# Annex 5

## IWUA Capacity Development

**Sustainable Smallholder Irrigation Development and Management in Semi-Arid Lands Project**

# Final Report

# Annex 5: Agriculture

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# CHAPTER 1 Agricultural Development Activities for Batch-1 Pilot Schemes

## 1.1 General

For the purpose of inducing farmer awareness of the market-oriented farming management, the SHEP Approach was introduced with the collaboration of SHEP UP project. The SHEP Approach was developed by the Smallholder Horticultural Empowerment Project (SHEP) that was a bilateral technical cooperation project between the GOK and JICA. The SHEP Approach refers to specific methods and techniques for empowering smallholder horticulture farmers, and it includes a series of training session for farmer groups and FEOs/ Group Facilitators. The approach was confirmed as an efficient and effective approach for small-scale farmers by authorities of MOA, then Smallholder Horticultural Empowerment and Promotion Unit was established to extend the SHEP Approach nationwide. The Smallholder Horticulture Empowerment and Promotion project (SHEP-UP) is now underway.

In consideration of the fact that the pilot project sites of the SIDEMAN-SAL are located in the land areas under arid and semi-arid (ASAL) conditions, the activities that are anticipated to contribute augmentation of the resilience of local communities in ASAL area through improvement in their livelihood and nutrition status with alternative selection (diversity) of agricultural enterprises/ produces and with stable productivity of their staple food crops are also required. For this purpose, the Project introduced to farmers the use various technologies known as Low Input Sustainable Agriculture (LISA) technologies. This composed of the Kenyan Traditional Vegetable program, the Push-pull technology and “Bokashi” fermented organic materials technology. The Kenyan Traditional Vegetable program (also known as African Leafy Vegetable program) was introduced with the collaboration of Bioversity International.

Technologies consisting of the technical knowledge and practical skills, which contribute augmentation of the resilience of local communities in ASAL area, would be directly transferred to mainly Sub-county Agricultural Officers (ScAOs), District Agricultural Extension Officers (DAEOs) and Frontline Extension Officers (FEOs) in the pilot schemes through the lectures, workshops, practical trainings, meetings and frequent contacts targeting at the local farmers. A government official appointed by the MoALF worked with project team for smooth implementation of the project activities.

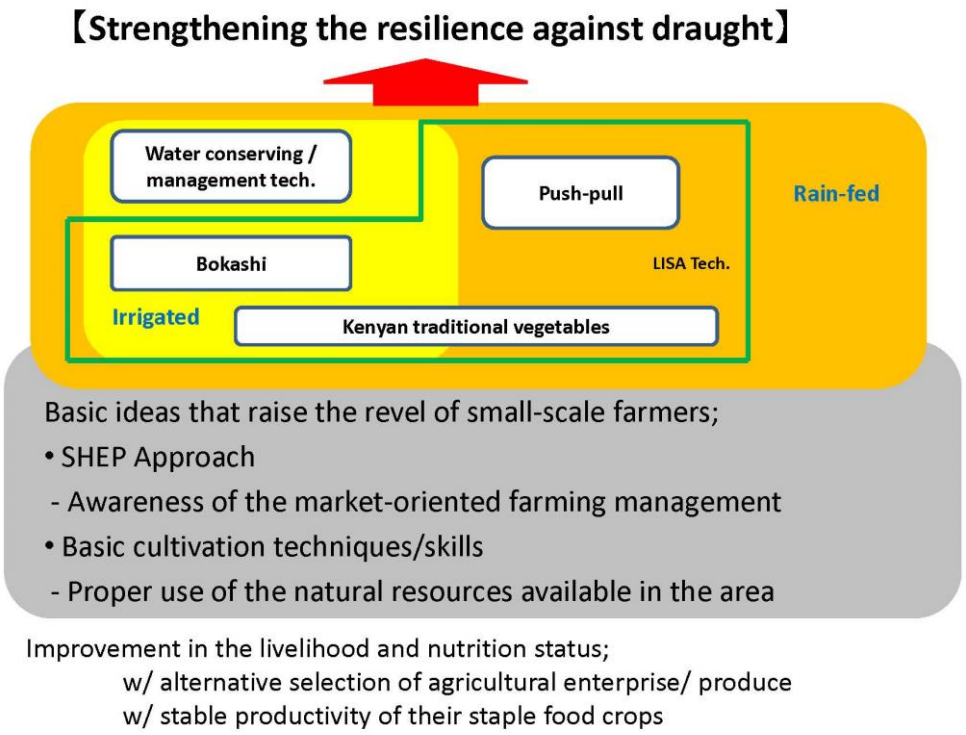



Figure 1.1.1 Basic Concept of Agricultural Support Activities in SIDEMAN-SAL

## 1.2 Outline of Activities

### 1.2.1 Concept and Strategy

For the introduction of SHEP Approach, SHEP Experts who are authorized as skilled facilitators of introducing SHEP Approach will conduct the introduction of SHEP Approach to model farmer groups in SIDEMAN-SAL pilot schemes. Experienced ScAOs also exist in a few sub-counties where the SHEP Approach is in practice, and their knowledge and experiences in implementation of the training activity will be utilized at the SIDEMAN-SAL pilot schemes in the "SHEP overlapping sub-counties." In those pilot schemes above mentioned the general/ original SHEP Approach would be introduced by the experienced ScAO with support from SHEP Unit.

In other pilot schemes located in the sub-counties where the SHEP Approach is NOT in practice, the core components of SHEP Approach would be introduced by the SHEP experts. The series of trainings is mainly focusing on/ aiming to the increment of the farmer's competence/ capacity of the followings;

a) identifying the present productivity and the cost and benefit in his/her farm production,

b) understanding the market condition/ demands surrounding farmers,

c) making strategy for the adaptation to the market demands through crop selection/ranking and crop planting calendar making, and
d) maintaining awareness of the income-oriented farm production through recording the revenue and expenditure of his/ her farm production activities.

In either case the procedure, protocol, methodologies and materials of SHEP Approach are basically used as is when the training components of the approach are introduced. In some cases making minor adjustment/ modification on the procedure and materials would be made in the context of the actual situation on the ground.

Table 1.2.1 Pilot Schemes for Batch-1

| Scheme | Sub-county | County |
|---|---|---|
| Pilot schemes in the sub-county where SHEP is NOT in practice | | |
| Olopito | Narok North | Narok |
| Mdachi | Ganze | Kilifi |
| Gatitu-Muthaiga | Laikipia West | Laikipia |
| Murachake | Mbeere North | Embu |
| Kaben | Marakwet East | Elgeyo-Marakwet |
| Tumutumu | Igembe South | Meru |
| Pilot schemes in the sub-county where SHEP is in practice | | |
| Kasokoni | Taveta | Taita-Taveta |
| Muungano | Thalaka South | Tharaka-Nithi |

*Source: JICA Team*

The LISA Technologies were introduced through the adaptation trial/ demonstrations at the selected few pilot farmers fields for the prospective/ candidate technology. Pilot farmers conducted trial/ demonstration planting at their fields and record the revenue and expenditure for production. After the production period, an evaluation and decision-making meeting was held within the model farmer group. Then accepted candidate technology(s) would be disseminated to the entire model farmer group members for the subsequent production seasons. In consideration of the implementation schedule and the workloads of ScAOs who would introduce the general/original SHEP Approach, the introduction of LISA technologies into the model farmer groups in SIDEMAN-SAL pilot schemes where SHEP Approach is in practice would be discussed later on.

### 1.2.2 Basic Approach to Linkage between SHEP-Unit and SIDEMAN-SAL

To implement the introduction of SHEP Approach, the program would be implemented based on the collaboration of SHEP UP project. SHEP Experts who are authorized by the SHEP Unit as skilled facilitators/ trainers introducing SHEP Approach would conduct the introduction of SHEP Approach for model farmer groups in the SIDEMAN-SAL pilot schemes. The procedure, protocol, methodologies and materials, which are recognized as a part of SHEP Approach, would be used as is, or in the state of minor modifications with consultation of

SHEP Unit and quoting/ remaining their copyright. In some cases making minor adjustment/ modification of the procedure and materials would be made in the context of the actual situation on the ground.

### 1.2.3 Selection of Farmer Groups, Pilot Farmers and Group Representatives

Selection of model farmer groups was followed the selection procedure being taken by SHEP Approach. In each pilot scheme, an existing formal/ informal farmer group of between fifteen (15) and fifty (50) group membership will be selected. Gender will be considered in selection of group representatives. A couple of farmer representatives consisted of a male and a female membership would be selected/ invited in each workshop. Also two to three farmers will be selected as pilot farmers in a model group for the trial introduction of the Low Input and Sustainable Agriculture (LISA) technologies. The demand-driven approach will also be applied in the selection of candidate technologies in the trial introduction of Kenyan traditional vegetables. The selected pilot farmers will be expected to disseminate the knowledge learned to neighboring farmers.

Upon selection of the farmers' representatives for the model group they are expected to obtain a signed certification of their democratic selection and confirmation that the selected farmers will pass all the information learned at the training workshop to the other members of the group within the designated period after training session. This certification shall be signed by Chairperson of the model farmer group. The selected farmers will be required to present the said certification at the training workshop and authenticate their presence and participation in the training by signing in their Name in a register. They will also be expected and required to participate in the workshop on full time basis in order to capitalize and ensure that all theoretical and practical knowledge is passed on to them.

The basis/origin of the selection criteria for the model farmer groups was adopted/ derived by SIDEMAN-SAL from Smallholder Horticultural Empowerment & Promotion Project (SHEP-UP). There is however minor adjustments which have been made to suit the specific situation/ condition for SIDEMAN-SAL. One such specific situation includes the area of emphasis whereby for SHEP-UP is horticulture while the emphasis for SIDEMAN- SAL is crop production inclusive of horticulture.

Table 1.2.2 Selection Criteria for Farmer Groups for Batch-1

| No. | Item | Criteria |
|---|---|---|
| 1 | Number of Group | • Each scheme in a sub county to choose 1 (one) model farmer group for implementation of the SIDEMAN-SAL Agricultural Activities |
| 2 | Group Status | • Select farmers group of the Crop Production and/or Crop Marketing groups from both 'formal' and 'informal' groups<br>• DO NOT form a new group for the project. Select from the existing |

| | | |
|---|---|---|
| | | groups |
| 3 | Membership | • The group membership to be between 15 (fifteen) to 50 (fifty)<br>• Choose a group who has over 60% of its membership drawn from IWUA members for the SIDEMAN-SAL Irrigation Scheme |
| 4 | Age | • Members should be over 18 years of age |
| 5 | Literacy | • Farmer group officials should be literate in order to read and write during the training session/monitoring/reporting<br>• In addition, s/he will be required to translate the training materials/handouts into their local languages where needed |
| 6 | Occupation | • Each group member is practicing crop production or crop produce marketing |
| 7 | Group Activities | • Choose group whose core business is crop production or crop produce marketing<br>• Choose group whose alternative income generating activities is complementary to crop production<br>• Emphasis on the choice of the farmer group should be those which have NOT started buying inputs and selling their produce together<br>• Avoid choosing group with similar farming /marketing activities which are being supported by other Projects/Programs<br>• Choose group in which the project will complement the work done by other service providers |
| 8 | Group Attitude | • Choose group with a 'healthy & positive attitude' towards extension service providers to have dialogue<br>• Choose group with 'high motivation' to learn new idea & technologies<br>• Choose group with ability and willingness to mobilize resources |
| 9 | Area under Coverage | • Choose group to evenly cover (fairly represent) the production areas in the SIDEMAN-SAL scheme (Avoid choosing only group from the same area)<br>• Avoid choosing group from the area which have security concerns (it might cause some negative effects to the field activities of the project) |
| 10 | Accessibility | • Choose group which is accessible by road (i.e., PSCC/FEO/Group Facilitators need to visit the group for frequent communication and training sessions) |
| 11 | Group's Sensibility to Gender Issues | • Chose a group which advocates gender balance and is actively involved in gender promotion<br>• Pro-gender balance. DO NOT choose groups with less than 30% of female/male participation<br>• Provide preference to a group with women official (s) (i.e., women with the leadership roles) |
| 12 | Special Groups | • Support should be given to 'Special Groups' of the disadvantaged or discriminated groups in the society |

*Source: JICA Team*

Based on the selection criteria above mentioned, ScAOs may adjust/ add the selection criteria according to their specific situation with report/ approval of SIDEMAN-SAL. In case of any changes, ScAOs should fill out the "Revision/ Addition of the Selection Criteria" form and submit it to the SIDEMAN-SAL for concurrence in advance before the final group selection.

## 1.3 Field Activities for the Agricultural Development/Farming Support Programs

### 1.3.1 Sensitization Meetings

To promote the relevant officials and beneficiary farmers understanding of the basic concept and purpose of the activities, several opportunities would be provided by the project. The

Project will hold sensitization meetings for County Officials composed of ScAOs, ScIOs and other County MWI officials; and another for the members of selected farmer group and local extension officers, such as FEOs and DAEOs.

Table 1.3.1 Activities for the Sensitization of SIDEMAN-SAL Farming Support Programs

| Topic/Activity | Purpose | Content | Facilitator | Participant |
|---|---|---|---|---|
| Sensitization Meeting for County Officials | Sensitization for the county officials, ScAOs and other relevant staffs (including ScIOs and County MWI officials) | 1) Explanation of the outline of a) SIDEMAN- SAL farming support activity, b) SHEP Approach, c) LISA technologies d) Resilience survey<br>2) Procedure of reporting/ monitoring of activities | PMT<br>JICA Team<br>SHEP Experts<br>Bioversity Intl. | ScAOs<br>ScIOs<br>County/ Sub-county MoALF officials |
| Sensitization Meeting for Local Extension Officials and Farmer Group | Sensitization for the selected farmer group members and relating local officials, such as DAEOs and FEOs | 1) Explanation of the outline of a) SIDEMAN- SAL farming support activity, b) SHEP Approach, c) LISA technologies<br>2) Procedure of reporting/ monitoring of activities | PMT<br>JICA Team<br>SHEP Experts<br>Bioversity Intl. | FEOs<br>DAEOs<br>ScAOs<br>Members of the model farmer group |

*Source: JICA Team*

### 1.3.2 Field Activities in the Sub-counties where SHEP is in Practice

The major activities relating to the farmer training in SHEP Approach are outlined below;

Table 1.3.2 Major Activities of SHEP Approach

| Topic/Activity | Outline | Participant |
|---|---|---|
| Sensitization Workshop | *Facilitation of the understanding of the project activities<br>*Clear definition of the roles and responsibilities of all those concerned with the project | Staff of the head office of the Ministry of Agriculture and Provincial Agricultural Boards, district agricultural officers, extension workers and representatives (both male and female) of farmers' organizations |
| Baseline Survey | *Participation of farmers' organizations (and individual farmers) in the survey in which various survey tools are used under the guidance of extension workers | Members of the District Management Teams, extension workers, farmers' |

| | | |
|---|---|---|
| | | organizations and member farmers of the farmers' organizations |
| FABLIST Forum | *A forum for the meeting between farmers' organizations and members of the horticultural industry for the former to expand their knowledge and network of 'farming as a business.' | Members of the District Management Teams, extension workers, representatives (both male and female) of farmers' organizations and members of the horticulture industry in the project areas available for business with farmers' organizations |
| JEF2G Training | *Exercises of a series of activities for market research, crop selection, analysis of problems and purposes and preparation of an action plan<br>*Exercise in market research using the format prepared by the project team | Members of the District Management Teams, extension workers concerned and representatives (both male and female) of farmers' organizations |
| Group Activities (Market Research/ Action Plan Making) | *Implementation of market research by farmers assisted by extension workers<br>*Preparation of an action plan on the basis of the results of the market research | Extension workers concerned and representatives of farmers' organizations |
| FT-FaDDE | *Technical training for extension workers corresponding to the needs of farmers' organizations<br>*Distribution of training material for the extension which can be used at the places of work | Extension workers concerned |
| In-Field Training | *Dissemination of technologies in accordance with the contents of the action plans in In-field Training<br>*Practical lessons on the knowledge and technologies required for the production of selected crops | Members of the District Management Teams, divisional agricultural officers, extension workers concerned and farmers' organizations |
| Monitoring and Follow Up | *Monitoring of the state of horticultural production and farming technologies of the participating farmers' organizations and changes in the organizations during the implementation and after the completion of the series of activities | Members of the District Management Teams, divisional agricultural officers and extension officers concerned (implementers) |

*The texts in the table are quoted from the references issued by SHEP UP Project *Source: JICA Team*

The procedure, protocol, methodologies and materials of SHEP Approach are basically used as is. Also implementation schedule would be followed by the original schedule set/planned

by SHEP Unit.

### 1.3.3 Field Activities in the Sub-counties where SHEP is not in Practice

#### (1) Introduction of the Core Components of SHEP Approach

In pilot schemes located in the sub-counties where the SHEP Approach is NOT in practice, the core components of SHEP Approach would be introduced by the SHEP experts. The series of trainings are listed below;

Table 1.3.3 Activities for Introduction of the Core Components of SHEP Approach

| Topic/Activity | Purpose | Content | Facilitator | Participant |
|---|---|---|---|---|
| Baseline Survey Workshop | Workshop for baseline survey | 1) How to fill the baseline survey tools<br>2) Baseline survey exercise | PMT<br>JICA Team<br>SHEP Experts | ScAO, DAEO & FEO<br>Representatives of the model farmer group |
| Abbreviated Market Condition Survey & Crop Planting Calendar Making Workshop | *Identify the actual market condition in the nearest places in/ from the pilot scheme<br>*Crop planting calendar making exercise | 1) Exercise in market condition survey<br>2) Practices in making action plan and crop planting calendar | PMT<br>JICA Team<br>SHEP Experts | ScAO, DAEO & FEO<br>Representatives of the model farmer group |
| Record Keeping Management Workshop | Training session of the record keeping management | How to record the revenue and expenditure for farming business | PMT<br>JICA Team<br>SHEP Experts | ScAO, DAEO & FEO<br>Representatives of the model farmer group |

* Above those activities would be implemented in accordance with the procedures of SHEP Approach

*Source: JICA Team*

#### (2) Introduction of the LISA Technologies

As Low Input Sustainable Agriculture (LISA) technologies, followings would be introduced through the farmer's preliminary selections;

##### 1) Kenyan Traditional Vegetables

Kenyan Traditional Vegetables (KTV), also known as the African Leafy Vegetables (ALV), program is anticipated to contribute to the improvement in the livelihood and nutrition status of the farming groups in ASAL with alternative selection (diversity) of agricultural enterprise/ produce and with introduction/ revival of the nutritious-supplemental food crops. It is expected to create more demand for these nutritious local crops and there by trigger more production of this resource.

**2) The Push-pull technology**

The push-pull technology is an effective, low-cost technology for the control of stem borers and suppression of striga weeds in maize cultivation. It is a simple cropping strategy, whereby farmers use Nepier grass and desmodium legume (silverleaf and greenleaf desmodiums) intercrop as repellent "push" plants and trap "pull" plants. In ASAL area the stability in productivity of the dominant crop for staple food through reduction of the pest damage is essential for augmentation of the resilience of local communities. This technology will also provide fodder for livestock and improve the fertility of the soil.

**3) The "Bokashi" fermented organic materials technology - Composting**

This technology will enable farmers to improve yields through low cost use of improved soil fertility and plant nutrition. Basically, it is compositing and consequent reduction on the amounts and cost of commercial fertilizers. Farmers will be introduced to good soil fertility management, soil organic matter management, soil and water conservation, improved pest and disease management, and pest, disease and weed management that complement improved soil fertility and plant nutrition.

The series of activities conducted for the introduction of candidate technologies above mentioned are listed below;

Table 1.3.4 Activities for the Introduction of the Low Input Sustainable Agricultural (LISA) Technologies

| Topic/Activity | Purpose | Content | Facilitator | Participant |
|---|---|---|---|---|
| Technology Introduction Workshop | 1) Selection of 2-3 pilot farmers in the model farmer group<br>2) Technical guidance/ demonstration of Kenyan Traditional Vegetables | Technical training to the selected pilot farmers | PMT<br>JICA Team<br>Bioversity Intl. | ScAO & FEO<br>Pilot farmers of the model farmer group |
| Technology Evaluation Meeting | Evaluation of the trial/ demonstration practices, and making decision for further dissemination into the entire model farmer group | 1)Report from the pilot farmers<br>2)Evaluation of the technology<br>3)Decision making for further dissemination | PMT<br>JICA Team<br>Bioversity Intl. | ScAO & FEO<br>Pilot farmers and members of the model farmer group |
| Technology Dissemination Workshop | Dissemination of the technology into entire model farmer group | Technical workshop for the technology | PMT<br>JICA Team<br>Bioversity | ScAO & FEO<br>Members of |

| | | | | |
|---|---|---|---|---|
| (when the candidate technologies are approved) | | | Intl. | the model farmer group |

*Source: JICA Team*

## 1.4 Methods of Verification Study

### 1.4.1 Reporting Procedure of Training/Activities

The Monthly Progress Reports of SIDEMAN-SAL Agronomic Activities will be domiciled at PSCC level. The reports are expected to be generated by FEOs through/ under the supervision of Sub-County Agricultural Officer and submitted to the PMT with copies to PSCC and the County Agricultural Director. They shall include planned activities, duration of the specific activity/ date when conducted, the venue where it took place and the number of farmers who attended by gender as well as remarks. Expected output of this are documented Monthly Reports for the Agronomic Activities which indicates the trend in implementation and farmer participation.

Field Activity/Workshop Reports are the responsibility of the Sub-County Agricultural Officers who will ensure the questionnaire as set out by SIDEMAN-SAL is filled by the FEO to report on how the field training/ workshop was conducted and perceived. Inform that would be required include the topic covered, name of the model farmer group, name FEO or facilitator and the number of participants by gender. The FEO on behalf of the model farmer groups regarding their level/degree of understanding of the topics covered in the field training. The FEO shall also indicate the mode of the training (lecture, exercise and or demonstration) and the outputs of the training. He/ she is also expected to provide his/her observations, suggestions and way forward. The DAEO may also be required to fill in their observations and suggestions if they accompany the FEO to implement the field training. The report is then submitted to Sub County Agricultural Officer for his comments before forwarding to the PMT for information, review and further guidance. Other subsequent field training/workshops will follow the same mode of reporting except that famers are expected to give a report on activities undertaken by the group after the previous training. The output expected from this as an indication of farmer attendance/ participation by gender and perceptions/ understanding of topics covered. The report would also give a pointer on areas of improvement for effective future training.

### 1.4.2 Evaluation of Adoption/Dissemination of the Introduced Technologies

Reporting and recording formats used at the Baseline Survey, Market Survey/Crop Planting Calendar Making and Record Keeping Management in the introduction of the core components of SHEP Approach would be utilized for this purposes. Baseline survey would

be conducted periodically as a benchmark survey that identify the degree/progress of understanding (intelligibility)/utilization of learned technologies and knowledge obtained from the various training workshops. Various recording formats submitted by farmers would be reviewed for confirmation of the degree of understanding the concepts of approach. Products/outcome of training sessions, such as Crop Planting Calendar and Group Action Plan, are also used as the indicator of understanding of the introduced technologies/concepts. Also what kinds of traditional vegetables were adopted and how many farmers adopted the vegetables could be identified the Crop Production and Income Analysis Data Sheet used at the Baseline Survey. How much the Push-pull technology affected on maize cultivation may be confirmed by using Harvest Records.

Not only by the reporting documents but the actual field visits the feedback system on the training programs could be strengthened. Frequent participations and collaborations to the training sessions of original SHEP Approach at the pilot scheme sites would enable the PMT to send feedback to SHEP Unit on the implementation/ introduction of SHEP Approach in ASAL.

## 1.5 Implementation Schedule

The program timetables in Batch-1 pilot schemes are attached below;

Table 1.5.1 Activities in the Agricultural Development Program for Batch-1

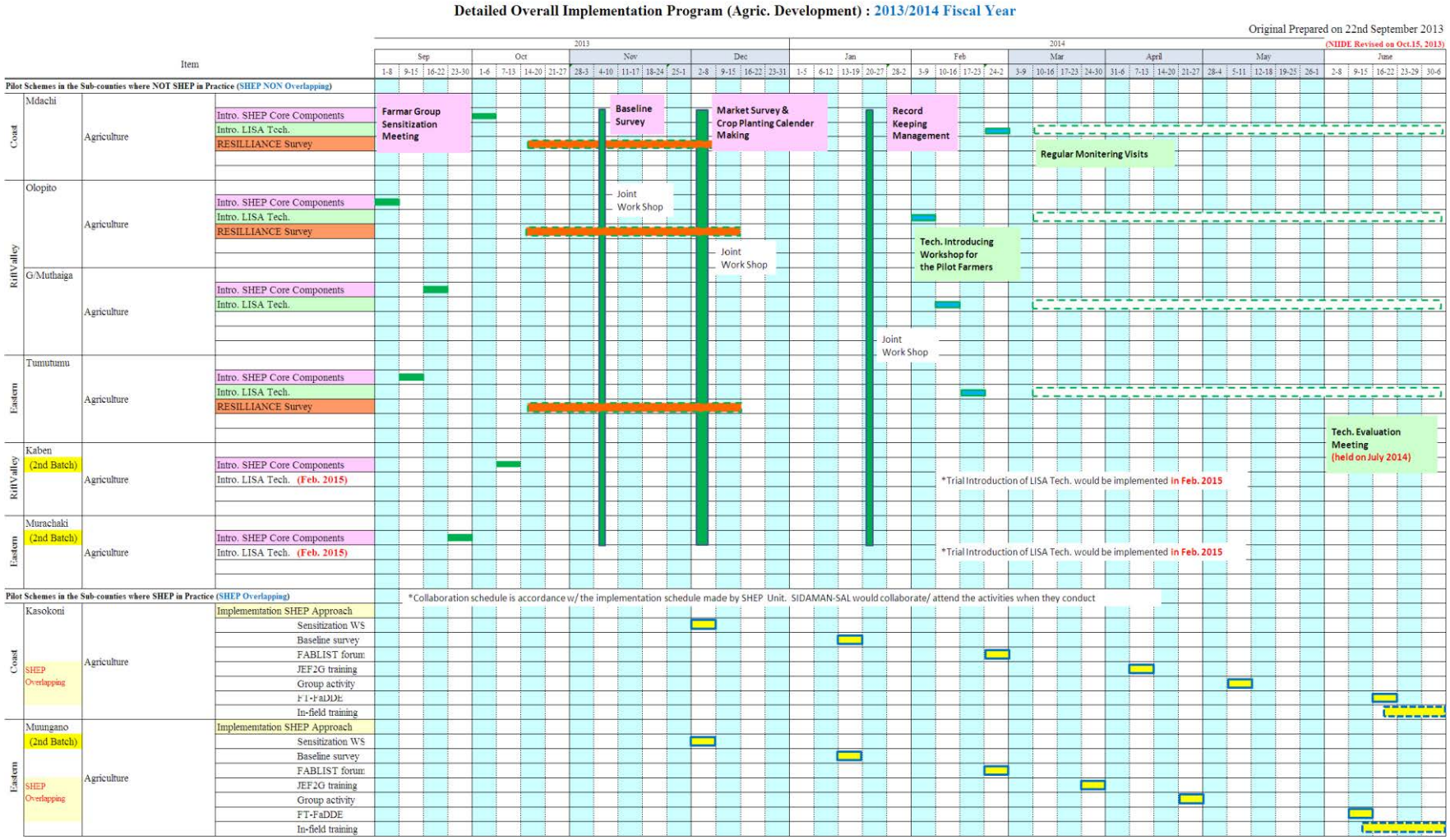
| Activities | | Planned Period |
|---|---|---|
| Overall Pilot Schemes | | |
| Sensitization Meeting for the County Officials | | Aug. 2013 |
| Pilot schemes in the sub-county where SHEP is NOT in practice | | |
| Sensitization Meeting for the Local Extension Officers and Farmer Group | | Sep.-Oct. 2013 |
| Introduction of the Core Components of SHEP Approach | | |
| | Baseline survey | Nov. 2013 |
| | Market survey and Crop planting calendar making | Dec. 2013 |
| | Record keeping management | Jan. 2014 |
| Introduction of LISA Technologies | | |
| | Technology introduction workshop | Feb.-Mar. 2014 |
| | Technology evaluation meeting | Aug.-Sep. 2014 |
| | Technology dissemination workshop | Sep. 2014 |
| Trial Implementation of Resilience Survey (only at the selected schemes) | | |
| | Sensitization and data collection meeting | May-Jun. 2014 |
| | Feedback meeting | May-Jul. 2015 |
| Pilot schemes in the sub-county where SHEP is in practice | | |
| Implementation of the original SHEP Approach | | |
| | Sensitization meeting | Dec. 2013 |
| | Baseline survey | Jan. 2014 |

| | | |
|---|---|---|
| | FABLIST forum | Feb. 2014 |
| | JEF2G training | Mar.-Apr. 2014 |
| | Group activity | Apr.-May 2014 |
| | FT-FaDDE | Jun. 2014 |
| | In-field training | Jun. 2014 - |

* Planned periods for the Implementation of original SHEP Approach are estimated based on the implementation schedule set by SHEP Unit. (as of Mar. 2014)

*Source: JICA Team*

Table 1.5.2 Program Timetable in Batch-1 Pilot Schemes




*Source: JICA Team*

## 1.6 Achievement and Issues to be Addressed

### 1.6.1 Sensitization Programs for Officers and Farmers

Sensitization meeting for county officials including the County Directors of both Agriculture and Irrigation and the Sub-county Agricultural and also Irrigation Officers was held in Nairobi on August 22nd, 2013. At the meeting a workshop in the selection criteria of model farmer group in the SIDEMAN-SAL pilot schemes was held, and SCAOs were requested to select a farmer group and to submit the membership list and the group profile sheet by the time when the sensitization meeting for local agricultural officers and farmers of selected farmer groups would be held at each pilot scheme site.

