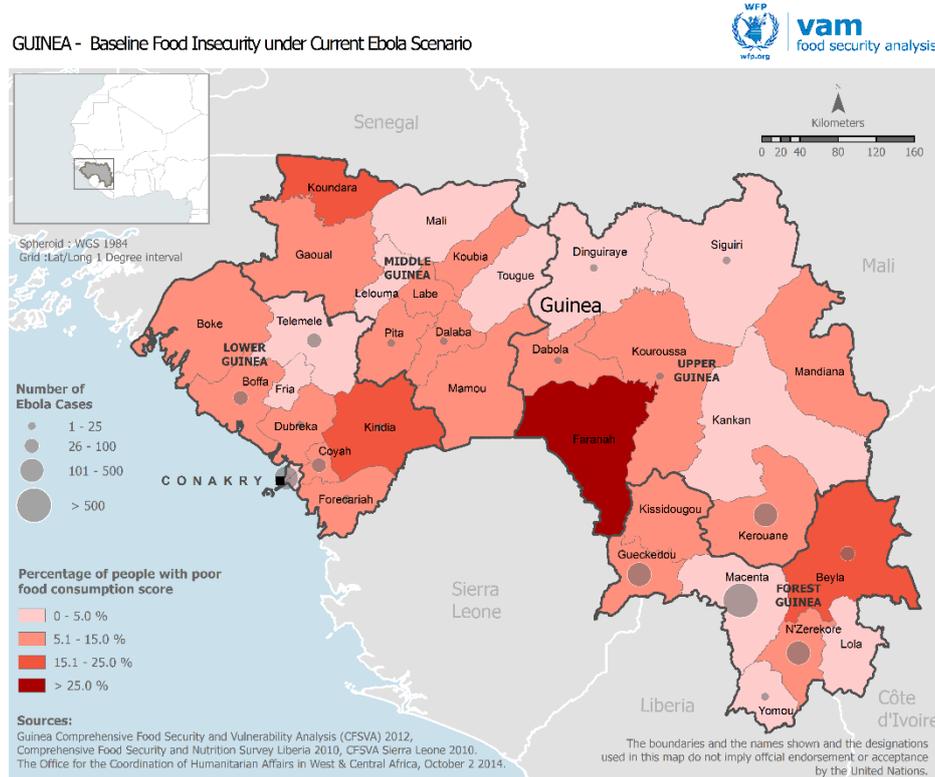
¹¹ Since September 2014, WFP has been collecting basic food security data remotely through mobile phones in Ebola-affected countries in West Africa. Each month, mVAM (mobile Vulnerability Analysis and Mapping) surveys are sent to randomly selected panels of households in Sierra Leone, Guinea and Liberia through text message and Interactive Voice Response technology. The sample size in Guinea was 780 respondents in the first round and 530 in the second round. The first round was collected in early October and the second round in early November.

5. FOOD SECURITY

5.1 Pre-crisis food insecurity

Figure 8 shows a map overlaying the food insecurity situation before Ebola with the number of cases in epidemiological week 46 (10-16 November) by province/district. The food security data is based on Comprehensive Food Security and Vulnerability Analysis Surveys from year 2012. The pre-crisis food insecurity is measured as the percentage of households with a poor food consumption score. The data shows that many of the worst-affected areas in Forest Guinea in the south were relatively food secure prior to the outbreak. This is also true for the highly affected capital Conakry.

Figure 8: Guinea - Pre-crisis food insecurity overlaid with Ebola cases in epidemiological week 46 (10-16 November)



