

RIU

Yam exporters cut losses and build profits

Validated RNRRS Output.

A series of recommendations are helping exporters and market agents in Ghana to realize the full income generation and market potential of yams. Previously, biological and economic losses took a high toll on crops destined for local and overseas markets. Now, thanks to improved yam quality and new training and promotional material, exports to Europe and the US are growing. The strengthening of links between yam producers and exporters has improved the quality and quantity of yams provided, eliminating the need for intermediaries and ensuring that advance orders and better market information are available to growers.

Project Ref: **CPH47:**

Topic: **5. Rural Development Boosters: Improved Marketing, Processing & Storage**

Lead Organisation: **Natural Resources Institute (NRI), UK**

Source: **Crop Post Harvest Programme**

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Description

CPH47

A. Description of the research output(s)

Research into Use

NR International
Park House
Bradbourne Lane
Aylesford
Kent
ME20 6SN
UK

Geographical regions included:

[Europe](#), [Ghana](#), [USA](#),

Target Audiences for this content:

[Crop farmers](#), [Processors](#),
[Traders](#),

1. *Working title of output or cluster of outputs.*

In addition, you are free to suggest a shorter more imaginative working title/acronym of 20 words or less.

Improving the domestic and export marketing system for yams in Ghana.

2. *Name of relevant RNRRS Programme(s) commissioning supporting research and also indicate other funding sources, if applicable.*

Crop Post-harvest Programme

3. *Provide relevant R numbers (and/or programme development/dissemination reference numbers covering supporting research) along with the institutional partners (with individual contact persons (if appropriate)) involved in the project activities. As with the question above, this is primarily to allow for the legacy of the RNRRS to be acknowledged during the RIUP activities.*

R6505: Relieving post-harvest constraints and identifying opportunities for improving the marketing of fresh yam in Ghana. (1996-2000)

R7582: Development of integrated protocols to safeguard the quality of fresh yams. (2000 – 2003)

Additional RNRRS funding was provided through the Crop Post-harvest Programme office in Accra to produce dissemination material including a dissemination leaflet; “Enhancing the production and supply of good quality yams in Ghana” written by David Crentsil and Paa-Nii Johnson, and a video of yam production and handling practices.

Additional funding for research work was provided by the University of Ghana.

Lead Institution: Natural Resources Institute, the University of Greenwich, UK

Lead person: D.Rees D.Rees@gre.ac.uk Tel +44 1634 883522

Partners: Natural Resources Institute, the University of Greenwich, UK
R. Bancroft, C. Coote, P. Greenhalgh, G. Onumah, D.Rees,
S.Taylor, K. Tomlins

University of Greenwich
S. Otoo (M.Phil student)

Dept. of Crop Sciences, University of Ghana, Ghana
F. Aboagye-Nuamah, E. Ametepe, Prof. J. N. Ayertey, E.
Cornelius, Prof. K.A. Oduro, K. Offei

Dept. of Agricultural Economics and Farm Management,
University of Ghana, Ghana
S. Agbodza, R. Al-Hassan, H.A. Asante, J.B.D. Jatoo, R.

Tweneboah-Kodua

Agricultural Engineering Services Directorate, Ministry of Food
and Agriculture (MoFA), Accra, Ghana
D. Crentsil, Paa-Nii Johnson

Ministry of Food and Agriculture, Sunyani, Ghana
L. Krampa

4. Describe the RNRRS output or cluster of outputs being proposed and when was it produced? (**max. 400 words**). This requires a clear and concise description of the output(s) and the problem the output(s) aimed to address. Please incorporate and highlight (in bold) key words that would/could be used to select your output when held in a database.

Yam (*Dioscorea* spp.), especially **white yam (*Dioscorea rotundata*)** is a high value commodity in Ghana, but the full potential for **income generation** both through **domestic markets** and the **export trade** has not been realised due to problems and inefficiencies in the production, handling and trading systems. In the case of export this is clearly illustrated by problems of bad/inconsistent **quality of yams** on arrival at countries of importation such as the UK.

This research programme (1996-2003) sought to develop and test integrated technical, economic, social and ecologically acceptable protocols to reduce biological and economic losses inherent in the current system, to improve the quality of yams destined for both local and overseas markets and to strengthen the links between yam producers and exporters.

Detailed analysis of the existing system in Ghana resulted in the following outputs:

a) Recommendations to improve the links between yam growers and traders in order to improve the quality and increase the quantity of yams provided by growers.