Also same meetings for the local agricultural officers including District Agricultural Extension Officers (DAEOs) and Frontline Extension Officers (FEOs) and the member farmers of selected farmer groups were held at SIDEMAN-SAL pilot schemes. Because the sensitization activities for farmer groups in the two pilot schemes located in the sub-counties where SHEP Approach is in practice (the SHEP overlapped sub-counties) were conducted accordance with the implementation procedure and schedule organized by SHEP Unit, the meetings have been held at the six pilot schemes located in the sub-counties where SHEP Approach is NOT in practice (the SHEP non-overlapped sub-counties).

Table 1.6.1 Sensitization Meeting for Local Agric. Officers and Farmers

| Date | Scheme | Sub-county | County | No. Participant |
|---|---|---|---|---|
| September 4, 2013 | Olopito | Narok-North | Narok | 32 |
| September 11, 2013 | Tumutumu | Igembe-South | Meru | 53 |
| September 18, 2013 | G/Muthaiga | Laikipia-West | Laikipia | 50 |
| September 25, 2013 | Murachake | Mbeere-North | Embu | 30 |
| October 3, 2013 | Mdachi | Ganze | Kilifi | 62 |
| October 10, 2013 | Kaben | Marakwet-East | Elgeyo-Marakwet | 45 |

*Source: JICA Team*

The membership lists and group profiles of the selected farmer groups were collected.

In most cases the selected farmer groups met the criteria. However in several cases SCAOs had difficulties on the selection. For instance there were no existing registered agricultural production/ marketing groups in the Mdach scheme. The selected model farmer group was comprised of 50 members who were the most active members from the IWUA. Also in the Gatitu/Muthaiga scheme two groups of Gatitu/Muthaiga were already existing and registered as farmer irrigation groups. The fifty (50) members of the model farmer group were chosen as representatives of sections/ blocks from those two groups.

Table 1.6.2 Selected Farmer Group Profile for Batch-1 Pilot Schemes

| Scheme | Sub-county | Name of Farmer Group | No. Membership | | |
|---|---|---|---|---|---|
| | | | Total | F | M |
| Pilot schemes in the sub-county where SHEP is NOT in practice (SHEP non-overlapped sub-counties) | | | | | |
| Olopito | Narok-North | Olopito Irrigation Scheme | 50 | 32 | 18 |
| Mdachi | Ganze | Mdachi Scheme | 55 | 28 | 22 |
| G/Muthaiga | Laikipia-West | Gathitu-Muthaiga | 53 | 35 | 18 |
| Murachake | Mbeere-North | Ukulima Bora S.H.G | 20 | 6 | 14 |
| Kaben | Marakwet-East | Kaben Irrigation Scheme | 50 | 33 | 17 |
| Tumutumu | Igembe-South | Bainthanga Water Project | 50 | 34 | 16 |
| Pilot schemes in the sub-county where SHEP is in practice (SHEP overlapped sub-counties) | | | | | |
| Kasokoni | Taveta | Ngoyaki Foundation C.B.O | 18 | 6 | 12 |
| Muungano | Tharaka-South | Turkey Self Help Group | 19 | 10 | 9 |

*Source: JICA Team*

Table 1.6.3 Sample Farmer Group Profile for Batch-1 Pilot Schemes / Olopito Scheme

SIDEMAN SAL Project

Group Profile: Date 4/09/2013

Name of Group OLOPITO Irrigation Scheme Scheme Name OLOPITO Irrigation scheme

County NAROK Sub-County Narok north

1. Membership: Total No. 50 Male; 32 Female; 18
2. Composition of Group Members: Total No. Male; Female;
3. Leadership:
   - Chairperson's Name: Solomon Sopia Sex: M. Telephone No.: 0707666270
   - Secretary's Name: Joshua K. Ronko Sex: M. Telephone No.: 0723 836 213
   - Treasurer's Name: Magdaline Nkomun Sex: F Telephone No.: 0704840875
4. Date of last election of the officials:
5. Day of the Group Meeting:

| Type of meeting | Day/Month |
|---|---|
| General Meeting | Three times a year April AUG Dec. |
| Monthly Meeting | First week of every month (Friday) |
| Weekly Meeting | N/A |

*The contents in this format are based on the forms utilized by SHEP© Project*

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*Source: JICA Team*

Table 1.6.4 Sample Farmer Group Member List for Batch-1 Pilot Schemes / Olopito Scheme

SIDEMAN SAL Project

Model Farmer Group Membership List (Year )  Date 4/09/2013

Name of Group  Scheme Name

County  Sub County

| No. | Name of Farmer | M/F | ID No. | Date Joined | Agreed on code of conduct | Membership Fee Paid | | Signature (Farmer) |
|---|---|---|---|---|---|---|---|---|
| | | | | | Signature (Farmer) | Date | Signature (Officials) | |
| 1 | Jonathan Kowa | M | 20759109 | 2000 | | 2013 | | |
| 2 | Samson Sankok | M | 11661812 | 2000 | | 2013 | | |
| 3 | Samson Lekue | M | 20403166 | 2000 | | 2013 | | |
| 4 | Leonard Kowa | M | 21596897 | 2000 | | 2013 | | |
| 5 | Solomon Sopia | M | 25724316 | 2000 | | 2013 | | |
| 6 | Daniel Simat | M | 20759019 | 2000 | | 2013 | | |
| 7 | Mary Simat | F | 0101698 | 2000 | | 2013 | | |
| 8 | Agines Simat | F | 22755150 | 2000 | | 2013 | | |
| 9 | Magdaline Ukumgan | F | 9884284 | 2000 | | 2013 | | |
| 10 | John Ukumum | M | 9174173 | 2000 | | 2013 | | |

*The contents in this format are based on the forms utilized by SHEP© Project*

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*Source: JICA Team*

### 1.6.2 Baseline Survey Workshop

#### (1) Baseline Survey Workshop

The first training session on the introduction of the core components of SHEP Approach was held on October 30, 2013 at Mwea Irrigation Agricultural Development (MIAD) Center, Wanguru. Sub-county officers including SCAO, DAEO and FEO, and two farmer representatives from each pilot scheme in the six sub-counties where SHEP is not in practice were participated in the workshop.

At the beginning of the workshop the farmers' representatives for the model group presented a signed certification of their democratic selection and confirmation that the selected farmers would pass all the information learned at the training workshop to the other members of the group within the designated period after workshop.

#### (2) Field Farmer Training Session

Under the supervision of the sub-county agricultural officers including SCAOs (also Crop Officers and Agric. Business Officers if available) and DAEOs, the FEOs and all farmer groups were requested to hold the field farmer training sessions and data collection gatherings at each pilot scheme. The farmer groups in the two pilot schemes located in the SHEP overlapping sub-counties have conducted baseline surveys accordance with the implementation procedure and schedule organized by SHEP Unit (refer Chapter 6.7.6: Collaboration Field Visits in the Sub-County where SHEP is in Practice).

#### (3) Follow-up Field Visit

Immediately after the workshop SIDEMAN-SAL formed the follow-up field visit teams and observed the field farmer training activities for the purpose of progress managements at each pilot scheme site. County officers and farmer representatives who participated in the workshop seemed to be well understood about topics learned at the workshop, and they passed on all theoretical and practical knowledge to other member farmers at the field farmer training sessions.

Table 1.6.5 Follow-up Field Visits for the Baseline Survey Workshop

| Date | Scheme | Sub-county | County |
|---|---|---|---|
| November 14, 2013 | Olopito | Narok-North | Narok |
| November 14, 2013 | Mdachi | Ganze | Kilifi |
| November 19, 2013 | G/Muthaiga | Laikipia-West | Laikipia |
| November 19, 2013 | Murachake | Mbeere-North | Embu |
| November 21, 2013 | Kaben | Marakwet-East | Elgeyo-Marakwet |
| November 21, 2013 | Tumutumu | Igembe South | Meru |

*Source: JICA Team*

Because of the arrears of distribution/allocation of the requested budget for field activities in SIDEMAN-SAL agricultural activities funded by/derived from the Counterpart Funds, the emergency financial support for the field activity was provided.

### (4) Outline of the results of Baseline Survey

Submission of the baseline data of farmer group members consisting of 1) Crop Production and Income Analysis Data, 2) General Horticultural Crop Production and Post Harvest Handling Technique and 3) Group Empowerment Indicator were requested by the end of November 2013.

Table 1.6.6 Number of Sample Collected on Baseline Survey

| Scheme | Sub-county | Name of Farmer Group | Sample |
|---|---|---|---|
| Pilot schemes in the sub-county where SHEP is NOT in practice | | | |
| Olopito | Narok-North | Olopito Irrigation Scheme | 48 |
| Mdachi | Ganze | Mdachi scheme | 55 |
| G/Muthaiga | Laikipia-West | Gathitu-Muthaiga | 47 |
| Murachake | Mbeere-North | Ukulima Bora S.H.G | 20 |
| Kaben | Marakwet-East | Kaben Irrigation Scheme | 46 |
| Tumutumu | Igembe-South | Bainthanga Water Project | 45 |
| Pilot schemes in the sub-county where SHEP is in practice | | | |
| Kasokoni | Taveta | Ngoyaki Foundation C.B.O | 16* |
| Muungano | Tharaka-South | Turkey Self Help Group | 14* |

* Compiled data set was provided from SHEP Unit *Source: JICA Team*

#### 1) Crop Production and Income Analysis Data

Because the model farmer groups in Kasokoni and Muungano are located in the SHEP overlapping sub-counties (Taveta and Tharaka-south counties, respectively) and they reported only horticultural enterprises in the 5 major enterprises produced by the model farmer groups, it is difficult to simply compare the average net income per group member of the model farmer groups between in the SHEP-NON-overlapping sub-counties and SHEP-overlapping sub-counties.

On the Table 1.6.7, among the model farmer groups in SHEP non-overlapping sub-counties it is observed that the model farmer groups in Gathitu-Mutahiga and Kaben reported the higher average Net Income per group member (Ksh. 145,547 and Ksh. 149,271, respectively) compared to that of the groups in Tumutumu (Ksh. 5,972). Five measure enterprises produced by the model farmer group in Gathitu-Muthaiga and Kaben consisted mainly on horticultural and fruit crops such as Tomato, Cabbage, Onion, Mango and Banana where the measure enterprises in Tumutumu consisted only grain crops. Similar trend was observed on the model farmer group in Murachake.

Table 1.6.7 Outline of Baseline Survey

| Basic Information | | Sample # | Enterprise | Member Average | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2. Area under the crop (Acre) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
| Scheme | Farmer Group Name | | 5 major enterprises produced in the farmer group | 2b. | (5.x 7.) | 9 | (8 – 9) |
| | | | | Acres | Ksh | Ksh | Ksh |
| Pilot schemes in the sub-county where SHEP is NOT in practice | | | | | | | |
| OLOPITO | Olopito Irrigation Scheme | 48 | Green Maiz, Beans, Kale, Tomato, Cabbage | 2.019 | 91,722 | 38,531 | 53,594 |
| MDACHI | Mdachi Scheme | 55 | Green maiz, Cowpie, Kunde, Cassava, Muchicha | 3.091 | 59,257 | 20,228 | 39,028 |
| G/MUTHAIGA | Gathitu-Muthaiga | 47 | Cabbage, Green Maiz, Tomato, Beans, Onion | 1.819 | 234,051 | 88,505 | 145,547 |
| MURACHAKE | Uklima Bora S.H.G. | 20 | Sorghum, Green Maiz, Cowpie, Maiz, Millet | 4.755 | 33,114 | 20,336 | 12,778 |
| KABEN | Kaben Irrigation Scheme | 46 | Maize, Mango, Banana, Beans, Green Maiz | 2.637 | 212,211 | 62,940 | 149,271 |
| TUMUTUMU | Bainthanga Water Project | 45 | Maize, Pigeon peas, Cowpie, Beans, Green Maiz | 3.495 | 49,080 | 43,164 | 5,972 |
| Pilot schemes in the sub-county where SHEP is in practice (Reported only Hort. Crops) | | | | | | | |
| KASOKONI | Ngoyaki Foundation C.B.O. | 16 | Banana, Tomato, Kale, Bulb onion, Capsicum | 0.498 | 31,218 | 13,177 | 18,041 |
| MUUNGANO | Turkey Self Help Group | 14 | Tomato, Avocado, Mango, Kale, Banana | 0.025 | 3,747 | 633 | 3,114 |

*Source: JICA Team*

On the Table 1.6.8, comparisons among the model farmer groups in four schemes, Olopito, Gathitu-Muthaiga, Kasokoni and Muungano, on the Tomato production, the average area under crop are almost same (around 1/2 acre) except Muungano. It seems that the productivity (in Net Produce per Acre) of model group farmers in Gathitu-Muthaiga (8,076kg/acre) is higher than that of farmers in other two schemes (4,591kg/acre in Olopito and 4,073kg/acre in Kasokoni, respectively). However the average farm-gate price in Olopito (Ksh.39/kg) is larger than that in other two schemes (Ksh.33/kg in Gathitu-Muthaiga and Ksh.21/kg in Kasokoni, respectively) and this affected the difference in average net income per farmer in between Olopito (Ksh.50,112) and Kasokoni (Ksh.17,100).

Table 1.6.8 Outline of Baseline Survey/ Five Major Enterprises in the Schemes 1

**Pilot schemes in the sub-county where SHEP is NOT in practice**

| Scheme | Enterprise | | No. farmers producing in a Farmer Group | 2. Area under the crop (Acre) | 3. Total Production (Kg) | 4. Total Production per Acre (Kg/Acre) | 5. Net Produce (kg) | 6. Net Produce per Acre (kg/Acre) | 7. Average Price per Kg (Ksh/Kg) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2b. | 3 | (3./2b) | 5 | (5./2b) | 7 | (5.x 7.) | 9 | (8 – 9) |
| | | | | **Acres** | **Kg** | **Kg/Acre** | **Kg** | **Kg/Acre** | **Ksh/Kg** | **Ksh** | **Ksh** | **Ksh** |
| OLOPITO | GREEN MAIZ | TOTAL | 45 | 72.756 | 40,510.0 | --- | 33,700.0 | --- | --- | 1,087,019 | 759,955 | 327,064 |
| | | AVERAGE | 45 | 1.617 | 900.2 | 593.4 | 748.9 | 488.7 | 32 | 24,156 | 16,888 | 7,268 |
| | BEANS | TOTAL | 43 | 34.293 | 11,007.3 | --- | 10,186.7 | --- | --- | 673,068 | 316,255 | 356,813 |
| | | AVERAGE | 43 | 0.798 | 256.0 | 326.1 | 236.9 | 300.8 | 67 | 15,653 | 7,355 | 8,298 |
| | KALE | TOTAL | 18 | 7.072 | 50,425.0 | --- | 37,750.0 | --- | --- | 412,550 | 183,030 | 229,520 |
| | | AVERAGE | 18 | 0.393 | 2,801.4 | 6,014.3 | 2,097.2 | 4,792.5 | 12 | 22,919 | 10,168 | 12,751 |
| | TOMATO | TOTAL | 10/11 | 5.750 | 28,004.0 | --- | 23,900.0 | --- | --- | 839,520 | 338,400 | 501,120 |
| | | AVERAGE | 10/11 | 0.575 | 2,800.4 | 5,531.6 | 2,390.0 | 4,591.3 | 39 | 83,952 | 33,840 | 50,112 |
| | CABBAGE | TOTAL | 10 | 5.179 | 104,625.0 | --- | 91,600.0 | --- | --- | 1,390,500 | 232,495 | 1,158,005 |
| | | AVERAGE | 10 | 0.518 | 10,462.5 | 24,656.1 | 9,160.0 | 22,052.0 | 20 | 139,050 | 23,250 | 115,801 |
| MDACHI | GREEN MAIZE | TOTAL | 50 | 143.050 | 38,226.5 | --- | 35,411.0 | --- | --- | 1,536,765 | 806,795 | 729,970 |
| | | AVERAGE | 50 | 2.861 | 764.5 | 451.3 | 708.2 | 412.4 | 45 | 30,735 | 16,136 | 14,599 |
| | COWPIE | TOTAL | 15 | 20.757 | 1,296.9 | --- | 949.5 | --- | --- | 72,265 | 34,140 | 38,125 |
| | | AVERAGE | 15 | 1.384 | 86.5 | 186.1 | 63.3 | 125.0 | 78 | 4,818 | 2,276 | 2,542 |
| | KUNDE | TOTAL | 15 | 11.828 | 10,526.5 | --- | 10,421.5 | --- | --- | 826,625 | 35,210 | 791,415 |
| | | AVERAGE | 15 | 0.789 | 701.8 | 435.5 | 694.8 | 410.5 | 75 | 55,108 | 2,347 | 52,761 |
| | CSSAVA | TOTAL | 14 | 20.915 | 7,140.0 | --- | 6,449.0 | --- | --- | 205,760 | 64,500 | 141,260 |
| | | AVERAGE | 14 | 1.494 | 510.0 | 1,067.2 | 460.6 | 972.5 | 38 | 14,697 | 4,607 | 10,090 |
| | MCHICHA | TOTAL | 12 | 2.987 | 6,294.0 | --- | 6,112.0 | --- | --- | 170,990 | 18,790 | 152,200 |
| | | AVERAGE | 12 | 0.249 | 524.5 | 1,689.9 | 509.3 | 1,632.3 | 32 | 14,249 | 1,566 | 12,683 |
| G/MUTHAIGA | CABBAGE | TOTAL | 39 | 19.774 | 300,687.0 | --- | 273,344.0 | --- | --- | 2,324,314 | 993,890 | 1,330,424 |
| | | AVERAGE | 39 | 0.507 | 7,709.9 | 15,369.0 | 7,008.8 | 13,982.5 | 8 | 59,598 | 25,484 | 34,113 |
| | GREEN MAIZE | TOTAL | 37 | 25.430 | 33,225.0 | --- | 30,735.0 | --- | --- | 825,602 | 374,565 | 451,037 |
| | | AVERAGE | 37 | 0.687 | 898.0 | 1,335.3 | 830.7 | 1,215.2 | 26 | 22,314 | 10,123 | 12,190 |
| | TOMATO | TOTAL | 34 | 13.692 | 133,012.0 | --- | 119,724.0 | --- | --- | 3,725,730 | 1,450,702 | 2,275,028 |
| | | AVERAGE | 34 | 0.403 | 3,912.1 | 9,109.9 | 3,521.3 | 8,075.8 | 33 | 109,580 | 42,668 | 66,913 |
| | BEANS | TOTAL | 15 | 4.932 | 3,178.0 | --- | 2,888.5 | --- | --- | 186,658 | 102,760 | 83,898 |
| | | AVERAGE | 15 | 0.329 | 211.9 | 626.6 | 192.6 | 564.8 | 66 | 12,444 | 6,851 | 5,593 |
| | ONION | TOTAL | 13/14 | 8.330 | 72,840.0 | --- | 70,800.0 | --- | --- | 1,578,150 | 469,590 | 1,108,560 |
| | | AVERAGE | 13/14 | 0.595 | 5,603.1 | 9,012.1 | 5,446.2 | 8,632.7 | 29 | 121,396 | 36,122 | 85,274 |

*Source: JICA Team*

Table 1.6.9 Outline of Baseline Survey/ Five Major Enterprises in the Schemes 2

**Pilot schemes in the sub-county where SHEP is NOT in practice**

| Scheme | Enterprise | | No. farmers producing in a Farmer Group | 2. Area under the crop (Acre) | 3. Total Production (Kg) | 4. Total Production per Acre (Kg/Acre) | 5. Net Produce (kg) | 6. Net Produce per Acre (kg/Acre) | 7. Average Price per Kg (Ksh/Kg) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2b. | 3 | (3./2b) | 5 | (5./2b) | 7 | (5.x 7.) | 9 | (8 – 9) |
| | | | | **Acres** | **Kg** | **Kg/Acre** | **Kg** | **Kg/Acre** | **Ksh/Kg** | **Ksh** | **Ksh** | **Ksh** |
| MURACHAKE | SORGHUM | TOTAL | 20 | 19.715 | 3,906.0 | --- | 3,350.0 | --- | --- | 103,200 | 84,115 | 19,085 |
| | | AVERAGE | 20 | 0.986 | 195.3 | 340.3 | 167.5 | 277.3 | 34 | 5,160 | 4,206 | 954 |
| | GREEN GRAM | TOTAL | 20 | 22.172 | 2,233.0 | --- | 1,902.0 | --- | --- | 146,910 | 80,057 | 66,853 |
| | | AVERAGE | 20 | 1.109 | 111.7 | 242.5 | 95.1 | 200.6 | 74 | 7,346 | 4,003 | 3,343 |
| | COWPEA | TOTAL | 19 | 13.967 | 3,754.0 | --- | 3,284.0 | --- | --- | 145,510 | 89,043 | 56,467 |
| | | AVERAGE | 18 | 0.735 | 197.6 | 296.3 | 172.8 | 245.7 | 46 | 7,658 | 4,686 | 2,972 |
| | MAIZE | TOTAL | 14 | 22.142 | 6,095.0 | --- | 5,638.0 | --- | --- | 164,935 | 71,230 | 93,705 |
| | | AVERAGE | 14 | 1.582 | 435.4 | 409.2 | 402.7 | 354.0 | 32 | 11,781 | 5,088 | 6,693 |
| | MILLET | TOTAL | 13 | 10.232 | 1,921.0 | --- | 1,588.0 | --- | --- | 70,800 | 63,090 | 7,710 |
| | | AVERAGE | 13 | 0.787 | 147.8 | 249.9 | 122.2 | 178.6 | 48 | 5,446 | 4,853 | 593 |
| KABEN | MAIZE | TOTAL | 41 | 37.368 | 57,137.5 | --- | 53,681.0 | --- | --- | 1,532,940 | 510,455 | 1,022,485 |
| | | AVERAGE | 41 | 0.911 | 1,393.6 | 2,693.3 | 1,309.3 | 2,411.1 | 30 | 37,389 | 12,450 | 24,939 |
| | MANGO | TOTAL | 25 | 22.474 | 382,905.0 | --- | 345,670.0 | --- | --- | 2,283,378 | 764,656 | 1,518,722 |
| | | AVERAGE | 25 | 0.899 | 15,316.2 | 25,767.5 | 13,826.8 | 22,882.2 | 8 | 91,335 | 30,586 | 60,749 |
| | BANANA | TOTAL | 24 | 8.852 | 153,890.0 | --- | 144,238.0 | --- | --- | 1,774,331 | 619,437 | 1,154,894 |
| | | AVERAGE | 24 | 0.369 | 6,412.1 | 28,841.2 | 6,009.9 | 27,009.5 | 13 | 73,930 | 25,810 | 48,121 |
| | BEANS | TOTAL | 22 | 7.620 | 9,053.0 | --- | 8,514.0 | --- | --- | 657,072 | 131,030 | 526,042 |
| | | AVERAGE | 22 | 0.346 | 411.5 | 1,049.7 | 387.0 | 948.0 | 74 | 29,867 | 5,956 | 23,911 |
| | GREEN GRAM | TOTAL | 22 | 15.165 | 5,808.0 | --- | 4,929.0 | --- | --- | 569,800 | 181,240 | 388,560 |
| | | AVERAGE | 22 | 0.689 | 264.0 | 1,301.9 | 224.0 | 1,138.4 | 113 | 25,900 | 8,238 | 17,662 |
| TUMUTUMU | MAIZE | TOTAL | 37 | 79.498 | 32,905.0 | --- | 28,180.0 | --- | --- | 990,800 | 859,180 | 131,620 |
| | | AVERAGE | 37 | 2.149 | 889.3 | 536.2 | 761.6 | 435.5 | 36 | 26,778 | 23,221 | 3,557 |
| | PIGEON PEA | TOTAL | 28/30 | 22.543 | 11,160.0 | --- | 9,100.0 | --- | --- | 302,000 | 416,170 | -73,000 |
| | | AVERAGE | 28/30 | 0.751 | 398.6 | 943.5 | 325.0 | 604.6 | 40 | 10,786 | 13,872 | -2,607 |
| | COWPEA | TOTAL | 12/13 | 6.970 | 2,250.0 | --- | 1,728.0 | --- | --- | 93,880 | 117,640 | -23,760 |
| | | AVERAGE | 12/13 | 0.581 | 187.5 | 445.9 | 144.0 | 314.9 | 53 | 7,823 | 9,803 | -1,980 |
| | BEANS | TOTAL | 12 | 6.965 | 1,445.0 | --- | 675.0 | --- | --- | 50,900 | 117,500 | -66,600 |
| | | AVERAGE | 12 | 0.580 | 120.4 | 364.5 | 56.3 | 135.2 | 77 | 4,242 | 9,792 | -5,550 |
| | GREEN GRAM | TOTAL | 8 | 9.707 | 2,440.0 | --- | 1,822.0 | --- | --- | 174,660 | 142,050 | 32,610 |
| | | AVERAGE | 8 | 1.213 | 305.0 | 372.9 | 227.8 | 226.1 | 94 | 21,833 | 17,756 | 4,076 |

