

Final report on CALIDENA for the mango value chain in Ghana

Strengthening of the quality infrastructure system to increase the competitiveness of agricultural export products

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Abbreviations | Explanation of terms used

CALIDENA	Methodology Name (Calidad y Cadena – Quality and Chain)
DG	Director General
DNA	Deoxyribonucleic acid
EPA	Environmental Protection Agency, Ghana
FAGE	Federation of Associations of Ghanaian Exporters
FAQ	Frequently Asked Questions
FDA	Food and Drugs Authority
GIZ	German Agency for International Cooperation
GSA	Ghana Standards Authority
HACCP	Hazard Analysis and Critical Control Points
HPW	Company name
IPM	Integrated Pest Management
MOAP	Market Oriented Agriculture Program
MOFA	Ministry of Food and Agriculture, Ghana
MOTI	Ministry of Trade and Industry
PPRSD	Plant Protection and Regulatory Services Directorate, Ghana
PTB	Physikalisch-Technische Bundesanstalt, Germany
QMS	Quality Management System
SOP	Standard Operating Procedure
TC	Technical Committee

1. INTRODUCTION

The project “Strengthening of the quality infrastructure system to increase the competitiveness of agricultural export products” carried out by the Physikalisch-Technische Bundesanstalt (PTB) in Ghana, aims to improve the offering of quality infrastructure services needed for selected agricultural export products considering international good practice, and increase the use of these services. A concrete expected output of the project is informing value chain actors about quality aspects and ensuring that their demand for quality infrastructure services is known.

To achieve this, the CALIDENA approach, a participatory methodology developed by PTB to stimulate quality in value chains, is applied. CALIDENA aims to systematically and sustainably support the improvement of national quality infrastructure services in line with national demand. At the same time, it allows to raise awareness on quality issues and facilitates networking among stakeholders from the selected value chain and support organisations, including quality infrastructure institutions and ministries.

The process (figure 1) includes a preparatory phase, during which the value chain is selected, and stakeholders are identified. The core of the process is initiated with a workshop, which brings the stakeholders together to define quality gaps and concrete actions to address the gaps. In the months following the workshop, the defined actions are then implemented.

Figure 1 Overview of the CALIDENA process



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This report describes the CALIDENA process for the Ghanaian mango value chain and highlights achievements, challenges and lessons learned.

2. THE CALIDENA PROCESS FOR THE MANGO VALUE CHAIN IN GHANA

2.1 OBJECTIVE AND PROCESS

The CALIDENA process for mango had the overall objective to foster quality in the value chain of processed mango products from Ghana and promote exports to promising international markets.

To achieve this, the following main activities were carried out:

July 2017	Training of local facilitators for the CALIDENA methodology
August-October 2017	Feasibility study, process and workshop preparation
October 2017	Kick-off: Participatory assessment of the value chain and definition of an action plan
February 2018	Follow-up workshop on CALIDENA activities for the mango value chain
July 2018	Hand-over of the CALIDENA activities for mango to the Mango Round Table

2.2 DESCRIPTION OF THE CENTRAL ACTIVITIES AND RESULTS

Training of local facilitators

In July 2017, a training on the CALIDENA approach was carried out in Accra, Ghana, to introduce the methodology to interested institutions and prepare local facilitators for the application of CALIDENA. The training was attended by 10 Ghanaians, including representatives of the Ghana Standards Authority (GSA), the Plant Protection and Regulatory Services Directorate (PPRSD) of the Ministry of Food and Agriculture (MoFA), the Federation of Associations of Ghanaian Exporters (FAGE) and several consultancy service providers.

Preparation of the process

For the first CALIDENA process within the PTB project “Strengthening of the quality infrastructure system to increase the competitiveness of agricultural export products” the mango value chain was selected.

The selection was made in coordination with the main project partner GSA and with the activities of the German Agency for International Cooperation (GIZ) in the frame of the Market Oriented Agriculture Program (MOAP).

A value chain analysis carried out by GIZ was used as a basis and complemented with additional information regarding specific quality issues and available quality infrastructure services.

