Farm Mechanization & Conservation Agriculture for Sustainable Intensification

Review and Planning Meeting for Kenya and Tanzania

11th to 14th of March 2014, Sportsman's Arms Hotel, Nanyuki, Kenya

List of acronyms

2WT:	Two-wheel tractor
ACIAR:	Australian Centre for International Agricultural Research
AIFSC:	Australian International Food Security Centre
CA:	Conservation agriculture
CARMATEC:	Centre for Agricultural Mechanization and Rural Technology
CGIAR:	Consultative Group on International Agricultural Research
CIMMYT:	International Maize & Wheat Improvement Center
CSU:	Charles Stuart University
DASIP:	District Agriculture Sector Investment Project
FACASI:	Farm Mechanization and Conservation Agriculture for Sustainable Intensification
FAO:	Food and Agricultural Organization of the United Nations
IBLI:	Index Based Livestock Insurance
ICAR:	Indian Council of Agricultural Research
IFPRI:	International Food Policy Research Institute
IMP:	International Mentoring Platform
KARI:	Kenya Agricultural Research Institute
KENDAT:	Kenya Network for Dissemination of Agricultural Technologies
M&E:	Monitoring and Evaluation
SARI:	Selian Agricultural Research Institute
SIMLESA:	Sustainable intensification of maize-legume cropping systems for food security in eastern and southern Africa
SRA:	Small Research and development Activity
SSA:	Sub-Saharan Africa

1. Background of the project

1.1. Summary of the process that led to this workshop

Below is a summary of the process that led to the planning event reported here:

20th of December 2011:	First discussions between ACIAR and CIMMYT on the possibility to develop a project proposal looking at mechanizing CA in SIMLESA.
4th of January 2012:	*Selection of Frédéric Baudron as the focal point to develop a concept note on small mechanization and conservation agriculture in Eastern and Southern Africa.*
15th of January 2012:	*First draft of a concept note titled "Mechanization to Leverage sustainable Intensification in Sub Saharan Africa (MELISA)".*
19th of February 2012:	*Submission of a "Small Research and development Activity" (SRA) proposal to ACIAR to finance a research design workshop for the finalization of a Phase 1 proposal (pre-proposal) to be submitted to ACIAR.*
5th of March 2012:	*SRA titled "Research Design for MELISA" granted by ACIAR*
10th to 13th of April 2012:	*Research design workshop in Addis Ababa, Ethiopia.*
14th of June 2012:	*Submission of a Phase 1 proposal (pre-proposal) titled "Mechanization to Leverage sustainable Intensification in Sub Saharan Africa (MELISA)" to ACIAR.*
20th of June 2012:	*Reception of the comments from the In-House Review and invitation to submit a Phase 2 proposal (full proposal).*
6th of November 2012:	*Submission of a Phase 2 proposal renamed "Farm Mechanization & Conservation Agriculture for Sustainable Intensification".*
7th of December 2012:	*Reception of the comments from a first external reviewer on the Phase 2 proposal.*

12th of December 2012:	*Reception of the comments from a second external reviewer on the Phase 2 proposal.*
17th of December 2012:	*Submission of a revised Phase 2 (second version).*
20th of December 2012:	*Small group meeting at ACIAR discussing the Phase 2 proposal and requesting for adjustments.*
29th of January 2013:	*Submission of a revised Phase 2 (third version).*
28th of February 2013:	*Submission of the final version of the Phase 2 proposal (fourth version) following ACIAR comments on the previous one.*
18th of March 2013:	*Project accepted by ACIAR, letter of agreement signed by ACIAR and sent to CIMMYT.*
25th of March 2013:	*Letter of agreement signed by CIMMYT.*
25th to 30th of March 2013:	*Planning event for Kenya and Tanzania in Arusha, Tanzania.*
3rd to 8th of February 2014:	*Planning event for Ethiopia and Zimbabwe in Harare, Zimbabwe.*
11th to 14th of March 2014:	*Review of first year implementation and Planning for the 2nd Year of the FACASI Project (Kenya and Tanzania)*

1.2. The project in brief

Rationale

The need for sustainable intensification in sub-Saharan Africa (SSA) is widely recognized. Although a lot of emphasis is being placed in current Research for Development work on increasing the efficiency with which land, water and nutrients are being used, farm power appears to be a 'forgotten resource'. However, farm power in SSA countries is declining due to the collapse of most tractor hire schemes, the decline in number of draught animals and the decline in human labour (e.g. stemming from rural-urban migration and pandemics). A consequence of low farm mechanization is high labour drudgery, which affects women disproportionally (in, e.g. weeding, threshing, shelling and transport by head-loading). Undoubtedly, sustainable intensification in SSA will require an improvement of the farm power balance through increased power supply - via improved access to mechanization - and/or reduced power demand via energy saving technologies such as conservation agriculture (CA).