*Source: JICA Team*

Table 1.6.10 Outline of Baseline Survey/ Five Major Enterprises in the Schemes 3

**Pilot schemes in the sub-county where SHEP is in practice (Only Horticultural Crops are reported)**

| Scheme | Enterprise | | No. farmers producing in a Farmer Group | 2. Area under the crop (Acre) | 3. Total Production (Kg) | 4. Total Production per Acre (Kg/Acre) | 5. Net Produce (kg) | 6. Net Produce per Acre (kg/Acre) | 7. Average Price per Kg (Ksh/Kg) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2b. | 3 | (3./2b) | 5 | (5./2b) | 7 | (5.x 7.) | 9 | (8 – 9) |
| | | | | **Acres** | **Kg** | **Kg/Acre** | **Kg** | **Kg/Acre** | **Ksh/Kg** | **Ksh** | **Ksh** | **Ksh** |
| KASOKONI | BANANA | TOTAL | 11 | 6.968 | 56,890.0 | --- | 53,570.0 | --- | --- | 476,440 | 113,750 | 362,690 |
| | | AVERAGE | 11 | 0.633 | 5,172.0 | 10,462.0 | 4,870.0 | 9,920.0 | 10 | 43,313 | 10,341 | 32,972 |
| | TOMATO | TOTAL | 8 | 4.276 | 18,035.0 | --- | 16,330.0 | --- | --- | 330,300 | 193,500 | 136,800 |
| | | AVERAGE | 8 | 0.535 | 2,254.0 | 4,486.0 | 2,041.0 | 4,073.0 | 21 | 41,288 | 24,188 | 17,100 |
| | KALE | TOTAL | 5 | 1.325 | 2,960.0 | --- | 2,555.0 | --- | --- | 51,100 | 22,700 | 28,400 |
| | | AVERAGE | 5 | 0.265 | 592.0 | 2,847.0 | 511.0 | 2,445.0 | 20 | 10,220 | 4,540 | 5,680 |
| | BULB ONION | TOTAL | 4 | 2.856 | 2,780.0 | --- | 2,455.0 | --- | --- | 71,600 | 93,000 | -21,400 |
| | | AVERAGE | 4 | 0.714 | 695.0 | 890.0 | 614.0 | 776.0 | 33 | 17,900 | 23,250 | -5,350 |
| | CAPSICUM | TOTAL | 2 | 0.863 | 2,220.0 | --- | 2,030.0 | --- | --- | 71,700 | 18,270 | 53,430 |
| | | AVERAGE | 2 | 0.431 | 1,110.0 | 3,943.0 | 1,015.0 | 3,610.0 | 28 | 35,850 | 9,135 | 26,715 |
| MUUNGANO | TOMATO | TOTAL | 10 | 0.030 | 740.0 | --- | 730.0 | --- | --- | 22,950 | 2,850 | 20,100 |
| | | AVERAGE | 10 | 0.003 | 74.0 | 22,367.0 | 73.0 | 21,922.0 | 31 | 2,295 | 285 | 2,010 |
| | AVOCADO | TOTAL | 6 | 0.279 | 2,495.0 | --- | 2,364.0 | --- | --- | 51,470 | 4,830 | 46,640 |
| | | AVERAGE | 6 | 0.046 | 416.0 | 7,769.0 | 394.0 | 7,184.0 | 18 | 8,578 | 805 | 7,773 |
| | MANGO | TOTAL | 6 | 0.203 | 514.0 | --- | 514.0 | --- | --- | 23,700 | 5,780 | 17,920 |
| | | AVERAGE | 6 | 0.034 | 86.0 | 2,881.0 | 86.0 | 2,881.0 | 50 | 3,950 | 963 | 2,987 |
| | KALE | TOTAL | 3 | 0.009 | 45.0 | --- | 45.0 | --- | --- | 2,100 | 1,360 | 740 |
| | | AVERAGE | 3 | 0.003 | 15.0 | 9,156.0 | 15.0 | 9,156.0 | 33 | 700 | 453 | 247 |
| | BANANA | TOTAL | 1 | 0.025 | 120.0 | --- | 120.0 | --- | --- | 3,600 | 1,200 | 2,400 |
| | | AVERAGE | 1 | 0.025 | 120.0 | 4,800.0 | 120.0 | 4,800.0 | 30 | 3,600 | 1,200 | 2,400 |

*Source: JICA Team*

Table 1.6.11 Outline of Baseline Survey/ Comparison among Schemes on Enterprises 1

| Enterprise | | Scheme | No. farmers producing in a Farmer Group | 2. Area under the crop (Acre) | 3. Total Production (Kg) | 4. Total Production per Acre (Kg/Acre) | 5. Net Produce (kg) | 6. Net Produce per Acre (kg/Acre) | 7. Average Price per Kg (Ksh/Kg) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2b. | 3 | (3./2b) | 5 | (5./2b) | 7 | (5.x 7.) | 9 | (8 – 9) |
| | | | | Acres | Kg | Kg/Acre | Kg | Kg/Acre | Ksh/Kg | Ksh | Ksh | Ksh |
| GREEN MAIZE | AVERAGE | OLOPITO | 45 | 1.617 | 900.2 | 593.4 | 748.9 | 488.7 | 32 | 24,156 | 16,888 | 7,268 |
| | AVERAGE | MDACHI | 50 | 2.861 | 764.5 | 451.3 | 708.2 | 412.4 | 45 | 30,735 | 16,136 | 14,599 |
| | AVERAGE | G/MUTHAIGA | 37 | 0.687 | 898.0 | 1,335.3 | 830.7 | 1,215.2 | 26 | 22,314 | 10,123 | 12,190 |
| MAIZE | AVERAGE | MURACHAKE | 14 | 1.582 | 435.4 | 409.2 | 402.7 | 354.0 | 32 | 11,781 | 5,088 | 6,693 |
| | AVERAGE | KABEN | 41 | 0.911 | 1,393.6 | 2,693.3 | 1,309.3 | 2,411.1 | 30 | 37,389 | 12,450 | 24,939 |
| | AVERAGE | TUMUTUMU | 37 | 2.149 | 889.3 | 536.2 | 761.6 | 435.5 | 36 | 26,778 | 23,221 | 3,557 |
| BEANS | AVERAGE | OLOPITO | 43 | 0.798 | 256.0 | 326.1 | 236.9 | 300.8 | 67 | 15,653 | 7,355 | 8,298 |
| | AVERAGE | G/MUTHAIGA | 15 | 0.329 | 211.9 | 626.6 | 192.6 | 564.8 | 66 | 12,444 | 6,851 | 5,593 |
| | AVERAGE | KABEN | 22 | 0.346 | 411.5 | 1,049.7 | 387.0 | 948.0 | 74 | 29,867 | 5,956 | 23,911 |
| | AVERAGE | TUMUTUMU | 12 | 0.580 | 120.4 | 364.5 | 56.3 | 135.2 | 77 | 4,242 | 9,792 | -5,550 |
| COWPEA | AVERAGE | MURACHAKE | 18 | 0.735 | 197.6 | 296.3 | 172.8 | 245.7 | 46 | 7,658 | 4,686 | 2,972 |
| | AVERAGE | TUMUTUMU | 12/13 | 0.581 | 187.5 | 445.9 | 144.0 | 314.9 | 53 | 7,823 | 9,803 | -1,980 |
| | AVERAGE | MDACHI | 15 | 1.384 | 86.5 | 186.1 | 63.3 | 125.0 | 78 | 4,818 | 2,276 | 2,542 |
| GREEN GRAM | AVERAGE | MURACHAKE | 20 | 1.109 | 111.7 | 242.5 | 95.1 | 200.6 | 74 | 7,346 | 4,003 | 3,343 |
| | AVERAGE | KABEN | 22 | 0.689 | 264.0 | 1,301.9 | 224.0 | 1,138.4 | 113 | 25,900 | 8,238 | 17,662 |
| | AVERAGE | TUMUTUMU | 8 | 1.213 | 305.0 | 372.9 | 227.8 | 226.1 | 94 | 21,833 | 17,756 | 4,076 |
| KUNDE | AVERAGE | MDACHI | 15 | 0.789 | 701.8 | 435.5 | 694.8 | 410.5 | 75 | 55,108 | 2,347 | 52,761 |
| PIGEON PEA | AVERAGE | TUMUTUMU | 28/30 | 0.751 | 398.6 | 943.5 | 325.0 | 604.6 | 40 | 10,786 | 13,872 | -2,607 |
| CSSAVA | AVERAGE | MDACHI | 14 | 1.494 | 510.0 | 1,067.2 | 460.6 | 972.5 | 38 | 14,697 | 4,607 | 10,090 |
| SORGHUM | AVERAGE | MURACHAKE | 20 | 0.986 | 195.3 | 340.3 | 167.5 | 277.3 | 34 | 5,160 | 4,206 | 954 |
| MILLET | AVERAGE | MURACHAKE | 13 | 0.787 | 147.8 | 249.9 | 122.2 | 178.6 | 48 | 5,446 | 4,853 | 593 |

*Source: JICA Team*

Table 1.6.12 Outline of Baseline Survey/ Comparison among Schemes on Enterprises 2

| Enterprise | | Scheme | No. farmers producing in a Farmer Group | 2. Area under the crop (Acre) | 3. Total Production (Kg) | 4. Total Production per Acre (Kg/Acre) | 5. Net Produce (kg) | 6. Net Produce per Acre (kg/Acre) | 7. Average Price per Kg (Ksh/Kg) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2b. | 3 | (3./2b) | 5 | (5./2b) | 7 | (5.x 7.) | 9 | (8 – 9) |
| | | | | Acres | Kg | Kg/Acre | Kg | Kg/Acre | Ksh/Kg | Ksh | Ksh | Ksh |
| KALE | AVERAGE | OLOPITO | 18 | 0.393 | 2,801.4 | 6,014.3 | 2,097.2 | 4,792.5 | 12 | 22,919 | 10,168 | 12,751 |
| | AVERAGE | KASOKONI | 5 | 0.265 | 592.0 | 2,847.0 | 511.0 | 2,445.0 | 20 | 10,220 | 4,540 | 5,680 |
| | AVERAGE | MUUNGANO | 3 | 0.003 | 15.0 | 9,156.0 | 15.0 | 9,156.0 | 33 | 700 | 453 | 247 |
| TOMATO | AVERAGE | OLOPITO | 10/11 | 0.575 | 2,800.4 | 5,531.6 | 2,390.0 | 4,591.3 | 39 | 83,952 | 33,840 | 50,112 |
| | AVERAGE | G/MUTHAIGA | 34 | 0.403 | 3,912.1 | 9,109.9 | 3,521.3 | 8,075.8 | 33 | 109,580 | 42,668 | 66,913 |
| | AVERAGE | KASOKONI | 8 | 0.535 | 2,254.0 | 4,486.0 | 2,041.0 | 4,073.0 | 21 | 41,288 | 24,188 | 17,100 |
| | AVERAGE | MUUNGANO | 10 | 0.003 | 74.0 | 22,367.0 | 73.0 | 21,922.0 | 31 | 2,295 | 285 | 2,010 |
| CABBAGE | AVERAGE | G/MUTHAIGA | 39 | 0.507 | 7,709.9 | 15,369.0 | 7,008.8 | 13,982.5 | 8 | 59,598 | 25,484 | 34,113 |
| | AVERAGE | OLOPITO | 10 | 0.518 | 10,462.5 | 24,656.1 | 9,160.0 | 22,052.0 | 20 | 139,050 | 23,250 | 115,801 |
| ONION | AVERAGE | KASOKONI | 4 | 0.714 | 695.0 | 890.0 | 614.0 | 776.0 | 33 | 17,900 | 23,250 | -5,350 |
| | AVERAGE | G/MUTHAIGA | 13/14 | 0.595 | 5,603.1 | 9,012.1 | 5,446.2 | 8,632.7 | 29 | 121,396 | 36,122 | 85,274 |
| BANANA | AVERAGE | KABEN | 24 | 0.369 | 6,412.1 | 28,841.2 | 6,009.9 | 27,009.5 | 13 | 73,930 | 25,810 | 48,121 |
| | AVERAGE | KASOKONI | 11 | 0.633 | 5,172.0 | 10,462.0 | 4,870.0 | 9,920.0 | 10 | 43,313 | 10,341 | 32,972 |
| | AVERAGE | MUUNGANO | 1 | 0.025 | 120.0 | 4,800.0 | 120.0 | 4,800.0 | 30 | 3,600 | 1,200 | 2,400 |
| MANGO | AVERAGE | KABEN | 25 | 0.899 | 15,316.2 | 25,767.5 | 13,826.8 | 22,882.2 | 8 | 91,335 | 30,586 | 60,749 |
| | AVERAGE | MUUNGANO | 6 | 0.034 | 86.0 | 2,881.0 | 86.0 | 2,881.0 | 50 | 3,950 | 963 | 2,987 |
| MCHICHA | AVERAGE | MDACHI | 12 | 0.249 | 524.5 | 1,689.9 | 509.3 | 1,632.3 | 32 | 14,249 | 1,566 | 12,683 |
| CAPSICUM | AVERAGE | KASOKONI | 2 | 0.431 | 1,110.0 | 3,943.0 | 1,015.0 | 3,610.0 | 28 | 35,850 | 9,135 | 26,715 |
| AVOCADO | AVERAGE | MUUNGANO | 6 | 0.046 | 416.0 | 7,769.0 | 394.0 | 7,184.0 | 18 | 8,578 | 805 | 7,773 |

*Source: JICA Team*

**2) General Horticultural Crop Production and Post Harvest Handling Technique**

To assess the level of both individual farmers and Farmers Groups in adopting basic horticultural production techniques, General Horticultural Crop Production and Post Harvest Handling Technique (GHCP&PHHT) survey report was also submitted from each individual farmer.

This GHCP&PHHT survey is a tool to identify the capacity changes of both individual farmers and Farmers Groups in adopting basic horticultural production techniques, and this was the 1std survey for model farmer groups. On the Table 1.6.14, it is observed that a small proportion of farmers have conducted "Pre-cultivation Preparation" such as undertaking market survey (Q1), preparing crop planting calendar (Q2) and conducting soil testing (Q3). Also less than 1/4 of the entire farmers have practiced "Cost & Income Analysis (Q20)". In most cases farmers use at least one of the following harvesting indices: color, size, shape, and firmness (Q17).

Table 1.6.13 Outline of Baseline Survey/ Questions on GHCP&PHHT

| Pre to Post Cultivation Stages | | Items | Horticultural/Crop Production Techniques Advocated for Adoption | Yes* | No |
|---|---|---|---|---|---|
| 1 | Pre-Cultivation Preparation | Q 1 | Does the farmer undertake a **market survey** to determine the crop(s) to cultivate each season? | | |
| | | Q 2 | Does the farmer prepare and use **crop planting calendar(s)** based on the market survey results? | | |
| | | Q 3 | Does the farmer undertake **soil testing** at least once in two years for vegetables/annual flowers; or before the planting for fruit trees/perennial flowers? | | |
| | | Q 4 | Does the farmer use recommended **composting** practices by using different organic materials to supply major nutrients: Nitrogen (N), Phosphorus (P), and Potassium (K) in preparing compost/manure? | | |
| | | Q 5 | Does the farmer use recommended **quality planting material(s)** with one or more of the following characteristics: disease resistance and tolerance, high yield, early maturity, better tastes, size, and longer shelf life? | | |
| 2 | Land Preparation | Q 6 | Does the farmer use with one or more following recommended **land preparation practices** in management of pests & diseases: solarization, timely ploughing, appropriate depth of ploughing, and minimizing movement of soil to check possible spread soil borne pests & diseases? | | |
| | | Q 7 | Does the farmer **incorporate crops residue** at least two months before planting into the farm during ploughing to enhance recycling of nutrients? | | |
| | | Q 8 | Does the farmer in corporate compost/manure or organic fertilizer as a **basal application** at least 1-2 weeks before the planting? | | |
| 3 | Crop Establishment (Planting/ Transplanting) | Q 9 | Does the farmer use recommended practices in **raising seedlings** for vegetables/annual flowers or use seedlings for fruit trees/perennial flowers raised from recognized nursery(s)? | | |
| | | Q 10 | Does the farmer use recommended planting/transplanting **spacing**? | | |
| | | Q 11 | Does the farmer plant/transplant using recommended **fertilizer application rates**? | | |
| 4 | Crop Management | Q 12 | Does the farmer **supplement crop water requirement** through one or more of the following irrigation methods: watering can, overhead, drip, and fallow to meet the minimum crop water requirement? | | |
| | | Q 13 | Does the farmer ensure timely weeding and use of appropriate weeding tools in **managing of weeds**? | | |
| | | Q 14 | Does the farmer undertake appropriate **top-dressing** practices: timeliness, type and recommended rate of application, and method of application? | | |
| | | Q 15 | Does the farmer use at least two of the following **Integrated Pests Management (IPM) practices**: cultural, biological, physical and chemical? | | |
| | | Q 16 | Does the farmer observe the following use of **safe and effective use of pesticides**: appropriate doses, recommended pesticides, and Pre Harvest Interval (PHI)? | | |
| 5 | Harvest | Q 17 | Does the farmer use at least one of the following **harvesting indices**: color, size, shape, and firmness? | | |
| 6 | Post-Harvest Handling | Q 18 | Does the farmer use **harvesting/storage/transportation containers/standard packaging materials** with following characteristics: well-ventilated, easy to clean, and smooth thus minimizing damages? | | |
| | | Q 19 | Does the farmer apply one of the following recommended value addition techniques: **cleaning, sorting, grading, packaging or processing of the produce** ? | | |
| 7 | Cost and Income Analysis | Q 20 | Does the farmer keep records on cost of production and sales and undertake **cost and income analysis**? | | |

*Source: JICA Team*

Table 1.6.14 Outline of Baseline Survey/ Summary Table on GHCP&PHHT Results

| Basic Information | | Percent adoption of each item of the GHCP&PHHT (by the group members) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pre-Cultivation Preparation | | | | | Land Preparation | | | Crop Establishment (Planting/ Transplanting) | | | Crop Management | | | | | Harvest | Post-Harvest Handling | | Cost & Income Analysis |
| SCHEME | Sample# | Q01 | Q02 | Q03 | Q04 | Q05 | Q06 | Q07 | Q08 | Q09 | Q10 | Q11 | Q12 | Q13 | Q14 | Q15 | Q16 | Q17 | Q18 | Q19 | Q20 |
| OLOPITO | 48 (F:17/M:31) | 10.9 | 30.4 | 2.2 | 60.9 | 93.5 | 76.1 | 58.7 | 32.6 | 47.8 | 28.3 | 15.6 | 50.0 | 95.7 | 23.9 | 73.9 | 26.1 | 91.1 | 8.7 | 78.3 | 20.5 |
| MDACHI | 55 (F:26/M:29) | 5.5 | 1.8 | 0.0 | 9.1 | 20.4 | 12.7 | 14.5 | 7.4 | 14.5 | 36.4 | 9.1 | 16.4 | 30.9 | 9.3 | 57.4 | 7.7 | 61.8 | 20.0 | 10.9 | 3.7 |
| GATITU-MUTHAIGA | 47 (F:14/M:33) | 14.9 | 14.9 | 2.1 | 46.8 | 87.0 | 66.0 | 31.9 | 27.7 | 55.3 | 68.1 | 31.9 | 89.1 | 74.5 | 53.2 | 70.2 | 54.3 | 97.9 | 65.2 | 80.9 | 26.1 |
| MURACHAKE | 20 (F:14/M:6) | 15.0 | 10.0 | 0.0 | 90.0 | 70.0 | 90.0 | 40.0 | 55.0 | 10.0 | 60.0 | 10.5 | 10.0 | 95.0 | 10.5 | 90.0 | 50.0 | 100.0 | 15.0 | 78.9 | 5.0 |
| KABEN | 46 (F:12/M:34) | 17.8 | 13.3 | 0.0 | 26.1 | 100.0 | 95.6 | 41.3 | 4.3 | 58.7 | 63.0 | 2.2 | 95.7 | 87.0 | 8.9 | 93.5 | 40.0 | 95.6 | 78.3 | 100.0 | 19.6 |
| TUMUTUMU | 45 (F:13/M:32) | 0.0 | 0.0 | 0.0 | 31.1 | 73.3 | 86.7 | 88.9 | 37.8 | 17.8 | 51.1 | 6.7 | 24.4 | 100.0 | 8.9 | 97.8 | 0.0 | 100.0 | 0.0 | 100.0 | 0.0 |
| KASOKONI | 16 (F:6/M:10) | 0.0 | 6.3 | 0.0 | 75.0 | 75.0 | 62.5 | 62.5 | 25.0 | 100.0 | 25.0 | 25.0 | 100.0 | 87.5 | 87.5 | 100.0 | 18.8 | 100.0 | 18.8 | 100.0 | 6.3 |
| MUUNGANO | 14 (F:8/M:6) | 7.1 | 7.1 | 7.1 | 7.1 | 14.3 | 7.1 | 92.9 | 92.9 | 7.1 | 7.1 | 0.0 | 42.9 | 92.9 | 21.4 | 85.7 | 35.7 | 92.9 | 92.9 | 92.9 | 21.4 |

* Adoption of each General Horticultural Crop Production & Post-Harvest Handling Technique by the group members in percentage

*Source: JICA Team*

### 3) Group Empowerment Indicator

The Group Empowerment Indicators (GEIs) is a tool to determine the capacity change of the Farmers Groups in terms of Leadership, Cooperation among members & Gender. 5 levels are set from both qualitative aspects (do not require measurement) and quantitative aspects (measurable) which guide the level of farmers group in terms of previous 3 concepts and how they network with other community members.

The outline of each level is defined as follows:
GEI Level I: The group is formed as recommended by outsiders. But not all members are fully convinced of its benefit.
GEI Level II: The group members are becoming aware of the benefits of grouping.
GEI Level III: The group members became confident in each other.
GEI Level IV: Strong ties have been established among the group members. The members are interested in the capacity enhancement of the group as well as the community as a whole.
GEI Level V: The group is able to work together to address various problems and can build and maintain a network with other groups and organizations.

Table 1.6.15 Outline of Baseline Survey/ Summary on GEI

| Scheme | Name of Farmer Group | Sample # | | | GEI score | | | |
|---|---|---|---|---|---|---|---|---|
| | | T | F | M | L | C | G | **GEI** |
| Pilot schemes in the sub-county where SHEP is NOT in practice | | | | | | | | |
| Olopito | Olopito Irrigation Scheme | 44 | 18 | 26 | III | II | II | **II** |
| Mdachi | Mdachi scheme | 50 | 20 | 30 | II | III | III | **II** |
| G/Muthaiga | Gathitu-Muthaiga | 37 | 13 | 24 | II | II | IV | **II** |
| Murachake | Ukulima Bora S.H.G | 20 | 14 | 6 | II | II | II | **II** |
| Kaben | Kaben Irrigation Scheme | 19 | 5 | 14 | I | I | I | **I** |
| Tumutumu | Bainthanga Water Project | 49 | 17 | 32 | I | I | III | **I** |
| Pilot schemes in the sub-county where SHEP is in practice | | | | | | | | |
| Kasokoni | Ngoyaki Foundation C.B.O | 18 | 6 | 12 | II | II | II | **II** |
| Muungano | Turkey Self Help Group | 19 | 10 | 9 | II | II | II | **II** |

*T: Total, F: Female, M: Male, L: Leadership, C: Cooperation among members, G: Gender and GEI: GEI Level

*Source: JICA Team*

Table 1.6.16 Sample Group Empowerment Indicator (GEI) Report for Batch-1 Pilot Schemes / Olopito Scheme

SIDEMAN-SAL
Sustainable Smallholder Irrigation Development and Management in Semi-Arid Lands Project

**Report of the Group Empowerment Indicators**

Date: 19/11/013

Group Name: OLOPITO Pilot Scheme

Name of Pilot Scheme: OLOPITO

Attendance: Total No. 44 Female/ 18 Male/ 26

| Essential Parameter in Group Cohesiveness | Level observed |
|---|---|
| Leadership | III |
| Cooperation among Members | II |
| Gender | II |

| | | |
|---|---|---|
| Overall Group Empowerment Level | II | The group needs more trainings on Leadership/gender. |

Name of Chairperson: Solomon Sopia Signature:

Name of FEO: JOSEPH NYAORIBO Signature:

Name of SCAO: Stephen Kiretai Signature:

1 *The contents in this format are based on the forms developed by SHEP[c] Project*

*Source: JICA Team*

### 1.6.3 Market Survey and Crop Planting Calendar Making Workshop

**(1) Workshop and Field Survey**

Series of training activities in the core components of SHEP Approach were implemented on between the 3rd and 5th of December, 2013 at MIAD Center again. Sub-county officers and two farmer representatives who did NOT participate previous training workshop, from each pilot scheme in the six non-SHEP overlapping sub-counties were participated in the workshop.
Simulation of the Market-Survey was included in this series of training, and SIDEMAN- SAL received great helps on the arrangement of the simulation from the local SCAOs having jurisdiction over Kagio market located near by the MIAD center.
SIDEMAN-SAL again visited at the field farmer training sessions/ activities for the purpose of progress managements at each pilot scheme site.

Table 1.6.17 Follow-up Field Visits for the Market Survey and Crop Planting Calendar Making Workshop

| Date | Scheme | Sub-county | County |
|---|---|---|---|
| December 16, 2013 | Olopito (1) | Narok-North | Narok |
| December 17, 2013 | Mdachi (1) | Ganze | Kilifi |
| December 18, 2013 | Murachake (1) | Mbeere-North | Embu |
| December 20, 2013 | Kaben (1) | Marakwet-East | Elgeyo-Marakwet |
| December 20, 2013 | Tumutumu (1) | Igembe-South | Meru |
| January 15, 2014 | Mdachi (2) | Ganze | Kilifi |
| January 17, 2014 | Olopito (2) | Narok-North | Narok |
| January 22, 2014 | G/Muthaiga (1) | Laikipia-West | Laikipia |
| January 22, 2014 | Tumutumu (2) | Igembe-South | Meru |
| January 24, 2014 | Murachake (2) | Mbeere-North | Embu |
| January 24, 2014 | Kaben (2) | Marakwet-East | Elgeyo-Marakwet |

*Source: JICA Team*

The emergency financial support for this field activity was again provided with the same reason mentioned previously.