GSA and FAGE agreed to act as host and co-host for the CALIDENA process. The relevant stakeholders were identified in collaboration with the trained facilitators. To include the perspective of an international buyer HPW AG in Switzerland was contacted.

CALIDENA Kick-Off

The Kick-off Workshop was held in October 2017. Numerous participants from the different value chain links, from quality infrastructure institutions, ministries, research institutes and other support organisations attended the workshop.

The farmers' associations confirmed their strong commitment to the process by taking over the role of co-host as FAGE was unable to attend the workshop and could not co-host the process.

During the 3-day event, the participants identified important quality gaps along the value chain from farming, over processing to retail and export of mango products, with the following results:

QI component	Gaps farming	Gaps processing	Gaps retail and export
Quality system / good practice	No added incentive for using QMS	Dependency on certified suppliers and lack thereof	1. No HACCP certification 2. Temperature control 3. Cold storage during transport 4. Pest control 5. Poor drainage system
Standards & Technical regulations	Lacking consideration of importance of standards and technical regulations	Organic requirements are not met	FDA license
Conformity assessment	1. Few conformity assessment bodies 2. Capacity to test new substances 3. Delivery time is slow 4. No seed certification 5. Reliability of lab testing 6. Doubts about the functioning of agrochemicals	1. Clients doubt reliability of results 2. Guidelines for sampling missing 3. Efficiency of testing lab (takes long time) 4. Samples are tested only once 5. Information flow is inadequate between lab and client	No internal lab
Metrology	1. Capacity is now being built for moisture calibration 2. Calibration for use of pesticides 3. Information about metrology for farmers	1. Weighing scales → no stickers 2. Cooling chain?	Equipment is not calibrated
Accreditation	No accreditation body in Ghana		

A visit of the mango processing plant of HPW Fresh & Dry, a mango farm, a pack house, and the Yilo Krobo Mango Farmers' Association allowed the participants to confirm and concretize the identified gaps and discuss possibilities to improve quality.

Finally, the participants defined an action plan to address the identified quality gaps:

Activity	Responsible person / institution
<p>Green Label to introduce basic quality management in mango farming</p> <ol style="list-style-type: none"> 1. Check viability of compatibility of Green Label with mango value chain and quality management systems and requirements of buyers 	<p><i>Coordination:</i> Lysbeth Adetola <i>Information:</i> farmers' associations, processors</p>

<p><i>If compatibility is confirmed:</i></p> <p>2. Request Standards Body to organize TC meeting for Green Label inviting the mango value chain actors</p> <p>3. Negotiate incorporation of Green Label as requirement in procurement of major buyers in the mid-term</p>	<p><i>Request letter:</i> farmers' associations <i>Coordination of TC meeting:</i> Nathaniel Brakoh (GSA) <i>Participation in TC meeting:</i> farmers' associations, processors</p> <p>Farmers' associations & processors</p>
<p>Pesticide residue testing</p> <p>4. Organize a tour at the GSA Pesticide Laboratory for mango value chain actors to explain and show the procedures and answer possible questions, increasing transparency on working practices and strengthening trust in the reliability of the analysis results of the laboratory</p> <p>5. Develop a factsheet for farmers on how to do sampling for pesticide residue analysis for fruits</p> <p>6. Consultancy for GSA Pesticide Laboratory on improving efficiency and evaluating economic feasibility of offering a cheaper fast service to an increased client base</p>	<p><i>Coordination:</i> Ernestina Adeenze (GSA) <i>Main collaborators:</i> Seth Djanmah (farmers' associations) and Daniel Komayire (HPW Fresh & Dry)</p> <p><i>Coordination:</i> Ernestina Adeenze (GSA) <i>Main collaborators:</i> Seth Djanmah, William Kpese and Reverend Lawrence Lomo Kwami, Vida Ofori (Bomarts), Ernest Adu Dwumfour (AfriCert)</p> <p>GSA Pesticide Laboratory, PTB</p>
<p>Calibration for the mango value chain</p> <p>7. Develop a standard operating procedure (SOP) on calibration for the pesticide spraying process</p> <p>8. Organize calibration training on site for value chain links and development of a handout to ensure information for actors unable to participate in the training</p> <p>9. <i>Calibration at the port:</i> Letter of DG GSA to port, copying MOTI, to address lacking calibration of port infrastructure (cold rooms etc.)</p> <p>Joint letter from farmers' associations to the port authority to request calibration of equipment needed to support export</p>	<p>Paul Date (GSA), Richard Nyumuah, PTB</p> <p><i>Coordination:</i> Paul Date (GSA) <i>Participation:</i> farmers' associations, processors, pack house staff, certification bodies</p> <p><i>Coordination:</i> Paul Date (GSA), Alex Kwapong (MOTI)</p> <p><i>Coordination:</i> Davies Korboe</p>
<p>Controlling pesticide quality</p> <p>10. Organize pilot study on quality of pesticides used by mango farmers</p>	<p><i>Coordination:</i> Christina Foerg-Wimmer <i>Samples:</i> farmers' associations <i>Testing:</i> GSA Pesticide Laboratory <i>Funding:</i> PTB</p>

