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REPORT ON POTENTIALS AND COOPERATION OPPORTUNITIES IN AFRICAN COUNTRIES

submitted by

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Potenzialen und Kooperationsmöglichkeiten in afrikanischen Ländern”)





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Innovation Potentials for Food Security and Sustainable Agricultural Growth in Africa

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and Sustainable Agricultural Growth - an Africa-wide Perspective”)



INNOVATION POTENTIALS FOR FOOD SECURITY AND SUSTAINABLE AGRICULTURAL GROWTH IN AFRICA

Objective

In the past, the increased use of agricultural inputs and the expansion of cultivated areas have contributed significantly to increased production, but in the future the increase in sustainable productivity will have to play the central role in agricultural growth. An increase in sustainable productivity requires increased investment in research and development, agricultural education, organizational reforms such as partnerships with farmers, access to technology and good policies that support the right to food. This study focuses on measures at the strategic level, which as part of the special initiative “One World, No Hunger” tap the potentials of improvements in food security and sustainable agricultural growth.¹

The context of agriculture and food security in Africa

In light of the growing global population and competing forms of land use, innovations in the agricultural sector are essential for food security and the right to food. Investments in agriculture are not only used to increase production but also contribute greatly to poverty reduction. Food security and conflicts are also closely linked to one another so investments in agriculture also play an important role in avoiding violent conflicts, flight and migra-

Innovation? Produce more and more sustainably with fewer resources and better technologies; Create more productive agriculture and value creation networks with new organizational forms and improve nutrition directly and indirectly

Potentials? Reduce the differences between the circumstances in the agriculture and food industry and the realistic possibilities; potential analyses consider agroecology, technology, institutional and political contexts, but the potentials of women and men who work in the agri-food sector, must be strengthened

tion. Furthermore, agricultural production often decreases significantly during conflicts (by more than 12% p.a.)².

The majority of the population (63%) in sub-Saharan Africa lives in rural areas and derive their livelihoods from agriculture. More than 23%, or 222 million people are chronically undernourished there. For the poor primarily, the most important production factor is their own labor. Investments in agriculture are particularly effective in reducing poverty since agriculture is the sector with the highest intensity of unskilled workers of all economic sectors. Therefore, the poor especially benefit



from growth in this sector.

Productivity must increase but sustainably

The current situation in Africa offers good conditions for successful investments in agriculture. For the past 15 years approximately, both the overall economy and the agriculture sector have shown a positive growth trend, which has spread across all regions of the continent. Many African countries have also become more competitive.

Nevertheless, there continues to be a great deal of room for the expansion of regional commerce³. In many countries, agricultural production per head is still below the level of the 1960s. Despite improvements in productivity in the past one to two decades, many countries today still show a total factor productivity (TFP), that is, output in relation to all units of inputs, below the 1960s level (see

Necessary but insufficient measures: promote productivity increase through sustainable intensification, esp. with smallscale farmers; make basic foodstuffs available

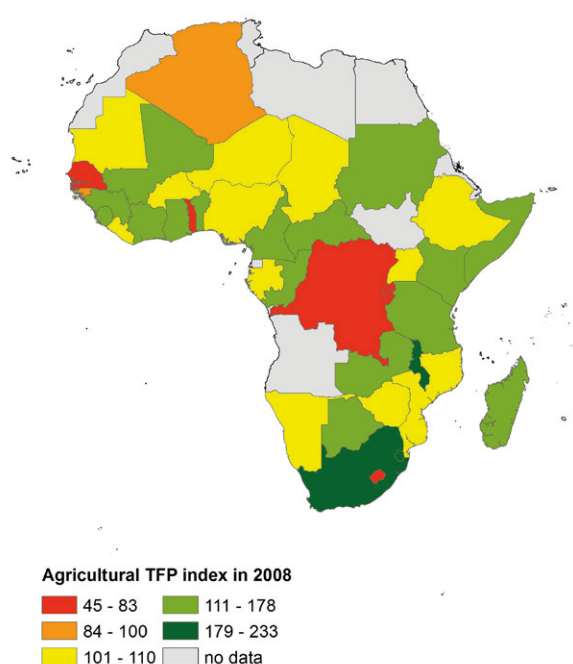
Sufficient measures: Overcome discrimination and marginality (legal policy, governance, participation, security); overcome „hidden hunger“ with comprehensive programmes (esp. micro- nutrients for women and children)

figure). Investments in research and development are essential for the improvement of agricultural productivity. For each dollar invested, there is a return on investment between \$3 and \$6⁴.

Respect diversity

There are very many different agricultural systems on the continent, each with particular potentials and challenges. In addition, 60% of the farms in sub-Saharan Africa have less than one hectare, another 20% has between one and two hectares – with the tendency toward further reductions due to the growing population. These small operating areas present special challenges and potentials with regard to productivity and transaction costs. To sustainably satisfy the demand of a growing population, a “sustainable intensification” of the agriculture is necessary⁵, which also includes innovations in the seed sector, an improvement in the efficiency of fertilizer use, mechanization and an improvement in road and ICT infrastructure. With all innovations the rights and specific needs of women must be respected.

Figure 1: Agricultural productivity in Africa



TFP Index 1961=100;

Source: Fuglie & Rada (2013)



Africa's own strategies and programs for agricultural development and food security

The most recent period of economic up-swing goes hand in hand with a far-reaching change in the agricultural policy and strategy landscape, which has freed itself from the external influence and constantly changing agendas of donors and now offers a more coherent framework for growth and development, led by African countries. Agricultural development and food security are at the top of the list of priorities on the political agenda. The most recent major agreement, the **Malabo Declaration**, which was adopted after comprehensive preparations at the African Union Summit in Malabo (Equatorial Guinea) in 2014, affirms this priority and strengthens the process of the **Comprehensive African Agriculture Development Programme (CAADP)**. CAADP is the most important program of the New Partnership for Africa's Development (NEPAD), an agency of the African Union and *the* reference for developments in the agricultural sector in Africa. CAADP was established in 2003 at the AU Summit in Maputo in the so-called **Maputo Declaration** and is an integrated, agriculture-driven framework program for development, whose objectives are poverty reduction and improved food security. In CAADP, African governments agree to invest 10% of their annual public expenditures in agriculture, in order to achieve an average growth in the sector of 6% per year. 42 of 54 countries have already signed a CAADP agreement. Many countries have already undertaken additional steps in the intended CAADP process, which consists of eight steps total. On the whole, Africa's countries have made good progress toward the stated goals. However, investments in innovation and research and development are still not yet at the required level, although these expenditures are essential for the increase in agricultural productivity.

In the core area of innovation promotion, there are also new African initiatives to support education, science and technology for innovations in the agrifood sector. One such initiative is the **Science Agenda for Africa (S3A)**, which was published in 2014. The goal is a more productive and more efficient agrifood sector that ensures that people have sufficient food. This science agenda is also included in the CAADP process. Another important step toward increased agricultural research is the **Science, Technology and Innovation Strategy for Africa (2024)**, which provides the continental framework for a transition to an innovation-driven, science-based economy in Africa. One of the priorities of the strategy is the elimination of hunger and the guarantee of food security.

Increased support from development partners

To support these African initiatives, there are various international partnerships that want to contribute to agricultural growth and food security in Africa, in particular the **Alliance for a Green Revolution in Africa (AGRA)** since 2006, **Feed the Future** since 2009, **New Alliance for Food Security and Nutrition** since the G8 summit in 2012 and the **New Vision for Agriculture**, which was founded by the World Economic Forum. These and other programs add up to billions in investments and have contributed to the positive turnaround in investments and strengthened Africa's own efforts. The German development cooperation with the special initiative "One World, No Hunger" should examine the experiences of these programs and networks and connect, where appropriate, but place priority on the strengthening of the African strategies to have a long-term effect. Also the civil society in Africa plays an important role in the change in the agricultural sector with its partners in Germany. Increasingly, young African entrepreneurs are also coming



to the fore and change the sector with new business models, whether through mobile phone-supported information services or training offerings for young farmers. These entrepreneurs are increasingly changing the investment landscape in Africa. The German education and research cooperation for the strengthening of Africa's agricultural sector has been extended, particularly in the areas of climate change and land use.

What should be the focus of the Special Initiative "One World, No Hunger" for innovation in Africa?

The special initiative "One World, No Hunger" comes at a time when many African countries are making advances in the areas of food security and agricultural growth. German development investments should therefore connect with and build on already existing Africa-wide and country-specific initiatives under CAADP to ensure policy coherence. German involvement should combine Germany's specific strengths with specific demand and latent needs in Africa, such as vocational training for farmers, optimization of supply chains, cooperation models, agricultural research and technology development.

Criteria: Criteria for the strategic orientation of German development investments in Africa are proposed here. They are in line with the guidelines for good development partnerships (e.g. Accra Principles), especially the leadership of the African partner countries. Generally the criteria emphasize tapping the potential and strengthening effectiveness in order to overcome hunger and malnourishment. Above all, such countries should be supported with investments that display the following characteristics

1. **have a track record of political commitment** to foster sustainable agricultural growth, as indicated by performance under CAADP, and

2. **show actual progress** in sustainable agricultural productivity driven by related innovations, as indicated by comprehensive productivity measurement and innovation actions on the ground, and
3. **prioritize actions for hunger and malnutrition reduction** and show progress (for instance measured by the Global Hunger Index), but where agricultural and rural development and nutrition interventions are likely to make a significant difference, as indicated by public policy and civil society actions.