The end-products of this series of activities in the training package including 1) Market Survey Report, 2) Crop Selection, 3) Crop Ranking, 4) Problem Maps, 5) Objective Maps 6) Group Action Plan and 7) Crop Planting Calendar were submitted after about two months period for preparation.

**(2) Market survey:**

Farmer group selected examiners/ representatives including the farmer representatives who participated in the previous Market Survey and Crop Planting Calendar Making Workshop, and formed a survey team. ScAO and FEOs previously identified appropriate market place and obtained permission from the market authorities for survey. Survey team carried out the survey based on the survey questionnaire forms and recorded information on the forms.

Items on the questionnaire are; a) Name of produce dealer, b) Produce (and variety) handled, c) Quality requirement, d) Peak demand, e) Required quantity and frequency of supply, f) Place of production, g) Purchasing unit price, h) Mode of payment, i) Terms of payment and j) Marketing challenges. At the time same time the survey team also collected market information on each target enterprise/crop and recorded (see Table 1.6.18).

Table 1.6.18 Sample Market Survey Results Report for Batch-1 Pilot Schemes / Gathitu-Muthaiga Scheme

***Sustainable** Smallholder **Irrigation Development and Management in semi-Arid Lands Project***

Market Survey results

*Name of Farmer Group*: **Gatitu Muthaiga** *Name of Scheme*: **Gatitu Muthaiga** *Date:* **21/01/2014**

| Name and contact of produce dealer | Produce and variety | Produce quality requirement | Peak demand (month) | Quantity and frequency of supply | | Place of production | Purchasing unit price (kshs/kg) | Mode of payment | Terms of payment | Marketing challenges |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Quantity of supply (kg) | Frequency (daily/weekly etc) of supply | | | | | |
| Moses Theuri 0726890820 | Purple passion | By colour | March - November | 1000kg | weekly | Sipili Nyeri Nakuru | 50 | Cash Cheque | Cash on delivery | High taxation |
| Margaret Wairimu 0712264670 | Sweet pepper California wonder | Firmness | October - December | 100kgs | weekly | Rumuruti kiamariga | 70 | Cash M-pesa | Cash on delivery | Loss of quality due to breakage during transportation. |
| Mary Njeri 0713459999 | Carrots Nantes | Fully mature Smooth Orange in colour medium to large size | March -April | 500kgs | weekly | Karuga Losogwa Boiman Ndunduri | 35 | cash | -Cash on delivery -cash after delivery | Loss in the market place due to lack of storage facility |
| Nancy Waithera 0726496360 | Cabbage Globe master | Firm heads | January - March | 3000 pieces | Weekly | Pesi Kiamariga Ng'arua Subukia | 20 | cash | Cash on delivery | Poor means of transport Lack of storage facilities |
| Grace Wanjiru 0720789883 | Kales/Spinach Thousand headed Giant fordhook | Clean fresh leaves | January-March | 300kgs | daily | Bushi Rumuruti Wiyumiririe Subukia Nyahururu | 12 | Cash M-Pesa | Cash on delivery One day after delivery | Highly perishable |
| Harrison Ndung'u 0720363035 | Bulb onions Red pinnoy passion | Well cured medium in size | May -July | 2000kgs | weekly | Rombo Mutara Busia Nyeri Tanzania | 27 | Cash | Cash on delivery | Rotting due to poor curing |
| Pauline Wambui 0728497782 | Tomatoes Onex Rio-grade | Large size Almost red in colour | November, April and May | 4000kgs | weekly | Mutara Subukia -Pesi -Ng'arua -Rumuruti | 35 | Cash M-pesa | Cash on delivery | Theft of produce at the market place. High cost of transport due to poor roads. |

*Source: JICA Team*

**(3) Crop Ranking and Crop Selection:**

All farmer group members were called together and conducted market survey analysis and crop selection to identify the market opportunities and to choose profitable agro-enterprise. They prepared crop selection information sheet based on the information collected at the market survey (see Table 1.6.19). Through the discussion and vote in a democratic manner farmer group selected two (2) prioritized enterprises (crops) for further steps (see Table 1.6.20).

Table 1.6.19 Sample Crop Selection Sheet for Batch-1 Pilot Schemes / Gathitu-Muthaiga Scheme

***Sustainable Smallholder Irrigation Development and Management in semi-Arid Lands Project***

**Crop Selection Sheet**

*Name of Farmer Group*: **Gatitu Muthaiga** *Name of Scheme*: **Gatitu Muthaiga** *Date:* **21/01/2014**

| Crop/variety | Consumed by local or not | Experience in cultivating the crop | Month of planting and maturity period | Major production challenges | Average marketable yield per acre(kgs) | Average unit price(kshs) | Total income per acreKshs) | Cost of production per acre(kshs) | Estimated net income per acre(kshs) | Main market(s) | Marketing conditions | Remarks | Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tomatoes<br><br>Onex/Rio-grade | Yes | Yes | January, April & May<br>5 months | Inadequate irrigation water.<br>- unpredictable weather | 14,400 kgs | 33/- per kg | 475,200/- | 170,700/- | 305,500/- | Nakuru<br>Nairobi<br>Nyahururu | 60 crates per week, Halfway red ripe | Exploitation by brokers during marketing | |
| Kales/ Spinach<br><br>Thousand headed Giant fordhook | Yes | Yes | September<br>4 months | High incidences of pest and diseases | 18,000 kgs | 10/- per kg | 180,000/- | 92,270/- | 87,280/- | Nyahururu<br>Nakuru | Fresh leaves, 300kgs daily for Nyahururu market | Grown by few farmers | |
| Carrots<br><br>Nantes | Yes | Yes | December<br>3 months | Inadequate knowledge, Inadequate irrigation water | 12,000 kgs | 35/- per kg | 420,000/- | 50,000/- | 370,000/- | Nyahururu<br>Nakuru<br>Karatina<br>Nairobi | Smooth, clean, orange in colour medium size. | Grown by few farmers | |
| Cabbage<br><br>Globle master | Yes | Yes | October<br>4 and half months | High incidences of pest and diseases | 20,000 kgs | 8/- per kg | 160,000/- | 90,630/- | 69,370/- | Nyahururu<br>Karatina<br>Nairobi | Firm heads dark green in colour. | High cost of production. | 1st Crop |
| Bulb onions<br><br>Red pinnoy and Passion | Yes | Yes | December to February<br><br>5 months | Inadequate knowledge, High incidences of pest and diseases, poor irrigation methods. | 8,550kgs | 25/- per kg | 213,750/- | 126,980/- | 86,770/- | Nyahururu<br>Karatina | Well cured bulbs, 2000kgs per week in Nyahururu market. | High cost of production as compared to net returns | 2nd crop |

*Source: JICA Team*

Table 1.6.20 Sample Crop Ranking Sheet Report for Batch-1 Pilot Schemes / Gathitu-Mutahiga Scheme

Sustainable *Smallholder* ***Irrigation Development and Management in semi-Arid Lands Project***

**Crop Ranking Sheet**

*Name of Farmer Group*: **Gatitu Muthaiga** *Name of Scheme*: **Gatitu Muthaiga** *Date:* **21/01/2014**

**1st Crop**

| Name of crops | No. of members selected the crop/total no. of participants | Crop ranking |
|---|---|---|
| Tomatoes | 1 member / 34 members | |
| Kales/spinach | 2 members / 34 members | |
| Carrots | 5 members / 34 members | |
| Cabbages | 8 members / 34 members | **1st crop** |
| Passion fruits | 7 members / 34 members | |
| Sweet pepper | 5 members / 34 members | |
| Bulb onions | 6 members / 34 members | |

**2nd Crop**

| | | |
|---|---|---|
| Tomatoes | 4 members / 34 members | |
| kales/Spinach | 1 member / 34 members | |
| Carrots | 5 members / 34 members | |
| Passion fruits | 4 members / 34 members | |
| Sweet pepper | 7 members / 34 members | |
| Bulb onions | 13 members / 34 members | **2nd crop** |

*Source: JICA Team*

### (4) Results of crop selection

The selected/ prioritized crops reported by each farmer group are listed below;

Table 1.6.21 Selected/ Prioritized Crops (1std & 2ndt) of Each Pilot Scheme

| Scheme | Sub-county | Farmer group | 1st crop | 2nd crop |
|---|---|---|---|---|
| Pilot schemes in the sub-county where SHEP is NOT in practice | | | | |
| Olopito | Narok-North | Olopito Irrigation Scheme | Green Maize | Dry Beans |
| Mdachi | Ganze | Mdachi scheme | Okura | Black Nightshade |
| G/Muthaiga | Laikipia-West | Gathitu-Muthaiga | Cabbage | Bulb Onion |
| Murachake | Mbeere-North | Ukulima Bora S.H.G | Green Maize | Tomato |
| Kaben | Marakwet-East | Kaben Irrigation Scheme | Tomato | Green Gram |
| Tumutumu | Igembe-South | Bainthanga Water Project | Water Melon | Onion |
| Pilot schemes in the sub-county where SHEP is in practice | | | | |
| Kasokoni | Taveta | Ngoyaki Foundation C.B.O | Tomato | Capsicum |
| Muungano | Tharaka-South | Turkey Self Help Group | Tomato | Water Melon |

*Source: JICA Team*

For the selection of those 1st and 2nd prioritized crops, farmer group members had taken into account not only the market prices but also the interest, preference, experience, availabilities of planting materials and resources, and technical feasibility of farmer group members.

For instance the farmer group members in Gathitu-Muthaiga scheme chose Cabbage and Bulb Onion as their selected/ prioritized crops. Although farmers have remarked that the high cost of production on Cabbage and Bulb Onion, it is deduced/ inferred that they expected the reduction of production costs through the group production. At the first crop selection vote the numbers of votes polled were dispersed. However at the vote for the second crop selection many of farmer group members voted for Bulb onion (seeTable 1.6.21).

Also in case of Olopito and Kaben schemes, farmers also considered the construction periods and water availabilities at the time of selections. Despite the fact that horticultural crops seemed to be better choice as cash crops, they chose the grain crops that were able to grow under rain-fed condition and to serve as staple foods. Group members in the several schemes had selected prioritized crops with the expectation of irrigation water after construction periods.

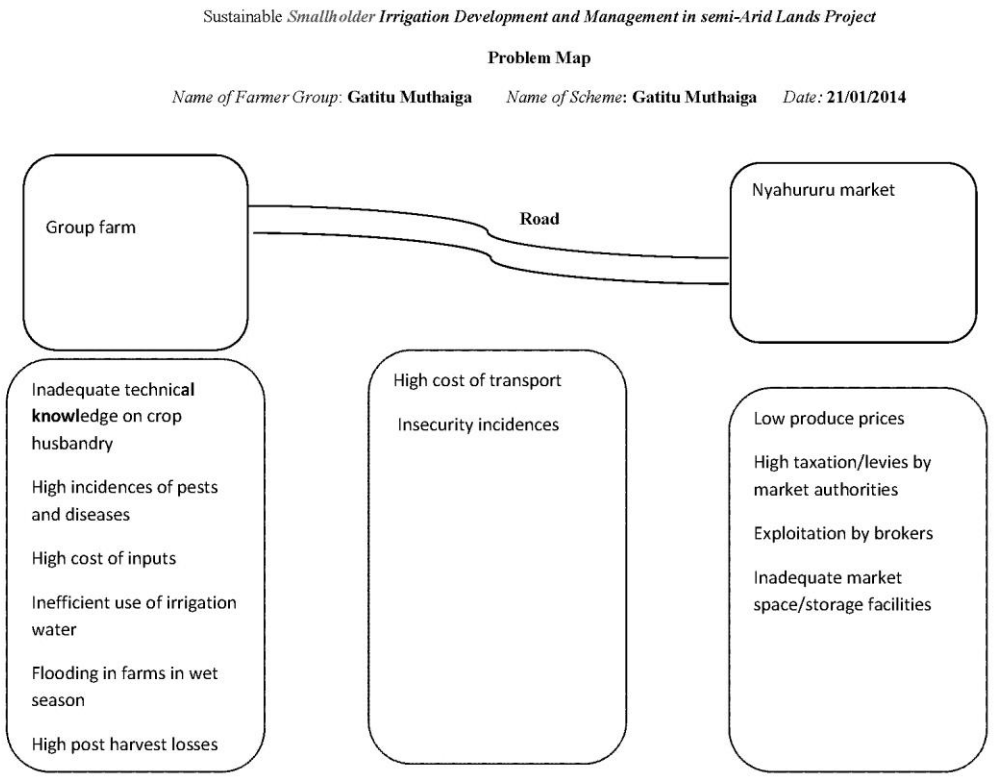
### (5) Problem Map and Objective Map:

Then, farmer group practiced to draw the problem map for the purposes of identifying problems/ challenges for selling selected/ prioritized enterprises at competitive price at market. The objective map stating their objectives with regard to the respective problems/ challenges in the problem map was subsequently built (see Table 1.6.22 and Table 1.6.23).

**(6) Group Action Plan and Crop Planting Calendar:**

Finally the action plan which includes all the activities to enhance the business and the crop planting calendar for those two selected/ prioritized crops were prepared (see Table 1.6.24 and Table 1.6.25). Group action plan consists of a) Objective b) Activity, c) Resources, d) Implementer, e) Schedule and f) Monitor sections. Based on the consultation with ScAOs and other field officials, farmer group members built those plans.

Table 1.6.22 Sample Problem Map for the 1st Selection Crop for Batch-1 Pilot Schemes / Gathitu-Mutahiga Scheme



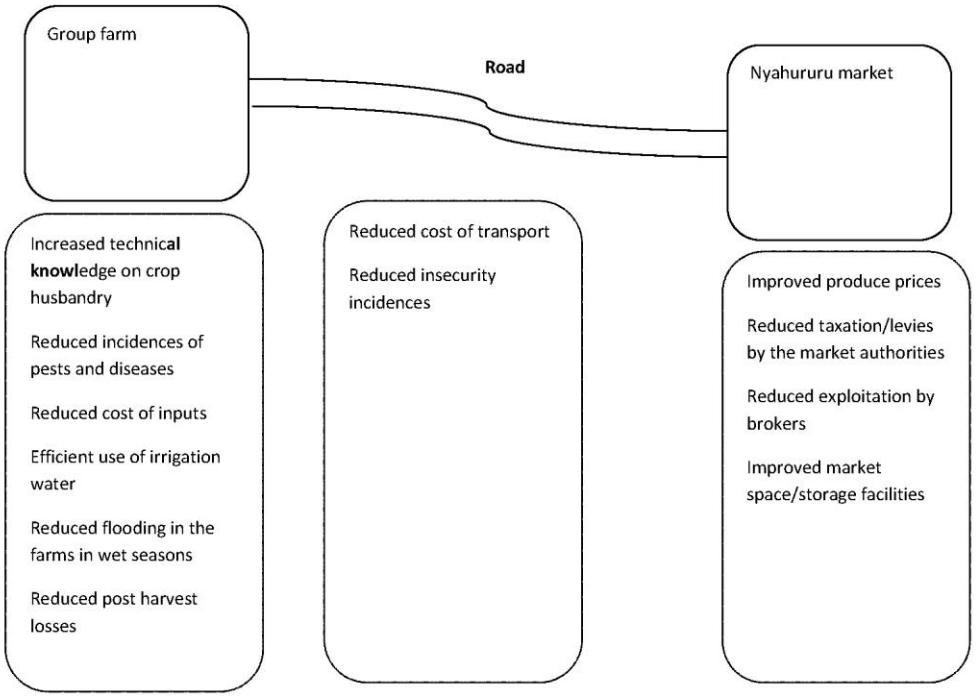

*Source: JICA Team*

Table 1.6.23 Sample Objective Map for the 1st Selection Crop for Batch-1 Pilot Schemes / Gathitu-Mutahiga Scheme

Sustainable *Smallholder* ***Irrigation Development and Management in semi-Arid Lands Project***

**Objective Map**

*Name of Farmer Group:* **Gatitu Muthaiga** *Name of Scheme*: **Gatitu Muthaiga** *Date:* **21/01/2014**




*Source: JICA Team*

Table 1.6.24 Sample Group Action Plan for Batch-1 Pilot Schemes / Gathitu-Mutahiga Scheme

Sustainable *Smallholder* ***Irrigation Development and Management in semi-Arid Lands Project***

**Group Action Plan**

*Name of Farmer Group*: **Gatitu Muthaiga** *Name of Scheme*: **Gatitu Muthaiga** *Date:* **22/01/2014**

| OBJECTIVE | ACTIVITY | STAGE | RESOURCES | IMPLEMENTER | SCHEDULE | MONITOR |
|---|---|---|---|---|---|---|
| Increased technical knowledge on crop husbandry | Farmers trainings | Pre-planting<br>Production | Transport<br>Staff allowances<br>Stationery | SCAO's office<br>Group members | May 2014 | SCAO's office |
| | Demonstration | Pre-planting<br>Production | Demo plot<br>Demo materials<br>Transport<br>Staff allowances<br>Stationery | SCAO's office<br>Group members | May 2014 | SCAO's office |
| | Farmers field day | Production | Transport<br>Staff allowances<br>Stationery | Extension Service Provider.<br>SCAO office<br>Farmers | June-July 2014 | SCAO's office |
| | Farmers tour | Production<br>marketing | Transport<br>Staff allowances<br>Stationery | SCAO office<br>Farmers | June 2014 | SCAO's office |
| Reduced incidences of pests and diseases | Farmers trainings | Pre-planting<br>Production | Demo materials<br>Stationery<br>Transport<br>Staff allowances. | SCAO office<br>Farmers | May-Aug 2014 | SCAO's office |
| Reduced cost of transport | Repair impassable section of the feeder roads | Pre-planting<br>Production<br>Marketing | Murrum<br>Skilled labour.<br>Non skilled labour.<br>Transport(Lorry,Tractor) | Group members | May-Sep 2014 | Chairman's office |
| | Collective group marketing | Marketing | Transport(Lorry,Pick ups etc) | Group members | May-Sep 2014 | Chairman's office |
| Improved produce prices | Market survey | Pre-planting<br>Production | Transport<br>Airtime<br>Stationery | Group members | April-June 2014 | Chairman's office |
| | Training on value addition and utilization | Production<br>Marketing | Demo materials<br>Stationery | SCAO's office<br>Group members | July-Sep 2014 | SCAO's office |
| Reduced insecurity incidences | Formation of community vigilante groups | Production<br>Marketing | Funds | Group members.<br>Assistant Chief | June-Aug 2014 | Assistant Chief office |
| | Write proposal to Deputy County Commissioners office for establishment of | Production.<br>Marketing | Stationery<br>Transport | Group members | August 2014 | Chairman's office |

*Source: JICA Team*

Table 1.6.25 Sample Crop Planting Calendar for 1st Select Crop for Batch-1 Pilot Schemes / Gathitu-Mutahiga Scheme

Sustainable *Smallholder* ***Irrigation Development and Management in semi-Arid Lands Project***

**Crop Planting Calendar (1st crop cabbage)**

*Name of Farmer Group*: **Gatitu Muthaiga** *Name of Scheme*: **Gatitu Muthaiga** *Date:* **22/01/2014**

| JULY | AUG | SEPT | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Land preparation. Nursery sowing. Control of damping-off & cutworms. Nursery watering. | Transplanting 30days after germination. Fertilizer application (150kgs DAP @ 10gms/hole). Manure application(5tons /acre) | Pest & diseases control.1st weeding. 1st topdressing (CAN 75Kgs) | 2nd weeding. 2nd topdressing (CAN 150Kgs. Pest & disease control. | Harvesting 70-120days after transplanting. Sorting & grading, Marketing. **Peak demand** | **Peak demand for onions** | | | | |

*Source: JICA Team*

### 1.6.4 Record Keeping Management Workshop

The one-day record keeping management workshop was held on February 12, 2013 at MIAD. Participant farmer representatives were selected by the same manners taken at previous session. The field farmer training sessions at pilot schemes were observed by SIDEMAN-SAL for the purpose of progress managements at each pilot scheme site.

Table 1.6.26 Follow-up Field Visits for the Record Keeping Management Workshop

| Date | Scheme | Sub-county | County |
|---|---|---|---|
| February 26, 2014 | Mdachi | Ganze | Kilifi |
| February 28, 2014 | Tumutumu | Igembe-South | Meru |
| March 5, 2014 | Olopito | Narok-North | Narok |
| March 5, 2014 | G/Muthaiga | Laikipia-West | Laikipia |
| March 7, 2014 | Kaben | Marakwet-East | Elgeyo-Marakwet |
| March 7, 2014 | Murachake | Mbeere-North | Embu |

*Source: JICA Team*

The knowledge and skills obtained from this training topic would contribute/ produce an effect on the accuracy/ quality of the next (the 2nd year) baseline survey reports. The end-products of the activities in this training package including 1) Group Input Purchasing Record, 2) Group Harvesting Record, 3) Group Sales of Produce Record and 4) Planned Group Activities Record would be collected at the time when the 2nd-year baseline survey is held on September, 2014. The emergency financial support for this field activity was also provided with the same reason mentioned previously.

This training topic and workshop mainly focused on the importance of record-keeping implemented at each farm household. At the time of workshop SIDEMAN-SAL announced that the submission of reporting forms 1) to 4) above mentioned would be collected on voluntary bases. Group purchasing has not been reported from groups. Because of the drought damages, many farmer group members could not adjust the harvest/ shipment timings as group activities.

### 1.6.5 The 2nd Baseline Survey

To grasp the changes in farm economy, the Second Annual Baseline Survey of the model farmer groups in the SHEP-NON-overlapping sub-counties was implemented September 2014. Submission of the survey data of the farmer group members consisting of 1) Crop Production and Income (CPI) Analysis Data, and 2) General Horticultural Crop Production and Post Harvest Handling Technique (GHCP&PHHT) were requested by the end of November 2014. Those above information from the model farmer groups in Kasokoni and Muungano located in the SHEP overlapping sub-counties (Taveta and Tharaka-south counties, respectively) are now requested.

Table 1.6.27 Number of Sample Collected on the 2nd Baseline Survey

| Scheme | Sub-county | Name of Farmer Group | Sample |
|---|---|---|---|
| Pilot schemes in the sub-county where SHEP is NOT in practice | | | |
| Olopito | Narok-North | Olopito Irrigation Scheme | 40 |
| Mdachi | Ganze | Mdachi scheme | 40 |
| G/Muthaiga | Laikipia-West | Gathitu-Muthaiga | 35 |
| Murachake | Mbeere-North | Ukulima Bora S.H.G | 12 |
| Kaben | Marakwet-East | Kaben Irrigation Scheme | 19 |
| Tumutumu | Igembe-South | Bainthanga Water Project | 19 |
| Pilot schemes in the sub-county where SHEP is in practice | | | |
| Kasokoni | Taveta | Ngoyaki Foundation C.B.O | * |
| Muungano | Tharaka-South | Turkey Self Help Group | * |

* Compiled data set is under requested to SHEP Unit *Source: JICA Team*

### (1) Crop Production and Income Analysis Data

Because the model farmer groups in Kasokoni and Muungano are located in the SHEP overlapping sub-counties (Taveta and Tharaka-south counties, respectively) and they report only about horticultural enterprises in the 5 major enterprises produced by the model farmer groups, it is difficult to simply make a comparison between SHEP-NON-overlapping and SHEP-overlapping sub-counties in the average net income per group member of the model farmer group.

Among the model farmer groups in the SHEP-NON-overlapping sub-counties, on the Table 6.7.28, same as last year, it is observed that the model farmer groups in Gathitu-Mutahiga and Kaben were reported the higher average in the net income per group member (Ksh. 121,417 and Ksh. 182,172, respectively) compared to that of the group in Murachake (Ksh. -3,060). (Refer Tables 6.7.7 and 6.7.28)

Five measure enterprises produced by the model farmer groups in Olopito and Gathitu-Muthaiga consisted mainly on horticultural and fruit crops such as Tomato, Cabbage, Kale and Onion, where the major enterprises in Tumutumu and Muracheke consisted only on grain crops (Refer Tables 6.7.29 and 6.7.30).

The average net income of farmers in Mdachi, Kaben and Tumutumu are increased (please refer Tables 6.7.7 and 6.7.28). The average net income per group members in Olopito was sharply decreased (from Ksh.53,594 in 2013 to Ksh.26,472 in 2014) because of the drought damages. Although farmers in Gathitu Muthaiga reported they have also received draught damages, their decreased profits were moderate (from Ksh.145,547 in 2013 to Ksh.121,417 in 2014). Farmers in Murachake scheme have not received any profits from their farming, except on the production of Green gram and Maize (See Table 6.7.30).

Table 1.6.28 Outline of the 2nd Baseline Survey

| Basic Information | | Sample # | Enterprise | Member Average | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2. Area under the crop (Acre) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
| Scheme | Farmer Group Name | | 5 major enterprises produced in the farmer group | 2b. | (5.x 7.) | 9 | (8 – 9) |
| | | | | Acres | Ksh | Ksh | Ksh |
| Pilot schemes in the sub-county where SHEP is NOT in practice | | | | | | | |
| OLOPITO | Olopito Irrigation Scheme | 40 | Green Maiz, Beans, Kale, Tomato, Cabbage | 4.868 | 52,259 | 25,787 | 26,472 |
| MDACHI | Mdachi Scheme | 40 | Green maiz, Cowpie, Kunde, Cassava, Muchicha | 2.783 | 91,632 | 33,363 | 58,270 |
| G/MUTHAIGA | Gathitu-Muthaiga | 35 | Cabbage, Green Maiz, Tomato, Beans, Onion | 1.328 | 187,777 | 66,360 | 121,417 |
| MURACHAKE | Uklima Bora S.H.G. | 12 | Sorghum, Green Gram, Cowpie, Maiz, Millet | 3.492 | 15,247 | 18,924 | -3,060 |
| KABEN | Kaben Irrigation Scheme | 19 | Maize, Mango, Millet, Beans, Green Gram | 3.351 | 236,890 | 54,719 | 182,172 |
| TUMUTUMU | Bainthanga Water Project | 19 | Maize, Millet, Cowpea, Beans, Green Gram | 6.867 | 64,087 | 40,255 | 23,832 |

*Source: JICA Team*

Maize or green maize is planted at all pilot schemes, and farmers in the five schemes, Olopito, Mdachi, Gathitu-Muthaiga, Kaben and Tumutumu cultivated beans as intercrop/ catch crop with those maize/ green maize (Table 6.7.31)

On theTable 6.7.32, comparisons between the model farmer groups of Gathitu-Muthaiga and Kaben on the Tomato production, the average farm-gate price per Kg (Ksh.38 in G/Muthaiga and Ksh.34 in Kaben) are almost same. Although the farmers in Kaben hold the 1.5 times larger area under crops (0.605 Ac.) and the cost of production was less than 1/2 compared to that was in Gathitu-Muthaiga, the productivity (the net produce per Acre) of the farmers in Gathitu-Muthaiga (10,085kg/Acre) is much greater than that of farmers in Kaben (4,459Kg/Acre). It causes the difference in the average net income per farmer.