Note: An overview of all the activities carried out during the CALIDENA process, including the implementation status can be found in annex 1.

Follow-up on CALIDENA activities

To support the implementation of the action plan, the coordinators for each activity reported regularly on the progress made. The updates were collected in progress reports and sent to all CALIDENA participants.

In February 2018, a Follow-Up Workshop was held to review the activities carried out, deepen the diagnostic and define additional activities to address persisting quality challenges.

The importance of improving quality in the mango value chain was confirmed by the participants and it was highlighted that additional actors were necessary to achieve this. In particular, a stronger participation by processing firms, the Environmental Protection Agency (EPA) and the Green Label Foundation were identified as crucial. Furthermore, it was mentioned that activities should be coordinated with the Mango Round Table, a platform that regularly assembles stakeholders of the mango value chain to share knowledge. As such, the Mango Round Table can also address quality issues in the value chain and strengthen the collaboration with quality infrastructure institutions, as initiated with the CALIDENA process.

Most activities defined in October were implemented at the time of the follow-up workshop. Activities that were yet to be finalized and new activities were defined as follows:

Activity	Responsible person / institution
Ghana Green Label Standard <ol style="list-style-type: none"> 1. Write to GSA to organize a TC meeting on the Green Label Standard with buyer participation 2. Organize a meeting with the Green Label Foundation to discuss awareness raising activities 3. Send information about Green Label certification to participants 	<p>Nathaniel Brakoh (GSA) & Lysbeth Adetola; letter prepared by Frederick Mills (PTB) and signed by farmers' representatives</p> <p>Lysbeth Adetola, Frederick Mills (PTB), Dr. Bernard Nsiah</p> <p>Dr. Bernard Nsiah</p>
Calibration for the mango value chain <ol style="list-style-type: none"> 4. Complete and distribute the SOP for pesticide spraying 5. Organize formal training for input providers on how to calibrate equipment 6. Find out if sanctions for not doing regular calibration are included in the standards bill 	<p>Richard Nyumuah</p> <p>Paul Date (GSA) / Eric Quaye (PPRSD)</p> <p>Paul Date (GSA)</p>
Pesticide Residue Testing <ol style="list-style-type: none"> 7. Prepare FAQ for pesticide residue laboratory to be distributed and published on the GSA website 8. Distribute the fact sheet on sampling electronically to farmers and upload it on the GSA website 9. Improve delivery times of GSA pesticide residue laboratory 	<p>CALIDENA participants Ernestina Adeenze (GSA)</p> <p>Ernestina Adeenze (GSA)</p> <p>Meinster Kodjo Eduafo & Ernestina Adeenze (GSA)</p>

10. Inform farmers about the possibility of conducting leaf analysis at GSA	Meinster Kodjo Eduafo (GSA)
Pesticide quality 11. Send list of registered chemicals the CALIDENA participants and regional offices	Lawrence Alato (PPRSD)
Hand-over of CALIDENA process 12. Prepare the hand-over of the CALIDENA process to the Mango Round Table	Tony Sikpa (FAGE), Paul Date (GSA), Richard Nyumuah, Frederick Mills (PTB), Katharina Telfser (PTB)

CALIDENA Hand-Over

In July 2018, a last workshop with the mango value chain actors and support organizations was organized with the support of PTB. The workshop had the objective of closing the CALIDENA cycle and handing the process over to the Mango Round Table.