Purchase of tubers for export directly from growers rather than through several middlemen as at present would improve quality. The recommended strategy also depends on providing more secure advanced orders and increased market information to growers, and development of a **higher value domestic market** to expand demand for quality produce.

b) Recommendations for the improvement of seed yam quality to reduce fungal infections (other DFID outputs indicate the importance of using seed yams free from viral infection).

c) Optimal curing, storage and transport conditions for a range of yam cultivars/species over a range of maturity. As well as improving handling strategies, this information would also valuably feed into breeding programmes for the production of yam cultivars with improved marketing potential.

d) Strategies for improvement of quality during shipping for export by introducing temperature control, providing more accurate technical information to **shippers**, and clarifying the lines of responsibility.

e) Improved methods of assessing quality both by sampling/destructive assessment and **non-destructive**

quality assessment methods.

The use of electronic sensor arrays has been developed but not yet to the stage of commercialisation.

- f) Production of extensive teaching materials in the form of leaflets, photographic material and a video with potential for use to train the stakeholders involved in the yam handling chain.
- g) Recommendations to improve the efficiency and profitability of yam export marketing.

5. What is the type of output(s) being described here?

Please tick one or more of the following options.

Product	Technology	Service	Process or Methodology	Policy	Other Please specify
	X		X	X	

6. What is the main commodity (ies) upon which the output(s) focussed? Could this output be applied to other commodities, if so, please comment

The main commodity focus is Yam (*Dioscorea spp.*)

However, many of the outputs relating to the organisation of marketing and export trade would be relevant to the development of trade of other commodities of similar value, such as sweetpotato. Outputs relating to the relationship between traders and growers are of relevance to a wide range of marketed crops.

7. What production system(s) does/could the output(s) focus upon?

Please tick one or more of the following options. Leave blank if not applicable

Semi-Arid	High potential	Hillsides	Forest-Agriculture	Peri-urban	Land water	Tropical moist forest	Cross-cutting
	X	X	X	X			

8. What farming system(s) does the output(s) focus upon?

Please tick one or more of the following options (see Annex B for definitions).

Leave blank if not applicable

Smallholder rainfed humid	Irrigated	Wetland rice based	Smallholder rainfed highland	Smallholder rainfed dry/cold	Dualistic	Coastal artisanal fishing
X	X		X			

9. How could value be added to the output or additional constraints faced by poor people addressed by clustering this output with research outputs from other sources (RNRRS and non RNRRS)? (**max. 300 words**).

Please specify what other outputs your output(s) could be clustered. At this point you should make reference to the circulated list of RNRRS outputs for which proformas are currently being prepared.

Information that could be used to address two of the identified constraints has been obtained through other projects.

Given that infected seed yams are an important source of fungal infections in harvested ware yams the selection and use of clean planting material can reduce losses and increase income generation for growers. Likewise, although not addressed within this project, the use of planting material free from viral infection is very important. Strategies to produce seed yams free of both fungal and viral infection are addressed in the RNRRS output **“Clean yam seed material: Lawrence Kenyon R8416, R7503”**

Stronger links between growers and traders, together with improved flow of market information have also been identified as an important constraint to efficient marketing of yams. This issue was also addressed in the project cluster **“Cassava as a commercial / industrial commodity Andrew Graffham Nanam Dziedzoave R6504, R7418, R8268, R8432”** where cassava growers were linked effectively with processing industries. In this context also, the lessons learnt from East Africa as outlined in the RNRRS output **“Market Information tools: Ulrich Kleih R8250”** could add value very effectively to the outputs given here. The project **“Managing for value – the COProm management model for access to viable markets Nanam Dziedzoave, Andrew Graffham R8432”** developed a model for successful commercialisation of cooperative ventures in Ghana.

Validation

B. Validation of the research output(s)

10. How were the output(s) validated and who validated them?

Please provide brief description of method(s) used and consider application, replication, adaptation and/or adoption in the context of any partner organisation and user groups involved. In addressing the “who” component detail which group(s) did the validation e.g. end users, intermediary organisation, government department, aid organisation, private company etc... This section should also be used to detail, if applicable, to which social group, gender, income category the validation was applied and any increases in productivity observed during validation (max. 500 words).

For an improved handling strategy to be successful depends on:

- whether protocols can be shown to be consistent, and technically and economically superior to existing practices,
- whether or not individual farmers can be convinced of the benefits and persuaded to break with tradition, pool their resources and work communally with others to bring about improvements, and
- whether the new working relationships that may be required to promote changes in post-harvest practice are sustainable over time.