5.2 The impact of Ebola on food insecurity

Results from recent assessments

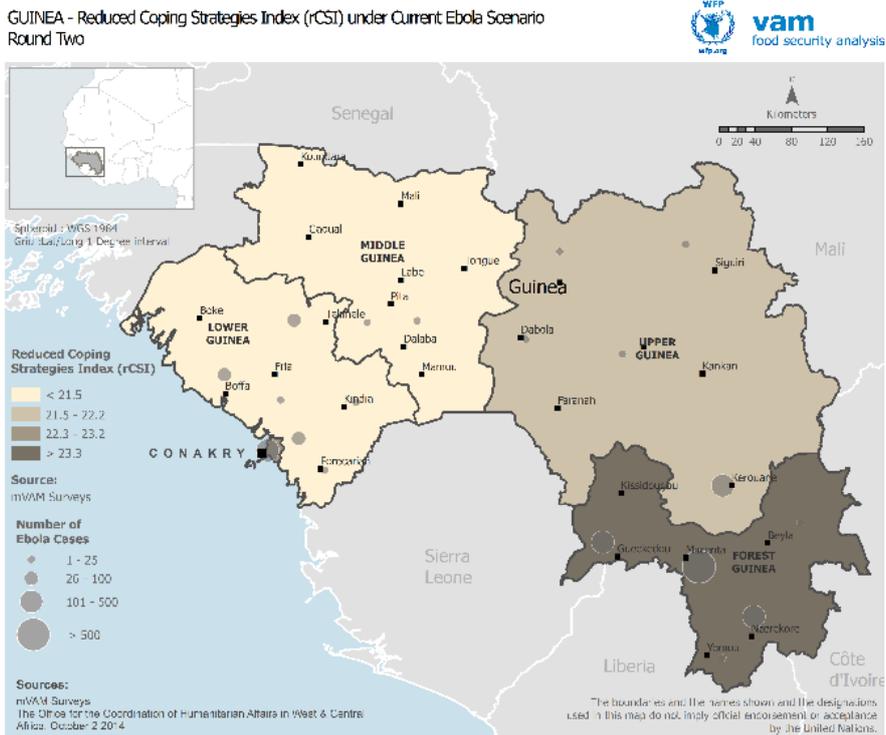
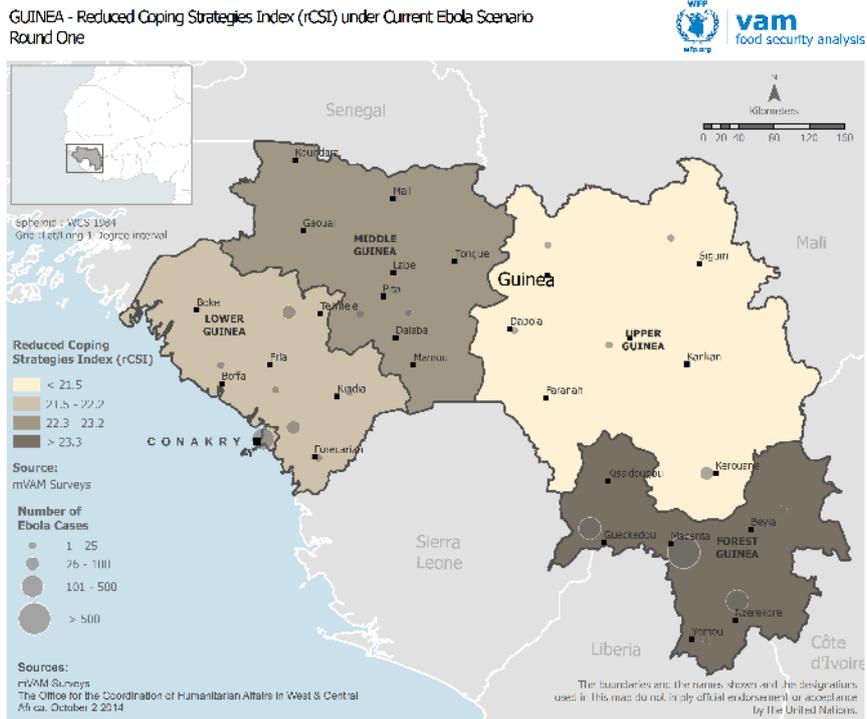
According to the mVAM surveys undertaken by WFP, Ebola appears to be a shock to an already precarious situation of chronic food insecurity, particularly in Forest Guinea (Figure 9). The food security situation is assessed using the reduced coping strategy index (rCSI) – an indicator that is suitable for remote surveys. The rCSI measures the frequency and severity of the behaviours households engage in when faced with food shortages. A high rCSI reflects greater vulnerability to food insecurity. The mean rCSI has remained stable at high levels between October and November standing at 22.1 and 22.9, respectively. In Forest Guinea, the rCSI has remained stable at high levels, with a value of 23.5 in October and 25.8 in November (difference not statistically significant). The high rCSI in Forest Guinea is of concern because it is registered during the harvest in a surplus-producing food zone during a season when households should benefit from access to own production and lower market prices.