Objectives

The overall goal of the project is to improve access to mechanization, reduce labour drudgery, and minimize biomass trade-offs in Eastern and Southern Africa, through accelerated delivery and adoption of 2WT-based technologies by smallholders.

The project has four principal objectives:

- To evaluate and demonstrate 2WT-based technologies to support CA systems, using expertise and implements from Africa, South Asia and Australia.
- To test site-specific commercial systems to deliver 2WT-based mechanization.
- To identify improvements in national institutions and policies for wide adoption of 2WT-based mechanization.
- To improve capacity and create awareness of 2WT-based technologies in the sub-region, and share knowledge and information with other regions.

Methods

The proposed project will be implemented in Ethiopia, Kenya, Tanzania and Zimbabwe. A range of methodologies will be employed by the project in these sites, including: (1) on-station and participatory on-farm evaluation of 2WT-based technologies; (2) business model development; (3) institution and policy analysis; (4) establishment of a permanent knowledge platform; and (5) establishment of an international mentoring platform aiming at building research capacity in the NARS by funding mentoring and training visits from countries such as Australia and India, and exchange visits between Africa and Australia/South Asia. A common M&E system including gender disaggregated data will be developed.

Partnerships

The project will operate in eight sites (two per country) half of them selected as a subset of existing ACIAR-funded project sites (SIMLESA and ZimCLIFS), the other half representing sites where NARS have conducted long-term CA and/or mechanization work. The project will be implemented mainly via national agricultural research centers (or national NGOs) and regional networks in each participating country. There will be strong links with CGIAR, Australian and Asian partners who will provide specific training on agricultural engineering, as well as mentoring, capacity building, and academic support. CIMMYT will coordinate the project implementation through its Ethiopia office.

Output and Impact

A large body of knowledge will be generated and strong linkages amongst stakeholders (including private sector actors involved in business models) will be established. Thus, at the end of the project, we anticipate that ~360 rural service providers would have emerged, ~9,900 farms would benefit from 2WT-based CA, and ~25,200 farms would benefit from 2WT-based transport, threshing and/or shelling. With service providers expected to double their income, smallholders adopting 2WT-based CA expected to increase their income by 50% and smallholders adopting 2WT-based transport, threshing and shelling, expected to increase their income by 20%, such an adoption pathway would translate into an approximate cumulative economic value of US$ 19 million at the end of the project.

2. Day 1: Review

2.1. Welcome Remarks by ACIAR/AIFSRC (Ms. Liz Ogutu)

- Current research activities: FACASI fits well into the AIFSRC program on strong and equitable economic and social systems and therefore links with ACIAR's cropping systems and economics flagship program SIMLESA
- AIFSRC M&E obligations
- 2014-15 project output indicators, including:
    - Commercial models identified for testing of delivery of two-wheel tractor services to smallholders in four countries of east and southern Africa
    - Role of gender in smallholder decisions to adopt maize- and legume-based sustainable intensification assessed