With these three criteria and the indicators used for them, potential priority countries can be identified, as shown in Table 1.

What to commit to in which countries

The question of "where" investments should be made is partly answered here by an analysis of the countries' performance and needs. Countries that are far along in the CAADP process should have priority since this indicates political support and the process requires an analysis of the particular agriculture sectors and the development of a strategy, which suggests improved conditions for investments in agriculture. Countries that have no agriculture strategies should not be supported. However, they can be supported while they are developing strategies. Furthermore, compliance with the 10% expenditure goal and the level of R&D expenditures can be understood as government support. Improvements in productivity (TFP) can be considered indications that investments in these countries fall on fertile ground. Investments should also be focused on countries where food insecurity and poverty are still big problems. However, more recent successes in the fight against hunger should also be considered indications that those particular governments are actively addressing these problems and should therefore be supported with investments.



Table 1: Potential analysis for countries with green innovation centers and other African countries
(Countries with innovation centers have a gray background)¹

Rank	Country	(1) Production potential score		(2) Political commitment score			(3) Hunger status and progress score		Overall score
		Percent score agricultural growth	Percentage point score innovation	Percent score public agricultural expenditure	Percent score innovation investment	Percent score progress on agricultural policy	Score hunger problem to be addressed	Percentage point score progress on hunger reduction	
		Index: Number of years with >6% agricultural growth (2005-2014) ^{2, 5}	Index: Percentage point change in TFP (2001-2008) ^{3, 6}	Index: Number of years with government expenditure on agriculture >10% (2005-2014) ^{2, 5}	Index: Average share of agricultural GDP spent on R&D (2005 to 2011) ^{4, 7}	Index: Number of steps in CAADP process completed (% of the maximum of 8) ⁵	Index: Value of Global Hunger Index (2014) ^{3, 8}	Index: Reduction in prevalence of undernourishment (2001-2011) ^{3, 9}	
1	Ethiopia	70	60	80	26	100	100	100	78
2	Mozambique	70	60	20	43	88	100	100	72
3	Sierra Leone	80	100	0	22	50	100	100	71
4	Kenya	70	100	0	100	75	60	60	68
5	Niger	60	100	40	0	63	100	60	65
6	Malawi	50	100	90	78	88	30	30	63
7	Senegal	50	30	0	81	88	30	100	54
8	Congo (Brazz.)	50	100	0	97	13	60	30	52
9	Mali	40	60	60	61	63	30	60	52
10	Zambia	20	100	30	38	63	100	0	51
11	Tanzania	50	60	0	51	100	60	30	50
12	Burundi	10	0	0	64	63	100		49
13	Angola	60		0	0	13	60	100	48
14	Benin	20	60	0	53	100	0	100	47
15	Rwanda	60	0	0	61	75	30	100	47
16	Ghana	20	100	0	62	88	0	60	47
17	Burkina Faso	40	0	40	39	88	60	60	45
18	Sudan	10	30	0	25	13	100		(44)
20	Uganda	50	0	0	100	75	60	30	43
22	Zimbabwe	50	0	60	48	13	60	60	42
24	Nigeria	40	60	0	33	63	30	30	37
26	Madagascar	10	30	40	21	13	100	30	37
27	Liberia	50	0	10	47	50	60	30	35
29	Togo	40	0	0	43	75	30	60	35
30	Gambia	30	0	0	82	50	30	60	35
31	Cote d'Ivoire	30	30	0	49	75	60	0	34
32	Cameroon	10	30	0	0	25	30	100	31
35	Chad	40	0	0	14	13	100	0	26
40	Congo DRC	40	0	0	17	63			23
41	Tunisia	40		0	0	0	0	0	13

¹ Columns (1), (2) and (3) are each one group. Within these groups, the indicators are weighted equally. The total score is the average of the three groups, which each have the same weight. Missing data are ignored. If, for example, in Group (1) data are missing for one indicator, the other indicator is weighted with 100% (instead of 50%) in the score for Group (1).

² Number of years in which the growth or expenditure goal sought was achieved relative to the total number of years in the observation period (relative success in %).

³ For these indicators, 4 classes are formed. The basis for the class formation are country quartiles. The worst quartile has a score of 0, the second a score of 30, the third a score of 60 and the best quartile a score of 100.

⁴ The score is 100 if 1% or more of the agricultural GDP for R&D spent.

Comment: empty cells mean missing data; they are not included in the ranking

Sources:

⁵ www.resakss.org; ⁶ Fuglie & Rada (2011); ⁷ www.asti.cgiar.org/data; ⁸ Global Hunger Index 2014 (von Grebmer et al., 2014);

⁹ www.fao.org



Based on these criteria, Ethiopia, Mozambique, Sierra Leone, Kenya, Niger, Malawi, Senegal, Congo (Brazz.), Mali and Zambia are the “top ten” countries for investments. All of these countries have already signed CAADP agreements. Five of these countries (Ethiopia, Kenya, Malawi, Mali and Zambia) are countries with green innovation centers.

Regarding the “how”, the principles should be good governance, relatively low transaction costs relative to the total investment, sound financial procedures, and the prevention of misappropriation of funds. Partnership principles and strict monitoring and evaluation systems must be established, which measure the progress with regard to the mutually set goals. A model could be the independent evaluation committees as established by AGRA, which assess the potential of investments.

The question of “in what” should be invested, should be answered based on the expected social and economic effects, particularly the influence on the reduction of hunger and positive income and labor market effects for smallscale farmers and generally in rural areas, primarily for the youth. Investments should have the potential for upscaling, in order to achieve maximum impact.

If these criteria are applied, without being interpreted as rigid rules, the German development investments in African agriculture and in food security can make a significant contribution to the eight action areas of the Charter for the Future and have a positive impact on the African agenda as a whole, in accordance with the Sustainable Development Goals of the United Nations.

End notes

1 This summary is based on a comprehensive Africa-wide study (Husmann, von Braun, Badiane, Akinbami, Abiodun, Virchow, 2015) and 12 country dossiers, which are available to the BMZ.

2 Kimenyi, M., Adibe, J., Djiré, M., Jirgi, A., Kergna, A., Deressa, T. and Westbury, A (2014) “The Impact of Conflict and Political Instability on Agricultural Investments in Mali and Nigeria”, Brookings Africa Growth Initiative Working Paper 17

3 Badiane, O., Collins, J., Diao, X. and Ulimwengu, J. (2015) “Economic Recovery in Africa and its Determinants”, in Beyond a Middle Income Africa: Achieving Economic Growth with Rising Employment and Incomes, Hg. O. Badiane and T. Makombe, ReSAKSS Annual Trends and Outlook Report, Washington D.C.: International Food Policy Research Institute (IFPRI).

4 Fuglie, K. and Rada, N. (2013) “Resources, Policies, and Agricultural Productivity in Sub-Saharan Africa”, USDA-ERS Economic Research Report, No. 145.

5 The Montpellier Panel (2013) “Sustainable Intensification: A New Paradigm for African Agriculture”, London.



PART B COUNTRY CASE STUDIES

Overview of Country Case Studies

Benin	10	Malawi	22
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The following summaries of the country studies for the twelve countries with green innovation centers in Africa are based on detailed dossiers, which are available online at www.research4agrinnovation.org.

All of the summaries begin with an introduction to the agrifood sector and then describe potentials in these sectors, followed by an assessment of specific underlying conditions for agricultural investments (1.2). Section 1.3 presents the agricultural strategies of the particular country. The last part (1.4) names specific cooperation opportunities for the German development assistance. These recommendations are based on an analysis of different factors showing the potential of various products and supply chains to reduce hunger and promote agricultural development. The analyzed factors, which are presented in detail in the dossiers, include (1) the “revealed comparative advantage” of a country which shows for which products a country has a trade advantage; (2) the gap between the current and potential yield (yield

gap) which shows with which products innovations may be able to generate increases in the yield; (3) the average increase in yield of various products (normally) over the last ten years to identify the products that are already showing signs of “movement” and can link innovations to existing positive trends and (4) the share of the volume of a product produced in the country relative to the entire supply in the country. This last indicator shows what role the production of a product plays on the domestic market and the level of self-sufficiency of the product.

For the sake of clarity, all of the sources and bibliographical references are listed in the detailed country dossiers and are not included in the summaries featured here. The author teams who wrote the country studies are listed in the detailed country dossiers. The dossiers will be further developed later on in the ZEF Program of Accompanying Research and should therefore be considered “living documents”.



