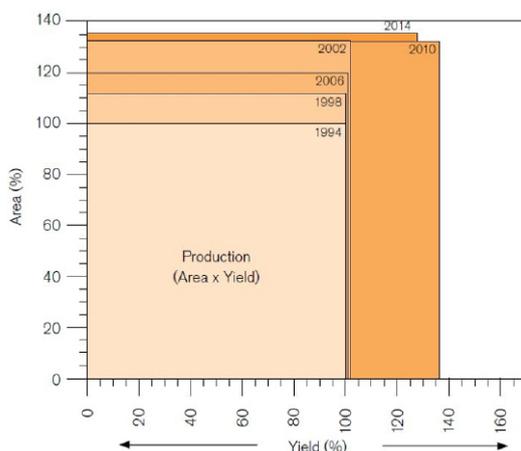


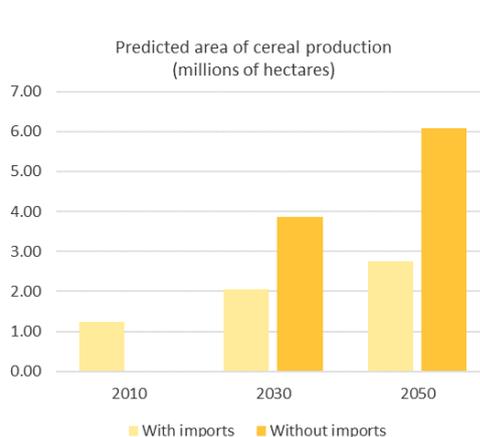
## Food and forests: understanding agriculture and conservation trade-offs in Ghana

In Ghana, as in many countries in Africa, policymakers need to better understand and manage the major trade-offs – existing and future – between two competing objectives: increasing agricultural production to meet growing domestic food demand and conserving nature.

**Figure 1. Change in cereal yield and cultivated area, Ghana 1994-2014 (based on FAO data<sup>3</sup>)**



**Figure 2. Cereal area with and without imports (from IFPRI's IMPACT model<sup>2</sup>)**



### Competing policy objectives and implications for land use

The principal staple food crops in Ghana are a mix of cereals (especially maize) and roots and tubers (especially cassava). In the period 1994–2014 cereal production in Ghana increased by a factor of 1.74 (see Figure 1) and production of roots and tubers by a factor of 3. Based on the IMPACT model of the International Food Policy Research Institute (IFPRI)<sup>2</sup>, van Ittersum et al. in their paper entitled “Can sub-Saharan Africa feed itself?” note that food demand in Africa is projected to again triple over the period 2010–2050 — a growth rate much higher than in other continents.<sup>4</sup> This growth in demand is a function of improved food

security and increasing consumption of meat as well as population growth. In Ghana, cereal demand is predicted to grow by a factor of 3.2 by 2050, and for roots and tubers by a factor of 2.3.

Ghana's forests cover 37% of the total land area. This area is divided into three main ecological zones: the High Forest Zone, Transitional Zone and the Savannah Zone. Ghana's High Forest Zone in the southwest falls within the biodiversity hotspot of the Guinean forests of West Africa, one of the 36 most important biodiversity areas in the world.<sup>5</sup> The Transitional Zone exists in the mid-part of the country. It has characteristics

### Summary

Agricultural expansion is the number one driver of the loss of nature and its biodiversity and ecosystem services.<sup>1</sup> But efforts to rapidly reduce these losses must recognise the political and economic realities of developing countries striving for economic growth and poverty eradication in the face of climate change. How to balance the competing objectives of agricultural production (SDG 2) and nature conservation (SDG 15) is a critical challenge for sustainable development, and there is growing recognition that success will require transformative change.

### Background

In contrast to the situation in Latin America and parts of Southeast Asia, in most countries in Africa it is the expansion of staple food crops to meet growing domestic demand rather than export commodities which drives the loss of nature and its biodiversity and ecosystem services. In Ghana, it is currently a mix of the two — expansion of food crops in the centre and north, and cocoa in the closed forest zone of the south.

