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**TITLE:** Ghana Post-Harvest Innovation Centre (PHIC)

**Project leader:** Lindy van der Veen, Berenschot  
**Requested budget:** €35.000  
**Countries:** Ghana

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Willy van den Broek

**1 Motivation and project aims***1.1 Knowledge requirements for the target group*

Dutch and Ghanaian companies, knowledge institutes and service providers want to explore the feasibility of setting up a Post-Harvest Innovation Centre (PHIC) to reduce losses in Ghana. The PHIC will be a PPP aiming to improve access to technology and knowledge on postharvest issues and supply chain efficiency for chain actors and stakeholders. The following information is needed to take informed decisions:

- Good understanding of critical points in perishable and non-perishable value chains in Ghana that contribute to losses.
- Opportunities for SMEs and knowledge institutes to reduce these losses or to valorise waste and side streams (circular food systems).
- Insights in strategies of the Innovation Centre and the different roles it should play in the field of brokering technology, knowledge, networking, policy implementation, business support, etc.
- Economic feasibility of setting up a PHIC, including an elaborated business case.

*1.2 Definition of the problem*

Currently vast quantities of foodstuffs, estimated at 30–40% of total global production, are lost or wasted between the field and consumer. It is expected that these losses will increase as the changing diet patterns of the rising middle class in Africa will result in a higher demand for perishable crops such as dairy, fish, horticulture, etc. World population projections would require that overall food production should be raised by 60 to 70 percent in the decades until 2050. To cope with increasing food demand governments have traditionally emphasized increasing food production while emphasis on reducing food losses have been given little or no attention as required.

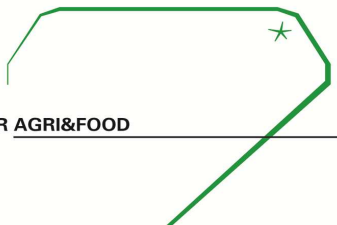
The causes of post-harvest losses are manifold: they include pre-harvest factors, harvesting at an incorrect stage of produce maturity, poor harvesting techniques, excessive exposure to rain, drought and extremes of temperatures and humidity, contamination by micro-organisms, spillage, damage from inappropriate tools, chemical contamination or rough handling (including heat build-up) during harvesting, loading, packing or transportation, and inadequate and insecure storage facilities. This leads to food that is unsafe to eat, is spoiled or has incurred unacceptable quality loss, and hence also leads to financial losses.

Public and private organizations in Ghana recognize the need to reduce post-harvest losses. In 2006 African governments committed themselves to take measures to halve postharvest losses by 2009 and reduce them by 10% by the year 2015. The Government of Ghana has made the reduction of post-harvest losses their priority. It wishes to develop a national investment plan to reduce losses. As an illustration: the ministry of Food and Agriculture has approached Wageningen UR to develop a Tailor Made Training for their staff so that they will be well equipped to develop this strategy and investment plan. The Minister and his staff have also expressed their interest to WUR in setting up a Post-Harvest Innovation Centre.

The Private Enterprise Foundation (PEF) which represents about 80% of the private industry in Ghana is currently working on –as part of their approved strategic plan- setting up a ‘physical one stop shop’ for its members and potential investors. This ‘one stop shop’ will provide services and expertise (local and foreign) that is paramount to the agro-food industry in Ghana. PEF is keen to explore opportunities to combine their ‘one stop shop’ with the PHIC because they highly value the Dutch reputation in reducing post-harvest losses. Furthermore, the University of Ghana has asked Wageningen UR whether they can set up a joint training and R&D programme on post-harvest management.

