

RIU

# From mangos to markets

## Validated RNRRS Output.

Mango farmers producing for UK export markets have benefited from new methods for evaluating the relationships among stakeholders, as well as their respective roles in marketing high-value produce. A manual helps them to establish individual responsibilities, providing trouble-shooting and feedback mechanisms. It includes procedures for strengthening the ability of the farmers and labourers to accurately assess their technology needs and communicate these to suppliers. It also provides tools to help in interactions with other stakeholders in the supply chain. The manual will assist organisations working with smallholder producers producing a range of commodities. It will do this by helping them to access and monitor scientific resources more effectively – bringing them to bear on pre- and post-harvest problems affecting market access.

Project Ref: **CPH37:**

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

**CPH37**

## Research into Use

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

## Geographical regions included:

[India](#),

## Target Audiences for this content:

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

**A. Description of the research output(s)**

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.

**Optimisation of horticulture research and uptake in India through the development of technical and management systems with public and private sector partners**

**Making horticulture supply chains work for farmers and traders**

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.

**R7494**

Natural Resources Institute, University of Greenwich, UK (Contact person: John Orchard – 44 1634 883741. email: [j.e.orchard@gre.ac.uk](mailto:j.e.orchard@gre.ac.uk))

The Agricultural and Processed Food Products Export Development Authority (APEDA).

Vijaya Association of Fruit and Vegetable Growers' Co-op Societies of Andhra Pradesh, Vijayawada.

Indian Council of Agricultural Research (ICAR), Ministry of Food.

Indian Council of Industrial Research (CSIR).

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.

The opportunities to create wealth and sustainable development from agricultural activities is usually seen in the context of **technology innovation and transfer** activities, often undertaken in discreet 'technical packets' by a range of separate institutions. All too often projects fail to deliver sustainable impacts because of a lack of understanding of the institutional and managerial arrangements necessary for adaptation, integration and **management of information** and technology in the whole **supply chain**.

These managerial and institutional arrangements for managing knowledge generation and transfer were examined in a study of the mango **export** sector of India from 1999 to 2002. This project analysed the Integrated Training Programme (ITP) for **mango** farmers developed and run by the **Agricultural and Processed Food Export Development Authority (APEDA)** and contracted trainers. The ITP provided technical guidance to mango farmers producing for UK export markets. The project evaluated both the institutional framework of

**technology** transfer to farmers and the technical component (concentrating on key **post-harvest constraints** including **controlled atmosphere (CA)** storage technology).

The principal project outputs were

**Methodology:** Methods for undertaking a **stakeholder inventory**, establishing patterns of interactions between stakeholders; mapping knowledge sources and flows from the ITP, and a stakeholder evaluation were established. The relationships between different stakeholders and their respective roles in the marketing of high value produce were mapped. Technical and management systems were developed and field-tested by undertaking a series of case studies in collaboration with a range of marketing organisations that receive imported produce from the target farmers.

A **techno-managerial manual** which places emphasis on identifying individual stakeholder responsibilities and activities, with trouble shooting and feedback mechanisms. The manual includes procedures for strengthening the ability of the farmers/labourers themselves, to accurately assess their technology needs and articulate with relevant technology suppliers either directly or indirectly through the marketing organisation. It also provides **decision tools** and procedures to aid the interaction between other stakeholders e.g. exporters/importers, in the supply chain. The manual will assist organisations working with smallholder producers to access and monitor more effectively scientific resources and bring these to bear on those pre- and post-harvest constraints which are preventing market access.

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

Please tick one or more of the following options.

<b>Product</b>	<b>Technology</b>	<b>Service</b>	<b>Process or Methodology</b>	<b>Policy</b>	<b>Other Please specify</b>
	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 commodity examined in the project, mango, was only used as case study to study technical and institutional innovation learning. The approach is applicable to all commodities, and farming and marketing systems.

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

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

<b>Smallholder rainfed humid</b>	<b>Irrigated</b>	<b>Wetland rice based</b>	<b>Smallholder rainfed highland</b>	<b>Smallholder rainfed dry/cold</b>	<b>Dualistic</b>	<b>Coastal artisanal fishing</b>
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.

