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# How to sustainably intensify agriculture in Ghana?

## Recommendations for expanding the focus of the Planting for Food and Jobs Programme

### SAIRLA Policy Briefing Paper

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#### At a glance

**Many small scale farmers in Ghana are facing a dual crisis. One is the rapid decline in soil fertility (coupled with land degradation). The second is climate change. Both work in tandem to undermine the food security of farm households, particularly in the northern regions.**

**This underlying crisis in agriculture has been obscured by Ghana's recent successes in boosting agricultural production through its Planting for Food and Jobs (PFJ) campaign and in its overall economic growth.** Part of this success has been the Ghana government's recognition that it is essential to harness the agricultural sector within the wider drive to increase economic growth. In the 2017-18 cropping season, the PFJ's campaign enabled over 200,000 farmers in Ghana to increase their harvests of maize and rice. Although the PFJ campaign has many innovative aspects compared to previous agricultural policies, key elements include subsidies for chemical fertilisers and improved seed. Since 2008, such subsidies have been Ghana's government's main response to address the critical issues of declining soil fertility and climate change which affect the mass of small-scale family farmers.

**The challenge for the PFJ, therefore, is how to build on its initial success while more effectively addressing the impacts of soil degradation and climate change in agriculture.** This would involve fostering a transition to sustainable and climate resilient agricultural growth over the medium to long term. The scope of this challenge is clear. One in-depth analysis indicates that by enabling farmers to use optimal soil fertility management, Ghana's overall agricultural output would likely increase by over USD 400 million<sup>i</sup>. Also, according to the African Union Commission, only 0.04% of agricultural land in Ghana is currently under sustainable land management practices.<sup>ii</sup>

**This briefing paper provides evidence why, and sets out recommendations for how, the government of Ghana should seize the opportunity to build on its success with the PFJ programme in boosting agricultural productivity by:**

1. Reforming farm input subsidies to promote increased production and use of organic fertilisers.
2. Achieving economically viable use of chemical fertiliser through an integrated soil fertility management approach.
3. Promoting farming practices for a more sustainable and climate resilient approach to agriculture.

For generations, small scale farmers in Ghana maintained their soils and food security through shifting agriculture and fallowing. In recent decades, increased population has caused a relative scarcity of land. Today, many farm households cannot fallow. They are obliged to use the same fields every year. This has reduced the levels of organic matter essential for soil health, and crop yields.

Fertility management is particularly difficult to manage in Ghana because most soils are of low inherent fertility. Their coarse nature contributes to water stress. Extensive areas of land have suffered from severe soil erosion. Ghana has



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one of the highest rates of soil nutrient depletion among sub-Saharan African countries with annual estimated losses of 35 kg N, 4 kg P and 20 kg K ha<sup>iii</sup>. In light of this, declining soil fertility is a slow onset crisis affecting farmers' agricultural productivity. This decline in soil fertility is coupled by a second convergent crisis caused by climate change. Decreasing annual rainfall, erratic rainfall patterns, floods, drought and high temperatures have greatly increased the risks to farmers of crop failure. The combination of soil degradation and climate change are making the livelihoods of many small-scale farmers increasingly vulnerable. Many rural households are experiencing decreasing food and nutrition security, particularly in the northern regions. According to the World Food Programme, 34% of people living in Upper West Region and 17% of people living in Upper East Region were suffering from food insecurity in 2013.<sup>iv</sup>

## Recommendations

**Recommendation 1: Re-orient public expenditure** to support appropriate incentives that enable different categories of farmers **to sustainably intensify their agriculture, even if this requires substantial shift of expenditures away from chemical fertiliser subsidies to promote alternative sustainable practices**

The PFJ campaign's current success (both economic and political) tends to obscure data, generated by various agricultural research studies, indicating that this record of agricultural growth cannot be sustained in the longer term. Nor is it adequately enabling farmers to adapt to climate change.

A key component of the Ghana government's response to the challenges has been to provide access to farmers to subsidised chemical fertilisers. This is seen as the way to overcome declining soil fertility. While these subsidies have increased short term yields, the underlying rationale is to help farmers gain additional income, so they will eventually be more able to afford increasing quantities of chemical fertiliser.