*1.3 Aim(s) of the project*

The market-led Post-Harvest Innovation Centre (PHIC) will be a ‘one stop shop’ for solutions to reduce post-harvest losses, thereby facilitating a supply chain approach which is needed to come up with long lasting solutions to reduce food losses. For the Centre to become a ‘showroom of technology and knowledge’, it needs to incorporate a meaningful group of stakeholders. For some it is clear that participation in the Centre will be a good entry point to capture the Ghanaian (possibly even the West African) market. For others the business case still needs to be established. Therefore, the aim of this project is to build a dedicated consortium for a Post-Harvest Innovation Centre (PHIC) in Ghana and develop a coherent business case for the various stakeholders:



1. the private sector to provide technology that has proven its success in similar situations
2. intermediary organisations, NGOs and public agencies to train end users (farmers, employees of companies, etc.)
3. knowledge institutes for research and development
4. service providers that can assist companies in new business development, e.g. by developing bankable projects, advice on practical issues related to market entry, etc.

The consortium to be built is considered a group of companies that will act as founding fathers of the PHIC. This requires a high commitment and a certain level of influence of partners. Once the PHIC is established, an unlimited number of interested companies can benefit of the Centre as steppingstone to enter a new market.

#### *1.4 Target groups:*

The seed money project will mainly deal with interested members of the four stakeholder categories mentioned under section 1.3. Once the PHIC is established, various target groups will benefit from the reduction of quantity and quality losses, such as farmers (Producer Organisations), exporters organisations, importers, companies, retailers, and consumers.

#### *1.5 Economic context<sup>1</sup>:*

Ghana's economy has been strengthened by a quarter century of relatively sound management, a competitive business environment, and sustained reductions in poverty levels. Ghana is well-endowed with natural resources and agriculture accounts for roughly one-quarter of GDP and employs more than half of the workforce, mainly small landholders. Its GDP real growth rate was estimated at 7.9% in 2012 and observers expect GDP-growth rates of considerably more than 7% also in the years to come.

The country is regarded as one of Africa's success models, due to its political stability, relatively free market, mostly low import tariffs, transparency, and relatively low corruption grade. The US Department of Agriculture (USDA) has described Ghana as 'a key access point for entry into the West Africa region market'.

Consumer food purchases are gradually but steadily shifting towards supermarkets and convenience stores, with Ghana having attracted investment from multinational supermarket chains such as Shoprite, Carrefour and Walmart chains.

Despite rapid economic development, the agro-food sector in Ghana is still underdeveloped. This is a.o. due to the fragmentation of production, lack of knowledge and investment capacity of smallholders and weak market linkages.

#### *1.6 Economic Opportunities:*

Ghana loses about 20 to 30 per cent of cereals and legumes, and about 20 to 50 per cent of her roots, tubers, fruits and vegetables annually<sup>2</sup> either in storage, during transport or at the market. To give a few examples:

- Ghana has not met its maize production potential. Farmers have identified insect pests and fungi as important obstacles. Post-harvest losses can be as high as 50-70%<sup>3</sup>. In addition to the physical loss, fungi produce highly toxic mycotoxins making maize unsafe for food or feed. Unavailability of fast and cheap methods to estimate and monitor the level of contamination by mycotoxins and good storage facilities are a health hazard and may slow down the government's efforts to set up a viable Commodity Exchange.
- Ghana is the second largest cocoa exporter in the world. Phosphine is used as insecticide for the fumigation of the cocoa beans. A quarter of all cocoa produced in the world passes through the Amsterdam harbour and is processed in the Netherlands. However, the Ghanaian cocoa beans often exceed the allowable levels permitted by Netherlands Government. Additional treatment, degassing, is needed before the containers meet the health and safety standards for them to be offloaded. Alternative treatment can save costs, time and improve quality.
- 'Losses' can also be turned into a resource. Ghana produces over 14 million tons of cassava (value almost 1.5 billion USD). Wageningen carries out research on treatment of cassava peels with fungi through which the nutritive value of animal feed can be improved. This can contribute to the development of the livestock, poultry and aquaculture industry for which the lack of access to good quality feed is a huge bottleneck. Other research in Ghana: mushroom cultivation on cassava waste.
- The Netherlands CBI<sup>4</sup> highlighted that, while Ghana used to be the third exporter of fresh pineapples, export volumes have dropped a.o. because of inconsistent and substandard quality.