Table 1.6.29 Outline of the 2nd Baseline Survey/ Five Major Enterprises in the Schemes 1

**Pilot schemes in the sub-county where SHEP is NOT in practice**

| Scheme | Enterprise | | No. farmers/ sample producing in a FG | 2. Area under the crop (Acre) | 3. Total Production (Kg) | 4. Total Production per Acre (Kg/Acre) | 5. Net Produce (kg) | 6. Net Produce per Acre (kg/Acre) | 7. Average Price per Kg (Ksh/Kg) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2b. | 3 | (3./2b) | 5 | (5./2b) | 7 | (5.x 7.) | 9 | (8 – 9) |
| | | | | **Acres** | **Kg** | **Kg/Acre** | **Kg** | **Kg/Acre** | **Ksh/Kg** | **Ksh** | **Ksh** | **Ksh** |
| OLOPITO (40) | BEANS | TOTAL | 34/20 | 33.019 | 16,731.0 | 16,522.5 | 13,772.0 | 13,946.5 | 1,560 | 1,022,150 | 146,850 | 875,300 |
| | | AVERAGE | 34/20 | 1.651 | 836.6 | 869.6 | 688.6 | 697.3 | 78 | 51,108 | 7,729 | 43,765 |
| | CABBAGE | TOTAL | 3/3 | 1.596 | 30,200.0 | 61,779.8 | 24,050.0 | 53,159.0 | 60 | 390,750 | 33,000 | 1,572,065 |
| | | AVERAGE | 3/3 | 0.532 | 10,066.7 | 20,593.3 | 8,016.7 | 17,719.7 | 20 | 130,250 | 11,000 | 119,250 |
| | GREEN MAIZE | TOTAL | 36/24 | 146.097 | 18,527.0 | 13,185.1 | 8,998.0 | 5,907.2 | 1,093 | 382,495 | 424,190 | -41,695 |
| | | AVERAGE | 36/24 | 6.087 | 772.0 | 549.4 | 374.9 | 246.1 | 46 | 15,937 | 17,675 | -1,737 |
| | KALE | TOTAL | 9/8 | 2.559 | 10,920.0 | 30,537.8 | 9,860.0 | 27,956.6 | 100 | 104,500 | 59,100 | 45,400 |
| | | AVERAGE | 9/8 | 0.320 | 1,365.0 | 3,817.2 | 1,232.5 | 3,494.6 | 13 | 13,063 | 7,388 | 5,675 |
| | TOMATO | TOTAL | 3/3 | 0.648 | 2,554.0 | 24,838.5 | 2,284.0 | 22,306.3 | 118 | 79,388 | 73,000 | 6,388 |
| | | AVERAGE | 3/3 | 0.216 | 851.3 | 8,279.5 | 761.3 | 7,435.4 | 39 | 26,463 | 24,333 | 2,129 |
| MDACHI (40) | CASSAVA | TOTAL | 14/14 | 8.490 | 13,089.8 | 32,543.9 | 10,740.5 | 26,206.2 | 555 | 322,635 | 95,600 | 227,035 |
| | | AVERAGE | 14/14 | 0.606 | 935.0 | 2,324.6 | 767.2 | 1,871.9 | 40 | 23,045 | 6,829 | 16,217 |
| | COWPIE | TOTAL | 16/16 | 11.436 | 1,793.0 | 2,747.6 | 1,281.0 | 1,938.6 | 1,175 | 87,030 | 73,100 | 13,930 |
| | | AVERAGE | 16/16 | 0.715 | 112.1 | 183.2 | 80.1 | 129.2 | 73 | 5,439 | 4,569 | 871 |
| | GREEN MAIZE | TOTAL | 32/32 | 61.267 | 46,156.0 | 27,353.9 | 43,287.0 | 25,083.2 | 1,291 | 1,764,727 | 705,000 | 1,059,727 |
| | | AVERAGE | 32/32 | 1.915 | 1,442.4 | 854.8 | 1,352.7 | 783.9 | 40 | 55,148 | 22,031 | 33,116 |
| | KUNDE | TOTAL | 7/7 | 7.372 | 1,320.0 | 1,707.8 | 1,244.0 | 1,607.8 | 360 | 64,160 | 27,000 | 37,160 |
| | | AVERAGE | 7/7 | 1.053 | 220.0 | 244.0 | 177.7 | 229.7 | 51 | 9,166 | 3,857 | 5,309 |
| | MCHICHA | TOTAL | 16/15 | 3.453 | 4,555.0 | 47,854.4 | 3,777.0 | 39,527.3 | 320 | 94,310 | 88,620 | 5,690 |
| | | AVERAGE | 16/15 | 0.230 | 303.7 | 3,190.3 | 251.8 | 2,635.2 | 21 | 6,287 | 5,908 | 379 |
| G/MUTHAIGA (35) | BEANS | TOTAL | 15/10 | 3.855 | 6,595.0 | 14,948.5 | 5,944.0 | 13,580.9 | 745 | 345,870 | 113,550 | 232,320 |
| | | AVERAGE | 15/10 | 0.386 | 659.5 | 1,494.9 | 594.4 | 1,358.1 | 75 | 34,587 | 11,355 | 23,232 |
| | CABBAGE | TOTAL | 17/17 | 7.065 | 163,170.0 | 374,788.3 | 149,060.0 | 339,639.2 | 83 | 620,088 | 419,043 | 201,045 |
| | | AVERAGE | 17/17 | 0.416 | 9,598.2 | 22,046.4 | 8,768.2 | 19,978.8 | 5 | 36,476 | 24,650 | 11,826 |
| | GREEN MAIZE | TOTAL | 27/18 | 9.926 | 15,065.0 | 27,164.8 | 13,660.0 | 24,330.8 | 585 | 462,990 | 202,930 | 260,060 |
| | | AVERAGE | 27/18 | 0.551 | 836.9 | 1,509.2 | 758.9 | 1,351.7 | 33 | 25,722 | 11,274 | 14,448 |
| | ONION | TOTAL | 12/12 | 5.685 | 80,600.0 | 450,525.1 | 73,480.0 | 405,700.3 | 406 | 2,772,930 | 561,910 | 2,211,020 |
| | | AVERAGE | 12/12 | 0.474 | 6,716.7 | 37,543.8 | 6,123.3 | 33,808.4 | 34 | 231,078 | 46,826 | 184,252 |
| | TOMATO | TOTAL | 10/10 | 4.685 | 52,060.0 | 113,603.4 | 46,224.0 | 100,854.9 | 382 | 1,851,210 | 583,580 | 1,267,630 |
| | | AVERAGE | 10/10 | 0.469 | 5,206.0 | 11,360.3 | 4,622.4 | 10,085.5 | 38 | 185,121 | 58,358 | 126,763 |

*Source: JICA Team*

Table 1.6.30 Outline of the 2nd Baseline Survey/ Five Major Enterprises in the Schemes 2

Pilot schemes in the sub-county where SHEP is NOT in practice

| Scheme | Enterprise | | No. farmers/ sample producing in a FG | 2. Area under the crop (Acre) | 3. Total Production (Kg) | 4. Total Production per Acre (Kg/Acre) | 5. Net Produce (kg) | 6. Net Produce per Acre (kg/Acre) | 7. Average Price per Kg (Ksh/Kg) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2b. | 3 | (3./2b) | 5 | (5./2b) | 7 | (5.x 7.) | 9 | (8 – 9) |
| | | | | Acres | Kg | Kg/Acre | Kg | Kg/Acre | Ksh/Kg | Ksh | Ksh | Ksh |
| MURACHAKE (12) | COWPEA | TOTAL | 9/6 | 7.352 | 172.0 | 172.5 | 122.0 | 114.9 | 355 | 6,930 | 29,540 | -22,610 |
| | | AVERAGE | 9/6 | 1.225 | 28.7 | 28.8 | 20.3 | 19.2 | 59 | 1,155 | 4,923 | -3,768 |
| | GREEN GRUM | TOTAL | 7/3 | 2.119 | 300.0 | 660.7 | 240.0 | 545.1 | 360 | 25,800 | 14,720 | 11,080 |
| | | AVERAGE | 7/3 | 0.706 | 100.0 | 220.2 | 80.0 | 181.7 | 120 | 8,600 | 4,907 | 3,693 |
| | MAIZE | TOTAL | 5/2 | 1.989 | 560.0 | 627.7 | 470.0 | 539.6 | 100 | 27,300 | 18,400 | 8,900 |
| | | AVERAGE | 5/2 | 0.995 | 280.0 | 313.9 | 235.0 | 269.8 | 50 | 13,650 | 9,200 | 4,450 |
| | MILLET | TOTAL | 5/2 | 0.605 | 23.0 | 38.0 | 20.0 | 33.0 | 65 | 1,300 | 4,200 | -2,900 |
| | | AVERAGE | 5/2 | 1.211 | 56.0 | 46.3 | 49.0 | 40.5 | 130 | 6,370 | 7,205 | -835 |
| | SORGHUM | TOTAL | 7/3 | 5.152 | 186.0 | 381.9 | 163.0 | 324.2 | 395 | 15,840 | 34,590 | -18,750 |
| | | AVERAGE | 7/3 | 1.288 | 46.5 | 95.5 | 40.8 | 81.1 | 99 | 3,960 | 8,648 | -4,688 |
| KABEN (19) | BEANS | TOTAL | 10/10 | 7.225 | 3,499.5 | 5,107.7 | 1,505.8 | 4,130.2 | 1,450 | 159,485 | 62,500 | 96,985 |
| | | AVERAGE | 10/10 | 0.723 | 350.0 | 510.8 | 150.6 | 413.0 | 145 | 15,949 | 6,250 | 9,699 |
| | GREEN GRAM | TOTAL | 10/10 | 8.451 | 6,002.5 | 6,710.8 | 5,777.0 | 6,429.8 | 1,478 | 747,720 | 105,230 | 642,490 |
| | | AVERAGE | 10/10 | 0.845 | 600.3 | 671.1 | 577.7 | 643.0 | 148 | 74,772 | 10,523 | 64,249 |
| | MAIZE | TOTAL | 16/16 | 22.219 | 26,640.0 | 44,776.3 | 24,292.0 | 42,023.9 | 701 | 1,001,369 | 273,625 | 727,744 |
| | | AVERAGE | 16/16 | 1.389 | 1,665.0 | 2,798.5 | 1,518.3 | 2,626.5 | 44 | 62,586 | 17,102 | 45,484 |
| | MANGO | TOTAL | 9/9 | 9.123 | 72,080.0 | 153,146.0 | 65,445.0 | 95,175.0 | 297 | 1,672,375 | 426,975 | 1,245,400 |
| | | AVERAGE | 9/9 | 1.014 | 9,010.0 | 19,143.3 | 7,271.7 | 10,575.0 | 33 | 185,819 | 47,442 | 138,378 |
| | MILLET | TOTAL | 3/3 | 2.168 | 840.0 | 1,424.0 | 640.0 | 961.5 | 550 | 126,000 | 9,150 | 116,850 |
| | | AVERAGE | 3/3 | 0.723 | 280.0 | 474.7 | 213.3 | 320.5 | 183 | 42,000 | 3,050 | 38,950 |
| TUMUTUMU (19) | BEANS | TOTAL | 8/8 | 9.007 | 1,440 | 7,784.8 | 1,075 | 4,854.4 | 390 | 57,200 | 67,500 | -10,300 |
| | | AVERAGE | 8/8 | 1.126 | 180 | 973.1 | 134 | 606.8 | 49 | 7,150 | 8,438 | -1,288 |
| | COWPEA | TOTAL | 2/2 | 3.000 | 670 | 470.0 | 425 | 325.0 | 70 | 14,500 | 15,000 | -500 |
| | | AVERAGE | 2/2 | 1.500 | 335 | 235.0 | 213 | 162.5 | 35 | 7,250 | 7,500 | -250 |
| | GREEN GRAM | TOTAL | 11/10 | 22.000 | 4,130 | 2,834.0 | 3,405 | 2,503.5 | 670 | 204,400 | 89,750 | 114,650 |
| | | AVERAGE | 11/10 | 2.200 | 413 | 283.4 | 341 | 250.4 | 67 | 20,440 | 8,975 | 11,465 |
| | MAIZE | TOTAL | 19/19 | 58.500 | 29,880 | 9,726.0 | 26,685 | 8,355.0 | 380 | 533,700 | 401,200 | 132,500 |
| | | AVERAGE | 19/19 | 3.079 | 1,573 | 511.9 | 1,404 | 439.7 | 20 | 28,089 | 21,116 | 6,974 |
| | MILLET | TOTAL | 18/16 | 22.970 | 5,991 | 4,809.4 | 5,273 | 4,260.2 | 565 | 190,100 | 145,900 | 44,200 |
| | | AVERAGE | 18/16 | 1.436 | 374 | 300.6 | 330 | 266.3 | 35 | 11,881 | 9,119 | 2,763 |

Table 1.6.31 Outline of the 2nd Baseline Survey/ Comparison among Schemes on Major Enterprises 1

| Enterprise | | Scheme | No. farmers/ sample producing in a FG | 2. Area under the crop (Acre) | 3. Total Production (Kg) | 4. Total Production per Acre (Kg/Acre) | 5. Net Produce (kg) | 6. Net Produce per Acre (kg/Acre) | 7. Average Price per Kg (Ksh/Kg) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2b. | 3 | (3./2b) | 5 | (5./2b) | 7 | (5.x 7.) | 9 | (8 – 9) |
| | | | | Acres | Kg | Kg/Acre | Kg | Kg/Acre | Ksh/Kg | Ksh | Ksh | Ksh |
| MAIZE | AVERAGE | MURACHAKE | 5/2 | 0.995 | 280.0 | 313.9 | 235.0 | 269.8 | 50 | 13,650 | 9,200 | 4,450 |
| | AVERAGE | KABEN | 16/16 | 1.389 | 1,665.0 | 2,798.5 | 1,518.3 | 2,626.5 | 44 | 62,586 | 17,102 | 45,484 |
| | AVERAGE | TUMUTUMU | 19/19 | 3.079 | 1,573 | 511.9 | 1,404 | 439.7 | 20 | 28,089 | 21,116 | 6,974 |
| GREEN MAIZ | AVERAGE | OLOPITO | 36/24 | 6.087 | 772.0 | 549.4 | 374.9 | 246.1 | 46 | 15,937 | 17,675 | -1,737 |
| | AVERAGE | MDACHI | 32/32 | 1.915 | 1,442.4 | 854.8 | 1,352.7 | 783.9 | 40 | 55,148 | 22,031 | 33,116 |
| | AVERAGE | G/MUTHAIGA | 27/18 | 0.551 | 836.9 | 1,509.2 | 758.9 | 1,351.7 | 33 | 25,722 | 11,274 | 14,448 |
| BEANS | AVERAGE | OLOPITO | 34/20 | 1.651 | 836.6 | 869.6 | 688.6 | 697.3 | 78 | 51,108 | 7,729 | 43,765 |
| | AVERAGE | MDACHI | 4/4 | 0.500 | 80.5 | 194.0 | 52.0 | 111.0 | 80 | 4,160 | 5,440 | -1,280 |
| | AVERAGE | G/MUTHAIGA | 15/10 | 0.386 | 659.5 | 1,494.9 | 594.4 | 1,358.1 | 75 | 34,587 | 11,355 | 23,232 |
| | AVERAGE | KABEN | 10/10 | 0.723 | 350.0 | 510.8 | 150.6 | 413.0 | 145 | 15,949 | 6,250 | 9,699 |
| | AVERAGE | TUMUTUMU | 8/8 | 1.126 | 180 | 973.1 | 134 | 606.8 | 49 | 7,150 | 8,438 | -1,288 |
| COWPEA | AVERAGE | MDACHI | 16/16 | 0.715 | 112.1 | 183.2 | 80.1 | 129.2 | 73 | 5,439 | 4,569 | 871 |
| | AVERAGE | MURACHAKE | 9/6 | 1.225 | 28.7 | 28.8 | 20.3 | 19.2 | 59 | 1,155 | 4,923 | -3,768 |
| | AVERAGE | TUMUTUMU | 2/2 | 1.500 | 335 | 235.0 | 213 | 162.5 | 35 | 7,250 | 7,500 | -250 |
| GREEN GRAM | AVERAGE | MURACHAKE | 7/3 | 0.706 | 100.0 | 220.2 | 80.0 | 181.7 | 120 | 8,600 | 4,907 | 3,693 |
| | AVERAGE | KABEN | 10/10 | 0.845 | 600.3 | 671.1 | 577.7 | 643.0 | 148 | 74,772 | 10,523 | 64,249 |
| | AVERAGE | TUMUTUMU | 11/10 | 2.200 | 413 | 283.4 | 341 | 250.4 | 67 | 20,440 | 8,975 | 11,465 |
| SORGHUM | AVERAGE | MDACHI | 1/1 | 0.500 | 20.0 | 40.0 | 1.0 | 2.0 | 80 | 80 | 1,600 | -1,520 |
| | AVERAGE | MURACHAKE | 5/2 | 1.288 | 46.5 | 95.5 | 40.8 | 81.1 | 99 | 3,960 | 8,648 | -4,688 |
| | AVERAGE | KABEN | 1/1 | 6.054 | 2,450.0 | 404.7 | 2,000.0 | 330.4 | 34 | 68,000 | 20,000 | 48,000 |
| MILLET | AVERAGE | MURACHAKE | 5/2 | 1.211 | 56.0 | 46.3 | 49.0 | 40.5 | 130 | 6,370 | 7,205 | -835 |
| | AVERAGE | KABEN | 3/3 | 0.723 | 280.0 | 474.7 | 213.3 | 320.5 | 183 | 42,000 | 3,050 | 38,950 |
| | AVERAGE | TUMUTUMU | 18/16 | 1.436 | 374 | 300.6 | 330 | 266.3 | 35 | 11,881 | 9,119 | 2,763 |

*Source: JICA Team*

Table 1.6.32 Outline of the 2nd Baseline Survey/ Comparison among Schemes on Major Enterprises 2

| Enterprise | | Scheme | No. farmers producing in a Farmer Group | 2. Area under the crop (Acre) | 3. Total Production (Kg) | 4. Total Production per Acre (Kg/Acre) | 5. Net Produce (kg) | 6. Net Produce per Acre (kg/Acre) | 7. Average Price per Kg (Ksh/Kg) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2b. | 3 | (3./2b) | 5 | (5./2b) | 7 | (5.x 7.) | 9 | (8 – 9) |
| | | | | Acres | Kg | Kg/Acre | Kg | Kg/Acre | Ksh/Kg | Ksh | Ksh | Ksh |
| KALE | AVERAGE | OLOPITO | 9/8 | 0.320 | 1,365.0 | 3,817.2 | 1,232.5 | 3,494.6 | 13 | 13,063 | 7,388 | 5,675 |
| | AVERAGE | G/MUTHAIGA | 2/2 | 0.213 | 1,660.5 | 6,275.5 | 1,110.5 | 4,212.5 | 10 | 11,105 | 8,048 | 3,058 |
| TOMATO | AVERAGE | OLOPITO | 3/3 | 0.216 | 851.3 | 8,279.5 | 761.3 | 7,435.4 | 39 | 26,463 | 24,333 | 2,129 |
| | AVERAGE | MDACHI | 7/7 | 0.178 | 458.6 | 19,401.0 | 356.0 | 15,963.8 | 53 | 17,856 | 4,614 | 13,241 |
| | AVERAGE | G/MUTHAIGA | 10/10 | 0.469 | 5,206.0 | 11,360.3 | 4,622.4 | 10,085.5 | 38 | 185,121 | 58,358 | 126,763 |
| | AVERAGE | KABEN | 2/2 | 0.605 | 2,975.0 | 4,914.1 | 2,700.0 | 4,459.9 | 34 | 92,310 | 25,000 | 67,310 |
| CABBAGE | AVERAGE | OLOPITO | 3/3 | 0.532 | 10,066.7 | 20,593.3 | 8,016.7 | 17,719.7 | 20 | 130,250 | 11,000 | 119,250 |
| | AVERAGE | G/MUTHAIGA | 17/17 | 0.416 | 9,598.2 | 22,046.4 | 8,768.2 | 19,978.8 | 5 | 36,476 | 24,650 | 11,826 |
| | AVERAGE | KABEN | 1/1 | 0.865 | 850.0 | 982.8 | 750.0 | 867.2 | 140 | 105,000 | 1,140 | 103,860 |
| POTATO | AVERAGE | OLOPITO | 2/1 | 0.297 | 160.0 | 539.6 | 138.0 | 465.4 | 320 | 44,160 | 1,900 | 42,260 |
| | AVERAGE | G/MUTHAIGA | 5/3 | 0.258 | 1,166.7 | 4,508.5 | 1,033.3 | 3,981.5 | 16 | 16,100 | 12,523 | 3,577 |
| ONION | AVERAGE | G/MUTHAIGA | 12/12 | 0.474 | 6,716.7 | 37,543.8 | 6,123.3 | 33,808.4 | 34 | 231,078 | 46,826 | 184,252 |
| BANANA | AVERAGE | KABNE | 5/5 | 0.809 | 692.0 | 1,289.0 | 447.2 | 814.8 | 108 | 36,380 | 8,728 | 27,652 |
| MANGO | AVERAGE | KABEN | 9/9 | 1.014 | 9,010.0 | 19,143.3 | 7,271.7 | 10,575.0 | 33 | 185,819 | 47,442 | 138,378 |
| MCHICHA | AVERAGE | MDACHI | 16/15 | 0.230 | 303.7 | 3,190.3 | 251.8 | 2,635.2 | 21 | 6,287 | 5,908 | 379 |
| MANAGU | AVERAGE | OLOPITO | 2/1 | 0.025 | 11.0 | 445.2 | 11.0 | 445.2 | 50 | 550 | 550 | 0 |
| | AVERAGE | MDACHI | 3/3 | 0.342 | 207.0 | 683.3 | 167.0 | 603.3 | 13 | 2,270 | 900 | 1,370 |
| MNABU | AVERAGE | MDACHI | 4/4 | 0.081 | 322.5 | 3,298.4 | 264.5 | 2,191.4 | 25 | 5,515 | 950 | 4,565 |

*Source: JICA Team*

Table 1.6.33 Prioritized Crops (1st & 2nd) and Number of Farmers Cultivated (Harvested) Those Selected Crops in Each Pilot Scheme (at the 2nd BLS)

| Scheme | Sub-county | 1st crop | *No. | 2nd crop | *No. |
|---|---|---|---|---|---|
| Olopito | Narok-North | Green Maize | 24 | Dry Beans | 20 |
| Mdachi | Ganze | Okura | 7 | Black Nightshade | 7 |
| G/Muthaiga | Laikipia-West | Cabbage | 17 | Bulb Onion | 12 |
| Murachake | Mbeere-North | Green Maize | nil | Tomato | nil |
| Kaben | Marakwet-East | Tomato | 2 | Green Gram | 10 |
| Tumutumu | Igembe-South | Water Melon | nil | Onion | nil |

*Source: JICA Team*

Number of farmers above mentioned is the number of farmers who successfully obtained their harvests and somehow sold them at the market/ to the middlemen. In some cases, farmers couldn't reach to harvest stage and they couldn't sell those prioritized crops at the market. Also they consumed harvests themselves and not sold. In many cases, farmers tend to NOT report the details in Total Income, Average Prices per Kg and Total Cost of Production when they fail to produce the crops.

**(2) General Horticultural Crop Production and Post Harvest Handling Technique**

This GHCP&PHHT survey is a tool to identify the capacity changes of both individual farmers and Farmers Groups in adopting basic horticultural production techniques, and this was the 2nd survey for model farmer groups. On the comparison between the Tables 6.7.14 and 6.7.35, it is observed that a small proportion of farmers have conducted "Pre-cultivation Preparation" such as undertaking market survey (Q1) and preparing crop planting calendar (Q2) in 2013, however in 2014, most farmers in all schemes except Tumutumu have conducted market survey and crop planting calendar making. Conducting soil testing (Q3) was still low. The percentages of farmer members who implemented the cost income analysis (Q20) was dramatically increased compared to that in 2013. The observation above mentioned proves that the series of training sessions and practices of the core components of SHEP Approach is actually taken hold across the members of farmer groups, and the knowledge obtained at the training contributed the increment of the farmer's competence/ capacity of the Market-Oriented Agriculture.

Table 1.6.34 Outline of the 2nd Baseline Survey/ Summary Table on GHCP&PHHT Results

| Basic Information | | Percent adoption of each item of the GHCP&PHHT (by the group members) | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pre-Cultivation Preparation | | | | | Land Preparation | | | Crop Establishment (Planting/ Transplanting) | | | Crop Management | | | | | Harvest | Post-Harvest Handling | | Cost & Income Analysis |
| SCHEME | Sample# | Q01 | Q02 | Q03 | Q04 | Q05 | Q06 | Q07 | Q08 | Q09 | Q10 | Q11 | Q12 | Q13 | Q14 | Q15 | Q16 | Q17 | Q18 | Q19 | Q20 |
| OLOPITO | 40 (F:15/M:25) | 52.5 | 72.5 | 7.7 | 52.5 | 87.5 | 89.7 | 52.5 | 25.0 | 82.1 | 65.0 | 35.9 | 52.5 | 97.4 | 34.2 | 84.6 | 70.0 | 86.8 | 60.0 | 85.0 | 52.5 |
| MDACHI | 40 (F:16/M:24) | 87.5 | 87.5 | 35.9 | 79.5 | 92.5 | 85.0 | 75.0 | 72.5 | 85.0 | 92.3 | 76.9 | 74.4 | 97.4 | 85.0 | 85.0 | 79.5 | 90.0 | 77.5 | 97.5 | 87.5 |
| GATITU-MUTHAIGA | 36 (F:12/M:24) | 47.2 | 52.8 | 2.8 | 38.9 | 80.6 | 72.2 | 61.1 | 58.3 | 77.8 | 75.0 | 19.4 | 88.9 | 83.3 | 50.0 | 83.3 | 83.3 | 91.7 | 75.0 | 94.4 | 52.8 |
| MURACHAKE | 12 (F:7/M:5) | 91.7 | 91.7 | 8.3 | 100.0 | 91.7 | 100.0 | 83.3 | 100.0 | 91.7 | 91.7 | 41.7 | 25.0 | 100.0 | 75.0 | 100.0 | 83.3 | 100.0 | 91.7 | 91.7 | 91.7 |
| KABEN | 19 (F:6/M:13) | 78.9 | 63.2 | 15.8 | 63.2 | 94.7 | 78.9 | 68.4 | 52.6 | 89.5 | 100.0 | 38.9 | 84.2 | 89.5 | 47.4 | 68.4 | 63.2 | 73.7 | 78.9 | 94.7 | 94.7 |
| TUMUTUMU | 19 (F:4/M:15) | 5.9 | 23.5 | 5.6 | 52.6 | 84.2 | 84.2 | 77.8 | 42.1 | 89.5 | 94.4 | 84.2 | 21.1 | 100.0 | 50.0 | 84.2 | 89.5 | 84.2 | 84.2 | 84.2 | 0.0 |

* Adoption of each General Horticultural Crop Production & Post-Harvest Handling Technique by the group members in percentage

*Source: JICA Team*

### 1.6.6 The 3rd Baseline Survey

The Third Baseline Survey of the model farmer groups in the SHEP-NON-overlapping sub-counties was implemented March 2015. Submission of the survey data of the farmer group members including 1) Crop Production and Income (CPI) Analysis Data, 2) General Horticultural Crop Production and Post Harvest Handling Technique (GHCP&PHHT) and 3) Group Empowerment Indicator (GEI) were requested to all ScAOs of the pilot schemes. Since only about a half of the year (6 months) has passed from previous survey that was held at September 2014, the data were collected only from the model farmer groups in the SHEP-NON-overlapping sub-counties, and those crop production and farm income data were derived from the previous short-rain season.