The rCSI in Conakry (22.7) has remained stable at high levels since last month. Coping strategies in Upper Guinea, Middle Guinea and Lower Guinea remain lower than in the rest of the country. The high

rCSI levels in both October and November could reflect high baseline levels of food insecurity, as well as the impact of EVD.

The most common coping strategies reported by households in Conakry are (i) consuming less expensive and less preferred food (85.7 percent of households) and (ii) limiting portion size at mealtimes (84.7 percent of households). In N'zérékore, 91.2 percent of households reported reducing the number of meals they eat in a day, and 87.3 percent stated that they are consuming less expensive and less preferred food. In addition, 87.3 percent of households also said they are borrowing food or relying on help from a friend/relative to meet their consumption needs, a sign of high food insecurity.

Figure 9: Guinea - Food insecurity in October and November as measured by the rCSI overlaid with Ebola cases for the corresponding periods



Sources: WFP mVAM surveys, The Office for the coordination of Humanitarian Affairs in West and Central Africa.

Estimated food insecurity

While the remote assessment data is helpful to understand some general dynamics of food insecurity because of the EVD, it cannot be used to estimate the number of food insecure people. To do this, the

Food Security Analysis Service of the World Food Programme (WFP) has developed a model to estimate the current and future number of food insecure people.

The model is designed to estimate the number of food-insecure people who are directly or indirectly affected by Ebola both currently and under possible future scenarios. It recognises that mostly indirect channels will be responsible for driving people into food insecurity because of the Ebola outbreak¹². Indirect effects come about due to people's poor understanding of the EVD (fear of contagion) and the decisions of governments and private actors to close borders, seaports, airports and businesses. Behavioural changes and actions taken to reduce the spread of the virus have an impact on the movement of goods and people and will affect the availability and the prices of food in the markets. They also affect labour markets and people's livelihoods and, as a consequence, earnings. In other words, both food availability and food access can be subject to indirect effects.

First the number of people directly affected by Ebola is estimated based on the Ebola spread data by province¹³. It is assumed that if a household member is affected by Ebola, the whole household becomes food insecure. However, impact is scaled down if children or the elderly are affected as opposed to adults, who are likely to be the breadwinners¹⁴. The number of directly food insecure is the derived by taking into account the population distribution of those affected, the average number of adults in a household and the dependency ratio in a given province. The estimates of indirectly food insecure are based on the infection rates at province level (and their projections), combined with pre-crisis data on food insecurity as measured by the food consumption score (FCS), household market dependency and livelihoods. The model allows for transitions from borderline to poor FCS and; from adequate to borderline FCS (see Annex 1 for details on the model).

Table 6 reports the estimated number of food insecure by province in December 2014. The directly affected are only about 13 000 individuals. The number of food insecure (poor FCS) is estimated to 970 000 individuals and are to be found all over the country. According to these estimates, a large number of the food insecure that has been added in December 2014 are in the highly Ebola affected province of N'zérékore. The number of individual vulnerable to food insecurity (borderline FCS) is 3 million. Most of these were vulnerable to food insecurity already at the baseline stage. Table 7 reports the estimated number of food insecure in March 2015. An important assumption behind the estimates for March 2015 is that the disease continues to spread at the average rate observed in December and then begins to slow down substantially by January 2015. In March 2015, the directly affected amounts to 25 000 individuals; 1.2 million are estimated to be food insecure and 2.9 million vulnerable to food insecurity¹⁵. In addition to N'zérékore, the province of Kindia, where trade is a major livelihood, is also estimated to have a high number of food insecure people.

¹² The World Bank notes in a report on Ebola that 80–90 percent of the economic impacts from pandemics are due to behavioural changes. See World Bank. 2014. *The Economic Impact of the 2014 Ebola Epidemic: Short and Medium Term Estimates for Guinea, Liberia, and Sierra Leone*. 17 September.

¹³ We use data on province level made available through the Office for the Coordination of Humanitarian Affairs in West and Central Africa (OCHA ROWCA).

¹⁴ The equivalence scale that we use gives the weight 0.5 to a child (aged 0–15) and 0.7 to an elderly person (aged 60+).

¹⁵ The EVD case projections and the impact weights have been adjusted to reflect the most recent information available. For this reason the estimates differ from the ones reported in WFP 2014. Special Focus: Ebola. How can we estimate the impact of Ebola on food security in Guinea, Liberia and Sierra Leone?