The participants reviewed the activities carried out so far and defined additional activities, which will be followed-up upon within the Mango Round Table:

Activity	Institutions to be involved
Ghana Green Label Standard	
1. Awareness creation <ul style="list-style-type: none"> - Strategy - Information events for relevant stakeholders - Training for farmers and other stakeholders 	Green Label Foundation, GSA, regulatory bodies, MoFA, agribusinesses, certification bodies, farmers' associations, policy makers, development partners, media
2. Standards review	Mango stakeholders
3. Influencing policy	Green Label Foundation, farmers' associations, parliamentarians
4. Marketing Green Label certified mangoes	Mango farmers' associations, Green Label Foundation
5. Compliance (enforcement)	MoFA, Green Label Foundation
Calibration for the mango value chain	
6. Sensitize farmers and service providers on calibration	GSA
7. Calibration of thermometers, weighing scales, waxing and fungicide machines at pack houses	GSA, pack houses, GIZ
8. Design / draft SOP for calibration of other spraying equipment	PTB, GIZ
9. Print and distribute SOP for calibration of knapsacks	PTB
10. Training of farmers	GIZ

<p>Pesticide quality</p> <p>11. Education and training for farmers and other stakeholders on:</p> <ul style="list-style-type: none"> - Lower use of pesticides - Integrated pest management (IPM) - Handling of agrochemicals (storage, preparation, application) <p>12. Distribution of updated pesticide list and specification of pesticides (crop, dosage)</p> <p>13. Pesticide study:</p> <ul style="list-style-type: none"> - Testing of samples at GSA and German labs - Sharing / publishing results - Regulatory actions as necessary <p>14. Standardization of copper-based fungicides for mango industry Research</p> <p>15. Disposal of obsolete chemicals and empty containers</p>	<p>Associations, individual farmers, market people, input dealers, processors, MoFA, PPRSD</p> <p>EPA, PPRSD District Departments</p> <p>GSA, EPA, PPRSD, PTB <i>Note: Due to its complexity and necessary implementation time, the pilot study has been integrated as separate activity in the PTB project.</i></p> <p>EPA, PPRSD</p> <p>EPA, PPRSD</p>
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It was agreed that by taking over the CALIDENA activities, the Mango Round Table will discuss regularly about quality-related issues which are necessary for maintaining and increasing market share. Issues that affect the quality of mango will be promptly addressed and solutions found to them, which will be acted upon by all actors of the value chain. To achieve this, commitment and collaboration will be required by all actors. GSA will become a member of the Mango Round Table and the CALIDENA participants will be involved in future activities. Participation in round table meetings is welcomed and can be requested to FAGE. Through strengthening the collaborations established in the CALIDENA process, quality shall become a part of the DNA of the mango value chain. A Letter of Intent was signed by GSA and the Mango Round Table to confirm their commitment.

3. ACHIEVEMENTS, REMAINING GAPS AND LESSONS LEARNED

Overall, the first CALIDENA process within the project was successful. The feedback by the participants was positive, confirming the benefit of the process and the suitability of the methodology. Next to the value of the networking and increased awareness on quality aspects in the value chain, concrete activities were implemented to address quality gaps.

The achievements of the process can be summarized as follows:

- Local facilitators were trained and qualified to use the methodology.
- A participatory assessment of quality gaps in the mango value chain was successfully carried out with the value chain actors and support organizations.
- Awareness about quality in the value chain could be increased.
- Value chain actors and support organization established strong connections, benefitting from the networking opportunity provided through the process.