Table 1.6.35 Number of Sample Collected on the 3rd Baseline Survey

| Scheme | Sub-county | Name of Farmer Group | Sample |
|---|---|---|---|
| Pilot schemes in the sub-county where SHEP is NOT in practice | | | |
| Olopito | Narok-North | Olopito Irrigation Scheme | 30 |
| Mdachi | Ganze | Mdachi scheme | 39 |
| G/Muthaiga | Laikipia-West | Gathitu-Muthaiga | 25 |
| Murachake | Mbeere-North | Ukulima Bora S.H.G | 14 |
| Kaben | Marakwet-East | Kaben Irrigation Scheme | 34 |
| Tumutumu | Igembe-South | Bainthanga Water Project | 20 |

*Source: JICA Team*

#### (1) Crop Production and Income Analysis Data

Among the model farmer groups in the SHEP-NON-overlapping sub-counties, on the Table 6.6.36, same as the last two surveys, it is observed that the model farmer groups in Gathitu-Mutahiga and Kaben were reported the higher average in the net income per group member (Ksh. 150,182 and Ksh. 111,039, respectively) compared to that of the group in Olopito (Ksh. -3,248) and Tumutumu (Ksh. -2,890).

It is not observed drastic changes in the overall trends in the major enterprises produced by the model farmer groups. In some cases the item number of major enterprises produced by a farmer group was decreased, because the survey was conducted just after short-rainy season and some enterprises were waiting for long-rain season. In Mdachi and Gathitu-Muthaiga their major crops were consisted on horticultural crops such as Tomato, Cabbage, Mchicha, Okura and Onion, where the major enterprises in Tumutumu and Murachake consisted only on grain crops (Refer Tables 6.6.38 and 6.6.39). In some pilot schemes including Tumutumu and Olopito, farmers mentioned the importance of planting grain cereals for their staple food crops, despite the fact that the cereal crops were not cash-crop and often caused the negative earnings at the end.

It is quite difficult to simply compare the average net income in this survey to that of previous ones, farmers in Gathitu-Muthaiga and Kaben obtained benefits from all planted items (enterprises) in Tables 6.6.38 and 6.6.39.

Table 1.6.36 Outline of the 3rd Baseline Survey

| Basic Information | | Sample # | Enterprise | Member Average | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2. Area under the crop (Acre) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
| Scheme | Farmer Group Name | | Major enterprises produced in the farmer group | 2b. | (5.x 7.) | 9 | (8 – 9) |
| | | | | Acres | Ksh | Ksh | Ksh |
| Pilot schemes in the sub-county where SHEP is NOT in practice | | | | | | | |
| OLOPITO | Olopito Irrigation Scheme | 30 | Green Maiz, Beans, Kale | 1.414 | 12,063 | 16,069 | -3,248 |
| MDACHI | Mdachi Scheme | 39 | Green maiz, Cowpie, Kunde, Muchicha, Okura | 1.762 | 22,272 | 13,797 | 8,475 |
| G/MUTHAIGA | Gathitu-Muthaiga | 25 | Cabbage, Green Maiz, Tomato, Beans, Onion | 0.930 | 216,299 | 66,117 | 150,182 |
| MURACHAKE | Uklima Bora S.H.G. | 14 | Sorghum, Green Gram, Cowpie, Maiz, Millet | 3.824 | 43,278 | 22,010 | 15,085 |
| KABEN | Kaben Irrigation Scheme | 34 | Maize, Mango, Tomato, Beans, Green Gram | 2.953 | 145,759 | 34,719 | 111,039 |
| TUMUTUMU | Bainthanga Water Project | 20 | Maize, Pigeon pea, Green Gram | 2.694 | 12,828 | 15,717 | -2,890 |

*Source: JICA Team*

Maize or green maize is planted at all pilot schemes, and farmers cultivated beans or other leguminous (i.e. peas) crops as intercrop/ catch crop with those maize/ green maize (Table 6.6.39) Mango is the most profitable enterprise/ crop in Kaben (Ksh.134,424). Tomato is the leading cash-crop in several schemes including Gathitu- Muthaiga, Murachake and Kaben. In theTable 6.6.40, comparisons between the model farmer groups of Gathitu- Muthaiga and Kaben on the Tomato production, the average farm-gate price per Kg (Ksh.27 in Gathitu- Muthaiga and Ksh.23 in Kaben) are almost same. Although the farmers in Kaben hold the 2 times larger area under crops (1.470 Ac.) and the cost of production was less than 1/4 compared to that was in Gathitu- Muthaiga, the productivity (the net produce per Acre) of the farmers in Gathitu- Muthaiga (10,583kg/Acre) is much greater than that of farmers in Kaben (2,855Kg/Acre). It causes the difference in the average net income per farmer.

Table 1.6.37 Outline of the 1st to 3rd Baseline Surveys

| Basic Information | | Enterprise | Member Average (1st BLS) | | | | | Member Average (2nd BLS) | | | | | Member Average (3rd BLS*) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scheme | Farmer Group Name | Major enterprises produced in the farmer group | Sample No. | 2. Area under the crop (Acre) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) | Sample No. | 2. Area under the crop (Acre) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) | Sample No. | 2. Area under the crop (Acre) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
| | | | | 2b. | (5.x 7.) | 9 | (8 – 9) | | 2b. | (5.x 7.) | 9 | (8 – 9) | | 2b. | (5.x 7.) | 9 | (8 – 9) |
| | | | | Acres | Ksh | Ksh | Ksh | | Acres | Ksh | Ksh | Ksh | | Acres | Ksh | Ksh | Ksh |
| Pilot schemes in the sub-county where SHEP is NOT in practice | | | | | | | | | | | | | | | | | |
| OLOPITO | Olopito Irrigation Scheme | Green Maiz, Beans, Kale, Tomato, Cabbage | 48 | 2.019 | 91,722 | 38,531 | 53,594 | 40 | 4.868 | 52,259 | 25,787 | 26,472 | 30 | 1.414 | 12,063 | 16,069 | -3,248 |
| MDACHI | Mdachi Scheme | Green maiz, Cowpie, Kunde, Cassava, Muchicha | 55 | 3.091 | 59,257 | 20,228 | 39,028 | 40 | 2.783 | 91,632 | 33,363 | 58,270 | 39 | 1.762 | 22,272 | 13,797 | 8,475 |
| G/MUTHAIGA | Gathitu-Muthaiga | Cabbage, Green Maiz, Tomato, Beans, Onion | 47 | 1.819 | 234,051 | 88,505 | 145,547 | 35 | 1.328 | 187,777 | 66,360 | 121,417 | 25 | 0.930 | 216,299 | 66,117 | 150,182 |
| MURACHAKE | Uklima Bora S.H.G. | Sorghum, Green Maiz, Cowpie, Maiz, Millet | 20 | 4.755 | 33,114 | 20,336 | 12,778 | 12 | 3.492 | 15,247 | 18,924 | -3,060 | 14 | 3.824 | 43,278 | 22,010 | 15,085 |
| KABEN | Kaben Irrigation Scheme | Maize, Mango, Banana, Beans, Green Maiz | 46 | 2.637 | 212,211 | 62,940 | 149,271 | 19 | 3.351 | 236,890 | 54,719 | 182,172 | 34 | 2.953 | 145,759 | 34,719 | 111,039 |
| TUMUTUMU | Bainthanga Water Project | Maize, Pigeon peas, Cowpie, Beans, Green Maiz | 45 | 3.495 | 49,080 | 43,164 | 5,972 | 19 | 6.867 | 64,087 | 40,255 | 23,832 | 20 | 2.694 | 12,828 | 15,717 | -2,890 |
| Pilot schemes in the sub-county where SHEP is in practice (Reported only Hort. Crops) | | | | | | | | | | | | | | | | | |
| KASOKONI | Ngoyaki Foundation C.B.O. | Banana, Tomato, Kale, Bulb onion, Capsicum | 16 | 0.498 | 31,218 | 13,177 | 18,041 | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |
| MUUNGANO | Turkey Self Help Group | Tomato, Avocado, Mango, Kale, Banana | 14 | 0.025 | 3,747 | 633 | 3,114 | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |

*Source: JICA Team*

Table 1.6.38 Outline of the 3rd Baseline Survey/ Five Major Enterprises in the Schemes 1

Pilot schemes in the sub-county where SHEP is NOT in practice — Batch-1 3rd survey (1)

| Scheme | Enterprise | | No. farmers/ sample producing in a FG | 2. Area under the crop (Acre) | 3. Total Production (Kg) | 4. Total Production per Acre (Kg/Acre) | 5. Net Produce (kg) | 6. Net Produce per Acre (kg/Acre) | 7. Average Price per Kg (Ksh/Kg) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2b. | 3 | (3./2b) | 5 | (5./2b) | 7 | (5.x 7.) | 9 | (8 – 9) |
| | | | | Acres | Kg | Kg/Acre | Kg | Kg/Acre | Ksh/Kg | Ksh | Ksh | Ksh |
| OLOPITO (30) | BEANS | TOTAL | 23 | 23.835 | 2,235.0 | 3,456.5 | 1,920.0 | 2,987.1 | 1,715 | 88,925 | 95,590 | -6,665 |
| | | AVERAGE | 23 | 1.036 | 93.1 | 150.3 | 80.0 | 129.9 | 71 | 3,557 | 4,156 | -267 |
| | GREEN MAIZE | TOTAL | 29 | 36.118 | 5,040.0 | 4,927.1 | 3,975.0 | 4,327.0 | 885 | 195,300 | 306,165 | -110,865 |
| | | AVERAGE | 29 | 1.245 | 180.0 | 169.9 | 142.0 | 149.2 | 35 | 6,734 | 11,339 | -3,823 |
| | KALE | TOTAL | 4 | 1.593 | 2,450.0 | 11,934.0 | 2,330.0 | 11,284.3 | 55 | 36,600 | 8,900 | 27,700 |
| | | AVERAGE | 4 | 0.398 | 612.5 | 2,983.5 | 582.5 | 2,821.1 | 14 | 9,150 | 2,225 | 6,925 |
| MDACHI (39) | COWPIE | TOTAL | 4 | 2.512 | 80.0 | 436.6 | 70.0 | 373.2 | 260 | 4,580 | 7,300 | -2,720 |
| | | AVERAGE | 4 | 0.628 | 20.0 | 109.2 | 17.5 | 93.3 | 65 | 1,145 | 1,825 | -680 |
| | GREEN MAIZE | TOTAL | 37 | 54.920 | 25,750.0 | 23,538.3 | 15,824.0 | 15,073.3 | 1,413 | 559,409 | 522,975 | 36,434 |
| | | AVERAGE | 37 | 1.484 | 696.0 | 636.2 | 428.0 | 407.4 | 38 | 15,119 | 14,134 | 985 |
| | KUNDE | TOTAL | 3 | 1.055 | 78.0 | 236.1 | 57.0 | 179.8 | 200 | 4,020 | 3,220 | 800 |
| | | AVERAGE | 3 | 0.352 | 26.0 | 78.7 | 19.0 | 59.9 | 67 | 1,340 | 1,073 | 267 |
| | AMARANTH | TOTAL | 3 | 0.170 | 436.0 | 5,925.9 | 415.0 | 5,531.8 | 80 | 16,100 | 10,600 | 5,500 |
| | | AVERAGE | 3 | 0.057 | 145.0 | 1,975.3 | 138.0 | 1,843.9 | 27 | 5,367 | 3,533 | 1,833 |
| | OKURA | TOTAL | 3 | 0.080 | 840.8 | 37,700.5 | 732.8 | 34,624.9 | 170 | 39,968 | 23,600 | 16,368 |
| | | AVERAGE | 3 | 0.027 | 280.3 | 12,566.8 | 244.3 | 11,541.6 | 57 | 13,323 | 7,867 | 5,456 |
| G/MUTHAIGA (25) | BEANS | TOTAL | 3 | 1.370 | 136.0 | 1,088.0 | 135.0 | 1,080.0 | 75 | 10,125 | 7,600 | 2,525 |
| | | AVERAGE | 3 | 0.457 | 45.3 | 362.7 | 45.0 | 360.0 | 25 | 3,375 | 2,533 | 842 |
| | CABBAGE | TOTAL | 13 | 4.756 | 106,000.0 | 335,995.1 | 90,848.0 | 290,185.1 | 135 | 783,660 | 217,220 | 566,440 |
| | | AVERAGE | 13 | 0.366 | 8,153.8 | 25,845.8 | 6,988.3 | 22,321.9 | 10 | 60,282 | 16,709 | 43,572 |
| | GREEN MAIZE | TOTAL | 11 | 6.759 | 10,125.0 | 33,633.6 | 9,435.0 | 31,559.4 | 274 | 347,640 | 77,810 | 269,830 |
| | | AVERAGE | 11 | 0.614 | 920.5 | 3,057.6 | 857.7 | 2,869.0 | 25 | 31,604 | 7,074 | 24,530 |
| | ONION | TOTAL | 12 | 3.727 | 37,350.0 | 108,214.2 | 36,280.0 | 104,704.0 | 343 | 1,108,450 | 308,815 | 799,635 |
| | | AVERAGE | 12 | 0.311 | 3,112.5 | 9,017.8 | 3,023.3 | 8,725.3 | 29 | 92,371 | 25,735 | 66,636 |
| | TOMATO | TOTAL | 11 | 8.605 | 96,067.0 | 103,648.0 | 91,040.0 | 97,447.0 | 294 | 3,126,992 | 1,018,160 | 2,108,832 |
| | | AVERAGE | 11 | 0.782 | 8,733.4 | 9,422.5 | 8,276.4 | 8,858.8 | 27 | 284,272 | 92,560 | 191,712 |

*Source: JICA Team*

Table 1.6.39 Outline of the 3rd Baseline Survey/ Five Major Enterprises in the Schemes 2

Pilot schemes in the sub-county where SHEP is NOT in practice — Batch-1 3rd survey (2)

| Scheme | Enterprise | | No. farmers/ sample producing in a FG | 2. Area under the crop (Acre) | 3. Total Production (Kg) | 4. Total Production per Acre (Kg/Acre) | 5. Net Produce (kg) | 6. Net Produce per Acre (kg/Acre) | 7. Average Price per Kg (Ksh/Kg) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2b. | 3 | (3./2b) | 5 | (5./2b) | 7 | (5.x 7.) | 9 | (8 – 9) |
| | | | | Acres | Kg | Kg/Acre | Kg | Kg/Acre | Ksh/Kg | Ksh | Ksh | Ksh |
| MURACHAKE (14) | COWPEA | TOTAL | 13 | 12.537 | 796.0 | 1,814.3 | 691.5 | 1,482.5 | 920 | 58,015 | 33,370 | 24,645 |
| | | AVERAGE | 13 | 0.964 | 61.2 | 139.6 | 53.2 | 114.0 | 71 | 4,463 | 2,567 | 1,896 |
| | GREEN GRUM | TOTAL | 9 | 13.609 | 240.0 | 276.6 | 209.0 | 226.0 | 1,080 | 27,315 | 29,270 | -1,955 |
| | | AVERAGE | 9 | 1.512 | 26.7 | 30.7 | 23.2 | 25.1 | 120 | 3,035 | 3,252 | -217 |
| | MAIZE | TOTAL | 8 | 11.978 | 1,043.0 | 2,539.5 | 969.0 | 2,383.5 | 198 | 14,800 | 52,210 | -37,410 |
| | | AVERAGE | 8 | 1.497 | 130.4 | 317.4 | 121.1 | 297.9 | 25 | 1,850 | 6,526 | -4,676 |
| | MILLET | TOTAL | 7 | 4.392 | 282.0 | 616.9 | 241.0 | 535.6 | 300 | 12,050 | 31,170 | -19,120 |
| | | AVERAGE | 7 | 0.627 | 40.3 | 88.1 | 34.4 | 76.5 | 43 | 1,721 | 4,453 | -2,731 |
| | SORGHUM | TOTAL | 12 | 13.377 | 1,331.0 | 1,162.3 | 1,323.0 | 1,139.8 | 370 | 42,610 | 47,200 | -4,590 |
| | | AVERAGE | 12 | 1.115 | 110.9 | 96.9 | 110.3 | 95.0 | 31 | 3,551 | 3,933 | -383 |
| KABEN (34) | BEANS | TOTAL | 6 | 6.907 | 1,100.0 | 1,658.4 | 1,040.0 | 1,460.7 | 520 | 91,400 | 40,650 | 50,750 |
| | | AVERAGE | 6 | 1.151 | 183.3 | 276.4 | 173.3 | 243.4 | 87 | 15,233 | 6,775 | 8,458 |
| | GREEN GRAM | TOTAL | 21 | 32.382 | 18,245.0 | 18,474.9 | 14,719.0 | 14,791.3 | 2,270 | 734,860 | 380,471 | 354,389 |
| | | AVERAGE | 21 | 1.542 | 868.8 | 879.8 | 700.9 | 704.3 | 108 | 34,993 | 18,118 | 16,876 |
| | MAIZE | TOTAL | 8 | 20.843 | 9,872.5 | 4,005.0 | 8,807.5 | 3,555.1 | 221 | 199,690 | 88,515 | 111,175 |
| | | AVERAGE | 8 | 2.605 | 1,234.1 | 500.6 | 1,100.9 | 444.4 | 28 | 24,961 | 11,064 | 13,897 |
| | MANGO | TOTAL | 20 | 22.483 | 138,035.0 | 232,520.6 | 113,275.0 | 196,427.1 | 738 | 2,970,789 | 282,311 | 2,688,478 |
| | | AVERAGE | 20 | 1.124 | 6,901.8 | 11,626.0 | 5,663.8 | 9,821.4 | 37 | 148,539 | 14,116 | 134,424 |
| | TOMATO | TOTAL | 8 | 11.762 | 37,250.0 | 61,122.7 | 33,585.0 | 56,201.9 | 186 | 589,561 | 170,835 | 418,726 |
| | | AVERAGE | 8 | 1.470 | 4,656.3 | 8,731.8 | 4,198.1 | 8,028.8 | 23 | 73,695 | 21,354 | 52,341 |
| TUMUTUMU (20) | GREEN GRAM | TOTAL | 2 | 0.605 | 20.0 | 66.1 | 19.0 | 62.8 | 250 | 2,470 | 6,350 | -3,880 |
| | | AVERAGE | 2 | 0.303 | 20.0 | 33.0 | 19.0 | 31.4 | 125 | 1,235 | 3,175 | -1,940 |
| | MAIZE | TOTAL | 20 | 51.157 | 11,750.0 | 6,973.7 | 10,144.0 | 6,117.6 | 400 | 202,880 | 268,700 | -65,820 |
| | | AVERAGE | 20 | 2.558 | 587.5 | 348.7 | 507.2 | 305.9 | 20 | 10,144 | 13,435 | -3,291 |
| | PIGEON PEA | TOTAL | 2 | 0.605 | 360.0 | 1,189.3 | 360.0 | 1,189.3 | 80 | 28,800 | 8,490 | 20,310 |
| | | AVERAGE | 2 | 0.303 | 360.0 | 594.6 | 360.0 | 594.6 | 80 | 14,400 | 4,245 | 10,155 |

*Source: JICA Team*

Table 1.6.40 Outline of the 3rd Baseline Survey/ Comparison among Schemes on Major Enterprises

Batch-1 3rd survey

| Enterprise | | Scheme | No. farmers/ sample producing in a FG | 2. Area under the crop (Acre) | 3. Total Production (Kg) | 4. Total Production per Acre (Kg/Acre) | 5. Net Produce (kg) | 6. Net Produce per Acre (kg/Acre) | 7. Average Price per Kg (Ksh/Kg) | 8. Total Income (Ksh) | 9. Total Cost of Production (ksh) | 10. Net Income (Ksh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2b. | 3 | (3./2b) | 5 | (5./2b) | 7 | (5.x 7.) | 9 | (8 – 9) |
| | | | | Acres | Kg | Kg/Acre | Kg | Kg/Acre | Ksh/Kg | Ksh | Ksh | Ksh |
| MAIZE | AVERAGE | MURACHAKE | 8 | 1.497 | 130.4 | 317.4 | 121.1 | 297.9 | 25 | 1,850 | 6,526 | -4,676 |
| | AVERAGE | KABEN | 8 | 2.605 | 1,234.1 | 500.6 | 1,100.9 | 444.4 | 28 | 24,961 | 11,064 | 13,897 |
| | AVERAGE | TUMUTUMU | 20 | 2.558 | 587.5 | 348.7 | 507.2 | 305.9 | 20 | 10,144 | 13,435 | -3,291 |
| GREEN MAIZ | AVERAGE | OLOPITO | 29 | 1.245 | 180.0 | 169.9 | 142.0 | 149.2 | 35 | 6,734 | 11,339 | -3,823 |
| | AVERAGE | MDACHI | 37 | 1.484 | 696.0 | 636.2 | 428.0 | 407.4 | 38 | 15,119 | 14,134 | 985 |
| | AVERAGE | G/MUTHAIGA | 11 | 0.614 | 920.5 | 3,057.6 | 857.7 | 2,869.0 | 25 | 31,604 | 7,074 | 24,530 |
| | AVERAGE | MURACHAKE | 1 | 1.211 | 90.0 | 74.3 | 80.0 | 66.1 | 30 | 2,400 | 7,000 | -4,600 |
| BEANS | AVERAGE | OLOPITO | 23 | 1.036 | 93.1 | 150.3 | 80.0 | 129.9 | 71 | 3,557 | 4,156 | -267 |
| | AVERAGE | MDACHI | 3 | 0.458 | 113.0 | 628.9 | 105.0 | 588.8 | 73 | 7,933 | 1,707 | 6,227 |
| | AVERAGE | G/MUTHAIGA | 3 | 0.457 | 45.3 | 362.7 | 45.0 | 360.0 | 25 | 3,375 | 2,533 | 842 |
| | AVERAGE | KABEN | 6 | 1.151 | 183.3 | 276.4 | 173.3 | 243.4 | 87 | 15,233 | 6,775 | 8,458 |
| COWPEA | AVERAGE | MDACHI | 4 | 0.628 | 20.0 | 109.2 | 17.5 | 93.3 | 65 | 1,145 | 1,825 | -680 |
| | AVERAGE | MURACHAKE | 13 | 0.964 | 61.2 | 139.6 | 53.2 | 114.0 | 71 | 4,463 | 2,567 | 1,896 |
| | AVERAGE | KABEN | 2 | 0.723 | 122.5 | 320.0 | 106.3 | 284.4 | 145 | 17,250 | 7,840 | 9,410 |
| TOMATO | AVERAGE | MDACHI | 3 | 0.130 | 221.3 | 1,817.7 | 183.3 | 1,490.5 | 70 | 9,733 | 9,723 | 10 |
| | AVERAGE | G/MUTHAIGA | 11 | 0.782 | 8,733.4 | 9,422.5 | 8,276.4 | 8,858.8 | 27 | 284,272 | 92,560 | 191,712 |
| | AVERAGE | MURACHAKE | 1 | 0.346 | 416.0 | 1,202.5 | 352.0 | 1,017.5 | 63 | 22,000 | 3,600 | 18,400 |
| | AVERAGE | KABEN | 8 | 1.470 | 4,656.3 | 8,731.8 | 4,198.1 | 8,028.8 | 23 | 73,695 | 21,354 | 52,341 |
| KALE | AVERAGE | OLOPITO | 4 | 0.398 | 612.5 | 2,983.5 | 582.5 | 2,821.1 | 14 | 9,150 | 2,225 | 6,925 |
| | AVERAGE | MDACHI | 1 | 1.000 | 180.0 | 180.0 | 120.0 | 120.0 | 60 | 7,200 | 1,500 | 5,700 |
| | AVERAGE | G/MUTHAIGA | 1 | 0.125 | 900.0 | 7,200.0 | 600.0 | 4,800.0 | 10 | 6,000 | 4,500 | 1,500 |
| AMARANTH | AVERAGE | OLOPITO | 1 | 0.093 | 252.0 | 2,719.5 | 260.0 | 2,805.8 | 60 | 15,600 | 2,000 | 13,600 |
| | AVERAGE | MDACHI | 3 | 0.057 | 145.0 | 1,975.3 | 138.0 | 1,843.9 | 27 | 5,367 | 3,533 | 1,833 |

*Source: JICA Team*

Table 1.6.41 Prioritized Crops (1st & 2nd) and Number of Farmers Cultivated (Harvested) Those Selected Crops in Each Pilot Scheme (at the 3rd BLS)

| Scheme | Sub-county | 1st crop | *No. | 2nd crop | *No. |
|---|---|---|---|---|---|
| Olopito | Narok-North | Green Maize | 29 | Dry Beans | 23 |
| Mdachi | Ganze | Okura | 3 | Black Nightshade | 0 |
| G/Muthaiga | Laikipia-West | Cabbage | 13 | Bulb Onion | 12 |
| Murachake | Mbeere-North | Green Maize | 1 | Tomato | 1 |
| Kaben | Marakwet-East | Tomato | 8 | Green Gram | 21 |
| Tumutumu | Igembe-South | Water Melon | 0 | Onion | 0 |

*Source: JICA Team*

Number of farmers above mentioned is the number of farmers who successfully obtained their yields/ harvests and somehow sold them at the market/ to the middlemen. In some cases, farmers could not reach to harvest stage and they could not sell those prioritized enterprises/ crops at the market. Also they consumed harvests themselves and not sold. In many cases, farmers tend NOT to report the details in Total Income, Average Prices per Kg and Total Cost of Production when they failed to produce the crops and to gain income from the yield.

It is difficult at this time to say something whether the crop selections through the use of Market Survey activities in SHEP approach contributed to their income growth or not. The selection/ prioritization of enterprises/ crops were made as premises for completion of the rehabilitation of irrigation system at the pilot schemes. In some cases farmer groups reported/ mentioned that they have intensions of planting selected crops after irrigation water reaches their schemes.

It is actually observed that the "selected grain crops," which are mainly grown under rain-fed condition, are followed/ planted by lager numbers of farm group members compared to the numbers of farmers cultivating "selected horticultural crops," which generally require irrigated conditions. In Tumutumu scheme no farmers could start planting their selected crops without completion of the rehabilitation of irrigation system where they selected water melon and onion as prioritized enterprises.