BENIN

1. Situation in the agri-food sector

Benin lies on the coast of West Africa. Of the 10.6 million residents, over 61% live in rural areas. The agriculture sector contributes 33% to the gross domestic product and 75% to the export revenue of the country. Around 70% of the population works in agriculture. The supply chains of rice, soybeans and poultry were selected for the green innovation centers. Rice is simultaneously Benin's most important import and export product. It makes up more than half of the import volume and 30% of the import value, while poultry makes up 6.4% of the import volume and 14.6% of the import value. In terms of export value, rice and poultry are close to each other with 5.6% and 4.4% respectively. Foreign trade with soy products is negligible. Other important supply chains are maize, pineapple and cashews.

Benin's national agricultural research system consists of the research centers of the Institut National des Recherches Agricoles du Bénin (INRAB), universities, private laboratories, and research-oriented non-governmental organizations. As a financially independent science and technology institution, INRAB has a coordinating role. There are also various international agencies and institutions working in Benin. There are also private research institutions that have made important contributions to the development and diffusion of innovations. Across the country, advisory services is provided by the national agricultural extension service. There are no private extension services in Benin. Innovation platforms are prevalent in Benin, in order to simplify the transfer of research results and

innovations. In the past, they have contributed to the acceptance of new types of rice and production techniques, as well as better access to investments and marketing opportunities.

2. Specific potentials to develop the agrifood sector

Benin has great potential in agricultural land development, since currently only around 17% of the potential agricultural area and only around 11% of the potential rice cultivation area are being used. The tropical climate is also well suited to produce fruits for export. The government has committed to modernizing agriculture and has established various supporting programs, e.g. for improvements in the management of soils and other natural resources, for improved access to markets, for research coordination and for the transfer of agricultural innovations. The national agricultural research system also plays a supporting role in this. Innovations in the supply chains described should be recorded in all areas: production, harvest and post-harvesting.

In order to tap the existing potential, investments in key areas, such as sustainable land use and the development of alternative land use forms, are necessary in the face of climate change and desertification. The research landscape must be strengthened and the research budget must be increased. Small farmers must have easy access to information and innovation. Finally, the private sector should be strengthened and included in the research and development process in those areas where it can be expected that



sector-specific resources will be brought in. Although Benin has completed all eight steps of the CAADP process, the other development indicators are rather weak. Benin was able to reach CAADP's 6% target for annual agricultural growth in just two of the 10 years between 2005 and 2014. In the same period, the country did not achieve the CAADP target of investing more than 10% of all public expenditures in agriculture in any of the years. Furthermore, between 2005 and 2011, on average only 0.5% instead of the desired 1% of the agricultural GDP was invested in agricultural research and development. The agricultural total factor productivity in Benin only increased by 11% between 2001 and 2008. On a positive note, the country was able to improve the percentage of chronically malnourished by 10 percentage points between 2001 and 2011. Nevertheless, with a score of 11.2, Benin has a serious malnutrition problem according to the World Hunger Index. So Benin is considered a country with potential but also with obstacles to development-relevant agricultural investments. Future agricultural investments in Benin will not realize their full potential until there are improvements in these indicators.

3. Needs to tap the potentials, country policies and strategies

The strategic plan for the promotion of the agricultural sector strengthens the primary sector with the objective of guaranteeing sustainable food security for the population and contributing to the economic and social development of the country to achieve the Millennium Development Goals and fight poverty. Important elements of the strategy are the access to improved seeds and other investments, agricultural mechanization, easier access to markets, improved access to knowledge and technical innovations, land rights and a professionalization of agricultural family businesses and promotion of entrepre-

neurial activities.

Benin's long-term objective is to become an agricultural export country. This objective should be achieved through improved regional specialization and diversification of the agricultural production. Additional elements are a strengthening of agricultural research and a professionalization of the sector by strengthening the human capital.

4. Effective and innovative co operation opportunities for German development assistance

Based on the potential analysis of the supply chains, some entry points for cooperation opportunities for German development assistance in Benin can be identified: The country has a high trade potential for cashews, cottonseed cake, palm oil, sugar and pineapple. However, for the SEWOH-promoted supply chains, particularly rice and soybeans, there is a comparative trade disadvantage. Between 2005 and 2012, Benin was able to achieve high annual increases in yields of 14% with peppers (incl. chili peppers) and 6% with cashews, sweet potatoes, rice and vegetables. Annual increases in yield were also recorded for soybeans, however, the share of soybean production in Benin was below 0.5% and is therefore negligible. Based on the share of domestic production in relation to the total supply in Benin, cottonseed cake, maize, nuts, millet and soybeans are particularly significant. On the other hand, only approx. 25% of the demand for rice, another SEWOH commodity, can be covered by domestic production in Benin.

Details on the potential analyses are provided in the Country Dossier (English version).



BURKINA FASO

1. Situation in the agrifood sector

Burkina Faso is a landlocked country in West Africa with around 17.5 million residents. The agriculture sector contributes 30% to the GDP and employs 85% of the workforce. For the agricultural innovation centers of SEWOH, the rice and sesame supply chains were selected. Rice production is at the center of Burkina Faso's development strategies for food security. The rice consumption of the populations is steadily increasing, however, up to now only approx. 47% of the demand can be covered by domestic production. Since 2010, sesame has become an important export commodity. Other important supply chains are cassava, fruits and vegetables, primarily cashew nuts and shea. As the main export until 2009, cotton also played a special role. This supply chain continues to be important. The promotion of organic cotton production from 2004 to 2011 led to rising employment figures and higher incomes for workers.

In Burkina Faso, national and international organizations, such as the Institut de l'Environnement et des Recherches Agricoles, are undertaking innovation-related research. Until 2010, agricultural product development was based on a sectoral approach. Experience with supply chains and innovation platforms was first gained through the FARA project, "Dissemination of New Agricultural Technologies in Africa". After that, the use of information platforms was expanded. At the regional or local level, these dealt with the supply chains of maize and animal products, improved seeds, rainwater management in grain farming or the use of innovative practices in cotton production.

2. Specific potential to develop the agrifood sector

Burkina Faso's greatest potential lies in the availability of arable land, of which only one third is used. Rice cultivation can also clearly be expanded since up to now only 10% of the 500,000 hectares of the lowlands are used for the crop. Burkina Faso also has a comparative advantage in cotton production. Through increased fruit and vegetable production, the country could increase the diversity of its exports.

To fully tap this potential, investments in several key areas would be necessary. Reliable investments in agricultural research and development would be critical, particularly to reduce the dependency of research on volatile donor financing. The productivity of small farmers could be increased significantly by protecting their rights as landowners and simplified access to loans. There is an urgent need to expand the road network and also to open paths for transport abroad (e.g. harbors), in order to simplify access to markets. Through investments in the development of the until now often fragmented supply chains, Burkina Faso could in the future also produce processed products and thereby increase the domestic value added.

General development efforts in Burkina Faso are currently still suboptimal. Although the government has already completed seven of the eight steps of the CAADP process, the country only achieved agricultural growth of more than the 6% per year targeted in the CAADP in four of the 10 years between 2005 and 2014. This is also reflected in the invest-



ments in the agriculture sector between 2005 and 2014: only in four of those years was more than 10% of all public expenditures invested in agriculture. Another indicator is the investment in agricultural research and development, which on average made up only 0.4% instead of the desired 1% of the agricultural GDP between 2005 and 2011. In the period from 2001 to 2008, Burkina Faso recorded a worsening in the agricultural total factor productivity by 16%, the worst development in sub-Saharan Africa. Between 2001 and 2011, the share of chronically malnourished in Burkina Faso only improved by 6% and with a score of 19.9 according to the World Hunger Index, the country's status is considered serious to very serious. Only through improvements in these indicators will future agricultural investments in Burkina Faso be able to have their full impact.

3. Needs to tap the potentials, country policies and strategies

In 2010, Burkina Faso adopted a new development strategy: the "Strategy for Accelerated Growth and Sustainable Development (SCADD)" aims to increase growth, create jobs and establish diverse, high-quality production in promising areas and supply chains through private investments over a 5-year period. The top priorities are: promotion of growth centers, development of promising supply chains, niche markets, and business clusters, as well as combatting poverty by promoting poverty-reducing growth. In concrete terms, the government developed the National Rural Sector Programme in consideration of ECOWAS Agricultural Policy and SCADD. This should contribute to food security, economic growth and poverty reduction.

4. Effective and innovative co operation opportunities for German development assistance

Based on the potential analysis of the supply chains, some entry points for German development cooperation opportunities in Burkina Faso could be identified. The country has a high trade potential for sesame (selected by SEWOH), oil seeds, cottonseed cake, cashews and goat meat. For rice (another supply chain promoted by SEWOH) Burkina Faso has no comparative advantage in international trade. With sesame and rice, as well as sweet potatoes, yams and cashews, high increases in yield of 5-10% per year were achieved between 2005 and 2012. These continuous increases in yield indicate additional investment potential. The difference between current and potential yield is especially high for the main grain types: maize, sorghum, millet and rice in rain-fed farming, but there is also potential for increases in irrigated rice. Particularly significant, based on the share of domestic production in relation to the total supply in the country, are maize, cottonseed, sorghum, yams and sugar cane, for which local production exceeds national demand. With sesame and rice, the demand in the country cannot be met by its own production.