- Most stakeholders showed strong commitment to the process, participated actively in workshops and engaged in supporting activities to increase quality in the value chain.
- Concrete activities were implemented to address the identified quality challenges (see annex 1).
- The process was handed-over to the Mango Round Table, an existing platform involving all value chain actors.
- A Letter of Intent was signed between GSA and the Mango Round Table to confirm their commitment to continue fostering quality in the mango value chain.

The following table highlights aspects to be considered throughout a CALIDENA process, referring to experiences, remaining gaps and lessons learned during the process for the mango value chain.

<i>Aspect to be considered</i>	<i>Experience with the mango process</i>
Training of Trainers	
<u>Selection of suitable participants</u> The training can serve a double function of training facilitators and at the same time informing the most important stakeholders in the quality infrastructure about the CALIDENA approach. The selected participants should thus include consultants with previous experience in facilitation and / or knowledge about value chains and quality infrastructure, and representatives of the quality infrastructure institutions.	From the 10 trained facilitators from Ghana, three consultants are now mainly involved in facilitation and support activities for CALIDENA depending on their skills and availability. The participants from government institutions, including quality infrastructure, gained a deep understanding of the approach, which proved valuable during the CALIDENA process for mango.
<u>Involvement of trainers from nearby countries</u> The combination of participants from different countries in a training can support the exchange on the regional level and bring in different perspectives. At the same time one training for several projects is more cost effective.	As the application of CALIDENA was envisaged also in a PTB project in Ethiopia, the local project officer and two consultants from Ethiopia participated in the workshop, enriching the group with a different perspective.
<u>Planning of further involvement of facilitators</u> In the best case, a strategy for the future involvement of local facilitators exists before the training is carried out. Then the facilitators can be informed about the expectations and possible work resulting from the CALIDENA activities in the short and medium term.	The application of CALIDENA is one of the indicators of the PTB project in Ghana. Therefore, it was clear that at least two CALIDENA processes could be supported by the PTB project. In the first process, the local facilitators were involved as co-facilitators and as coordinators for specific activities that were defined in the action plan. For the second process they prepared feasibility studies and will take a leading role in facilitation and follow-up of the implementation. Further potential for using the approach is seen in the government program “one district, one factory”.
Process preparation	
<u>Host and co-host organizations</u> Ideally a CALIDENA process is hosted by an institution of the quality infrastructure and a private sector organization from the value chain, that can take over the CALIDENA activities once the process is finished. To make sure it is clearly understood what is expected from the hosting organizations, a	GSA was the main host of the CALIDENA process and it was agreed verbally with FAGE, that the organization would act as co-host. However, no-one from FAGE was able to attend the Kick-Off Workshop. During the workshop, the farmers’ representatives agreed to take over the role of co-host. With a written agreement, it