Also many of those ScAOs, FEOs have raised an issue that workload of activities in SIDEMAN-SAL was heavy and tight. Local staffs should handle not only activities regarding farming support such as training workshops and field monitoring visits but training session for IWUA members and supervising construction works. Farmers are also regularly mobilized for construction works between an interval of their daily duties.

### (2) General Horticultural Crop Production and Post Harvest Handling Technique

To identify the capacity changes of both individual farmers and Farmers Groups in adopting basic horticultural production techniques, this survey was conducted again and it was the 3rd survey for model farmer groups. On the comparison in the Tables 6.6.41 (also refer Table.6.6.42), it is observed that a small proportion of farmers have conducted soil testing (Q3) and used

recommended compost (Q4) in "Pre-cultivation Preparation" in 2015. The numbers of farmers who undertook market survey (Q1) and prepared Crop Planting Calender (Q2) in 2015 were decreased compared to the numbers of farmers in 2014 (Table 6.6.43), except Murachake scheme. Farmers recognized that they kept using quality planting materials (Q5). For the questions regarding "Land Preparation (Q6,7,8)" and Crop Establishment (Q9,10,11)" the proportion of the adopted farmers in a group members were increased compared to the 1st survey in 2013 (Table 6.6.43). The percentages of farmer members who implemented the cost income analysis (Q20) were slightly decreased compared to the farmers conducted it in 2014, but still maintained higher proportions in 2015. The observation above mentioned proves that the series of training sessions and practices of the core components of SHEP Approach is actually taken hold across the members of farmer groups, and the knowledge obtained at the training contributed the increment of the farmer's competence/ capacity of the Market-Oriented Agriculture.

Table 1.6.42 Outline of the 3rd Baseline Survey/ Summary Table on GHCP&PHHT Results

| Basic Information | | Percent adoption of each item of the GHCP&PHHT (by the group members) Batch1-3rd | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pre-Cultivation Preparation | | | | | Land Preparation | | | Crop Establishment (Planting/ Transplanting) | | | Crop Management | | | | | Harvest | Post-Harvest Handling | | Cost & Income Analysis |
| SCHEME | Sample# | Q01 | Q02 | Q03 | Q04 | Q05 | Q06 | Q07 | Q08 | Q09 | Q10 | Q11 | Q12 | Q13 | Q14 | Q15 | Q16 | Q17 | Q18 | Q19 | Q20 |
| OLOPITO | 30 (F:14/M16) | 36.7 | 44.8 | 7.1 | 26.7 | 96.6 | 93.3 | 80.0 | 56.7 | 93.3 | 37.9 | 56.7 | 40.0 | 96.7 | 26.7 | 90.0 | 93.3 | 100.0 | 80.0 | 93.3 | 30.0 |
| MDACHI | 39 (F:21/M18) | 30.6 | 44.4 | 25.0 | 13.9 | 55.6 | 50.0 | 61.1 | 33.3 | 61.1 | 77.8 | 31.4 | 33.3 | 72.2 | 30.6 | 58.3 | 57.1 | 80.6 | 66.7 | 88.9 | 55.6 |
| G/MUTHAIGA | 25 (F:10/M15) | 40.0 | 24.0 | 0.0 | 16.0 | 88.0 | 96.0 | 84.0 | 60.0 | 84.0 | 64.0 | 28.0 | 96.0 | 92.0 | 76.0 | 92.0 | 84.0 | 100.0 | 88.0 | 96.0 | 52.0 |
| MURACHAKE | 14 (F:9/M5) | 92.9 | 92.9 | 0.0 | 85.7 | 92.9 | 92.9 | 85.7 | 85.7 | 57.1 | 92.9 | 42.9 | 50.0 | 92.9 | 50.0 | 92.9 | 92.9 | 100.0 | 78.6 | 92.9 | 92.9 |
| KABEN | 34 (F:9/M25) | 47.1 | 29.4 | 24.2 | 57.6 | 82.4 | 88.2 | 25.0 | 73.5 | 88.2 | 47.1 | 21.9 | 91.2 | 100.0 | 18.2 | 94.1 | 41.2 | 94.1 | 79.4 | 97.1 | 67.6 |
| TUMUTUMU | 20 (F:6/M14) | 10.0 | 10.0 | 0.0 | 30.0 | 95.0 | 100.0 | 75.0 | 40.0 | 30.0 | 30.0 | 25.0 | 40.0 | 100.0 | 5.0 | 100.0 | 60.0 | 100.0 | 30.0 | 90.0 | 20.0 |

* Adoption of each General Horticultural Crop Production & Post-Harvest Handling Technique by the group members in percentage

*Source: JICA Team*

Table 1.6.43 Outline of the 1st to 3rd GHCP&PHHT Results

| SCHEME | Sample No. | | | Q1: Implementation of Market Survey | | | Q2: Preparation of Crop Planting Calendar | | | Q20: Record keeping and Cost & Income Analysis | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1st | 2nd | 3rd | 1st | 2nd | 3rd | 1st | 2nd | 3rd | 1st | 2nd | 3rd |
| OLOPITO | 48 (F:17/ M:31) | 40 (F:15/ M:25) | 30 (F:14/ M16) | 10.9 | 52.5 | 36.7 | 30.4 | 72.5 | 44.8 | 20.5 | 52.5 | 30.0 |
| MDACHI | 55 (F:26/ M:29) | 40 (F:16/ M:24) | 39 (F:21/ M18) | 5.5 | 87.5 | 30.6 | 1.8 | 87.5 | 44.4 | 3.7 | 87.5 | 55.6 |
| GATITU-MUTHAIGA | 47 (F:14/ M:33) | 36 (F:12/ M:24) | 25 (F:10/ M15) | 14.9 | 47.2 | 40.0 | 14.9 | 52.8 | 24.0 | 26.1 | 52.8 | 52.0 |
| MURACHAKE | 20 (F:14/ M:6) | 12 (F:07/ M:05) | 14 (F:09/ M:05) | 15.0 | 91.7 | 92.9 | 10.0 | 91.7 | 92.9 | 5.0 | 91.7 | 92.9 |
| KABEN | 46 (F:12/ M:34) | 19 (F:06/ M:13) | 34 (F:09/ M25) | 17.8 | 78.9 | 47.1 | 13.3 | 63.2 | 29.4 | 19.6 | 94.7 | 67.6 |
| TUMUTUMU | 45 (F:13/ M:32) | 19 (F:04/ M:15) | 20 (F:06/ M14) | 0.0 | 5.9 | 10.0 | 0.0 | 23.5 | 10.0 | 0.0 | 0.0 | 20.0 |

*Source: JICA Team*

**(3) Improvements in the Group Empowerment Indicator (GEI)**

To identify the capacity change of the Farmers Groups in terms of Leadership, Cooperation among members & Gender, the Group Empowerment Indicators (GEIs) was used again at the time of the 3rd Baseline Survey held on March 2015.

Five (5) levels are set from both qualitative aspects (do not require measurement) and quantitative aspects (measurable) which guide the level of farmers group in terms of previous 3 concepts and how they network with other community members.

The outline of each level is defined as follows:
GEI Level I: The group is formed as recommended by outsiders. But not all members are fully convinced of its benefit.
GEI Level II: The group members are becoming aware of the benefits of grouping.
GEI Level III: The group members became confident in each other.
GEI Level IV: Strong ties have been established among the group members. The members are interested in the capacity enhancement of the group as well as the community as a whole.
GEI Level V: The group is able to work together to address various problems and can build and maintain a network with other groups and organizations.

Table 1.6.44 Outline of Baseline Survey/ Summary on GEI (at the 3rd BLS, March 2015)

| Scheme | Name of Farmer Group | Sample # | | | GEI score | | | |
|---|---|---|---|---|---|---|---|---|
| | | T | F | M | L | C | G | **GEI** |
| Olopito | Olopito Irrigation Scheme | 30 | 14 | 16 | III | II | III | **II** |
| Mdachi | Mdachi scheme | 42 | 24 | 18 | II | I | III | **I** |
| G/Muthaiga | Gathitu-Muthaiga | 25 | 9 | 16 | II | I | II | **I** |
| Murachake | Ukulima Bora S.H.G | 16 | 8 | 8 | III | III | IV | **III** |
| Kaben | Kaben Irrigation Scheme | --- | --- | --- | III | II | II | **II** |
| Tumutumu | Bainthanga Water Project | 19 | 4 | 15 | II | II | I | **I** |

*T: Total, F: Female, M: Male, L: Leadership, C: Cooperation among members, G: Gender and GEI: GEI Level

*Source: JICA Team*

Compared with the result of GEI survey in 2013 (Table 6.6.15), the overall scores in the leadership (L) and Gender (G) were improved in the model farmer groups in all schemes. Especially Groups in Kaben and Murachake show higher progress. On the other hand farmer groups in Mdachi and Gathitu- Muthaiga decreased in term of the Cooperation among members (C), that's why overall GEI in both schemes were getting down.

### 1.6.7 Follow-Up Interview Survey on the Activities of Trial Introduction of the Core Components of SHEP Approach (July 2015)

To identify/confirm the estimated number (or proportion) of membership in the model farmer group 1) who have ever individually (or by inner-group) undertaken Market Surveys after the 1st Market Survey implemented by the representatives of the model farmer groups and 2) who have been keeping crop records individually (or by inner-group), the follow-up interview survey was held on July 2015. SIDEMAN-SAL sent ScAOs a questionnaire sheet previously, and the answers were made based on the estimation made by ScAOs and FEOs.

Table 1.6.45 The results of Follow-Up Interview Survey on Trial Introduction of the Core Component of SHEP Approach

| Scheme | Name of Farmer Group | 1) Market survey | | | 2) Record keeping | | |
|---|---|---|---|---|---|---|---|
| | | T | F | M | T | F | M |
| Olopito | Olopito Irrigation Scheme | 21 | 10 | 11 | 25 | 12 | 13 |
| Mdachi | Mdachi scheme | 3 | 1 | 2 | 2 | 1 | 1 |
| G/Muthaiga | Gathitu-Muthaiga | 6 | 1 | 5 | 10 | 2 | 8 |
| Murachake | Ukulima Bora S.H.G | 5 | 3 | 2 | 16 | 9 | 7 |
| Kaben | Kaben Irrigation Scheme | ** | ** | ** | 21 | 6 | 15 |
| Tumutumu | Bainthanga Water Project | 1 | 0 | 1 | ** | ** | ** |
| Kasokoni | Ngoyaki Foundation CBO | --- | --- | --- | --- | --- | --- |
| Muungano | Turkey Self Help Group | 2 | 0 | 2 | 2 | 0 | 2 |

T; Total, F; Female, and M; Male

*Source: JICA Team*

The questions are listed below;

1) Has the Farmer Model Group ever undertaken Market Survey & Cropping Calendar after the 1st Market Survey?

2) Are there any Farmer(s) who have ever undertaken Market Survey & Cropping Calendar after 1st Market Survey?

3) Is the any spillover effect on Crop Market Survey & Cropping Calendar making in the area?

4) Are there any Farmer(s) in the Farmer Model Group who have been keeping crop records?

5) Has there been any spillover effect in keeping of Crop Records in the area?

6) Has the Farmer Model Group undertaken implementation of any Group Action Plans?

It is actually reported that the 2nd Market Survey has not conducted by the group representatives again, but it has been done by the voluntary individuals (or "not-so-structured inner-groups") in some pilot schemes. On the other hand, a model farmer group collected contributions from group members for the bus fares for the group representatives.

In many farmer groups mentioned that they had intensions of implementing activities on the Group Action Plan when irrigation water reaches their schemes. In Tumutumu scheme no farmers could start planting their selected crops without completion of the rehabilitation of irrigation system where they selected water melon and onion as prioritized enterprises.

There are several effects were reported;

- The trainees went back home and spread news of the training to neighbors who picked it up.
- Darajani FFS are doing it too.
- Some farmers in the neighboring schemes who produce water melons and green grams in succession have found buyers in Nakuru, Nairobi and Eldored.
- During trainings, farmers outside the irrigation scheme come for the trainings and they were convinced.
- The trained farmers went home and spread the news of the importance of keeping farm records.
- Those producing to sell are keen to keep records to determine the costs incurred and profit margins.

### 1.6.8 Trial Introduction of Low Input Sustainable Agriculture (LISA) Technologies

#### (1) General

Introduction meetings were held at the pilot scheme sites located in the four (4) sub-counties, which would have the second-batch pilot schemes in the near future. After the explanations of 3 candidate technologies in detail, farmer group members prioritized, and then selected two (2) technologies with consideration given to the interest, preference and feasibility of farmer group members. Following the demand-driven-approach, the farmer group members also prioritized/ selected three (3) crops/ varieties in Kenyan Traditional Vegetables (only when they selected KTVs). Finally each farmer group selected/ appointed two (2) pilot farmers per each selected technology as representatives of the farmer group. Results of the prioritizations/selections of candidate technologies, crops/ varieties of KTVs, and pilot farmers for each selected technology were reported to SIDEMAN-SAL.

Those selected pilot farmers were requested to conduct the adaptation-trial/ demonstration planting at their fields and to record the revenue and expenditure for productions. Pilot farmers also have responsibilities in making presentations to other group members at the evaluation and decision-making meeting that would be held at the end of production periods. They were also required to share the cost for obtaining planting materials (e.g. the seeds of KTVs). All other required farming tools/ materials should be prepared/ provided by the pilot farmers themselves.

Table 1.6.46 Introduction Meeting of LISA Technologies

| Date | Scheme | Sub-county | County |
|---|---|---|---|
| March 13, 2014 | Olopito | Narok-North | Narok |
| March 14, 2014 | Mdachi | Ganze | Kilifi |
| March 20, 2014 | G/Muthaiga | Laikipia-West | Laikipia |
| March 20, 2014 | Tumutumu | Igembe-South | Meru |

*Source: JICA Team*

#### (2) Results of selection of activities/candidate technologies

At the Introduction Meeting, farmer group was requested to prioritize candidate technologies, and to select two (2) candidate technologies as their selected technologies through the discussion and majority vote in a democratic manner (see Table 1.6.47 Selected Technologies in LISA of Each Pilot Scheme
47).

Table 1.6.47 Selected Technologies in LISA of Each Pilot Scheme

| Scheme | Rank | Crop/ Variety | Note |
|---|---|---|---|
| **Mdachi** (Kilifi) | 1 | Kenyan Traditional Vegetables | |
| | 2 | Push-pull Technique | |
| | 3 | Bokashi Technique | |
| **Olopito** (Narok) | 1 | Kenyan Traditional Vegetables | |
| | 3 | Push-pull Technique | |
| | ~~2~~ | ~~Bokashi Technique~~ | Declination/ refusal by model farmer group |
| **Gathitu/ Muthaiga** (Laikipia) | 1 | Kenyan Traditional Vegetables | |
| | 2 | Pusj-pull Technique | |
| | 3 | Bokashi Technique | |
| **Tumutumu** (Meru) | 1 | Kenyan Traditional Vegetables | |
| | 2 | Bokashi Technique | |
| | 3 | Push-pull technique | |

*Source: JICA Team*

In most cases farmers selected the Kenyan Traditional Vegetables (KTVs) and Push-pull Technique. During the LISA introduction meeting, farmers were fully informed on the ingredients of the Bokashi technology and the possible cost implications. The ScAO of Tumutumu scheme had experiences in application of Bokashi Technique and said familiar with/ confident about introduction of the technique into target group. Others pointed out the difficulties in the availabilities of large amount of yogurt and sugar at neighboring retail shops for Bokashi Technique.

Table 1.6.48 Sample Candidate Technology Selection Form/ Mdachi Scheme

Sustainable Smallholder Irrigation Development and Management in Semi-Arid Lands Project

**Reporting Form of the Prioritization/ Selection of Candidate Technologies for Trial Introduction of the Low Input Sustainable Agricultural (LISA) Technology**

Date: 14-03-2014

Name of Group: MDACHI IRRIGATION SCHEME GROUP

Name of Pilot Scheme: MDACHI SCHEME

Name of Sub-County: GANZE

Name of County: KILIFI

We, Mdachi Irrigation Scheme grp Group members, democratically prioritized/ selected the 2 candidate technologies for the trial introduction of Low Input Sustainable Agricultural (LISA) Technologies, and report the results listed below.

| Name of Candidate Technology | No. of members selected the technology / No of total participants | Ranking |
|---|---|---|
| Kenyan Traditional Vegetables | 55 (57) | |
| Push-pull Tech. | 46 | |
| BOKASHI Tech. | 17 | |

The pilot farmers/ group representatives implementing/ conducting the trial introduction promise to record the farming records including the revenue/ expenditure on the implementation/ demonstration of this trail introduction, and then to report the results at the evaluation/ decision-making meeting that will be held at the end of trial period within the model farmer group.

Name of Chairperson: CHIVATSI NDENGE KAMBI

Signature: Chivatsi Tel No. 0711766468

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[Sub-County Use]

Name of Sub-County Agricultural Officer: Dixon K. Mulwa

Name of Sub-County: GANZE

Signature:

*Source: JICA Team*

### (3) Process to select the traditional vegetables among candidates

When the farmer group chose the Kenyan Traditional Vegetable (KTVs) as their selection, they were also requested to prioritize those candidate/ available KTV crops/ varieties. Candidate crops/ varieties of KTVs were selected/ offered based on the availability and recommendation from Bioversity International.

Table 1.6.49 Candidate Crops/ Varieties in KTVs

| English Name | Swahilli Name | Scientific Name | Major Consuming Area |
|---|---|---|---|
| Giant African Nightshade | Mnavu | *Solanum scabrum* | All (Nationwide) |
| Orange-fruited Nightshade | Manabu | *Solanum villosum* | All (especially Coast, Western, and R-Valley) |
| Amaranth (Traditional) | Mchicha | *Amaranthus dubius* | All (Nationwide) |
| Amaranth (Inproved) | Mchicha | *Amaranthus spp.* | Central, Western |
| Spider plant | Mwangani | *Cleome gynandra* | Coast, Western, and Nyanza |
| Ethiopian Kale | Kanzira | *Brassica carinata* | Western and Nyanza |
| Rattle Pod | Mitoo | *Clotalaria spp.* | Western and Nyanza |
| Cockscomb | Mekanuri | *Celosia argentea* | Coast |
| Jute Mallow | Mulenda | *Corchorus olitorius* | Coast, Western and Nyanza |

*Source: JICA Team*

For the reporting and filing purposes the "KTVs Selection Form" was also submitted after the selection of KTV crops/ varieties. On the KTVs Selection Form there were several questions listed below to identify how/ why the farmer group selected/ prioltized crops on the list;

1) Have you (your group members) ever seen this crop/ variety before?

2) Have you (your group members) ever seen this crop/ variety in the market where you usually use/ sell produces/ purchase products?

3) Have you (your group members) ever heared the good reputation about this crop/ variety before?

4) Have you (your group members) ever grown/ planted this crop/ variety in your field?

5) Have your (your group members) family/ relatives/ friend previously produced this crop/ variety before?

6) Do you (your group members) expect this crop/ variety would increase your agricultural production/benefits?

7) Do you (your group members) expect this crop/ variety would increase your nutritional condition/ status?

8) Do you (your group members) want to try this crop/ variety even if you need to purchase the seed?

and also asking reasons why this crop/variety was preferable/ undesirable for them.
Farmer group also ticked the questions when applicable (see Table 1.6.51 Sample Crop/ Variety Selection on KTVs Form/ Mdachi Scheme
51).

Table 1.6.50 Selected Crops/ Varieties in KTVs of Each Pilot Scheme

(revised w/ KENRIK/ Bioversity's consultation)

| Scheme | Rank | Crop/ Variety | Note |
|---|---|---|---|
| **Mdachi** (Kilifi) | --- | **Mnavu** *(Solanum scabrum)* /Giant.Af.Nightshade | |
| | --- | **Mchicha** *(Amaranthus dubius)* /Amaranth | Requested **improved** (modern) one |
| | --- | **Mwangani** *(Cleome gynandra)* /Spider plant | |
| **Olopito** (Narok) | 1 | **Mnavu** *(Solanum scabrum)* /Giant.Af.Nightshade | |
| | 2 | **Mchicha** *(Amaranthus cruentus)* /Amaranth | Requested **traditional** one |
| | 3 | **Mwangani** *(Cleome gynandra)* /Spider plant | |
| **Gathitu/ Muthaiga** (Laikipia) | 1 | **Mnavu** *(Solanum scabrum)* /Giant.Af.Nightshade | |
| | 2 | **Managu** *(Solanum villosum)* /Org.Fru.Nightshad | Requested **this species** |
| | 3 | **Mwangani** (**Sageti:** *Cleome gynandra)* /Spider pl. | |
| **Tumutumu** (Meru) | 1 | **Mchicha** *(Amaranthus dubius)* /Amaranth | Arranged **improved** (modern) type |
| | 2 | **Mnavu** *(Solanum scabrum)* /Giant Af.Nightshad | Arranged this type |
| | 3 | **Kanzira** *(Brassica carinata)* /Ethiopian kale | |

*Source: JICA Team*

For instance the farmer group members of Mdachi scheme selected Giant African Nightshade, Amarantus and Spider plant with consideration given to the interest, preference, availabilities of planting materials and technical feasibility of farmer group members (Table 6.6.50). They had also chosen the Giant African Nightshade as the second prioritized crop for the Introduction of Core Components of SHEP Approach. They reported/ mentioned that they found Giant Nightshade in the market when they conducted Market Survey for the Introduction of Core Components of SHEP Approach, and relatives of some group members had experience in planting the Giant Nightshade, so they thought it is feasible for them (Table 6.6.51).

Table 1.6.51 Sample Crop/ Variety Selection on KTVs Form/ Mdachi Scheme

SIDEMAN-SAL

Sustainable Smallholder Irrigation Development and Management in Semi-Arid Lands Project Date: 14-03-2014

**Reporting Form of the Prioritization/ Selection of Candidate Crops/ Varieties for Trial Introduction of the Kenyan Traditional Vegetables (KTVs)**

Name of Group: MDACHI IRRIGATION SCHEME GROUP Name of Pilot Scheme: MDACHI SCHEME

Name of Sub-County: GANZE Name of County: KILIFI

| Crop Name Swahili/ English | Rank | Questions *(Tick if applicable) | | | | | | | | Reason why this crop/ variety is preferable/ undesirable for you |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| Mnavu/ Black Nightshade | | | | | | | | | | |
| Mchicha/ Amaranth | | | | | | | | | | |
| Kanzira/ Ethiopian Kale | | | | | | | | | | |
| Mwangani/ Spider plant | | | | | | | | | | |
| Mulenda/ Jute mallow | | | | | | | | | | |
| Mitoo/ Rattle Pod | | | | | | | | | | |
| Mekanuri/ Cockscomb | | | | | | | | | | |
| Managu (bitter)/ Black Nightshade | | | | | | | | | | |
| Mchicha (improved)/ Amaranth | | | | | | | | | | |

Name of Chairperson: CHIVATSI NDENGE KAMBI

Signature: ..... Tel No. 0711746468

*Source: JICA Team*

### (1) Selection of Farmers

For each one of two selected technologies farmer group selected pilot farmers consisting of one female and one male farmer representatives. Each farmer group in a scheme had four (4) pilot farmers for two (2) selected technologies.

Table 1.6.52 Pilot Farmers on Selected Technologies in Pilot Schemes

| | Scheme | Selected Technology | Name of the Pilot Farmers | Sex | Contact No. |
|---|---|---|---|---|---|
| 1 | Mdachi (Kilifi) | Kenyan Trad. Vegs | Evannce Munga | F | 0728- 340 364 |
| | | | Faustine Katana | M | 0727- 201 629 |
| | | Push-pull | Irene Shoka | F | 0717-468 394 |
| | | | Amani Kaiana (reported the change on Apr.05,2014) | M | 0718- 992 947 |
| 2 | Olopito (Narok) | Kenyan Trad. Vegs | Florence Kisio | F | 0712- 687 744 |
| | | | John Nkumum | M | 0701- 576 839 |
| | | Push-pull | Margaret Runko | F | 0700- 831 216 |
| | | | Simon Ndai Masaka | M | 0722- 354 629 |
| 3 | Gathitu/ Muthaiga (Laikipia) | Kenyan Trad. Vegs | Teresia Njogu | F | 0704- 530 887 |
| | | | Stanley M. Gakumu | M | 0707- 744 258 |
| | | Push-pull | Beatrice Kanyi | F | 0716- 669 307 |
| | | | Kuira Mathenge | M | 0715- 329 788 |
| 4 | Tumutumu (Meru) | Kenyan Trad. Vegs | Pauline Nthiu | F | 0708- 112 009 |
| | | | Joseph Njau | M | 0719- 167 354 (or 359) |
| | | Bokashi | Nancy Nkirote | F | 0708- 184 983 |
| | | | James Ntongai | M | 0739- 638 652 |

*Source: JICA Team*

Those above mentioned farmer representatives were recommended by others or/and nominated him-/her-selves, then selected through democratic process (by majority vote) at the time of Introduction/ sensitization meeting of LISA technologies with the JICA team members. In some cases farmers recognized as “practical farmers” in the schemes were selected by neighbors.

Table 1.6.53 Sample Pilot Farmer Selection Form of the Selected Technologies/ Mdachi Scheme

Sustainable Smallholder Irrigation Development and Management in Semi-Arid Lands Project

**Selection Form of the Pilot Farmers for**

**Trial Introduction of Push-pull Technique**

Date: 14-03-2014

Name of Group: MDACHI IRRIGATION SCHEME GROUP

Name of Pilot Scheme: MDACHI SCHEME

Name of Sub-County: GANZE

Name of County: KILIFI

We, Malachi irrigation Scheme Group members, democratically selected pilot farmers as the group representatives of 1 female and 1 male farmers indicated below to implement the trial introduction above entitled.
The pilot farmers/ group representatives promised to record the farming records including the revenue/ expenditure on the implementation/ demonstration of this trail introduction, and then to report the results at the evaluation/ decision-making meeting that will be held at the end of trial period within the model farmer group.

| Name of Pilot Farmers/ Group Representatives | Sex (Female/Male) | Telephone Number | Signature |
|---|---|---|---|
| Irene Shoka | F | 0717468394 | |
| Sammy Chai | M | 0715929834 | |

Name of Chairperson: CHIYAISI NDENGE KAMBI

Signature: Tel No. 0711746468

[Sub-County Use]

Name of Sub-County Agricultural Officer: Dixon R. Mulwa

Name of Sub-County: GANZE

Signature:

*Source: JICA Team*

**(2) Distribution of Planting Materials and Adaptation-trial/ Demonstration at Farmer Fields**

For Kenyan Traditional Vegetables (KTVs), seeds of the three (3) crops/ varieties that were prioritized/ selected by the farmer group were provided. Each pilot farmer received the amounts of seeds that satisfy a standard plot (designed with 10m x 10m) for demonstration/ adaptation-trial (for each crop/ variety) at the time of the first Field Monitoring Visit subsequently made after introduction meeting. The seeds were sold with comparatively low prices, and pilot farmers made payment to Bioversity International at the end of demonstration/ trial planting period.