Farmers use of subsidised chemical fertiliser has not been effective at a larger scale. While yields of specific crops have increased for the farmers involved, the data indicates that overall increases of food production in Ghana since 2008 come mostly from an expansion of land under cultivation, not from increased yields.<sup>v</sup>

Several reviews of Ghana's Farm Input Subsidy Programme (FISP) confirm what small scale farmers are saying. These studies indicate that using fertiliser on maize is often not profitable, given full fertiliser market prices, prevailing maize prices, and the average yield response rates observed on farmer-managed fields, particularly those comprised of degraded soils.<sup>vi</sup> The core problem is that fertiliser use often does not increase the value of crop output more than the costs of using it, except when very heavily subsidised. Moreover, the huge public investment in fertiliser subsidies since 2008 has not generated significant and lasting increases in yields.

It is well established that complementary investments in soil and water conservation are crucial for efficient and optimal nutrient uptake, especially on degraded soils. Without these, use of chemical fertiliser is often not profitable. A study in 2012 revealed that the fertiliser subsidy programme did not affect or increase Ghanaian farmers' investment in soil and water conservation.<sup>vii</sup>

The current design of the PFJ appears to recognise these challenges. For example, the PFJ strategy indicates that its value chain support services will emphasise capacity building on fertiliser use efficiency, appropriate soil fertility replenishment and sustainable soil management practices. It also singles out promoting establishment of local organic fertiliser production enterprises. Despite this, there is continued sub-optimal use of chemical fertiliser which contributes to a limited and often temporary increase of yields on degraded soils. By itself, a fertiliser subsidy programme cannot maintain soil fertility. Moreover, the cost creates a substantial burden on MOFA's budget. In the absence of complementary measures, fertiliser subsidies are not economically viable.

The high cost of fertiliser and improved seed subsidies is diverting government resources from other crucial investments required for the growth of the agricultural sector. In particular, expenditure allocated to agricultural research and knowledge-transfer activities, to rural infrastructure such as roads, and to strengthening agricultural value chain issues related to transport, storage and processing, has remained stagnant.

**Recommendation 2: Increase the share of agriculture land under sustainable land management practices from the current low level of 0.04 percent.** Achieve this by more aggressive promotion of sustainable intensification techniques to smallholder farmers, focused on an integrated soil fertility management and related agroecological practices.



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The PFJ programme should build on its initial success by expanding its focus to sustainable intensification. This requires overcoming the persistence of sub-optimal farmer practices for managing soil fertility, decreasing risks because of drought and erratic rainfall, and ensuring the economic use of chemical fertiliser. This requires helping farmers make a transition towards an environmentally sustainable and climate resilient farming system. **Research indicates that such a transition, if achieved, has the potential to increase agricultural output in Ghana by USD 400 million annually.**<sup>viii</sup>

There are agricultural innovations within the broad approach called “agroecology”, endorsed by the FAO, which are recommended by an increasing number of scientists and researchers as the best way forward for sustainable intensification. These agroecological innovations include:

- soil and water conservation techniques, including tied ridges, and soil bunds
- Farmer Managed Natural Regeneration of trees (a zero cost approach to agroforestry)
- stopping the burning of crop residues and controlling bush fires
- producing more manure or compost (composting and management of farm yard manure to produce organic sources of nitrogen)
- joint use of organic and inorganic fertilisers
- inter-cropping and crop rotation with legumes; soil and water conservation
- improved agronomic and soil management practices including soil testing for crop-soil-specific fertiliser recommendations; provision of lime to address soil acidification based on simple mobile soil testing kits that provide rapid site-specific soil diagnostics
- decentralised, community based small dams for irrigated dry season agriculture
- appropriate forms of small-scale mechanisation to reduce labour

In the Upper West Region, through the Sustainable Intensification: Trade-offs for Agricultural Management (SITAM) initiative, household surveys reveal how decisions by small scale farmers about how to make their farming systems more sustainable with such innovations are made. Most include, as labour and resources allow, applying different combinations of techniques that increase yields, improve water holding capacity of soils, “harvest” rainwater, and strengthen food security.

One example is agroforestry. This is an innovation by which farmers learn how to manage crops and trees together on the same land in a mutually beneficial system. This innovation is a sort of “simultaneous fallow” by which farmers regenerate the growth of indigenous trees on their land from stumps and shoots. Then, by pruning the trees at the right time, farmers spread a mulch of leaves on the soil, which prevents rainfall runoff. Pruning reduces competition with crops, and produces firewood.