Details on the potential analysis are provided in the Country Dossier (English version).



CAMEROON

1. Situation in the agri-food sector

Located in Central Africa, Cameroon is home to around 23 million people. Due to its climatic, cultural and biological diversity, Cameroon is often described as 'Africa in miniature'. The agriculture sector contributes 23% to GDP and employs 53% of the workforce. The supply chains for chickens, cacao, onions and potatoes were selected for the green innovation centers. A significant increase in the domestic demand for chicken is expected and the sector enjoys high import protection. In contrast to other export products, cacao is only cultivated by small farmers and is used primarily as a source of income for populations living forested areas. Other major supply chains are cassava, plantains, vegetables, maize, rice, potatoes and sweet potatoes as food crops, and bananas, cotton, coffee, rubber, oil palms and pineapples for export. Most of the meat demand is met by cattle and chickens.

Since 1996, the Institute of Agricultural Research for Development has conducted public research programs in the agriculture area. Applied research is also undertaken by international and national private sector companies. Nationwide agricultural extension services are offered almost exclusively by public institutions, supported by individual projects implemented by companies and non-governmental organizations. Innovation platforms are widely used throughout the agriculture sector. They are mostly focused on certain regions in the country and concerned among other things with bananas and plantains, rice, goat, and generally with production, processing and marketing.

2. Specific potentials to develop the agrifood sector

Cameroon's greatest potential lies in the fertile soils which cover 25% of the country, but are for the most part not yet used for agriculture. The abundant water supply, the large workforce and the large markets in central Africa and Nigeria are additional advantages. There have been successes in increasing agricultural productivity in recent years, particularly in the cassava supply chain, through the cultivation and propagation of healthy, pest-free, high-quality plant material and through improvements in the processing chain. In general, improved types of grains and legumes have been developed, which have led to a significant increase in the cultivation of these varieties.

To tap this potential, investments in several key areas would be necessary. For one thing, bottlenecks in the production of the most important plants, including cassava, rice, plantains, maize, potatoes and sugar cane, would have to be eliminated. The dependence on imported rice continues to be particularly high. The productivity of small farmers is low and could be significantly increased by improved access to inputs (such as fertilizers, pesticides and improved seeds), loans and machines (such as tractors or machines for shelling rice). Investments in the expansion of supply chains would allow Cameroon to also produce processed products in the future and thereby increase national value-added as a whole.

This would also include investments in the storage and marketing of products. There



is also an urgent need to expand the road network to improve access to markets. The national research system could be strengthened significantly through financial support and research cooperation with regional and international partners to increase the local capacities for innovations.

Based on the country analysis, the development expectations are limited. Cameroon has completed the first two of the eight steps of the CAADP process and has only achieved the CAADP goal of at least 6% agricultural growth per year in one year between 2005 and 2014. Similarly, Cameroon has not invested more than 10% of all public expenditures in agriculture in any year in the period between 2005 and 2014. The low positive trend in the agricultural total factor productivity of 7% between 2001 and 2008 can be seen as a sign of the relative underinvestment in agricultural research and development. Even though the food security situation in Cameroon improved by 18% between 2001 and 2011, the World Hunger Index is 12.6, signaling a serious degree of severity. In summary, Cameroon is considered a country with potential but also with development obstacles for development-related agricultural investments.

3. Needs to tap the potentials, country policies and strategies

The “National Agricultural Policy”, with its focus on modernization, food security, export diversification and processing establishes the political framework for the agriculture sector in Cameroon. In addition, an investment plan was adopted in 2014, which will provide investments totaling FCFA 3.35 billion (approx. EUR 5 billion) by 2020. The areas of focus are: development of the agricultural sector, improvements in production infrastructure and access to financial markets, sustainable use of natural resources and capacity building for rural development and collaboration. In concrete terms, the government set a goal of

training 30,000 farmers a year in 35 agricultural training centers spread throughout the country.

Cameroon is continuing to pursue “Vision 2035”, which strives for an “agricultural revolution”, which is supposed to lead to a significant increase in productivity and agricultural intensification and a change in the agricultural land tenure system and thereby reduce poverty to below 10%.

4. Effective and innovative co operation opportunities for German development assistance

The potential analysis of the supply chains in Cameroon indicates some entry points for future German cooperation opportunities. Cameroon’s greatest trade potentials are primarily in pyrethrum and cacao, as well as bananas, rubber and cotton. Except for cacao, the other supply chains promoted by SEWOH do not present any comparative trade advantages for Cameroon. However, in the period between 2005 and 2012, cacao was barely able to achieve any increases in yield. Onions (22%), rice (16%), tomatoes (12%) and bananas (11%) are the supply chains with significant annual increases in yield in this period. In addition to cacao, particularly important agricultural products in Cameroon include beans, sorghum, bananas and root crops.

Details on the potential analyses are provided in the Country Dossier (English version).



ETHIOPIA

1. Situation in the agri-food sector

Ethiopia is a landlocked country in East Africa with approx. 96.5 million inhabitants. The agriculture sector contributes 42% to the gross domestic product and employs 79% of the workforce. Soil and climate conditions favor the cultivation of diverse farm products. Nevertheless, food insecurity, hunger and malnutrition still play a large role in parts of Ethiopia. Factors that trigger these include droughts and floods, for example, but systemic factors, such as environmental degradation, a low degree of technologization in the agriculture sector, a lack of employment opportunities and high population pressure, also contribute significantly to this problem. The supply chains of wheat and fava beans (legumes) were chosen for the green innovation centers. Legumes are cultivated throughout the country and, as an inexpensive source of protein, contribute to the nourishment of small farmers. As the third most important agricultural export, the production of legumes has a positive effect on Ethiopia's economy, although this effect could already be significantly strengthened by a slight increase in production. Other important supply chains are teff, maize and animal products, which, with the exception of leather products, mainly play a role at the national level. Ethiopia is also the largest coffee producer in Africa; coffee cultivation earns the greatest export revenue for the country.

Various national and international institutions such as the Ministry of Agriculture and the FAO, support Ethiopian agriculture through their research.

However, research and development are dominated by the Ethiopian government and the private sector is still underrepresented. Nevertheless, up to now, the contribution of the Ethiopian Institute of Agricultural Research to increasing agricultural productivity at the national level has been minimal. However, there have been improvements in the development of the agriculture sector, due to the modernization of agricultural products, improved management of natural resources, the increased use of inputs by farmers, and the development of professional capacities. Innovation platforms are widely used in the agriculture sector. They are mainly focused on combatting hunger and poverty by ensuring provision of basic foodstuffs, adapting to changing climate conditions and using traditional knowledge, and they promote increased technologization and improved management of agriculture.

2. Specific potentials to develop the agrifood sector

With its great diversity, fertile soils, political support for agriculture and the well-established agricultural extension service, Ethiopia has enormous resources. Due to the close cooperation between national and international research institutions and the government, the country has already achieved substantial success in food security.

At many levels, Ethiopia is showing promising developments. In seven of the past ten years, the country experienced greater agricultural growth than the 6% per year targeted in CAADP.



The total agricultural factor productivity improved by 10% between 2001 and 2008. The government shows a great willingness to invest in agriculture and has already completed all eight steps of the CAADP process. While the government spends only 0.3% of the desired 1% of the agricultural GDP for research and development, they invested more than 10% of all public expenditures in agriculture in eight years between 2005 and 2014. They were able to lower the percentage of chronically malnourished by 19 % between 2001 and 2011. Nevertheless, Ethiopia still has a score of 24.4 according to the World Hunger Index, which documents a very serious degree of severity of malnutrition.

3. Needs to tap the potentials, country policies and strategies

In order to maximize the potentials of the agriculture sector, Ethiopia has been following a general agriculture-driven development strategy since 1995. Concrete measures are based on the “Growth and Transformation Plan 2”, which was adopted in 2015 and which declares poverty reduction as its primary goal as part of which agriculture (among other things, the development of the wheat supply chain) plays a central role. Additional important national strategies are the “Rural Development Policy and Strategy”, the “Plan for Accelerated and Sustained Development to Reduce Poverty”, the “Food Security Strategy” and the “Climate Change National Adaptation Programme of Action (NAPA)”. Overall, the country’s strategies aim to achieve agricultural development through the strengthening of capacities and increased use of labor, suitable forms of land use, the connection of specialization and diversification, and through the integration of agricultural and rural development. The marketing system should also be improved and the connections between research, extension systems

and farmers strengthened in order to support newer technologies.

4. Effective and innovative cooperation opportunities for German development assistance

Due to the positive developments in Ethiopia, there are numerous entry points for German development cooperation. Some criteria and suitable products are mentioned here: The trade potential is particularly high for sesame, goat meat, fruit and vegetables, oilseed and fava beans selected by SEWOH as a supply chain for the green innovation centers. With wheat, however, Ethiopia has no comparative advantage in international trade. Since 2005, the increases in yields have been greatest with sweet potatoes, yams, chickpeas, potatoes and maize. However, the SEWOH products – fava beans and wheat – also showed increases in yields of 7% and 5% respectively, in the same period. The gap between currently realized and potential yields (yield gap) in Ethiopia is especially high for non-irrigated maize, sorghum, wheat and millet. When measured by the share of domestic production in relation to the total supply in the country, maize, other types of grain, peas and beans are particularly relevant. Production of these products even exceeds demand in the country. More than three quarters of the wheat in demand in the country is produced in Ethiopia.