Table 6: Guinea - Estimated number of food insecure people by province in November 2014 ^{1/}

County	EVD cases	Directly affected (estimated)	FCS poor		FCS borderline	
			Baseline	December 2014	Baseline	December 2014
Boke	26	166	77 495	85 721	363 967	358 201
Conakry	298	1 939	17 346	25 785	295 379	325 916
Faranah	29	171	124 175	133 303	195 880	203 597
Kankan	178	1 391	88 568	113 810	483 214	448 020
Kindia	213	1 501	188 929	252 630	736 721	679 719
Labe	0	0	48 624	53 214	255 412	260 448
Mamou	20	90	54 094	60 081	198 470	201 092
N'zérékore	1 382	7 811	142 099	244 315	681 739	568 628
Total	2 146	13 069	741 330	968 859	3 210 782	3 045 621

^{1/} Note that the province level numbers are a bit lower than the national ones. Some of the EVD cases are reported with no geographical origin attached.

Table 7: Guinea - Projected number of food insecure by province in March 2015

County	EVD cases	Directly affected	FCS poor		FCS borderline	
			Baseline	March 2015	Baseline	March 2015
Boke	26	166	77 495	87 902	363 967	357 794
Conakry	432	2 810	17 346	27 616	295 379	328 159
Faranah	74	388	124 175	134 721	195 880	204 459
Kankan	520	4 169	88 568	150 648	483 214	462 311
Kindia	614	4 238	188 929	351 560	736 721	550 823
Labe	0	0	48 624	55 767	255 412	259 409
Mamou	20	90	54 094	61 673	198 470	200 787
N'Zerekore	2 259	12 813	142 099	340 672	681 739	523 932
Total	3 944	24 674	741 330	1 210 559	3 210 782	2 887 674

Based on the estimates of the light version of the Shock Impact Simulation Model (SISMod – Light)¹⁶, Table 8 show the direction of food insecurity (as measured by a poor FCS) by main source of income. While most income groups show an increase in food insecurity due to Ebola, the groups with the highest rates of food insecurity are small traders and unskilled labourers. Most of the food insecure (70 percent), are estimated to be in rural areas.

¹⁶ WFP has developed a light version of the Shock Impact Simulation Model (SISMod-Light) to provide the most likely situations of the shock impacts on household food security. SISMod is an economic model based on the classical Agricultural Household Model (Singh 1986), in addition, covered a broader income generation module and a two-stage demand system – Linear Expenditure System (Stone 1954) and Linear Almost Ideal Demand System (Deaton 1986) to simulation household food consumption under the income effects and price effects. The detailed methodology can be found in the FAO/WFP 2014. Food price volatility and natural hazards in Pakistan <http://www.fao.org/documents/card/en/c/9bbe0876-770b-4c97-8b52-c296ee94207d/>.

Table 8: Guinea - Estimated number of food insecure (% of poor FCS of group total) by main source of income, end of 2014

Main income source	Pre-crisis food insecurity (%)	Ebola driven food insecurity (%)
Crop sell	5-10	10-15
Livestock and livestock products	5-10	10-15
Forestry and fishing	10-15	10-15
Primary activities (mining)	5-10	10-15
Small trade activity (petty trading, street vendor)	10-15	15-20
Unskilled/casual labour	10-15	15-20
Private activity (craftsman, transporter, trader)	5-10	5-10
Wage (skilled, government, contract, NGO)	<5	5-10
Other Sources	5-10	10-15
Crop sell	5-10	10-15

Source: WFP SISMod-light.

6. **RECCOMENDATIONS**

6.1 Agriculture

Although the national level production impact of Ebola on food production is relatively small it masks the sub-national production and food security impacts. For example, impact at the county level production as high as – 8 percent for rice and – 7 percent in Nzerekore, the most affected area. Within that, some districts are likely to be harder hit than the others. Thus a targeted effort to re-establish farming system with provision of key farm inputs such as seed, fertilizer, and assistance for adoption of improved technologies, with stakeholder consultation and participation would be required to rebuild the community resilience. Other crucial activities should include community campaigns to help stop the spread of the disease, strengthening savings and loan schemes, particularly those involving women; and the provision of in-kind or financial support to vulnerable households to safeguard livelihoods and incomes

6.2 Food insecurity

The analysis indicates that different type of food assistance will be required. In addition to covering the import gap, cash/voucher transfers can assure food access for some segments of the population. Given reductions in trader activity, local purchase in surplus areas can assure that surpluses are being redistributed.