The outputs from this project should be seen in the much wider results from the project investigating decision tools for institutional change in public and private sectors (R7502). The same issues of managing the supply chain are also addressed in R8271 and R8431: 'Agriculture to Agri-business: Management systems for high-value horticulture'. This project also takes an integrated supply chain approach to management and control systems for horticultural crops in general. In addition the participatory and technical tools (the responsive toolbox) developed in R8265 (Improving household food security by widening the access of small-holder farmers to appropriate grain store pest management) will improve the matching of appropriate technologies to the needs of identifiable groups within communities.

The RNRRS has produced a range of training materials related to specific crops which also would be of value, including: IPM promotion through improved training manuals (R8417, R8341), IPM for smallholder cotton in Uganda (R8403, R8197), ICPM for smallholder coffee in Malawi (R8423, R8203), IPM for potato pests in Bolivia (R8443, R8044), Banana IPM (R8342, R7567, R7529, R7972).

## 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**).

The project aimed to develop methodologies to evaluate both the technical and institutional arrangement supporting the high-value horticultural export of mangoes from Andhra Pradesh. Studies centred on the evaluation of the impact of an Integrated Training Programme (ITP) developed and run by the Agricultural and Processed Food Export Development Authority (APEDA), a primary export support organisation.

The research entailed three levels of validation:

- analysis of the institutional framework governing the supply chain and the technology transfer programme (the ITP);
- evaluation of the relevance and quality of the transferred technologies through examination of the exported mangos at the point of entry into the high value markets and feedback from the stakeholders receiving training;
- field testing of the techno-managerial decision tools manual developed to allow multi-stakeholder analysis of the supply chain and thereby improve technology generation and delivery to enable small farmers to meet the requirements of high-value markets both within India and beyond.

The first validation was undertaken by project staff and an external consultant and entailed:

- Stakeholder inventory: Important stakeholders in the ITP process were identified and an inventory made identifying the stake that each of these stakeholders has in the process and why. This helps in understanding the role of the key actors in the process and the relative importance of their contributions and influence in the process as a whole.
- Patterns of interactions: examines the inter-relationships between different stakeholders and the nature of relationship were examined. The nature of interactions of stakeholders with each other was captured through a two-way matrix in order to understand the pattern of their interactions. This explains the institutional dynamics that emerged in the ITP process and identifies the process of change thereof. This was undertaken in comparison with a non-ITP situation.

The outcome from these evaluations was detailed in the project final technical report (Taylor, S. J. and Orchard, J. E. (2001). Optimisation of horticulture research and uptake in India through the development of technical and management systems with public and private sector partners. R7494. Crop Post-Harvest Programme. Final Technical Report. Volume 1)

The second validation looked at content of the ITP by assessing its impact on the quality of the exported produce and was undertaken by NRI staff who assessed the quality of the produce in relation to market requirements and diagnosed probable causes underlying any defects. This was feedback to the stakeholders in the supply chain which resulted in modifications to the ITP. Diagnostic reports from the outturn assessments were delivered to the stakeholders and summarised in the final technical report to the CPHP.

The final validation of the manual was to have been undertaken in the third year of the project by the use of case studies with the stakeholders in the chain, in particular the farmers and APEDA. This was not achieved because the project was terminated at the end of the second year following an external project review which determined that the project did not have an appropriate poverty focus.

#### 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).**

The validations took place over two years from 1999 to 2000.

The institutional analysis of the ITP took place on two locations in Andhra Pradesh in India. The farmers were from the Vijaya Association of Fruit and Vegetable Growers' Co-op Societies of Andhra Pradesh, which had a mixture of poor and relatively wealthy farmers cultivating mangoes in high potential areas with both irrigated (the majority of farms) rain-fed humid farming systems. For most of the non-poor farmers, farming is not their main occupation, however, mango orchards are considered as potential sources of cash income. Most of the farmers are educated pursuing lucrative careers like doctors, lawyers, retired government servants or businessmen. The project dealt mostly with their farm managers and labourers: farm labour is generally illiterate and so is not very conscious of the high quality requirements of handling the fruit for export. A few farms however, have the advantage of being able to employ the same set of labour over a period of time, leading to generation of required skills in the handling of the mango fruit grown for export. Officers of the Vijaya Association, mostly well-off farmers, were also part of the evaluation process.