Sentinel partners:

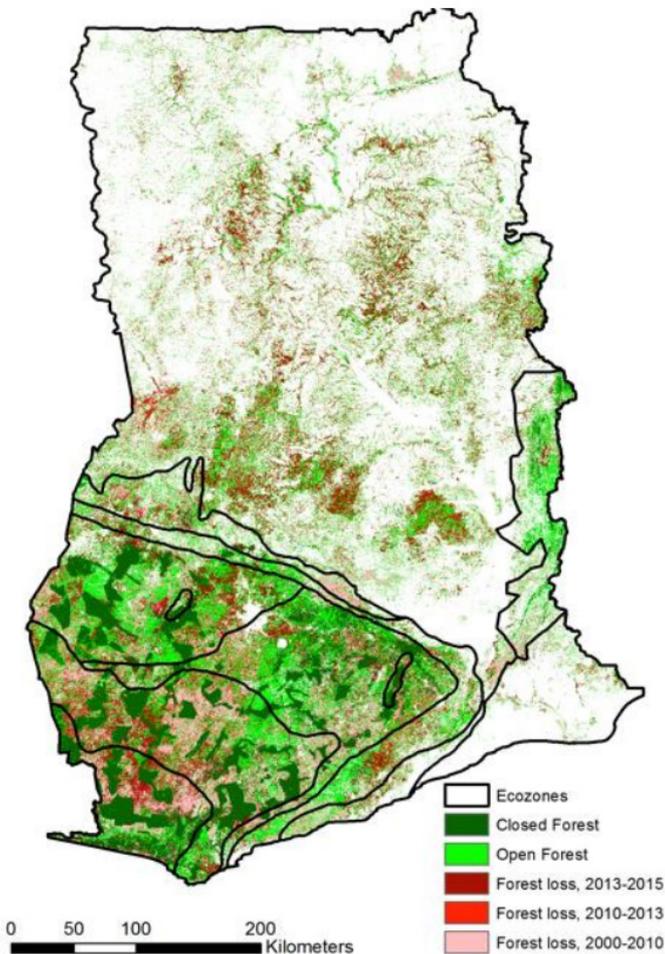


of both the High Forest and Savannah zones. The Savannah Zone mainly exists in the northern part of the country but stretches further south to the east coast. Most of the forest/woodlands of the savannah have disappeared but from a landscape perspective the remaining tree cover is significant for biodiversity and associated ecosystem services including carbon stocks.

Forests in Ghana are also classified according to the extent of canopy cover — closed forests having 60% or greater and open forests having 15–59% usually due to logging and other degradation (Figure 3). There was an increase in total forest area between 1990–2015, possibly due to the national afforestation programme, natural regeneration and/or fewer forest fires.<sup>6,7</sup> However, at the same time, forest degradation and deforestation continued. The net effect is that Ghana could end up with an expanded forest area but with a low canopy density.

Agricultural expansion is the most significant driver of deforestation and biodiversity loss in Ghana and the deforestation rate has increased in recent years to an average of 3% per year — among the highest in Africa.<sup>8</sup> The nature and significance of agricultural expansion as a cause of deforestation varies greatly across the different zones.

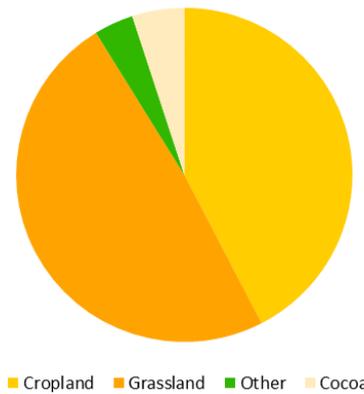
**Figure 3. Deforestation in Ghana between 2000 and 2015** (image taken from Ghana’s National Forest Reference Level, Fig. 5, page 29)<sup>8</sup>