**Recommendation 3: Massively increase the availability of high-quality compost and other forms of organic fertiliser, made from city waste and other materials available in Ghana, to small scale farmers**

Research indicates that the current pattern of chemical fertiliser use, if the true cost were applied, is not economically profitable.<sup>x</sup> For Ghana to achieve an economically viable return on its investment in chemical fertiliser, it is essential to enable farmers to increase the soil organic matter in their fields with compost, manure, not burning, minimum tillage, mulching and other methods. The combination of both organic and chemical fertilisers gives the greatest crop response and makes the use of chemical fertiliser profitable. **However, less than 2 percent of farmers in Ghana use both organic and chemical fertilisers in combination.**<sup>x</sup>

**Recommendation 4: Support existing research institutions in each of Ghana’s diverse agro-ecologies and regions to develop “best practices” for sustainable intensification of agriculture** from a farm systems perspective, with a focus on agroforestry, minimum tillage, cover crops, integration of livestock to increase manure production, preventing bush fires, soil diagnostics, updating soil maps need to reflect soil functional properties (rather than soil type) as well as more spatial detail on soil variation.

A review of Ghana’s current research and extension approach indicates that farmers are not using “best practices” to manage their soils. Such practices include a range of agroecological techniques required for an “integrated soil fertility management” approach.<sup>xi</sup> Soil fertility management remains a crucial yet underappreciated dimension of sustainable productivity growth. If soil fertility problems remain unaddressed, Ghana’s agricultural growth will be impeded, its agricultural lands will become increasingly degraded, its use of inorganic fertiliser will continue to be low due to



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relatively low crop responses on degraded soils.<sup>xii</sup> An effective integrated approach to soil fertility management requires an understanding of all factors constraining productivity in each specific agroecological area.

**Recommendation 5: Strengthen public agricultural extension programmes to more effectively transfer region-specific best practices for sustainable intensification to farmers** as well as foster bi-directional learning between researchers, extension officers and farmers to adapt best practices in light of farmers' knowledge and practical experiences

As explained under recommendation 4 above, a key issue affecting the performance of subsidised fertiliser is that the MOFA extension programme does not provide specific guidance about "best practices" for crop and soils management. Currently, MOFA does very limited soil testing. Existing soil maps in Ghana reflect mostly the soil type, but do not specify soil health and nutrient levels. This prevents extension workers from effectively guiding farmers in each district in Ghana about how to best manage their soils.

**Recommendation 6: Increase science-based monitoring and evaluation of yields on the fields of various categories of farmers who have started to adopt the recommended practice** for sustainable intensification in order to enable a gradual transition towards a 'best-fit' set of trade-offs and synergies

The SITAM initiative is building an evidence base to inform the NLA and the Ministry of Agriculture and Food on how to support small scale farmers in making effective trade-offs in applying such innovations.

As an illustration of the widely held value of research and monitoring, what has clearly emerged from extensive household surveys is that most small-scale farmers in the Upper West do not perceive the current approach of subsidies for chemical fertilisers and improved seeds, (and use of tractors) as lasting and sustainable solutions to their problems. At community meetings, farmers expressed their perceptions of negative effects, including loss of many types of indigenous seeds; increased dependency on improved seeds, chemical fertiliser and tractor services; herbicides and pesticides are making fields unproductive, introducing new species of weeds to the community and killing living organisms.

Overall, the pattern that is emerging, despite variation, is that most small scale farmers value and see the need for shifting to more sustainable and resilient way of farming, as a long term objective, but are "locked in" to making trade-offs that often favour the shorter term, sub-optimal practices due to lack of labour, no access to credit and having to meet immediate cash and food needs.

**Recommendation 7: Strengthen the capacity of district councils, rural communities, and traditional leaders to reduce the incidence of bush fires**, through the creation of "bush fire free zones" in order to stop the loss of vegetative cover and crop residues which reduce organic matter in farmers' fields and undermine nutrient recycling

A key insight from the SITAM research with communities is that there is a high level of diversity in practices and ways of farming (across different categories of farmers) and across villages (due to differences in the availability of land and labour, and socio-cultural factors). **This indicates the need for a decentralised approach to supporting different categories of farmers towards Sustainable Intensification of Agriculture, tailored to each agroecological context.** Agricultural innovations within the broad "agroecology" approach, endorsed by the FAO, include stopping the burning of crop residues and controlling bush fires which are better managed at the local level.

**Recommendation 8: Increase public expenditure on agriculture**, as a matter of urgency, and quickly move towards achieving Ghana's Maputo/ Malabo commitment of 10% of the national budget.

Implementation of the above recommendations will likely require an increase in the agricultural budget to be fully implemented. Achieving the goal of 10% of national budget invested in agriculture would enable the implementation of the recommendations made here.



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- <sup>vi</sup> Jayne, Thomas et al. (September 2015) p.24
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