Details on the potential analyses are provided in the Country Dossier (English version).



GHANA

1. Situation in the agri-food sector

Ghana is a West African country with a population of approx. 27 million people. Agriculture contributes around 30% of the GDP and employs half of the working population. 80% of agricultural production occurs in small farmer operations averaging 1.2 hectares in size. One of the country's major problems is pronounced socio-economic North-South inequality, the starting point of many development projects and strategies. For the green innovation centers, the supply chains for maize, rice and pineapple were selected. Maize is Ghana's most important grain and after cassava, the second most important staple in the country. For over one million small farmer households, maize production is the most important source of income. Rice is becoming an increasingly important food. There is work being done on improved varieties to cover domestic demand. In addition to export potential, the supply chain for pineapple also has great potential for local processing into juice, however, the operations lack sufficient raw materials. Other major supply chains are soybeans, fruit and vegetables, palm oil, cacao and cassava. The latter is processed into various locally important products (gari, starches, animal feed).

The Council for Scientific and Industrial Research is the most important national agricultural research organisation with 13 affiliated research institutes. Some universities also have sufficient capacities in the agrifood area. The agricultural extension services are for the most part centrally organized by the Ministry of Agriculture, however there are increas-

ing efforts to decentralize it and give greater responsibility to the districts. Innovation platforms are present in the country and have been initiated by various programmes. They deal with products such as maize, rice and oil palms, but also climate change and technology transfer.

2. Specific potentials to develop the agrifood sector

Ghana's development potential in the agriculture sector can be seen in the development of certain types of fruits ignored until now, shea and cashews, as well as the further development of cassava processing, which are worth considering as export products. There is also a large demand for fish and guinea hen. The government's investments in recent years in improved extension systems and infrastructure (roads, electricity, irrigation), among other things, are viewed as positive signals. The provision of small loans and grants for seeds, fertilizers and fish nets have also led to innovations. Innovation competitions and local innovation support funds have also played an important and exemplary role in this. As in other African countries, in Ghana the dependence on imported rice is high. The further development of local high-performance varieties of maize and rice and support of the processing industry would be important contributions to increasing national value-added. Ghana is showing promising developments at several levels. It has completed seven of the eight steps in the CAADP process and the agricultural total factor productivity improved by 16% between



2001 and 2008, which is above the average for Africa. On the other hand, Ghana only achieved agricultural growth of more than the 6% per year targeted in CAADP in two of the 10 years between 2005 and 2014 and did not invest more than 10% of all public expenditures in agriculture in any year during that period. The government also spends only 0.6% of the agricultural GDP on research and development, instead of the desired 1%. The percentage of chronically malnourished in Ghana decreased by 10% between 2001 and 2011. Ghana has a score of 7.8 in the World Hunger Index, which indicates moderately severe malnourishment. Prio to the beginning of the CAADP process, the country had already invested in agriculture and was able to reduce the percentage of chronically malnourished from around 45% in 1990/92 to 17% in 2000/02. Therefore, Ghana is in principle a promising country for agricultural investments, however, development-related agricultural investments to eliminate hunger and poverty in Ghana only play a limited role.

3. Needs to tap the potentials, country policies and strategies

The most important document to set the political framework of Ghana's agricultural development is the "Ghana Shared Growth and Development Agenda II (2014-2017)". It emphasizes the significance of investments to increase the competitiveness of the private sector, the acceleration of agricultural development, and the management of natural resources. Improved infrastructure, the strengthening of human capital, the creation of jobs, and a transparent, responsible and efficient government are also highlighted in the agenda. It is supported by the "Food and Agriculture Sector Development Policy (2009-2015)", in which the strengthening of the agriculture sector through the creation of supply chains is specifically discussed. In order to bridge the socioeconomic North-South gaps,

the government developed the long-term (2010-2030) "Savannah Accelerated Development Initiative" and established the Savannah Accelerated Development Authority.

4. Effective and innovative co operation opportunities for German development assistance

Ghana and Germany have a longstanding relationship in development cooperation. Building on supply chains already developed in the past (rubber, mangos, pineapples, citrus fruits, chili peppers, maize, guinea hen, cane rats and fish) and based on the potential analysis of the supply chains, additional cooperation opportunities are identified. The country has high trade potential for cacao, cashews, coffee, pineapple and vegetable oils.

For the SEWOH products maize and rice, there are comparative disadvantages in trade. If one considers the annual increases in yield between 2005 and 2012, pineapple, coconuts, oranges, beans and peanuts are the products with the greatest potential. The annual increases in earning for maize and rice are very low. The differences between realized and potential yield are quite high for all related cultures, but particularly so for millet, rice and maize. Based on the share of domestic production in relation to the total supply in the country, plantains, millet, sorghum, sweet potatoes, root crops and maize are particularly significant.

Details on the potential analyses are provided in the Country Dossier (English version).



KENYA

1. Situation in the agri-food sector

The agriculture sector plays a critical role in the Kenyan economy. More than 40% of the population lives from agriculture; in rural areas, it is more than 70%. The sector represents approx. 18% of the formal employment and provides the livelihood for a large part of the youth. The agricultural growth rates were very volatile in the last decade, with a low point of -4.1% growth in 2008 triggered by a pronounced drought. However, since then agriculture has recovered and is recording positive growth rates again. The strong domestic demand for a wide range of products and stronger exports of products with coffee, flowers, fruit and vegetables contributed largely to this.

Despite the steps that have already been taken, the greatest challenges remain the increase in productivity in important subsectors, improvements in land and resource management, improvements in market access and trade, increased participation of the private sector, institutional reforms, and improved coordination of research and technology transfer. Recent efforts to make the agriculture sector more productive can be seen in the Kenyan government's mid-term investment plan, which is in line with CAADP. This investment plan takes into account the agricultural diversity and provides investments in various strategic areas, among other things the improvement in productivity, commercialization and competitiveness; increased private sector involvement; sustainable land and resource management; reform of agricultural extension systems; improve-

ment in market access and trade, and effective coordination and implementation.

The most important agricultural products in Kenya are maize, wheat, tubers (potatoes and sweet potatoes), bananas and plantains, cassava, fruit, vegetables and legumes. There is also substantial tea and coffee production and not negligible livestock. The supply chains for milk and sweet potatoes were selected for the green innovation centers.

The national innovation system consists of several Kenyan research institutes, such as the Kenya Agricultural and Livestock Research Organization (KALRO) and universities, as well as international agricultural research institutes that have offices in Kenya. 10 of the 15 CGIAR centers currently have projects in Kenya. FARA has also created thirteen innovation platforms in the country which are concerned with various supply chains, primarily protein-rich maize and vitamin A-rich sweet potatoes.

On the whole, Kenya is showing very promising developments. The country recorded agricultural growth of at least 6% (CAADP goal) in seven of the years between 2005 and 2014. The total factor productivity in agriculture improved by 24% between 2001 and 2008. The political commitment is positive. The government has already completed six of the eight steps in CAADP and expenditures for agricultural research are even somewhat higher than the CAADP target of 1% of the agricultural GDP. However, the goal to invest at least 10% of all public expenditures in agriculture has been missed in all of the years since 2005.



Since 2001, the percentage of chronically malnourished only decreased by around 9%. The World Hunger Index in Kenya is 16.5. Hunger is therefore a serious problem in the country, which indicates that there is a great need for investments in agriculture.

2. Specific potential to develop the agrifood sector

Great potentials can be seen for the agriculture sector in Kenya in the expansion of irrigation, the diversification toward non-traditional agricultural products, the development of value-addition, and increased involvement of the private sector.

Important innovations in recent years in crop cultivation include the use of varieties that are adapted to altered moisture and temperature conditions, the transition to practices that retain soil moisture and nutrients, the monitoring of soil erosion and improvement in the water absorption of plants, as well as the use of seasonal forecasts. Small-scale irrigation systems have been introduced and improvements have been made in fighting plant diseases and pests. In livestock farming, the participatory breeding of local breeds, the installation of bunk feeders, the recultivation of pastures, and the diversification of productive livestock businesses are important innovations.

3. Needs to tap the potentials, country policies and strategies

The agriculture sector was identified as one of the three engines for the Kenyan economy in the “National Strategy for Economic Recovery” in 2003. Three strategies are of particular significance. The “Strategy for Revitalizing Agriculture, 2004-2014” was written for the implementation of the “Economic Recovery Strategy for Wealth and Employment Creation” in the agriculture sector. “Kenya Vision 2030” was adopted in 2008 and defines

the agriculture sector as a central element in the country’s economic recovery. Finally, the “Agriculture Sector Development Strategy 2010-2020” was established as a revision of the “Strategy for Revitalizing Agriculture, 2004- 2014” and presents a detailed plan as to how agriculture in Kenya can help achieve the targeted economic growth rate of 10% per year.