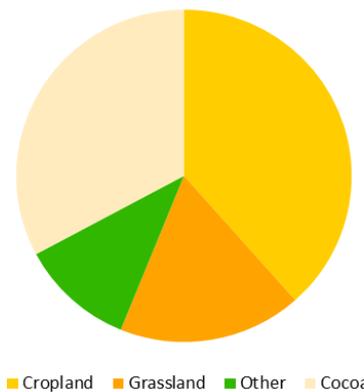
In the Savannah Zone where the remaining forest/woodland is open forest (Figure 3) expansion is largely from food crops and livestock production, mostly from smallholder farmers, but increasingly from medium and large-scale commercial farms. At the other extreme – the High Forest Zones – where most of the closed forest is located it is a mix of cocoa and food crops (Figure 4). However, with climate change affecting cereal production in the north, the expansion of cereals may become more significant than cocoa in the medium to longer term.

**Figure 4. Forest conversion in Ghana<sup>8</sup>**

**Conversion of open forest 2001-15**



**Conversion of closed forest 2001-15**

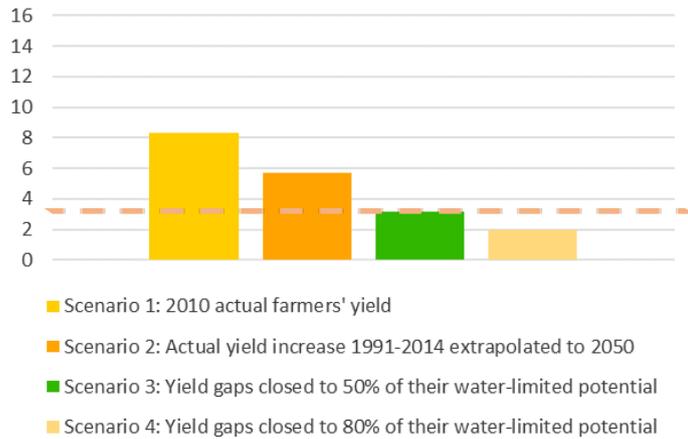


The IMPACT model predicts that the country will only produce 45% of its total requirement for cereals in 2050 and will have to import the remaining 55%. Since Ghana was already importing maize in 2010, the production needed by 2050 if the country was to be self-sufficient, as proposed in current policy, would be more than 4.9x that of 2010. This would translate to an expansion of the cropping area by 4.9x. Alternatively, if there is no control on imports then the figure would be 2.2x (see Figure 2).

In the future, the level of expansion of cereals may be reduced by improvements in cereal yields, resulting in less area needed for self-sufficiency (see Figure 5).<sup>4</sup> The dotted orange line shows the total area of land suitable for cereal production.<sup>9</sup> Suitability is defined in purely agroecological terms. If the profitability of cereal production is also taken into account, the area of suitable land is substantially reduced as most of the suitable land is currently relatively far from markets.

It seems fair to assume this constraint will diminish over time with better road infrastructure, but even so there does not appear to be enough suitable land for Ghana to achieve anything close to self-sufficiency in staple food crops in 2050 in contrast to the situation in Zambia.<sup>10</sup>

**Figure 5. Cereal area (Mha) required to be self-sufficient by 2050 (reproduced from van Ittersum et al. 2016)<sup>4</sup>**



**Box 1. Ghana in brief**

Ghana's population was estimated at 29.6 million in 2018, with an annual growth rate of 2.3%.<sup>11</sup> Ghana met the Millennium Development Goal of halving poverty and hunger before 2015 (MDG1). But over a quarter of the population is still below the poverty line of US\$1.25/day, particularly in the northern regions.<sup>12</sup> Since 2008, less than half of the population lives in rural areas, and in 2010 about half of the country's 3.6 million farm households cultivated less than 2 hectares (ha). In 2005/6, only 7% of rural households owned more than 10 ha and owned 48% of the land.<sup>13</sup> Around 11 million people live in forest areas, with around two-thirds supported by forest-related activities.