letter of intent stating the expected contributions should be signed at the beginning of the process.	might be possible to avoid such last-minute changes.
<p><u>Preparation of the Kick-off</u></p> <p>A checklist with clearly defined responsibilities (e.g. for the selection and contact of participants, the organization of the venue, facilitation material, catering and field trip) and regular exchange among the organization team are recommendable.</p>	The Kick-off was organized by the PTB project team, the involved experts and some of the local facilitators. The process could have been smoothed with a clearer definition of responsibilities and stronger communication, especially in the workshop week.
<p><u>Involvement of relevant institutions</u></p> <p>The participation of the relevant stakeholders is crucial for the success of the CALIDENA approach. Next to the more obvious stakeholders from the value chain links and quality infrastructure, the feasibility study might give hints as to where the main quality issues are and who needs to be involved to address them.</p>	A possible lack in market surveillance for agrochemicals was brought up during the Kick-off. As EPA, the responsible institution, was not present at the workshop, it was difficult to involve them in the implementation of activities in this area.
<p><u>Involvement of international buyers</u></p> <p>The CALIDENA approach highlights the need to align the work of a value chain with the requirements defined at the downstream end of the value chain (the buyer). The buyer “pulls” the value chain towards better quality. The clearer the requirements, the easier it is to identify gaps and needed actions. The direct involvement of an international buyer who sets or at least knows about the quality requirements of the market(s) they operate in, can be very beneficial for the CALIDENA process.</p>	For the mango process the Swiss importer HPW AG could be identified as international buyer. A representative of the company and a staff member of their fruit processing plant HPW Fresh & Dry located in Ghana, participated in the Kick-Off and pointed out the quality requirements for mango processing and export.
Kick-off Workshop	
<p><u>Workshop venue</u></p> <p>In the best case, one of the host organizations can provide a venue for the workshop, so the participants can get familiar with the institution and ownership is strengthened.</p>	GSA provided the venue for the workshop and strongly supported the implementation. This made it possible to include visits to the standards library and the pesticide residue laboratory at GSA in the program.
<p><u>Presence of a representative of the PTB project</u></p> <p>As decisions about the PTB contribution to the CALIDENA action plan need to be taken, a project representative with decision making power should participate in the workshop.</p>	The project coordinator and intermittent short-term expert were present at the Kick-off. This allowed to discuss possible contributions of the project throughout the workshop and to assume responsibility for specific activities when the action plan was defined.
<p><u>Field trip</u></p> <p>The field trip provides a valuable and unique opportunity for joint learning and exchange among the participants. It is a core element of the Kick-off Workshop.</p>	During the field trip a processing plant, a mango farm, a pack house and a farmers’ association were visited. Questions regarding quality issues could be clarified in a joint learning experience.
<p><u>Definition of the action plan</u></p> <p>The result of the CALIDENA Kick-off is a jointly defined action plan that will then be implemented by the participants. It is crucial to allocate sufficient time for the definition of the action plan and the identification of a coordinator for each activity to ensure ownership.</p>	The definition of the action plan was facilitated skillfully yet a bit rapidly by Ulrich Harmes-Liedtke. For all major issues defined, some quick-win activity could be concretized, and participants volunteered to coordinate the activities.
<p><u>Engagement of participants</u></p> <p>At the end of the workshop the participants should be informed about the next steps and receive the</p>	The participants were informed that a Follow-up Workshop would take place and that the implementation of the action plan

<p>necessary information to decide that it makes sense for them to get involved in the implementation of the activities. To achieve this, it can also be helpful to summarize what is expected from them and what are the benefits for them to further engage.</p>	<p>would be monitored in the meantime. A steering group was created; however, it was not clearly defined what it would be doing. Most participants got involved in the implementation of activities and participated in the full process. The processors, however, were only partly engaged.</p>
Follow-up	
<p><u>Regular progress reports</u> To keep the CALIDENA participants informed and motivated to continue the process, regular updates on the implementation status of the jointly defined activities should be summarized and sent to the participants.</p>	<p>The CALIDENA facilitator contacted the coordinators of the activities defined in the action plan regularly to ask about the progress of the implementation. The answers were collected in a table and sent to all the participants.</p>
<p><u>Review of the objective and actors involved</u> A Follow-up Workshop provides a good opportunity to review whether the objective of the process is still valid and if all necessary stakeholders are involved. In this way the strategic direction of the process can either be confirmed or adjusted to new developments. Moreover, additional stakeholders needed to address the identified issues can be included in the process.</p>	<p>The participants of the mango process confirmed vividly that quality in the value chain needs to be improved by jointly addressing persistent issues. Some additional stakeholders to be involved were identified. Ensuring their engagement for the implementation of concrete activities and for the next workshop was included in the action plan.</p>
Hand-over of the process	
<p><u>Selection of the organization to take over the process</u> In the best case, it is defined from the beginning of the process, which organization or platform will take over the process and the selected organization takes an active role throughout the process. In the feasibility study, the adequate organization can be identified. For the choice, the standing of the organization within the value chain and its financial sustainability should be considered. The timing of the hand-over should be discussed with the host organizations and sufficient time allocated for the preparation.</p>	<p>The Mango Round Table was identified early on as a possible platform to take over the CALIDENA activities, as it already brings together regularly actors from the different value chain links. However, the discussion about the takeover was delayed, as no meeting could be organized in the first quarter of 2018 (the round table relies on donor support to organize meetings). Nevertheless, the hand-over could take place in July 2018. During the Hand-Over Workshop, some CALIDENA participants raised doubts about whether the Mango Round Table was ready to follow-up on the CALIDENA activities.</p>
<p><u>Strong collaboration with the QI-partner</u> Both, the organization taking over the process and the quality infrastructure institutions need to be committed to the process to ensure that quality issues in the value chain continue to be addressed after the CALIDENA process is finished. Signing a letter of intent stating this commitment can be at the core of an official hand-over ceremony.</p>	<p>During the hand-over ceremony, a letter of intent was signed by the convenor of the Mango Round Table and GSA to confirm their commitment to continue working on quality issues in the mango value chain. The symbolic moment was witnessed by the CALIDENA participants and covered by local media.</p>