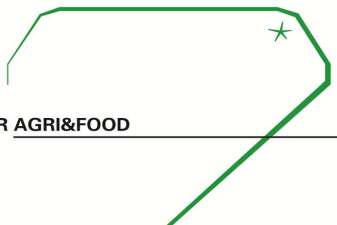
High food losses also means financial losses, which may be an incentive to invest in more efficient supply chains. Especially if customers increasingly expect to buy consistent high quality and safe food. In addition to Western importers, middle class customers in Ghana who buy their groceries in the supermarkets, and retailers in neighbouring countries all expect high quality produce. Various areas of technology and knowledge will be

<sup>1</sup> Based on information from CIA the World Factbook (Page last updated on January 28, 2014), [http://www.agrofood-westafrica.com/agrofood\\_aboutghana.html](http://www.agrofood-westafrica.com/agrofood_aboutghana.html) and <http://agritrade.cta.int/Agriculture/Topics/ACP-regional-trade/Ghana-seen-as-providing-gateway-for-agro-food-exports-to-West-Africa>

<sup>2</sup> ICIPE (2013). Postharvest losses in Africa: Analytical review and synthesis.

<sup>3</sup> World Bank (2012). Missing Food: The case of postharvest grain losses in Sub-Saharan Africa.

<sup>4</sup> GEPA, SPEG and CBI (December 2013). Strengthening Ghana Pineapple exports conference.



needed to reduce losses, such as storage, climate control, processing, packaging, pest control, supply chain management, quality assurance, variety and species specific information, etc. The PHIC will be the 'one stop shop' for joint profiling on post-harvest development and food loss reduction in which a wide variety of companies and other stakeholders can participate. This SMP can therefore also provide an opportunity to match the demand in Ghana with the 'offer of the Netherlands Network of Excellence (NoE) for postharvest losses'. The Netherlands ministry of Economic Affairs has been spearheading the establishment of this NoE, which has the potential to internationally position Dutch expertise and knowhow in this field. Additionally, the GhanaVeg project, supported by the Netherlands government to develop a sustainable horticulture industry in Ghana and implemented by Wageningen UR, can also provide opportunities to create the critical mass needed for a 'one stop shop PHIC'.

In addition to the private sector's interest to invest in technology, knowhow and R&D, there is also genuine interest from the Ghanaian government and NGOs to invest in reducing losses (see 1.1). Furthermore Ghana encourages collaboration with the private sector as can be seen in the PPP bill of May 2013<sup>5</sup>. Because of the magnitude of PHL in Africa, the African Union Commission has -since 2012- strongly advised all African countries to make such investment plans. The African Development Bank has earmarked funds to finance such investment plans. The PHIC is expected to create plenty of interest in other countries as well.

Ghana is considered a market with a safe business environment and hence a good hub for the growing West African market. For example, Nigeria is expected to be Africa's biggest economy by the end of 2014. Although we see a growing interest of Dutch companies for expanding business in Africa, they are often reluctant to enter the market through investment models, since the profitability on the short term is often insecure or not realizable. Therefore, a more long term focus is needed. An Innovation Centre that can fill the knowledge gaps and facilitate in building relationships with potential clients and partners will make it easier for companies to become structurally active in Ghana and the West Africa Region.

**1.7 Economic Threats:**

Research by the World Bank and McKinsey Global Institute indicates that African countries remain among the most expensive in which to operate a business. The USDA notes for example, that Ghana's domestic food processing capacity utilization fell in 2011 mainly due to the high cost of electricity, poor infrastructure, high cost and lack of raw material, increased cost of capital and high taxes. Because the majority of customers purchases their food in open-air markets or small grocery stores, the scope for return on investment for stakeholders in supply chains needs to be carefully established during this SMP.