In 2018, the agricultural sector contributed 19.7% to GDP, the lowest in six years. The industrial sector (including oil and gas) contributed 30–38% between 2013–2018, with the services sector contributing between 40–47% in the same period. Despite this, agriculture provided employment or livelihoods to approximately 38% of the labour force in 2018.<sup>11</sup>

A relatively recent analysis of the availability of land in Africa for expansion of crop production identified Ghana as having 3.55 million ha of non-forest land suitable for producing a range of crops (wheat, rice, maize, barley, sorghum, banana, soybean, coffee and cotton), and 4.35 million ha if forested areas outside of protected areas are included.<sup>9</sup> By 2050, the expansion of cereals alone would have converted most of this area even with substantial imports.

Degradation and fragmentation of forest habitats has had a

negative impact on ecosystem functions and services. The loss of 'high' forests is a particular threat to biodiversity. Ghana has some 1,185 known species of amphibians, birds, mammals and reptiles.<sup>14</sup> Of these, 3% are threatened. Outside of protected areas, large mammal populations have reduced through hunting.

**Are agriculture and environmental policies working for trade-off management?**

Agricultural and environmental policies in Ghana increasingly recognise the need for cross-sectoral approaches. But so far, trade-offs between competing (local, global and national) objectives are not clearly articulated or recognised. For example, the Ghana's sixth national Convention on Biological Diversity (CBD) report includes agricultural policies and programmes contributing to biodiversity targets.<sup>14</sup> Likewise, the 2016 Forest Development Master Plan (FDMP)<sup>5</sup> includes collaborations with the Ministry of Food and Agriculture (MoFA). The National Biodiversity Strategy and Action Plan (2016)<sup>15</sup> explicitly acknowledges 'duplication of roles and responsibilities without clear direction for biodiversity conservation' and 'weak coordination, especially at the national level' as indirect causes of biodiversity loss. But while agricultural expansion is explicitly acknowledged as a key driver of forest and biodiversity loss, there are currently no specific policies in place to address this threat, beyond ongoing attempts to increase agricultural productivity.

**Overview of competing policy objectives**

**Agriculture policy priorities: productivity increase, employment and markets**

Ghana is a signatory to the Comprehensive African Agriculture Development Programme (CAADP) launched during the second Africa Union Assembly held in Maputo, Mozambique. Parties have committed to allocating at least 10% of their national budgets to agriculture to achieve 6% annual growth of the agriculture sector.<sup>16</sup> Ghana has also endorsed the Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods. The declaration includes targets to end hunger, halve poverty, and ensure at least 30% of farm/pastoral households are resilient to climate shocks in Africa by 2025.<sup>17</sup> But in reality, the budgetary allocation to agriculture has been consistently below 10%, with only 6% of public expenditure invested in agriculture in 2017, and Ghana scoring only 3.81 out of 10 against the Malabo Declaration targets.<sup>18</sup>

The 2007 Food and Agriculture Sector Development Policy (FASDEP II) is still the main agricultural policy document. Its national vision for food and agriculture is a 'modernised agriculture culminating in a structurally transformed economy and evident in food security, employment opportunities and reduced poverty'.<sup>19</sup> But it does not comment on agricultural expansion as the main driver of deforestation in Ghana, and the environmental and social impacts of this expansion. Instead, it promotes sustainable land

management and productivity increase, with the expectation that this would address biodiversity loss. Following a decade of low levels of agricultural productivity growth and increasing levels of unemployment of rural youths, FASDEP II was complemented in 2017 with the Planting for Foods and Jobs strategic plan.<sup>20</sup> This emphasises agricultural productivity increases to meet future food demands of the growing population. It acknowledges that productivity for major cereal crops (maize, sorghum and rice) has not increased substantially over the past 15 years and that increases in food production are the result of agricultural expansion.