4. Effective and innovative co operation opportunities for German development assistance

Kenya has special comparative advantages in the international trade of green beans, tea, peas, and nuts, but also milk and sweet potatoes. In recent years, harvest yields have significantly improved, especially for cassava, wheat, rice, bananas and dry beans. Increases in yields have also been achieved with other types of fruit and vegetable. However, there were decreases in yields of sweet potatoes – one of the SEWOH supply chains. The gap between currently realized and potential yields (yield gap) is especially high for non-irrigated maize, sorghum, millet and wheat. Cloves, pineapple, legumes, cream and coffee are national products that have a high percentage of the total supply in the country, such that their production exceeds domestic demand. Data also show that the supply of the products selected by SEWOH (milk products and sweet potatoes) is completely produced within the country.

Details on the potential analyses are provided in the Country Dossier (English version).



MALAWI

1. Situation in the agri-food sector

The Southern African country of Malawi has 16.7 million residents. Malawi's agriculture sector contributes 37% to the GDP and 85% to export revenue. The sector is characterized by two partial structures: on the one hand, around two million small farmer operations which generate around 80% of Malawi's food production, and on the other hand, the large tobacco, sugar and tea plantations which generate over 80% of the agricultural exports. The supply chains for soybeans, peanut and cassava were selected for the green innovation centers. Other important agricultural products are maize, rice and potatoes. Since the production of tobacco has decreased dramatically due to the reduced demand, the national export strategy recommends the cultivation and the added value primarily of legumes (e.g. chickpeas).

A fundamental agricultural reform is the reason for the growth in recent years. For example, the previous monopoly of the Agricultural Development and Marketing Corporation in the purchase of maize and other products was eliminated and major steps have been taken in the direction of privatization. Malawi has also restructured its national agricultural research system. The most important institution in Malawi's national research system, with over half of the employees in the system, is the Department of Agricultural Research Services (DARS) within the Ministry of Agriculture. There are also institutions for animal sciences and forestry, as well as tobacco, tea and sugar research. Three universities cooperate with DARS in joint research

projects. The agricultural extension service has been undergoing a serious transformation since 2000 and is now characterized by a pluralistic approach. Outside of the government's extension service, there are competent non-governmental organizations, universities and farmer associations. The private sector also plays an important role in extension services. There are innovation platforms for seeds, vegetables, maize and chickpeas.

2. Specific potentials to develop the agrifood sector

Malawi's potential lies in its increasingly supply chain-oriented agriculture. The decentralization and opening of the agriculture sector have already led to wide-reaching, positive innovations. Nevertheless, there are still a number of problem fields, e.g. which continue to generate relatively low yields, an irrigation system that is not very widespread, small land parcels, a difficult marketing situation and lack of access to markets, weak quality controls, etc. The country has had some successes in those supply chains where farmer organizations have been included in the development process and where private investments were desired.

Investments in several key areas would be necessary to further tap the potential. Training and continued education and the development of human resources are the cornerstones for further development, which should also be promoted through the participatory involvement of small farmers, e.g. in the development and propagation of seeds. Improvements in access to agricultural inputs



(seeds, fertilizers, etc.) and to marketing structures are considered another important factor. Malawi is showing promising developments at many levels. In five of the years between 2005 and 2014, it experienced agricultural growth of more than the CAADP target of 6% per year. The government has already completed seven of the eight steps of the CAADP process, has invested more than 10% of all public expenditures in nine of the years between 2005 and 2014, and used 0.8% of the agricultural GDP for agricultural research and development. The latter investment still falls below the 1% desired by the African Union, but is one of the highest expenditures percentage-wise when compared to the twelve African SEWOH countries (after Kenya with 1.1%). The improvement in the agricultural total factor productivity by 47% between 2001 and 2008 can be considered one of the successes of this investment policy in Malawi. However, the percentage of chronically malnourished decreased by only 6% between 2001 and 2011. Malawi's score in the World Hunger Index is still at 13.6, which indicates a serious degree of severity in the area of chronic malnutrition. Through the agricultural reforms of recent years, Malawi has been able to achieve a surge in growth, however, it has not benefited the entire population. Malawi can be considered a promising country for development-related agricultural investments.

3. Needs to tap the potentials, country policies and strategies

The political framework for Malawi's agricultural reforms was laid out in the "Agriculture Sector Wide Approach", which developed a strategy to increase agricultural production, simplify access to food, and increase the share of processing in economic growth.

The "Malawi Growth and Development Strategy II (2011-2016)" provides the more extensive framework for a wide-reaching

transformation of the country from a primarily consuming, import-oriented economy to a producing, export-oriented economy. The agriculture sector plays a large role in Malawi's "Vision 2020". Special focus is placed on strengthening the private sector.

4. Effective and innovative co operation opportunities for German development assistance

There are opportunities for cooperation between Germany and Malawi in all of the supply chains, especially product processing and post-harvest processes. Strengthening of farmer associations and cooperatives through training and participatory development of improved varieties and marketing are other important elements. Based on the potential analysis of the supply chains, some entry points for German development opportunities in Malawi were identified. The country has a trade potential for tobacco, cotton, coffee, tea and peanuts, which is one of the SEWOH-promoted supply chains. The other promoted products (primarily soybeans and cassava) have no comparative advantages for international trade. The annual increases in yields between 2005 and 2012 for maize, pigeon peas, rice, cotton and potatoes are particularly worthy of mention. Based on the percentage of domestic production in relation to the total supply in Malawi, alcoholic beverages, sunflowers, maize, rice, millet, soybeans and cassava are especially relevant.

Details on the potential analyses are provided in the Country Dossier (English version).



MALI

1. Situation in the agri-food sector

Mali is a landlocked country in the Sahel with 17.1 million residents. Around 60% of the area is covered with dryland and desert. Although the GDP grew faster in the last ten years than the population, Mali continues to be a poor country that depends heavily on cotton and gold exports. These two products generate more than half of the revenue. The most important agricultural products are rice and millet, but also peanuts and Bambara peanuts, as well as vegetables and fish, which is usually sold domestically. The supply chains for rice, potatoes (seeds, table potatoes) and fish were selected for the green innovation centers. Although the majority of the population is employed in agriculture, the sector contributes less than half of the GDP.

The national agricultural research system is led by the National Agricultural Research Council, an agency of the Ministry for Rural Development. 75% of employees and over 70% of the financial resources of the national agricultural research fall under the National Agricultural Research Institute (IER). IER maintains six regional centers, nine research institutes and 14 substations. However, the research landscape in Mali is severely fragmented and there is no consultation or coordination. In addition, up to 90% of the research is financed by third-party funds, which represents a large handicap in the implementation of the national research program. The agricultural extension service is nationwide and largely run by the government and local authorities. However, universities and technical colleges as well as non-governmental

organizations are included in the extension services. The share of private companies involved in agricultural extension is low. Innovation platforms are poorly developed. Several international research institutes work in Mali, mostly in cooperation with IER.

2. Specific potential to develop the agri-food sector

Mali's agri-food sector is characterized by a weak regulatory framework. Low harvest yields, high post-harvest losses, significant health problems and low incomes limit people's options for healthy food. It is not easy for small farmers to get loans. Successes, e.g. in the production of rice, are nullified by a lack of processing and post-harvest structures. It is suggested that the potential of Mali's agricultural sector could be tapped with a focus on small farmer systems and small-scale irrigation structures. The growing demand of an increasingly urban population could also provide a stimulus for new cultivation systems, e.g. fish-intercropping and vegetable cultivation.

Based on the country analysis, general development efforts in Mali are still suboptimal at this time. Although the government has already completed five of the eight steps of the CAADP process and has invested more than 10% of all public expenditures in agriculture in six of the years between 2005 and 2014, Mali spends only 0.6% instead of the desired 1% of agricultural GDP (between 2005 and 2011) on agricultural research and development. In accordance with the low investments, the agricultural total factor



productivity only slightly increased by 10% between 2001 and 2008. Between 2001 and 2011, the percentage of chronically malnourished in Mali only improved by 8% and with a World Hunger Index of 13, the country has a serious to very serious status. Only through improvements in these indicators will future agricultural investments in Mali be able to achieve their full impact.

3. Needs to tap the potentials, country policies and strategies

Mali's Agricultural Development Policy (Politique de Développement Agricole) provides the strategic setting for the framework law on agriculture (LOA, Loi d'Orientation Agricole). The LOA covers all of the economic activities of the agriculture sector and promotes a restructuring and modernization of the agriculture sector and medium-sized and large family operations, in order to strengthen the rural economic activity. Development toward more privatization and less government intervention should also be achieved. The World Bank-supported Agricultural Competitiveness and Diversification Project and Agricultural Diversification Project should strengthen commercial cultivation and agroindustry as an alternative to subsistence farming.