**1.8 Desired expertise DLO:**

- Quick scan of critical points in perishable and non-perishable value chains in Ghana that contribute to losses, and identification of opportunities for Dutch and Ghanaian SMEs, knowledge institutes and service providers to reduce these losses or valorise waste and side streams (circular food systems).
- Link to relevant outcomes of Wageningen UR projects in Ghana (and neighbouring countries), and use good contacts with Ghanaian stakeholders (private sector, Minister of Food and Agriculture, research institutes, NGOs) and Dutch stakeholders in order to help form a project consortium.
- Co-create a focussed business plan to attract the required consortium partners, and develop a project proposal (FDOV or PPS top sector) for the implementation of the PHIC.

**1.9 Expected results:**

- A dedicated consortium of Ghanaian and Dutch founding fathers that are willing to invest in a PHIC and that have reached an overall agreement on the roles and responsibilities of each partner.
- Feasibility study, including an elaborated business case for the PHIC.
- Project proposal to fund part of the investment in the PHIC to be submitted at FDOV or Top Sector PPS.

**2 Work plan**

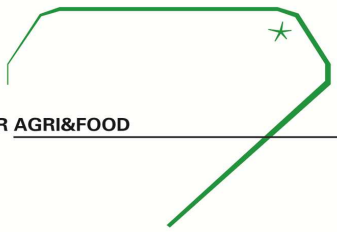
**2.1 Approach and time schedule**

Quick scan: desk study + interviews with key organisations / persons in Ghana	April
First draft of business case PHIC, elaborating few options for organisation types of PHIC	May
Consortium meeting in the Netherlands; pitching the PHIC and explore contributions of partners	May
Organise mission with Dutch companies to Ghana; facilitate meeting with potential Ghanaian founding fathers of the PHIC / local companies. Explore possibility to combine with GhanaVeg trade mission (June – with mission Minister Ploumen)	June
Elaborate business case and draft consortium agreement	July
Prepare project proposal	Aug - Oct
Submit FDOV proposal (or PPS Top sector proposal)	27-10-2014

**2.2 Outputs**

- Stakeholder / consortium meetings organised in the Netherlands, opportunities for PHIC discussed

<sup>5</sup> [http://www.mofep.gov.gh/sites/default/files/news/PPP\\_Law\\_Draft%20.pdf](http://www.mofep.gov.gh/sites/default/files/news/PPP_Law_Draft%20.pdf)



- Stakeholder / consortium 'match making' meetings organised in Ghana
- Consortium agreement signed, and funding parties identified
- project proposal to implement the PHIC (funding through FDOV or Top Sector PPS)

### 2.3 Dissemination to target groups

Discussions will be held with parties mentioned under 3.2, and meetings organized to inform other Dutch stakeholders who might be interested to participate. For example, the Ministry of EZ can mobilize the members of the NoE and Berenschot and Wageningen UR will actively approach their network. The PEF, which represents about 80% of the Ghanaian private sector, and the Netherlands embassy will inform and mobilize stakeholders in Ghana.

## 3 Project organisation

### 3.1 Project team (Wageningen UR)

Name	Organisation	Role	Email address	Telephone No.
Jennie van der Mheen	WI	WUR project leader, liaise with Berenschot & Ghanaian partners	<a href="mailto:Jennie.vandermheen@wur.nl">Jennie.vandermheen@wur.nl</a>	0317-486810
Henry Boerrigter	FBR	Agrologistics fresh chains	<a href="mailto:Henry.Boerrigter@wur.nl">Henry.Boerrigter@wur.nl</a>	0317-480187
Jan Broeze	FBR	Processing and use of waste /sidestreams	<a href="mailto:Jan.Broeze@wur.nl">Jan.Broeze@wur.nl</a>	0317-480147
Irene Koomen	CDI	Non perishable chains; link GhanaVeg	<a href="mailto:Irene.Koomen@wur.nl">Irene.Koomen@wur.nl</a>	0317-482986