Attaining food security through national self-sufficiency had been an explicit policy priority since FASDEP II. This vision was reiterated in the Planting for Foods and Jobs plan, focusing on strategies to increase productivity of staple food crops. The same applies to the National Climate Smart Agriculture and Food Security Action Plan (2016–2020)<sup>21</sup> which focuses on ‘climate-smart’ productivity increase, but does not mention agricultural expansion as a response to climate change impacts.

## Environment and conservation priorities: protection and sustainable land use

Ghana has ratified several international environmental and biodiversity conventions including the CBD, the Cartagena Protocol on Biosafety, the Nagoya Protocol on Access and Benefit Sharing, the Convention on Wetlands (Ramsar Convention), and the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC). The main policies and programmes governing forests and biodiversity are:

- **Ghana Forest and Wildlife Policy 2012<sup>7,22</sup> and Forest Development Master Plan 2016<sup>6</sup>:** These include plans for biodiversity conservation and aim to mainstream biodiversity by (a) effective management of protected areas, including Wildlife Protected Areas and Globally Significant Biodiversity Areas, (b) new biological corridors to link all important ecosystems by 2025, and (c) improving community participation in wildlife management (e.g. community resource management areas or CREMAS).

- **2013 National Forest Plantation Strategy<sup>23</sup>:** Aims to develop a sustainable resource base to meet future demand for industrial timber, relieving pressure on natural forests and increasing the total forest area. Its five objectives are to (a) restore the forest cover of degraded forest lands, (b) reduce the country’s wood supply deficit, (c) generate employment to reduce rural poverty, (d) improve environmental quality and provide an opportunity for the country to tap into the emerging benefits of carbon markets and payments for environmental services, (e) enhance the production of food crops and contribute to food security in the country.<sup>24</sup>

- **2015 Ghana National REDD+ Strategy<sup>5</sup>:** Aims to avoid deforestation and forest degradation, sequester carbon and achieve sustainable forest management and biodiversity conservation.

- **2016 National Biodiversity Strategy and Action Plan<sup>15</sup>:**

Emphasises the need to mitigate effects of agricultural expansion (estimated to account for 50% of deforestation in Ghana) by promoting climate-smart agriculture (CSA). However, it does not elaborate how CSA could meet the growing food demands of the country.

- Under the **CBD**, Ghana set itself under the current CBD strategy 2011–2020 the target of ‘reducing the rate of loss of all-natural habitats, including forests, to at least half and where feasible brought close to zero, and degradation and fragmentation significantly reduced’.<sup>14</sup>

- Under the **Africa Forest Landscape Restoration Initiative (AFR100)** Ghana has committed to restore 2 million ha of degraded land to forests by 2030.<sup>25</sup> This will be mainly through forest plantations, which addresses UNFCCC targets, but does not contribute to biodiversity conservation.

## Efforts to reduce social and environmental trade-offs

At national level, there is a lack of understanding of the social and environmental impacts of agriculture policies. Though national policies recognise that biodiversity and nature underpin agricultural productivity, there is a lack of technical capacity and finance available to manage the environmental impacts of agriculture expansion. As a result, agriculture and conservation targets continue to be missed and policies to reduce trade-offs remain ineffective.

Despite a decade of investments in agricultural productivity, in particular via a subsidy programme for fertiliser, production of food crops per hectare cultivated has overall decreased over the past 10 years. At the same time, agricultural expansion into forests and wetlands has continued. There are also no indications that the ‘yield gap’ will close in the near future. If Ghana aims to be staple food self-sufficient, further expansion into forests is inevitable. Ghana already has one of the highest rates of deforestation in the world, and the rate is increasing. Most deforestation now comes from protected areas: seven national parks, six resource reserves, five wildlife sanctuaries and 266 forest reserves. There are conflicting reports as to how much this deforestation is caused by cocoa versus mining, logging and other agricultural crops.