4. Effective and innovative co operation opportunities for German development assistance

Based on the potential analysis of the supply chains, some entry points for German development cooperation opportunities in Mali were identified. The country has a high trade potential for animals, sesame, goat meat, peanut oil and cotton. Mali has no comparative advantages in international trade for any of the supply chains promoted by SEWOH. The five products with the highest average increases in yields between 2005 and 2012 are maize, rice, black-eyed peas, sweet

potatoes and yams. The difference between currently realized yields and potential yields (yield gap) is particularly high for the main grain types maize, rice and millet. Based on the share of domestic production in relation to the total supply, sorghum, maize, millet, cassava, and sweet potatoes are particularly relevant.

Details on the potential analyses are provided in the Country Dossier (English version).



NIGERIA

1. Situation in the agri-food sector

Located in West Africa, Nigeria is the most populated country in Africa with its more than 182 million residents. With an estimated GDP of 522 billion U.S. dollars, the country has the strongest economy on the continent, although most of its economic power is based on the oil sector.

Agriculture employs around two thirds of the workforce, contributes approx. 22% of the GDP and accounts for around 88% of the revenue that is not from the oil sector. More than 90% of agricultural production is generated by small farmers who have less than 2 hectares of land. The supply chains of rice, maize, cassava and potatoes were selected for the green innovation centers. Other important products are various legumes, bananas and plantains, cacao and palm oil.

Nigeria's national agricultural research system consists of a multitude of institutions, for example, 122 technical colleges and over 20 government institutions or departments. The private sector maintains only a few research institutions. Agricultural extension is provided primarily by the Agricultural Development Programme (ADP), however, both the number of advisors and the quality of the advising are considered insufficient. Private consulting institutions (e.g. British American Tobacco, Shell, Mobil) and non-governmental organizations also play a large role in Nigeria. Innovation platforms are widely used in Nigeria and are used by many projects to introduce agricultural innovations. They are concerned

with the production and processing of maize, soybeans, plantains, vegetables, animal products, soil fertility and crop protection.

2. Specific potential to develop agri-food sector

Nigeria's greatest potential lies in its still unused land resources. At the moment, only close to a third (33 million hectares) of the potential area is used as cultivated land. Likewise, at this point only approx. 11% of the potentially irrigable land is irrigated. The large number of potential workers, a large domestic market and the numerous available agricultural innovations and technologies represent additional development potentials. Positive developments in the supply chains were achieved primarily through improved seeds (e.g. drought-resistant maize, vitamin A-enriched cassava) and through a strengthened processing sector. In order to tap Nigeria's great potential, investments would be needed in several areas, e.g. in access to small loans, in post-harvest and storage procedures, in better linkages within the supply chains and in improved infrastructure (e.g. road construction). Stronger promotion of national agricultural research is also recommended.

Based on the country analysis, the development expectations are limited. Nigeria has completed the first five of the eight steps of the CAADP process and has achieved the CAADP goal of at least 6% agricultural growth per year only in four of the years



between 2005 and 2014. Likewise, in the period between 2005 and 2014, Nigeria did not invest more than 10% of all of the public expenditures in agriculture in any year. Nigeria's investments in agricultural research and development amounted to only 0.3% of the agricultural GDP on average between 2005 and 2011, significantly below the CAADP target of 1%. This relative under-investment in agriculture leads to the only slightly positive trend in the agricultural total factor productivity of 11% between 2001 and 2008. In recent years, more precisely since the reforms of 2011, there have been some successes in Nigeria's food situation, primarily an increase in production and a reduction in food imports. Nevertheless, the percentage of chronically malnourished in Nigeria only slightly improved by 3% between 2001 and 2011. The World Hunger Index for Nigeria is 14.7, which represents a serious degree of severity. So Nigeria is considered a country with potential but also with obstacles to development for development-related agricultural investments. In particular the high absolute number of chronically undernourished in Nigeria (approx. 13 million people) requires urgent commitment to development-related agricultural investments. Only the Democratic Republic of Congo (with probably over 40 million), Ethiopia (approx. 32 million) and Tanzania (17 million) have more chronically malnourished people on the African continent than Nigeria.

3. Needs to tap the potentials, country policies and strategies

Recently, the Nigerian government has tried to reform the agriculture sector. These reforms include the "Agricultural Transformation Agenda" program, which was established in 2011. The strategy promotes agricultural production with the goal of reducing imports

and strengthening the export sector. The processing industry as well as intra- and inter-sectoral connections are promoted to create added value within the country. Through its membership in the "Grow Africa" initiative, Nigeria is required to strengthen the growing agricultural private sector. Between 2013 and 2014, investments of US\$ 611 million were made and more than 22,500 jobs were created.

4. Effective and innovative co operation opportunities for German development assistance

The potential analysis of the supply chains in Nigeria point toward a few entry points for future German cooperation opportunities. Nigeria's greatest agricultural trade potential lies with cashews, sesame, cacao, ginger and vegetables. The supply chains promoted by SEWOH do not represent any comparative trade advantages for Nigeria. In the period between 2005 and 2012, sesame, black-eyed peas, potatoes, sugar cane and okra achieved the highest average increases in yields. In addition to potatoes, rice is another SEWOH-promoted product that has had moderate increases in yields. By contrast, maize and cassava (also SEWOH products) have even had to accept losses in yields over that period. Millet and other types of grain, as well as sweet potatoes, yams, root crops and cassava have all be identified as particularly relevant agricultural products in Nigeria.

Details on the potential analyses are provided in the Country Dossier (English version).



TOGO

1. Situation in the agri-food sector

Togo lies in West Africa and has around 7.1 million residents. Its climate is tropical in the South and semi-arid in the North. 46% of the land area is farmed. The agricultural sector employs 75% of the population and contributes 41% of the GDP. The food crops (primarily cassava, yams, maize and millet) are consumed primarily domestically. Export products include cotton, cacao, coffee and palm oil. The supply chains for peanuts, cashews and soybeans were chosen for the green innovation centers. Maize is another important product. The crop is also marketed as chicken feed, thereby opening up a new market for maize producers.

Since 1997, Togo's agricultural research institute (Institut Togolais de Recherche Agronomique) has coordinated the agricultural research activities in the country. For each of the country's four agroecological zones, there is an excellence center. Applied research in the agri-food sector continues to be conducted by various institutes under the Ministry of Agriculture as well as universities. Some international research centers maintain project sites in Togo. Agricultural extension services are largely provided by government service providers. Non-governmental organizations and private companies do not play a significant role in that area. Some innovation platforms (IP) were initiated in Togo by FARA and CORAF/WE CARD. A major focus of the IPs lies in improved market access and the obtaining better prices.

2. Specific potentials to develop the agri-food sector

Togo's greatest potential lies in the previously uncultivated land resources. Until now, only around 45% of the 3.4 million hectares of arable land is cultivated. The country also has good opportunities to further develop rice production under irrigation. It is presumed that a total of 185,000 hectares are available for rice production, however until now only 29,000 hectares were cultivated. In recent years there have been some successes due to the promotion of innovative cooperatives between services providers and producers. Through access to decision mechanisms, small farmers were supported in tapping higher-quality markets.

To exploit the existing potential, investments in some areas would be necessary, e.g. in the simplification of access to agricultural investments in order to improve production of the main foods, in the strengthening of extension services, and in a more stable financing basis for national agriculture research. There is also a need for infrastructure development.

Based on the country analysis for Togo, the development expectations are limited. Togo has completed six of the eight steps in the CAADP process and has achieved the CAADP target of at least 6% agricultural growth per year in four of the years between 2005 and 2014. However, the government did not invest 10% of all public expenditures on agriculture in any year between 2005 and 2014,



although it is an official CAADP goal. Likewise, Togo only invested an average of 0.4% of the agricultural GDP in agricultural research and development between 2005 and 2011 instead of the desired 1%. In the period from 2001 to 2008, Togo experienced a worsening of the agricultural total factor productivity by 6%. Even though the food situation in Togo improved by 10% between 2001 and 2011, the World Hunger Index for Togo is 13.9, which indicates a serious degree of severity. Therefore, Togo is considered a country with potential but also with obstacles to development for development-related agricultural investments. Only through improvements particularly in the investment indicators will future agricultural investments in Togo achieve their full impact.

3. Needs to tap the potentials, country policies and strategies

The political framework for Togo's agricultural development is established by the National Program for Investment in Agriculture and Food Security ("Programme National d'Investissement Agricole et de Sécurité Alimentaire, PNIASA"). This program includes interventions for, among other things, structural reforms, growth spurts, regional integration, job creation and the promotion of agricultural research. An annual growth rate of 6% in the agriculture sector is strived for. PNIASA supports an intensification of grain production and the production of cassava and yams. For the export sector, investments in the important products of cotton, coffee and cacao are planned. Pineapple, cashews and bananas are to be developed as new export products. In animal production steps are taken to promote smaller and medium-sized companies and to further develop the supply chains of eggs, meat and milk. In the area of

fish production, both aquaculture and deep-sea fishing are to be strengthened. Another focal area is the development of strategies for climate change adaptation, special variety development, integrated management strategies for soil fertility, crop and animal health, and product processing.