Approach for estimating the number of food insecure, by province

The model described below is designed to estimate the number of food-insecure people who are directly or indirectly affected by Ebola both currently and under possible future scenarios. It recognises that mostly indirect channels will be responsible for driving people into food insecurity because of the Ebola outbreak¹⁷. Indirect effects come about due to people's fear of contagion and the decisions of governments and private actors to close borders, seaports, airports and businesses. Behavioural changes and actions taken to reduce the spread of the virus have an impact on the movement of goods and people and will affect the availability and the prices of food in the markets. They also affect labour markets and people's livelihoods and, as a consequence, earnings. In other words, both food availability and food access can be subject to indirect effects. To this end, the model relies on data on the infection rate at province level, or their future projections, combined with pre-crisis data on food insecurity, market dependency and livelihoods.

Our projections are based on the historical spread of the disease in each province/district¹⁸. If a province has had no new cases in the last 42 days (two incubation periods), the situation is considered stable and inactive. It is assumed that the average rate of the weekly spread observed in the previous 42 days will continue until the end of the year in a given province. The infection rate is assumed to slow down by January 2015. The date of the turning point is based on goals set up by the UN mission for Ebola Emergency response¹⁹. These plans are aligned with estimates by Centres of Disease Control and Prevention (CDC) on how rapidly the disease will start to reverse once efforts to control it are put in place. We also use the rates of decrease as estimated by CDC once the turning point is reached. According to these estimates, the reduction in the number of cases per week is around 13 percent once 60 percent of Ebola patients are hospitalized or in effective home isolation (by January–February in our model) and 24 percent once 70 percent are in such care (by March)²⁰. Modifications to these assumptions do not significantly change our estimates of food insecurity caused by Ebola.

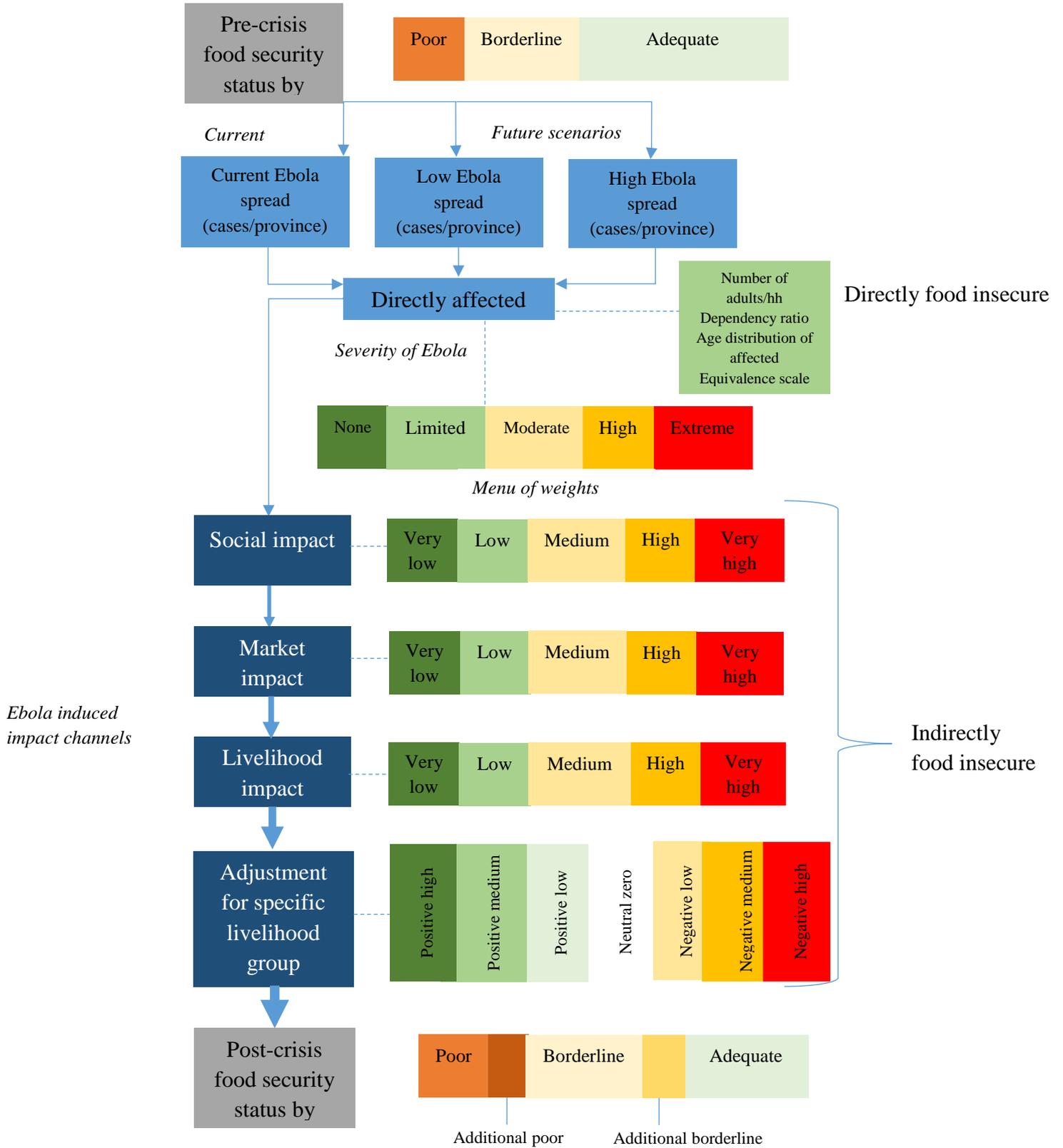
¹⁷ The World Bank notes in a report on Ebola that 80–90 percent of the economic impacts from pandemics are due to behavioural changes. See World Bank. 2014. *The Economic Impact of the 2014 Ebola Epidemic: Short and Medium Term Estimates for Guinea, Liberia, and Sierra Leone*. 17 September.