This programme was designed in such a way that interventions were developed, and, wherever possible, validated with a range of stakeholders during the course of the programme. In practice validation during the project was more feasible for the technical than socioeconomic outputs.

Examples of validation of technical findings during the project include:

- Having defined the optimal curing conditions for milk yams (30 - 37°C, high humidity, 7 days) practical methods for achieving these conditions in the villages were tested in consultation with growers. The technology was tested for one season only, so that further validation is necessary
- Samples of tubers recovered from a range of handling/storage treatments were exported to the United Kingdom and their qualities assessed to ascertain how the differently treated tubers could withstand the rigours of export handling. Two such export shipments were carried out.

Aspects of the project have been validated independently after the end of the project.

At the end of the project technical recommendations of the project were disseminated in the form of a booklet "Enhancing the production and supply of good quality yams in Ghana". Feedback from Post Harvest Officers of MOFA, Agricultural Extension Agents and exporters indicate that in the light of their experiences they agree with the project findings.

A recent visit by the Ghanaian project manager to the pack-house of one of the major yam exporters (K. Laast Co.) involved in the project, showed that the exporter had adopted most of the recommendations of the project. Thus, yams were now sourced from the production area and brought straight to the pack-house thus minimizing the number of times which the produce has to be loaded/unloaded, and reducing mechanical damage. According to the exporter this practice together with careful sorting and cleaning increases quality and leads to more quality tubers being exported. As a result, business was going well, and the company is expanding the pack-house and building new office and residential accommodation for the staff.

In view of the finding that poor temperature control during shipping was a problem, some exporters (Deloni and K. Laast) have tried reefer containers for export of the commodity. According to the General Manager of the Designated National Yam Export Pack House the quality of yams exported in such containers is better. However, K. Laast who use reefer containers to some destinations (Spain) to which ships only have reefer facilities finds that losses are higher than those incurred without temperature control. We believe that these contradictory findings indicate continued confusion over the optimal storage conditions.

11. *Where and when have the output(s) been validated?*

*Please indicate the places(s) and country(ies), any particular social group targeted and also indicate in which production system and farming system, using the options provided in questions 7 and 8 respectively, above (**max 300 words**).*

This project has been conducted (and validated) in Ghana, except where export consignments of yams have been followed into the UK.

Validation of technical aspects of the project undertaken during the course of the programme (1996-2003) occurred in project areas. These covered the yam growing regions of Brong Ahafo Region (Techiman District: Fiaso village, Atebubu District: Nyomoase village Sene District), Volta Region (Nkwanta District: Kete-Krachi District) and Northern Region (Salaga District). The social groups targeted were the growers (poor rural small holders), traders, generally with higher incomes, and exporters who had access to reasonable capital.

The main production systems where the outputs were validated were “High potential and Forest/Agriculture”
The main agricultural systems where the outputs were validated were “Irrigated” and “Small holder rain fed humid”

Current Situation

C. Current situation

12. **How and by whom** are the outputs currently being used? Please give a brief description (**max. 250 words**).

The outputs of this project are being used primarily by exporters/market agents, extension officers, and government organisations.

The larger and more enterprising exporters/market agents who were involved in the project have taken on board and successfully implemented many of the recommendations of the project relating to links with growers, grading, handling and shipping practices. As a result, they appear to have significantly increased their turnover (see 10).

The Ghanaian Government has been proactive in trying to improve export yam quality and thus promote yam exports both to Europe and the US. Some of the project recommendations have informed government policy, although there are also issues where this is not the case (e.g. when poor yam quality was detected in the US, the government made air-freighting compulsory, although our project findings indicate that better shipping conditions could have solved the problem).

Extension officers are using the promotional material produced by the project for training purposes.

13. **Where** are the outputs currently being used? As with Question 11 please indicate place(s) and countries where the outputs are being used (**max. 250 words**).

Outputs are being used primarily in Ghana, in the yam growing regions of Brong Ahafo Region (Techiman District: Fiaso village, Atebubu District: Nyomoase village Sene District), Volta Region (Nkwanta District: Kete-Krachi District) and Northern Region (Salaga District) and in the urban centres (especially Accra) where trading takes place.

There is some indication that the outputs are spreading across into Nigeria. For example, a Nigerian businessman, seeking to develop the yam export trade from Nigeria, travelled to Ghana for training after seeing the dissemination booklet “Enhancing the production and supply of good quality yams in Ghana” on the internet (David Crentsil *personal communication*).