### 3.2 Involved parties (besides Wageningen UR)

Name	Organisation	Role	Email address	Telephone No.
Lindy van der Veen	Berenschot	Organise the consortium, establish business cases, prepare FDOV proposal	<a href="mailto:l.vanderveen@berenschot.nl">l.vanderveen@berenschot.nl</a>	06 20 93 70 95
Nana Osei-Bonsu	Private Enterprise Foundation	'Host organisation', facilitate participation of their members (pvt sector in Ghana)	<a href="mailto:Nanakoseibonsu69@gmail.com">Nanakoseibonsu69@gmail.com</a>	+233264328329
Thierry van Helden	NL embassy Ghana	Link to potential consortia partners	<a href="mailto:Thierry-van.Helden@minbuza.nl">Thierry-van.Helden@minbuza.nl</a>	+233302214363
Michaël Ruhe	Thermondial	Supplier agrologistics: warehouses, innovative small-scale cooling, etc	<a href="mailto:m.ruhe@thermondial.com">m.ruhe@thermondial.com</a>	06 53164008
Ronald Niemeijer	R-biopharm	Producer dipsticks to measure mycotoxine levels	<a href="mailto:r.niemeijer@r-biopharm.de">r.niemeijer@r-biopharm.de</a>	+496151/8102-39
Marco Korbijn	Eco2	Natural fumigation	<a href="mailto:mkorbijn@eco2.nl">mkorbijn@eco2.nl</a>	0186-651010
Marc Paauw	Nijssen Koeling	Interior of PHIC: refrigeration system; storage rooms	<a href="mailto:m.paauw@nijssen.com">m.paauw@nijssen.com</a>	06 51384353
Frank Brinkman	Bakker Barendrecht	Importer fruits and vegetables from Ghana	<a href="mailto:fbrinkman@bakkerbarendrecht.nl">fbrinkman@bakkerbarendrecht.nl</a>	0180 695204
Sander Dijkslag	EOSTA	Market demands EU organic produce Capacity building; importer	<a href="mailto:sander@eosta.com">sander@eosta.com</a>	06 22711989

These partners, covering various parts of the supply chain, have currently indicated their commitment. We expect that during the implementation of this SMP, many others will show interest and join. Once the Centre has been established, other companies can still join, new capacity building programmes can be developed, and research for innovation will remain important to create a dynamic centre that will attract interest of potential users.

### 3.3 Monitoring and evaluation

Regular discussions with all stakeholders and joint mission to Ghana will help to continuously monitor expectations and ensure that relevant information is provided to stakeholders for decision making.

## 4 Budget

Cost item	Financial source	Budget
Desk study, 3 missions to Ghana (see 1.8 above for details)	Seed Money	€35.000
Feasibility study PHIC and consortium building / negotiating	Berenschot own contribution	In kind, est. value € 8.400
3 missions to Ghana, time experts (advice and proposal writing)	WUR own contribution	In kind, est. value €45.000
Discussions in NL and trade mission to Ghana	Participating companies	In kind, est. per company €7.500

## 5 Summary

An estimated 20-50% of the food produced in Ghana is lost. The Ghanaian private sector and government want to invest in reducing these losses. The Ghana PEF, representing 80% of companies in Ghana, is currently setting up a 'one of stop shop for appropriate solutions and knowhow for the agro-food industry' in Ghana. They wish to explore opportunities for setting up a joint Post-Harvest Innovation Centre because they appreciate the Dutch experience in tackling the complexity of postharvest losses and in valorising waste and side streams. Such a PHIC can be a good 'showroom and key entry point' for a large number and great diversity of companies to enter the Ghanaian and possibly the West African market, who would otherwise not have invested in Ghana.

The SMP is needed to build a dedicated consortium, estimate the return on investment for stakeholders and establish a sound set-up of the PHIC. This will result in a FDOV proposal or Top Sector PPS to implement the PHIC, which will contribute significantly to food security.

## 6 Project keywords:

Netherlands technology and expertise reducing post-harvest losses, processing waste into resources.