¹⁸ The CDC has estimated the future spread. However, to be used for our purposes, information on hospitalization/isolation of Ebola patients on provincial/district levels would be required. See http://www.cdc.gov/mmwr/preview/mmwrhtml/su6303a1.htm?s_cid=su6303a1_w

¹⁹ See for example www.un.org/ebolareponse/pdf/CNN_Nabarro.pdf

²⁰ The epidemic curve is likely to reach its peak when a lower number of patients are in effective care. However, the rate of decrease is slow (1.8 percent) as long as only half of patients are in effective care.

Figure 12: Guinea - Model for estimating food insecurity under Ebola



Estimating the directly food insecure

We first estimate the number of people directly affected by Ebola. We use Ebola spread data by province under the current, low and high scenario projections. We assume that if a household member is affected by Ebola, the whole household becomes food insecure. However, impact is scaled down if children or the elderly are affected as opposed to adults, who are likely to be the breadwinners²¹. We derive the number of directly food insecure by taking into account the population distribution of those affected, the average number of adults in a household and the dependency ratio in a given province.

Estimating the indirectly food insecure

The key components for estimating the number of indirectly food insecure people are described in the table below.

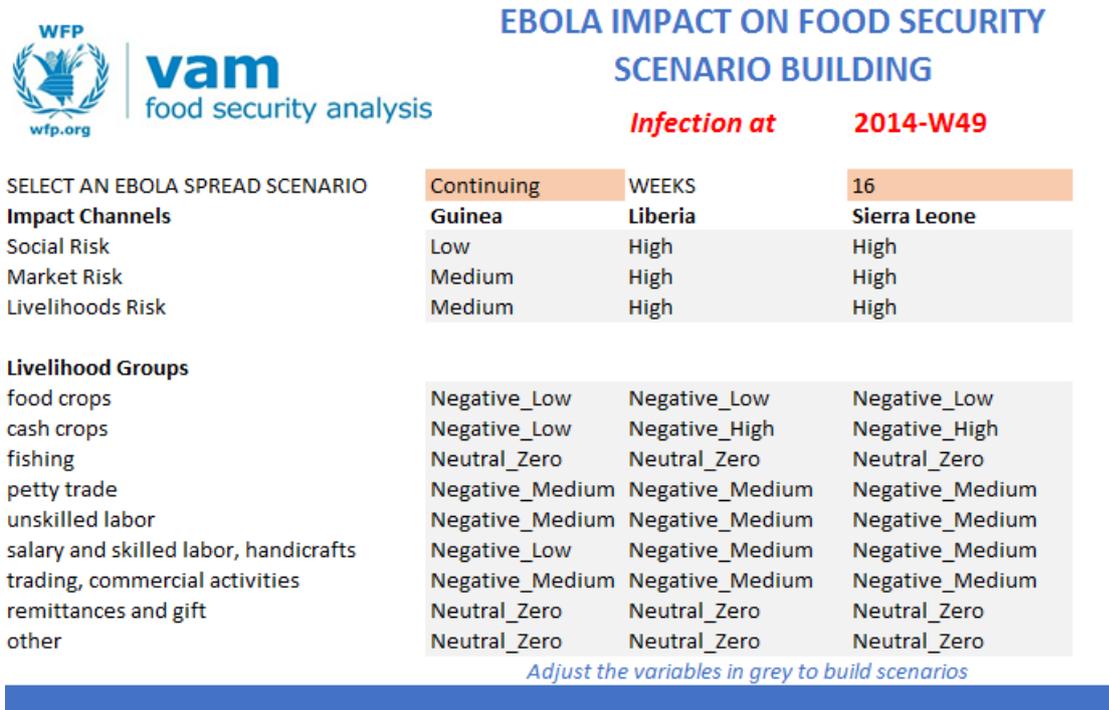
²¹ The equivalence scale that we use gives the weight 0.5 to a child (aged 0–15) and 0.7 to an elderly person (aged 60+).