The main production systems where the outputs are currently being used are “High potential and Forest/Agriculture”

The main agricultural systems where the outputs are currently being used are “Irrigated” and “Small holder rain

fed humid”

14. What is the scale of current use? Indicating how quickly use was established and whether usage is still spreading (max 250 words).

With no mechanism of continual assessment in place, it is difficult to be sure of the scale of uptake/use of project findings. However, observations made by MoFA indicate that current use of project outputs is primarily by the larger more enterprising exporters, as these are the organisations that had access to project dissemination, and the resources to implement them. Their activities will, of course, have impact on the growers with which they interact.

There is little indication that in the absence of further dissemination usage is spreading beyond these specific exporters, except the example of the Nigerian businessman travelling to Ghana for training as described in (10) .

15. In your experience what programmes, platforms, policy, institutional structures exist that have assisted with the promotion and/or adoption of the output(s) proposed here and in terms of capacity strengthening what do you see as the key facts of success? (max 350 words).

So far all dissemination of project outputs has been carried out by MoFA, through workshops and dissemination literature. Although curtailed by the end of the project in 2003, this has so far proved to be an effective mechanism as MoFA has links with all the key players (i.e. directly with traders in Accra, and with growers and traders in growing areas through extension officers).

However, efficient promotion and adoption of the outputs in Ghana also depends on effective regulation of the yam trade (both domestic and export) through government controls and trade organisations. Particularly in the past 3-4 years, the Ghanaian government has placed an emphasis on developing yam exports, and this has created an environment where outputs could be adopted more effectively than previously.

Important government activities include:

- Establishment of a single designated National Yam Export Pack House in which all documentations relating to yam exports are prepared. This pack house is located at Tema, close to the Port. From here the consignments are trucked under seal to a scanning machine from where they are sent direct to the ships.
- Rationalisation of bureaucracy of export with agencies now located under one roof (Plant Protection & Regulatory Services Directorate (PPRSD) of the Ministry of Food & Agriculture (MOFA), The Ghana Standards Board (GSB) and Customs, Excise and Preventive Services (CEPS)
- Redesignation of yam as a traditional crop, thereby bringing in regulations on establishment of letters of credit by the importers, payment of export tax and the strict adherence to standards, enforcement of which is done by the agencies listed above (PPRSD, GSB and CEPS).
- Provision of training for growers by Agricultural Extension Agents on good agricultural practices in yam production as well as good handling and storage practices, all meant to ensure that good quality yam tubers are produced and made available for sale.
- Provision of market information on weekly prices of yam at the major marketing centres.

Environmental Impact

H. Environmental impact

24. What are the direct and indirect environmental benefits related to the output(s) and their outcome(s)? (max 300 words)

This could include direct benefits from the application of the technology or policy action with local governments or multinational agencies to create environmentally sound policies or programmes. Any supporting and appropriate evidence can be provided in the form of an annex.

Generally the outputs from this cluster are focused towards income generation for poor communities in such a way that is environmentally neutral. However, outputs from this project cluster that decrease post-harvest losses will have a beneficial environmental impact as they will increase land-use efficiency, potentially reducing the land area needed for agricultural production.

25. Are there any adverse environmental impacts related to the output(s) and their outcome(s)? (max 100 words)

No serious adverse environmental impacts have been identified, although it is possible that where it becomes financially more attractive to grow yams, the area of land used for agricultural production may increase and that this may have an environmentally damaging impact.

None of the technologies considered involve the use of chemicals which persist within the environment.

26. Do the outputs increase the capacity of poor people to cope with the effects of climate change, reduce the risks of natural disasters and increase their resilience? (max 200 words)

Yes, to some extent. The crop already provides a valuable source of income for those producers who sell a part of their harvest, while exports of the commodity generate valuable foreign exchange earnings. Increased income generation both through local and national markets will provide communities with capital which provides the necessary flexibility to increase resilience to natural disasters.

Likewise an increase in food supply will contribute to an increase in resilience.

Yam is the second major staple in tonnage terms after cassava. It is grown mainly by smallholders, covering approximately 10% of the country's cultivated land. Although its main importance is probably as a source of income, its role in food security should not be overlooked. Clearly outputs that decrease post-harvest losses will improve food security, and the ability of poorer communities to cope with the stresses of natural disasters.