Conservation policies are clearly failing to halt deforestation and biodiversity loss, as reflected in reporting to the CBD against the 20 Aichi targets of the CBD strategic plan, including Target 5 to reduce the rate of loss of all natural habitats (progress made but at an insufficient rate), Target 12 to prevent the extinction of known threatened species (no significant change) and Target 14 to restore and safeguard ecosystems and ecosystem services (progress made but at an insufficient rate).

## Looking ahead: key messages

Current agricultural and forest policies are geared towards economic gain, with little consideration for biodiversity conservation. Agricultural policies focus on productivity increase through agricultural modernisation and value-chain development. The ongoing threats to forests and biodiversity from food and cash-crop production are not acknowledged and hence not addressed. The renewed emphasis on food self-sufficiency is likely to see further expansion of agricultural land use, particularly in the Transitional Zone and the north, and does not seem viable in the longer term. Without better trade-off management it seems likely that Ghana will lose most of its remaining forest and woodlands outside of enforced protected areas.

- Agriculture and unplanned and uncontrolled logging operations reinforce each other in a vicious cycle. This has been well documented in the FDMP. Attempts to reduce agricultural expansion must consider this dynamic and link interventions to improved control of logging.
- The current agricultural policy emphasises increasing the use of external inputs. This has had a negative impact on tree cover and natural vegetation and in some cases has contributed to biodiversity loss from pollution. In addition, most MoFA resources are spent on a small number of agricultural interventions (e.g. fertiliser, block farming, agricultural mechanisation, food stocks). But there is very limited support to farmers for sustainable, biodiversity-friendly farming practices.
- The impacts of deforestation on the livelihoods of forest dwellers, farmers and urban populations have not been documented. More evidence is needed, for example on linkages between flooding and deforestation, and on the benefits of forest protection (e.g. for ecotourism). This evidence would need to feed into existing SDG implementation and monitoring mechanisms. The explicit aim should be to identify and address competing objectives across sectors and ministries.
- Experience from other countries demonstrates that in addition to the more obvious technical interventions such as spatial and land-use planning, measures to better manage trade-offs should include investments in enhanced stakeholder engagement, communication and governance.<sup>26</sup>



## Acknowledgements

This briefing is a product of the “Agriculture, Food Production and Forest Conservation in Sub-Saharan Africa” (FFA) working group of the Science for Nature and People Partnership (SNAPP), in collaboration with the Sentinel project. The SNAPP FFA group had four meetings in the period October 2017 to March 2019. We would like to thank all those who participated in meetings of this group and thereby contributed to the content of this briefing. For a full list of FFA group members and products of the group see <https://www.nceas.ucsb.edu/projects/12768>. We would also like to acknowledge the Luc Hoffman Institute for contributing to incubating and accelerating the work of the SNAPP group and the Sentinel project.

## About the Science for Nature and People Partnership (SNAPP)

The mission of SNAPP is to deliver evidence-based, scalable solutions to global challenges at the intersection of nature conservation, sustainable development, and human well-being.

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# Sentinel

## Social and Environmental Trade-Offs in African Agriculture

Sentinel is an interdisciplinary research project seeking to address the challenge of achieving 'zero hunger' in sub-Saharan Africa, while at the same time reducing inequalities and conserving ecosystems

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### Publisher:

Sentinel / International Institute for Environment and Development  
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### Funders:

The research informing this briefing was funded by the Science for Nature and People Partnership (SNAPP), UK Research and Innovation (UKRI) via the Global Challenges Research Fund, the Luc Hoffmann Institute and the David and Lucile Packard Foundation. SNAPP is a partnership of The Nature Conservancy, the Wildlife Conservation Society and the National Center for Ecological Analysis and Synthesis (NCEAS) at University of California, Santa Barbara. The views expressed are those of the authors and do not necessarily reflect those of the funders.