Others involved in the ITP included business people – the exporters, and scientists from the research institutions ANGRAU, IIHR and CFTRI providing the training under contract to APEDA, the export association.

The diagnostic evaluations of the mango took place in 2000 in UK and Hong Kong for a shipment of Banganpalli variety from Andhra Pradesh and in the UK and The Netherlands for Kesar variety from Maharashtra. In 2001, Banganpalli variety from Andhra Pradesh was assessed in The Netherlands and the Kesar variety from Maharashtra and Gujarat in UK and Hong Kong.

## Current Situation

### C. *Current situation*

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

Due to the premature closure of the project, the manual was not evaluated and completed to the necessary standard to make it a usable output. The draft manual was passed to APEDA and the Vijaya Association. The draft manual was presented to APEDA and the Chairman endorsed its implementation as part of their evaluation and management systems in their export programme. The aim was to develop it in an electronic format as a management tool. Although this was taken forward due to the termination of funding.

However, the lessons learned from the project have been since used in the debate on innovation systems within other CPHP projects (Decision tools for institutional change in public and private sectors. R7502). The outputs have been used to produce a publication about the research (Hall, *et al.*, 2001. Institutional learning through technical projects: horticulture technology R&D system in India. AgREN Network Paper 111. ODI).

In addition, it has featured as a case study example in a number of publications including:

On the ISNAR Learning for Institutional Innovation website (<http://www.isnar.cgiar.org/shiip/india-vijaya.htm>)

Hall *et al.*, (2001). Arrangements and Implications for Developing New Technology for the Poor. *World Development* 29(5): 783-797.

Andy Hall and Rasheed V. Sulaiman (2002). Postharvest innovation systems in South Asia: research as capacity development and its prospects for impact. 9th JIRCAS International Symposium 2002 – “Value-Addition to Agricultural Products”, 53–61.

A. Hall, L. Mytelka and B. Oyeyinka (2006). Concepts and guidelines for diagnostic assessments of agricultural innovation capacity. United Nations University, Working paper series.

A. Hall. (2006). The origins and implications of using innovation systems perspectives in the design and implementation of agricultural research projects: Some personal observations. Conference presentation on [www.innovationstudies.org](http://www.innovationstudies.org)

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**).

See response to Question 12.

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

See response to Question 12.

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**).

Although the project was not able to proceed to completion, the project had established a platform for promotion in having two key stakeholders as part of the project:

- The Agricultural and Processed Food Products Export Development Authority (APEDA).
- Vijaya Association of Fruit and Vegetable Growers' Co-op Societies of Andhra Pradesh, Vijayawada.

As nodal organisations working at different levels in the supply chain they are well positioned to take the outputs and disseminate them to a wider audience. Vijaya worked at the farmers' level and were well placed to transfer the outputs both to the farmers and to the institutional partners (mostly research institutes) in the training programmes. Working with organisations such as APEDA allows dissemination of outputs to a country-wide range of farmers' associations, traders and exporters.

The outputs from the project have been published and have been used as a case study in a number of

publications on innovation system.

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## 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.*

The outputs of the project have no direct impact on the environment. However, application of the techno-managerial manual provides for environmental impacts to be assessed by all stakeholders. For instance one farmer, in evaluating the technology package delivered by the training programme, observed that even though the training was supposed to be needs based recommended as many 8 chemical sprays to control diseases whereas his traditional practice was to spray once or twice.

Since a key feature of the manual is to begin the technology transfer programme by identifying all stakeholders it would be necessary to include a section on environmental management and include those agencies tasked with monitoring the impact of agriculture.

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

There are no adverse impacts in adopting the techno-managerial manual.

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)*

This manual could be used to monitor the environmental changes since a key feature is the provision of a framework which asks all stakeholders e.g. farmers, labourers, technical personnel, readers, exporters, etc., to identify, monitor and evaluate the critical points in the supply chain. This could be used to monitor the impact of climate change on the farming system and the supply chain or vice versa. For instance, one of the technology packages being assessed was the use of controlled atmosphere packaging to prolong the shelf-life of fruit and thereby allow the use of sea transport rather than air freight.

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