Neighboring farmers in a pilot scheme could also purchase the seeds of the selected crops/ varieties directory from Bioversity International at the time when SIDEMAN-SAL provided seeds to Pilot Farmers. Neighboring farmers should make a payment on site at the time of purchasing. If pilot farmer(s) wanted to purchase more amounts of seeds, he/ she could do this at the time when other neighboring farmers purchased under the same conditions. SIDEMAN-SAL recorded the name, amount purchase, and amount paid for each neighboring farmers who purchased the seeds. All sales proceeds were sent directly to Bioversity International (see Table 6.6.54).
About the remaining crops/ varieties introduced at the meeting out of the selected three crops, the request from farmers (if requested) was collected/ compiled by SCAO and sent to Bioversity International directory.

For Push-Pull Technique, seeds of Desmodium that satisfied two (2) standard plots (designed with 21m x 21m per plot) for demonstration/ trial plots for each pilot farmer were provided by free of charge. However pilot farmers were requested to collect/ save the seed from the 1st year crops for subsequent years. SIDEMAN-SAL had no extra seeds for neighboring farmers. The root sprits/ stubs of Napier grass were obtained by the farmer group's. SIDEMAN-SAL provided the support for transportation means. For Bokashi, SIDEMAN-SAL had NO providing planting materials, except technical information, advice and materials (handbooks and leaflets).

Table 1.6.54 Sample Distribution Record of the Planting Materials for KTVs

Sustainable Smallholder Irrigation Development and Management in Semi-Arid Lands Project

Recording Form of the Seed Sharing/ Sales of Kenyan Traditional Vegetable (KTVs) (Page 3 )

Name of Group: .....MDACHI..... Name of Pilot Scheme: ...Mdachi scheme.....

| Crop name/ variety | Mwangani/ Spider plant | |
|---|---|---|
| Amount of the Seed Prepared (tsp/ gram) | 50 tsp | (Price Ksh. 20 /tsp/g) |
| Amount Purchased by the Pilot Farmer (tsp) | Amount (tsp/g) | Sales (Ksh.) |
| (Name) FOUSINE KAIANA | (12 tsp) | Ksh. 240 |
| (Name) EUNICE MUNGA | (12 tsp) | Ksh. 240 |
| Record on Sales of Seed for Neighboring Farmers | | 26 tsp remaining (35 |

| Date | Name | Amount (tsp/g) | Sales (Ksh.) |
|---|---|---|---|
| 3/4/2014 | JOHN TAA | 3 | 60 |
| | JOHN MWAISUMO | 3 | 60 |
| | MWAISELA MUHOMBI | 2 | 40 |
| | KASICHANA NYAMBU | 1 | 20 |
| | KAIANA JEFF | 1 | 20 |
| | KARISO KENGO | 2 | 40 |
| | SUMAZI TAURA NGORO | 1 | 20 |
| | JOHN TAA | 1 | 20 |
| | SAMMY CHAI | 2 | 40 |
| | TAITUS ALI | 1 | 20 |
| | KAIANA JEFF | 1 | 20 |
| | YUSUFU NGALA | 3 | 60 |
| | CHARO MGOMBO | 1 | 20 |
| | MTSANGANYIKO NDAA | 13 | 260 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

*The payment should be made on site at the time of purchase.

*The sales proceeds should be directory sent to Bioversity International.

19 — 380

30 — 600

*Source: JICA Team*

### (3) Progress of LISA Technology

Progress of the pilot farm is shown in Table 1.6.55 Progress of Pilot Farm on LISA Technology

5. As show in the table, however, the activities of KTV, and Push and Pull were largely affected by prolonged drought in 2014, which seemed to be the worst since 2000. All of rain-fed pilot farm were failed due to lack of rain. Mdachi was extremely serious because the scheme was suffered from flood after drought. But farmers, who failed in first trial, restarted to grow KTV in different field from beginning of Jun. On the other hand, the pilot farms implemented in irrigated field started to harvest them from end of Jun. As of end of August, the Bokashi does not start because they ready to start but the martial such as molasses are not available.

Table 1.6.55 Progress of Pilot Farm on LISA Technology

1) Push-Pull

| Scheme | | Land Preparation | Seeding | Vegetative growth | Harvest | Comment |
|---|---|---|---|---|---|---|
| Mdachi | 1 | ○ | X | - | - | Seeding could not implement due to flooding |
| | 2 | X | - | - | - | Land preparation could not implement due to flooding. |
| Olopito | 1 | ○ | ○ | ○ | X | Maize grew but did not fruit due to drought and disease. |
| | 2 | ○ | ○ | X | - | Maize and napier died by drought. |
| Gatitu/ Muthaiga | 1 | ○ | X | - | - | Seeding could not implement due to drought |
| | 2 | ○ | ○ | ○ | - | Seeding restarted after drought damage in different field. |

2) Kenya Traditional Vegetables

| Scheme | | Land Preparation | Seeding | Vegetative growth | Harvest | Comment |
|---|---|---|---|---|---|---|
| Mdachi | 1 | ○ | ○ | ○ | - | Seeding was restarted in garden near by house in May after flood damage. |
| | 2 | ○ | ○ | ○ | ○ | Seeding was implemented in the garden near by his house and the nursery was transplanted in irrigated field after flood. Harvest started in July. |
| Olopito | 1 | ○ | ○ | ○ | - | Seeding was restarted in irrigated field in Jun after the first trial damaged by drought. |
| | 2 | ○ | ○ | ○ | - | Seeding was restarted in irrigated field in Jun after the first trial damaged by drought. |
| Gatitu/ Muthaiga | 1 | ○ | ○ | X | - | Seed did not germinate due to drought. |
| | 2 | ○ | ○ | ○ | ○ | Harvest started in Jun and the area is expanding |
| Tumtum | 1 | ○ | ○ | ○ | ○ | Harvest started in Jun |
| | 2 | ○ | ○ | ○ | ○ | Harvesting started in Jun |

○: Started X : Not started or failed 1,2: Cultivate in irrigated field

Source : JICA Team

### (4) Evaluation of the LISA Technology

At the end of major rainy period (normally June to July), with the observation/ participation of local agricultural officers such as SCAO, DAEO and FEOS, interviews and discussions with pilot and volunteer neighboring farmers (and other group members) were implemented for the evaluation of candidate technologies and a decision making whether the farmers would like to continue and disseminate the technology to entire group members. The result of evaluation/ decision was reported to SIDEMAN-SAL by using designated report forms.

Table 1.6.56 Evaluation of the LISA Technologies

| Date | Schem | Sub-county | No .participants |
|---|---|---|---|
| August 14, 2014 | Mdachi | Ganze | *8 |
| August 21, 2014 | Olopito | Narok-North | *4 |
| August 28, 2014 | Gathitu-Muthaiga | Laikipia-West | 16 |
| September 04, 2014 | Tumutumu | Igembe-South | *3 |

*Interviewed with the pilot and volunteer farmers and received reports *Source: JICA Team*

At the time of provision/ distribution of the planting materials for Kenyan Traditional Vegetables (KTVs), the neighboring farmers could also purchase the seeds of the selected crops/ varieties directory from SIDEMAN-SAL at the time when SIDEMAN-SAL sold seeds to Pilot Farmers. Neighboring farmers should make a payment on site at the time of purchasing. SIDEMAN-SAL record the name, amount purchase, and amount paid for each neighboring farmers who purchased the seeds. When pilot farmer(s) want to purchase more amounts of seeds, he/she can do this at the time when other neighboring farmers purchase, under the same conditions. All sales proceeds should be sent directly to Bioversity Intl.

Table 1.6.57 Number of Farmers who Received/ Self-Purchased the Planting Materials (seed) of Kenyan Traditional Vegetables (KTVs)

| Scheme/ Crop of KTVs | LISA Pilot farmers received KTVs seed | Farmers voluntarily purchased seeds | Total |
|---|---|---|---|
| MDACHI | | | |
| Mnavu | 2 | 5 | 7 |
| Mchicha | 2 | 20 | 22 |
| Mwangani (Saget) | 2 | 14 | 16 |
| OLOPITO | | | |
| Mnavu | 2 | 4 | 6 |
| Mchicha | 2 | 4 | 6 |
| Mwangani (Saget) | 2 | 5 | 7 |

| | | | |
|---|---|---|---|
| GATHITU-MUTHAIGA | | | |
| Mnavu | 2 | 9 | 11 |
| Managu | 2 | 3 | 5 |
| Mwangani (Saget) | 2 | 12 | 14 |
| TUMUTUMU | | | |
| Mnavu | 2 | 6 | 8 |
| Mchicha | 2 | 11 | 13 |
| Kanzia | 2 | 7 | 9 |

*Source: JICA Team*

The LISA program started very well in March/April 2014, with farmers quite enthusiastic about the programs. A number of them even bought the seed on their own for planting but majority did not plant due to drought. Those who had irrigation water succeeded in getting good crop for their families and even to sell and generate income (in some incidences with better price than Kales). Those who did not have irrigation water suffered heavily from the effects of drought as were evidenced in Gatitu/Muthaiga and Olopito schemes.

Because of severe and unpredictable drought damage, the most of pilot farmers failed to continue production for the first planting. Several farmers attempted to re-planting and it caused that some pilot farmers were still under cultivation/ harvesting at the time of evaluation.

Table 1.6.58 Crop Production Report for Kenyan Traditional Vegetables (KTVs) 1

| Scheme / Pilot Farmer | | Area | Total Production | Breakdown | | | Farm Gate Price | Total Income | Cost per Field | Estimated GM/Acre |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Self | Sales | Others | | | | |
| No. | Crop | ($M^2$) | (Kg) | (Kg) | (Kg) | (Kg) | (Ksh/Kg) | (Ksh) | (Ksh) | (Kshs/Ac) |
| **Mdachi** (The date of Evaluation Meeting: Aug. 14, 2014) | | | | | | | | | | |
| **Charo Mgomba*** | | | | | | | | | | |
| 1 | Mnavu (GiantNS) | 300 | 53.0* | 0 | 53* | 0 | 20 | N/A* | 1,440 | N/A* |
| 2 | Muchicha (Imprvd) | 300 | 70.0* | 0 | 70* | 0 | 20 | N/A* | 1,440 | N/A* |
| 3 | Mwangani/Saget | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N/A |
| NOTE: Faustine Ketana was replaced by Charo Mgomba* for the 2nd planting, after flood damage. the harvest for 2nd planting was on the 1/4way at the time of Eva. Meeting* | | | | | | | | | | |
| **Evance Munga** | | | | | | | | | | |
| 1 | Mnavu (GiantNS) | 300 | 27.0* | 0 | 27* | 0 | 20 | N/A* | 1,520 | N/A* |
| 2 | Muchicha (Imprvd) | 300 | 62.0* | 0 | 62* | 0 | 20 | N/A* | 1,520 | N/A* |
| 3 | Mwangani/Saget | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | N/A |
| NOTE: The 1st planting was destroyed by flooding, the harvest for 2nd planting was on the 1/4way at the time of Eva. Meeting*. | | | | | | | | | | |
| **Olopito** (The date of Evaluation Meeting: Aug. 21, 2014) | | | | | | | | | | |
| **Florence Kisio** | | | | | | | | | | |
| 1 | Mnavu (GiantNS) | 100 | 1.5 | 1.5 | 0 | 0 | 50 | 75 | N/A | N/A |
| 2 | Muchicha (Imprvd) | 100 | 0.5 | 0.5 | 0 | 0 | 50 | 25 | N/A | N/A |
| 3 | Mwangani/Saget | 100 | 0 | 0 | 0 | 0 | N/A | N/A | N/A | N/A |
| NOTE: At the time of meeting all plants were on the nursery stages. The germination of Mwangani was low. | | | | | | | | | | |
| **John Nkumum** | | | | | | | | | | |
| 1 | Mnavu (GiantNS) | 100 | 0 | 0 | 0 | 0 | N/A | N/A | N/A | N/A |
| 2 | Muchicha (Imprvd) | 100 | 0 | 0 | 0 | 0 | N/A | N/A | N/A | N/A |
| 3 | Mwangani/Saget | 12 | 0 | 0 | 0 | 0 | N/A | N/A | N/A | N/A |
| NOTE: Because of the drought damage, all plants were not germinated. | | | | | | | | | | |

*Source: JICA Team*

Table 1.6.59 Crop Production Report for Kenyan Traditional Vegetables (KTVs) 2

| Scheme / Pilot Farmer | | Area | Total Production | Breakdown | | | Farm Gate Price | Total Income | Cost per Field | Estimated GM/Acre |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Self | Sales | Others | | | | |
| No. | Crop | ($M^2$) | (Kg) | (Kg) | (Kg) | (Kg) | (Ksh/Kg) | (Ksh) | (Ksh) | (Kshs/Ac) |
| **Gathitu-Muthaiga** (The date of Evaluation Meeting: Aug. 28, 2014) | | | | | | | | | | |
| **Stanley Murage** | | | | | | | | | | |
| 1 | Mnavu (GiantNS) | 240 | 153 | 75 | 66 | 12 | 30 | 4,590 | 2,100 | 41,500 |
| 2 | Managu (OrangeNS) | 240 | 100 | 42 | 50 | 8 | 30 | 3,000 | 2,100 | 15,000 |
| 3 | Saget/Mwangani | 120 | 6 | N/A | N/A | N/A | N/A | N/A | 500 | N/A |
| NOTE: Manavu and Managu are still under harvese. Saget is planted only for seed production. | | | | | | | | | | |
| **Teresia Njogu** | | | | | | | | | | |
| 1 | Mnavu (GiantNS) | 120 | Nil | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 2 | Managu (OrangeNS) | 120 | Nil | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 3 | Saget/Mwangani | 120 | Nil | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| NOTE: Pilot framer has prepared land but there was no germination due to drought and none application of irrigation water | | | | | | | | | | |
| **Tumutumu** (The date of Evaluation Meeting: Sep. 04, 2014) | | | | | | | | | | |
| **Pauline Nthiu** | | | | | | | | | | |
| 1 | Muchicha (Imprvd) | 120 | Nil | N/A | N/A | N/A | N/A | N/A | 654 | N/A |
| 2 | Muchicha (Imprvd) | 120 | Nil | N/A | N/A | N/A | N/A | N/A | 654 | N/A |
| 3 | Mwangani/Saget | 120 | Nil | N/A | N/A | N/A | N/A | N/A | 654 | N/A |
| NOTE: farmers have not reached harvesting stage at the time of meeting. | | | | | | | | | | |
| **Joseph Njau** | | | | | | | | | | |
| 1 | Manavu (OrangeNS) | 120 | Nil | N/A | N/A | N/A | N/A | N/A | 780 | N/A |
| 2 | Muchicha (Imprvd) | 120 | Nil | N/A | N/A | N/A | N/A | N/A | 780 | N/A |
| 3 | Mwangani/Saget | 120 | Nil | N/A | N/A | N/A | N/A | N/A | 780 | N/A |
| NOTE: farmers have not reached harvesting stage at the time of meeting. | | | | | | | | | | |

*Source: JICA Team*

For the similar reason, the maize production under Push-pull technology has been failed or still in the process of production.

The summary of the interviews/ discussions with the pilot and volunteer-neighboring farmers are below;

Table 1.6.60 Summary of the interview/ Discussion at the Evaluation

| **Olopito scheme** (KTVs) | | |
|---|---|---|
| Progress/ Performance | Farmer's Incentive Reported | Challenges Raised on Production |
| 1.Two pilot demo farmers were chosen but one farmer could managed to grow Managu and Saget with pumped irrigation water<br>2.There were about seven other volunteer farmers who purchased the seed but majority did not plant due to drought<br>3.One volunteer farmer planted Managu and Saget, but he did not follow instructions hence he had poor production | 1.There is a ready market for the KTV at price higher than that of kales<br>2.There is less incidence of pests and diseases than that of kales and cabbages<br>3.The KTVs have low production cost and have limited use of chemicals in their production<br>4.The KTVs are adaptable to the Narok environment as it is naturally growing in the area although it is disappearing<br>5.KTVs have medicinal value especially for gout<br>6.KTVs are good rotational crops as they can be rotated with brassica to break the disease and pest cycle. | 1.The prolonged drought caused delay in planting<br>2.Water from the project not available yet, so farmers used pump for irrigation<br>3.Pumping machine brake down, thus delaying planting/transplanting.<br>4.The germination of Spider plant was very low |

| **Olopito scheme** (Push-pull) | | |
|---|---|---|
| Progress/ Performance | Farmer's Incentive Reported | Challenges Raised on Production |
| 1.Poor germination of maize and desmodium in one demo farmer.<br>2.The other demo farmer maize affected by Maize lethal necrosis disease (MLND)<br>3.A few framers planted desmodium to raise seed but had very poor germination. | 1.There is high demand for fodder crops –Napier and desmodium<br>2.It helps to avoid use of chemicals in maize crop and to control stem borer in maize with no health hazards<br>3.It helps to control soil erosion with the cover plants of desmodium<br>4.Desmodium suppresses weeds<br>5.The Push–Pull technology has reduces production cost (cost of stalk borer control and weeds control are highly reduced) | 1.Drought affected germination for those delaying on rains<br>2.Damage from wildlife– particularly Antelopes that graze on desmodium<br>3.Maize was affected by mais lethal necrosis disease (MLND) in one of the plots |

| **Mdachi scheme** (KTVs) | | |
|---|---|---|
| Progress/ Performance | Farmer's Incentive Reported | Challenges Raised on Production |
| 1.Achieved two pilot demo farmers and over ten volunteer/ follower farmers | 1.The vegetables give income to the family<br>2.The vegetables provide nutritional value to the family members<br>3.It is adaptable to the local conditions<br>4.Mdachi farmers have been producing the local varieties of Mnavu and Mchicha and so have the traditional technical knowledge on production and utilization<br>5.Can use organic pest control or chemical pesticides | 1.The prolonged drought caused delay in planting<br>2.Flooding of the farms which destroyed the first crop<br>3.Criticism from neighbour that is dissuading the public from consuming the hybrid varieties of Mnavu and Mchicha<br>4.Pests particularly cut worms, and white aphids |

| **Mdachi scheme** (Push-pull) | | |
|---|---|---|
| Progress/ Performance | Farmer's Incentive Reported | Challenges Raised on Production |
| 1.Desmodium seed was provided to the pilot demo framers but Napier grass could not obtained from local Ag. agents<br>2.Two volunteer/ follower farmers undertook planting on their own<br>3. .The results of the two volunteer/ follower farmers (own effort) makes Push- Pull very promising to the farmers | 1.There is no chemical application to the maize<br>2.Push-Pull is farmer friendly and is safer to family<br>3. Farmers want to continue and multiply the Napier so as to be easy to obtain the same from close by<br>4. They indicated that the Napier forms a good guard row around the maize and stray cows graze it first before they reach the maize, by which time the herdsman will have removed the cows. | 1.Required complete package of inputs on a timely bases<br>2. Napier not locally available |

| **Gathitu-Muthaiga scheme** (KTVs) | | |
|---|---|---|
| Progress/ Performance | Farmer's Incentive Reported | Challenges Raised on Production |
| 1.Achieved two of pilot demo farmers and a number follower farmers<br>2.Stanley Murage planted Mnavu (Giant-African Nightshade) and Manugu (Orange-fruited Nightshade) and Saget under irrigation.<br>3.Mnave performed much better and is most popular in the area<br>4.Terresia Njiogu planted with no irrigation, and demo failed due to drought<br>5.The three volunteer farmers who were monitored had poor crop due to drought and others did not follow the technical guidelines.<br>6.Also number of farmers purchased seeds but could not plant due to drought | 1.Production cost was reported to be lower than other horticultural crops<br>2.Incidence of pests and diseases was reported as less than other horticultural crops, hence limited use of chemicals in production<br>3.KTVs have a high nutritional value<br>4.The KTVs are not only food but generate income to the family<br>5.Most popular KTV was giant managu<br>6.Farmers requested for more seeds<br>7.Farmers expressed the need to increase the number of demonstration farmers on KTVs | 1.Drought was evident during the implementation of the programe and for those who relied on rains they had very poor germination<br>2.Did not have ready market for Saget<br>3.There was also expressed the needs to learn them on how to cook and mix the vegetables<br>4.This needs to be followed up with the SCAO |

| **Gathitu-Muthaiga scheme** (Push-pull) | | |
|---|---|---|
| Progress/ Performance | Farmer's Incentive Reported | Challenges Raised on Production |
| 1.Achieved two of pilot demo farmers and another follower farmer<br>2.The two pilot demo farmers had to replant, because first trial failed due to drought. Second trial yielded little since again they were affected by drought.<br>3.Germination of desmodium was poor<br>4.Follower farmer failed to get a crop as all desmodium seed was washed away during irrigation | 1.Technology enhances availability of fodder from Napier and desmodium<br>2.The desmodium increases soil fertility<br>3.It also provides ground cover, hence control weed and increase soil moisture<br>4.The control of stalk borer leads reduction of the chemical cost for production<br>5.Increase maize yields (increase food and income)<br>6.Farmers still want to continue with technology and require desmodium seeds | 1.Drought affected the area caused the seed germination and crop growth very poor<br>2.Unavailability of desmodium seed to replant |

| **Tumutumu scheme** (KTVs) | | |
|---|---|---|
| Progress/ Performance | Farmer's Incentive Reported | Challenges Raised on Production |
| 1.Two pilot demo farmers planted Mchicha (Improved and Local) and Kanzira.<br>2.All used domestic water for irrigation of the plots and reported good crop<br>3.Pauline Nthiu has about 3kgs of Mchicha seed to sell to other farmers<br>4.Cooking demonstration was contacted in December 2014 | 1.Low production cost was reported compared to other horticultural crops<br>2.KTVs have high nutritional value<br>3.The KTVs are not only food but generate income to the family<br>4.Farmers requested for more seed<br>5.Farmers expressed the need to increase the number of demonstration farmers on KTVs | 1.Drought was evident during the implementation of the program<br>2.All pilot demo farmers relied on domestic water for irrigation which proved expensive<br>3.There was also expressed the needs to learn their utilization (how to cook and mix /process the vegetables) |

| **Tumutumu scheme** (Bokashi) | | |
|---|---|---|
| Progress/ Performance | Farmer's Incentive Reported | Challenges Raised on Production |
| 1.This technology proved too expensive and farmers had to request for assistance from SCAO to be supplied with molasses grass (as alternative source of sugar)<br>2.Despite the assurance to get the molasses, the pilot demo farmer did not make sufficient follow-up to obtain it from the office<br>3.The Bokashi technology demonstration and objective was thus not achieved | 1.They also suggested that number of demonstration farmers per technology be increased so as to expose more farmers to the new technology | 1.Despite the assurance from the SCAO to provide the molasses, the pilot demo farmers did not make sufficient effort/follow-up to obtain it from SCAOs office.<br>2.Follow-up and support by extension staff was also poor<br>3.Farmers do not appear keen to continue with this technology<br>4.Farmers have requested to be allowed to choose another technology other than Bokashi for next year |

Major positive impacts and constraints on Kenyan Traditional Vegetables (KTVs) and Push-pull Tequnology are reported as follows;

**Kenyan Traditional vegetables (KTVs):**

Farmers indicated the following benefits from Kenyan Traditional Vegetables program;

a) The KTVs are not only food but generate income to the family

b) The vegetables provide nutritional value to the family members

c) KTVs are easy and less costly to grow (There is less incidence of pests and diseases hence limited use of chemicals in production of KTVs than in kales and cabbages and other horticultural crops)

d) There is a ready market for the KTVs at price higher than that of kales

e) KTVs climatically adaptable to the local conditions/ environment and some are already grown in the area

f) sFarmers in some of the schemes (notably Mdachi and Olopito schemes) have been producing the local varieties of Mnavu and Mchicha and Saget so have traditional technical knowledge on production and utilization

g) Can use organic pest control or chemical pesticides

h) KTVs have medicinal value (such as gout quoted in Olopito)

i) KTVs are good rotational crops as they can be rotated with brassicas to break the disease and pest cycle

Farmers also pointed out several constraints;

a) Prolonged drought in all the schemes and flooding in Mdachi caused poor crop production

b) There was poor germination of certain KTV seeds particularly for Spider plant in Olopito and Gatitu Muthaiga

**Push-pull Technique:**

Farmers indicated the following benefits from the Push-pull technology

a) There is no chemical application to control stem borer hence it reduces the cost of maize production

b) Desmodium crops provides ground cover hence suppresses/ control weeds and increase soil moisture

c) Push-Pull is farmer friendly and is safer to family

d) They indicated that the Napier forms a good guard row around the maize and stray cows graze it first before they reach the maize, by which time the herdsman will have removed the cows

e) There is high demand for fodder crops (Napier and desmodium are very good fodder

crop and increase in production of these will enhance availability of fodder in the scheme areas

g) The Push and pull technology helps to control soil erosion

h) The Push–pull technology has reduces production cost (cost of stalk borer control and weeds control are highly reduced

i) The desmodium increases nitrogen in soil hence improves soil fertility

Under the Push-pull technology some of the problems noted were as follows;

a) Prolonged drought

b) Availability of Napier grass

c) Poor germination for desmodium and

d) Maize Lethal Necrosis Disease

In conclusion, farmers have agreed that there was the needs to continue with the program. They also expressed the need to increase the number of demonstration farmers on both technologies. Famers are still enthusiastic to continue with the technology due the associated benefits as indicated above. They want to continue and multiply the Napier in order to obtain the same from close-by.

**Bokashi technology**

During the LISA introduction meeting, farmers were fully informed on the ingredients of the Bokashi technology and the possible cost implications. The technology was nevertheless chosen by one scheme (i.e Tumutumu) but it never took off due to the challenges indicated below;

•Farmers realized that the technology was a bit expensive and could not afford amounts of sugar ingredient as required

•Non-supply by SCAO and non-collection by farmers of molasses (sugar substitute) hindered take off of the technology

Consequently the farmers requested that they be allowed to choose another technology other than Bokashi Tech.

### 1.6.9 Collaboration Field Visits in the Sub-Counties where SHEP is in Practice

Following the implementation schedule set by the SHEP Unit, SIDEMAN-SAL sent officers to the field activities of SHEP Approach conducted in the sub-counties where SHEP is in practice. After participation of each training/meeting session SIDEMAN-SAL officers submitted field visit reports for the purpose of the review of field activities. Those reports would finally be compiled and analyzed for the further recommendation and suggestion in the final report.

Table 1.6.61 Collaboration Field Visits for the SHEP Approach

| Activity/ Date | Scheme | Sub-county | County |
|---|---|---|---|
| **Baseline Survey** | | | |
| January 15, 2014 | Muungano | Tharaka- South | Tharaka-Nithi |
| January 17, 2014 | Kasokoni | Taveta | Taita-Taveta |
| **FABLIST Forum** | | | |
| February 26, 2014 | Muungano | Tharaka- South | Tharaka-Nithi |
| February 28, 2014 | Kasokoni | Taveta | Taita-Taveta |

*Source: JICA Team*