4. Effective and innovative co operation opportunities for German development assessment

The potential analysis of the supply chains identified some entry points for German co-operation opportunities in Togo. The country has comparative advantages and therefore high trade potential for cacao, cottonseed cake, peanuts, meal from tubers and root crops, as well as sesame and cashews. Togo has no comparative advantages in international trade for soybeans, another supply chain supported by SEWOH. Sweet potatoes, cotton, sorghum and rice achieved the highest annual increases in yields between 2005 and 2012. Peanuts, which are promoted by SEWOH, were able to achieve slight but continual increases in yields. The other SEWOH crops, cashews and soybeans, have not experienced any increases in yields. Based on the share of domestic production in relation to the total domestic supply, cotton, nuts in general, cassava, cacao and yams are particularly relevant. The domestic demand for soy and peanuts can also be met by domestic production.

Details on the potential analyses are provided in the Country Dossier (English version).



TUNISIA

1. Situation in the agrifood sector

The North African country of Tunisia has a population of around 11 million residents. The land area used for agriculture is around 10 million hectares, of which 4.2 million hectares are cultivated, of which 8% are irrigated. The agriculture sector is an important economic sector in Tunisia with an annual growth of 6% and a contribution to the GDP of 11.5%. Around 22% of the population are employed in the agriculture sector (including fisheries). On the other hand, the agriculture sector consumes the majority of the country's resources: 80% of the water and 90% of the fertile land resources are used for agriculture. The supply chains for meat/dairy, fruit (citrus fruits) and vegetables were selected for the green innovation centers in Tunisia. Other important products, which are mostly exported, are olives, dates and seafood.

The most important institute of the relatively well developed national agricultural research systems is the Institution de la Recherche et de l'Enseignement Supérieur Agricoles (IRESA) which was established in 1990. IRESA is a quasi-governmental institution under the Ministry of Agriculture and coordinates the activities of four of Tunisia's eight agricultural research institutions and all nine technical colleges. While Tunisia's agricultural research is supported primarily by its own government, significant contributions have been made by the World Bank and its bilateral donors, including the EU. Additional international institutions are various UN sub-organizations and international agricultural research centers. The agricultural extension service is

largely organized by the Ministry of Agriculture, e.g. through the Agence de la Vulgarisation et de la Formation Agricoles, but also through projects of international donors and through non-governmental organizations. There are also agricultural associations and cooperatives that provide advice and research. For financially secure farmers, there is the option of hiring local or international consultants. This is usually done by the large commercial operations.

2. Specific potentials to develop the agri-food sector

Tunisia's agriculture has steadily continued to develop since the 1980s. The country's development strategy has two main axes: economic growth and social stability. Due to agricultural reforms in the 1990s, the country has managed to increase productivity and build a stronger connection to the global market. Growth was achieved in some supply chains through specific stimuli and through technological innovations. However, the centralized orientation of the agriculture sector, which existed at least until the revolution of 2011, hindered any further developments.

In addition to Tunisia's suboptimal general development in past years, the indicators of the country analysis also point to limited development opportunities through agricultural investments. Tunisia has not yet begun the CAADP process but has already been able to achieve agricultural growth of more than the CAADP target of 6% per year in four of the years between 2005 and 2014. However, Tunisia did not invest more than 10% of all of its



public expenditures in agriculture in any year between 2005 and 2014. Detailed information on investments in agricultural research and development and on the development of agricultural total factor productivity was not available. The fact that Tunisia reduced its percentage of chronically malnourished below 5% decades ago and its World Hunger Index is below 5 means that chronic malnutrition only plays a small role in Tunisia.

3. Needs to tap the potentials, country policies and strategies

Tunisia's agriculture sector is governed by a series of economic and social development plans. In this context, structural reforms were implemented and the country directed more investments towards the agriculture sector, primarily with a focus on export products. Closer ties to the European market and free trade agreements with the Arabic world occurred as part of the 9th development plan (1997-2001). Until shortly before the revolution, export strengthening, water resource development, and improving local food security were included in the plan.

The revolution of 2011 led to a redefinition of food security, job creation and regional development; it is expected that, as a result of this, small farmers in disadvantaged areas will be better represented.

4. Effective and innovative co operation opportunities for German development assistance

Based on the potential analysis of the supply chains, entry points for future opportunities for German cooperation in Tunisia were identified. Tunisia has a high trade potential for dates, maize oil, olive oil, chili peppers and sweet peppers, as well as for cheese products. There is also a comparative advantage for fruits, as a SEWOH-promoted supply chain. However, there is no competitive

advantage for vegetables, which are another SEWOH-promoted supply chain. Significant increases in yields were attained for vegetables and fruits between 2005 and 2012. Based on the share of domestic production in relation to the total domestic supply, various types of vegetables and (citrus) fruits, honey and meat are particularly important agricultural products in Tunisia.

Details on the potential analyses are provided in the Country Dossier (English version).



ZAMBIA

1. Situation in the agrifood sector

Zambia is a landlocked country in Southern Africa with around 15 million residents. The agriculture sector contributes 10% of the GDP and employs 72% of the workforce. Although the government considers the agricultural sector to be the most important engine for economic development, the increase in agricultural production was not able to keep up with the growth of the national and international demand for Zambia's products. Maize is by far the most important agricultural crop, both in terms of cultivated land area and exports. The supply chains for soybeans (together with maize and cotton) and peanuts (together with beans) were selected for the green innovation centers. Soybean cultivation has great growth potential, particularly as feed for livestock (especially poultry), but also increasingly for human consumption. Peanuts are mainly grown by small farmers and largely consumed the households themselves.

Agricultural research is primarily coordinated by the Ministry for Agriculture and Animal Husbandry research institutes, Zambia Agriculture Research Institute, Golden Valley Agricultural Research Trust, and Central Veterinary Research Institute. The University of Zambia, the National Institute for Scientific and Industrial Research and recently Mulungushi University are involved in relevant research projects. Various international and regional organizations also offer support in research projects, e.g. the CGIAR centers, the World Bank and the African Development Bank. The development of innovation

platforms has not yet made much progress in Zambia.

2. Specific potentials to develop the agri-food sector

Zambia has numerous resources for the development of the agriculture sector, including land, workers, water and suitable weather conditions. Almost two thirds of the land area could be used for agriculture. The sector could benefit in particular from an expansion of the irrigation. Despite sufficiently available water resources, only a fourth of the irrigable area is actually irrigated. However, some general conditions would have to be fundamentally improved, for instance to engage the private sector much more, especially in marketing, extension services, agricultural research, mechanization, finance and improved access to markets for agricultural inputs and products. The maize supply chain employs most of the agricultural workers and receives the most financial support from the government. However, observations of urban consumption indicate that the younger population in particular, prefers wheat products and rice.

Cassava, the second most important staple crop after maize, is suited primarily for small farmers since the crop requires little input and can tolerate long drought periods. The current producers are also already very knowledgeable in the cultivation methods. Rice is becoming increasingly important as a staple food. Along with maize, the government is now buying rice for the national



reserves. The plant is cultivated primarily by small farmers, in part due to the production costs. Aquaculture is also required by the government to complement the dwindling resources in the national waters.

The high (and growing) demand for soybeans in Zambia and also in the neighboring countries holds great opportunities for the development of the agricultural sector. The potential to increase the yield is great since previous production increases were primarily achieved by expanding the cultivated areas. The weather conditions and soil quality are also suited for a significant expansion of peanut farming and export, provided that the current, primarily local, production can be modernized to meet the market demands.

The potential of the agriculture sector for the improvement of food security in Zambia is considered moderate. The government has already completed five of the eight CAADP steps, but the country has only achieved agricultural growth of more than the 6% per year targeted by the CAADP in two of the years between 2005 and 2014. Only in three of the years were more than 10% of all of the public expenditures invested in agriculture and only 0.4% instead of the desired 1% of the agricultural GDP were invested in agricultural research and development between 2005 and 2011. The agricultural total factor productivity was improved by 27%. Between 2001 and 2011, the percentage of chronically malnourished in Zambia increased by 5% and, with a score of 24.4 according to the World Hunger Index, the country has a very serious status. Only through improvements of these indicators will future agricultural investments in Zambia be able to have their full impact.

3. Needs to tap the potentials, country policies and strategies

The government has adopted several strategies for developing the agriculture sector. The National Agricultural Policy expires in 2015 and is currently being revised. The National Agriculture Investment Plan 2014-2018 focuses on sustainable resource management, increasing agricultural productivity, market access and disaster management. Strategies have also been developed for individual sectors and technologies, e.g. aquaculture, rice, cassava, irrigation and cooperatives.

4. Effective and innovative cooperation opportunities for German development assessment

Zambia has a comparative trade advantage in the export of maize. The yield of maize has increased compared to many other crops, however, there is still great potential for additional increases, particularly for rainwater-fed maize cultivation. Other products, for which Zambia has a comparative advantage internationally, are olive oil, cotton lint, unprocessed tobacco and green beans. Soybeans and peanuts are currently not competitive internationally but stand out due to their relatively high increases in yields in the past seven years, on which additional investments could build. The same is true for wheat and sweet potatoes. Soybeans (together with cassava and sweet potatoes) are one of the most important crops in terms of national production (in proportion to the total supply).

Details on the potential analyses are provided in the Country Dossier (English version).