Table 8: Guinea - Key components for estimating the number of indirectly food insecure people

Driving Factors	Description	Purpose
Pre-crisis food insecurity	The pre-crisis food insecurity as determined by the Food Consumption Score (FCS). For the purpose of the analysis, those with <i>poor</i> (as opposed to <i>borderline</i> or <i>acceptable</i>) FCS are defined as food insecure.	The model allows transitions of this variable from <i>FCS borderline</i> to <i>FCS poor</i> and from <i>FCS adequate</i> to <i>FCS borderline</i> because of the Ebola crisis.
Social impact	The social impact is quantified by the infection rate at province/district level.	This is the first impact channel in the model and captures risk stemming from socio-behavioural changes caused by Ebola. The weights for social risk are combined with a growth factor depending on the severity of Ebola in a given province. The infection rate in a province provides a proxy for this impact – the higher the infection rate, the higher the social disruption.
Market impact	The percentage of households dependent on the market for cassava: while rice is the main staple, households use <i>gari</i> (cassava flour) as a substitute. When households run out of cassava, they have to rely on the market for their main staples.	With this variable, we capture the market impact of Ebola. Market dependency on cassava indirectly also takes into account the development of price patterns. Households who are dependent on markets for their food consumption are more affected by market disruptions. Market dependency varies depending on the season. This is the second impact channel in the model. The weights for the market impact are combined with a growth factor depending on the severity of Ebola in a given province.
Livelihood impact	The livelihood profile of the household. Nine livelihood profiles are defined: <i>food crops</i> <i>cash crops</i> <i>fishing</i> <i>petty trade</i> <i>unskilled labour</i> <i>salary and skilled labour, handicrafts</i> <i>trading, commercial activities</i> <i>remittances and gifts</i> <i>other</i>	This gives the livelihood impact for specific livelihood groups and is the third impact channel in the model.

A menu of impact weights, ranging from very low (1) to very high (5), are attached to each impact channel (Figure 11). These weights are then used to determine what proportion of people will shift from FCS borderline to FCS poor and from FCS adequate to FCS borderline. The impact weights for social risk reflect the severity of Ebola. The market risk is combined with social risk through another set of weights, not only taking into account the Ebola spread, but also the level of market dependency. If harvest failure or market disruptions lead to increasing food prices, this is reflected by a higher weight attached to this impact channel. If such disruptions have a particular impact on some livelihood groups, the adjustment factors for those livelihood groups will be increased. For each livelihood group, adjustment factors ranging from negative high (1) to positive high (7) are used. The adjustment factor can also be neutral zero, which indicates that the livelihood groups are not affected by the Ebola outbreak. One such livelihood group could be households who depend on remittances. The dashboard where the weights can be selected is shown below.

Figure 12: Guinea - Dashboard for Ebola Model (illustration)



Limitations of the Model

The data-model has a few limitations: 1) the impact weights are subjective; 2) the data on food security was collected in June–July (Guinea, Sierra Leone) and May–August (Liberia) when, because of seasonality, relatively more people are food insecure; and 3) the baseline data on the level of food security is a few years old, so there may have been some changes in the food security profiles of the populations.