An overview of the achievements and gaps regarding the defined actions to address the identified quality issues is included in annex 1.

Annex 1: CALIDENA activities for mango status August 2018

Focus area	Identified gaps	Achievements	Remaining gaps / unfinished activities
Standards	<ul style="list-style-type: none"> No added incentive for farmers for using QMS Lacking consideration of importance of standards and technical regulations among farmers Lack of certified suppliers for processors Organic requirements are not met in processing 	<ul style="list-style-type: none"> Compatibility of Ghana Green Label Standard confirmed by task force Request for review of standard sent to GSA Information about how to get certified sent to farmers Contact with Green Label foundation established and awareness raising defined as possible area of collaboration 	<ul style="list-style-type: none"> Revision of Ghana Green Label Standard in TC meeting Confirmation of the buyers that they will request Ghana Green Label Application of standard by mango farmers Awareness raising for Ghana Green Label mango
Metrology	<ul style="list-style-type: none"> Calibration for use of pesticides on farms Information about metrology for farmers Cooling chain / temperature control in processing, retail and export Equipment in retail and export is not calibrated 	<ul style="list-style-type: none"> Standard operating procedure for the calibration of pesticide spraying equipment developed, especially with reference to canopy application for tree crops Calibration needs of mango companies assessed by GSA Initial calibration of cold rooms at Tema port carried out and company included in client database for regular calibration Decision to have equipment at the pesticide lab at PPRSD calibrated 	<ul style="list-style-type: none"> Electronical availability of standard operating procedure Sensitization and formal training for input providers and farmers on how to calibrate equipment Assure application of sanctions for neglecting calibration once the respective bill for parliament is finalized (by the end of the year) Calibration of equipment at PPRSD lab Calibration of equipment at pack houses
Pesticide residue testing	<ul style="list-style-type: none"> Delivery times are long Clients doubt reliability of testing results Guidelines for sampling are missing Information flow between laboratory and client is inadequate 	<ul style="list-style-type: none"> Laboratory tour organized to show procedures and answer questions by value chain actors Factsheet on how to sample fruits for pesticide residue testing developed, distributed to farmers and made available electronically Priority for analysis of samples from farmers and aggregators granted by Head of Food and Agricultural department Farmers were informed about the possibility of conducting leaf analysis at GSA 	<ul style="list-style-type: none"> Finalization of FAQ that can be published on the GSA website Definition of support for GSA pesticide residue laboratory in the frame of the PTB project
Pesticide quality and use	<ul style="list-style-type: none"> Doubts about the functioning of agrochemicals amongst farmers Pesticide to address bacteria black spot disease Disposal of obsolete chemicals and empty containers 	<ul style="list-style-type: none"> List of registered chemicals distributed among participating farmers Pilot study on pesticides <p><i>Note: Due to its complexity and necessary implementation time, the pilot study has been integrated as separate activity in the PTB project.</i></p>	<ul style="list-style-type: none"> Access to updated list of registered chemicals and specification of pesticides (crop, dosage) for farmers across the country Finalization and publication of pilot study Training for farmers and other stakeholders on handling and lower use of pesticides, including integrated pest management Research on copper-based fungicides for mango Guidance on disposal of obsolete chemicals and empty containers from EPA and PPRSD