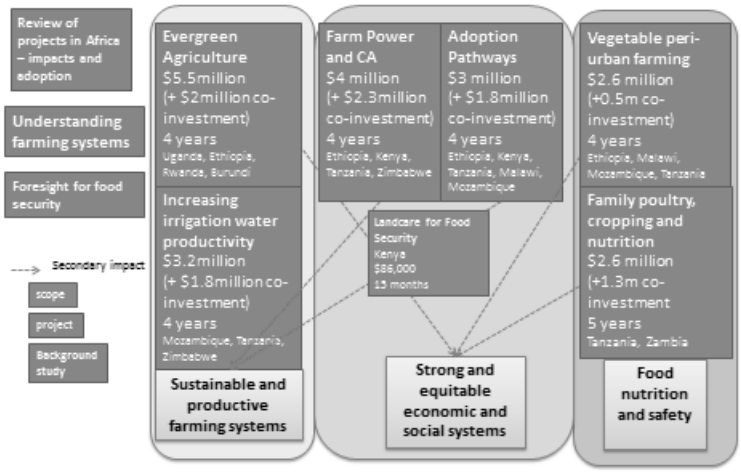

Figure 1 –AIFSRC current research activities

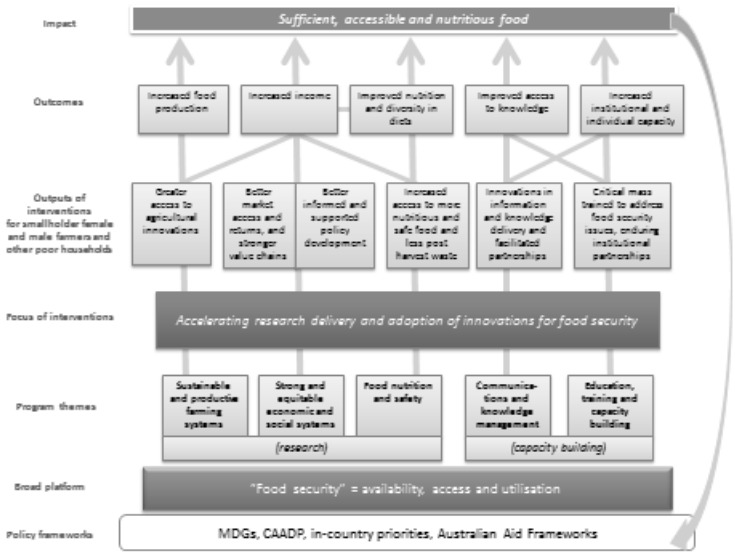

Figure 2 –AIFSRC 'logic diagram' for the strategic approach to food security of the center, focused around accelerating research delivery and adoption of innovations for food security

Points of emphasis

- National partners responsible for the success or failure of projects in the different target countries: CIMMYT and CSU providing backstopping
- Importance of private sector involvement
- Need for linkages between FACASI and other Australian investments
- Need to understand the gender dimension of smallholder decision-making.

2.2. Opening Remarks from the Australian Aid/Australian Higher Commission (Mrs Louisa Cass)

- Agro ecological similarities between Africa and Australia partnerships among African and Australian institutions have higher applicability potential.
- Agriculture and food security central to the Australian Aid/Australian High Commission
- Provide grants to fund research in agriculture
- Provide capacity building support, in the form of PhD and MSc scholarship to students from Africa
- Food security projects e.g. program to bring resilience in pastoralist systems, Index Based Livestock Insurance (IBLI) in Northern Kenya
- Humanitarian work in South Sudan and Somalia

Remarks: the High Commission can help in bringing small mechanization in the policy dialogue in Kenya

2.3. Official Opening by the Ministry of Agriculture (Mr. Mutoro)

- Long history of CA in Kenya
- Key issue: scaling out and sustaining initial adoption through e.g. mechanization
- Challenges related to CA: lack of capacity, lack of supportive policy.
- Poor hiring services for equipment
- Lack of plan regarding what CA adopters are expected to do with their conventional equipment
- Need for the Government to set up a mechanization division
- Need to produce handbooks about good practices (mechanization, CA)

Points of emphasis:

- Enabling the private sector to play important role in providing CA technologies through hiring services
- Insuring 2WTs to be a suitable replacement for conventional agriculture/drought animal
- Sustaining of initial gains of 2WTs through diversification of applications.

2.4. Project's Overview: Justification, Objectives and Major Activities (Dr Frédéric Baudron, CIMMYT): see annex 5 for full presentation

- Justification: Need to produce more in SSA will require more farm power, but farm power has been on the decline (both in terms of quantity and quality) in the past decades
- Main research hypothesis: farm power is as much a limiting factor to productivity as seed, nutrients and water in SSA
- Synergies between CA and small mechanization: the suppression of inversion tillage reduces power requirements by 50% , allowing for the use of smaller and cheaper sources of power
- Several CA planters for 2WTs are commercially available
- 2WT are multipurpose and can be used for post-harvest operations (e.g. shelling, threshing), water pumping and transport.
- Although the project will be implemented in maize- and wheat-based systems, the cost of mechanization will probably require the presence of cash crops as well
- Bangladesh illustrates the viability of delivering small mechanization through private rural service providers
- The business model approach aims at supporting market system through the intervention of the private sector

Points of emphasis:

- Power as a main limiting factor in many African farming systems
- Synergy between CA and small mechanization

- Multipurpose use of 2WT to harness potential – transportation major aspect- lack of transport service accounts 30%-40% of harvest damage
- Need to target high value cash crop/livestock products in maize-based and wheat-based systems
- Utilizing private sector service providers to support market systems
- Accelerated delivery of 2WT technology

Questions: Once an activity traditionally performed by women is mechanized – and thus becomes more profitable – can it be coopted by men?

Response: this is one of the gender research question that Mulunesh (the Gender and Agriculture Specialist) will explore in FACASI

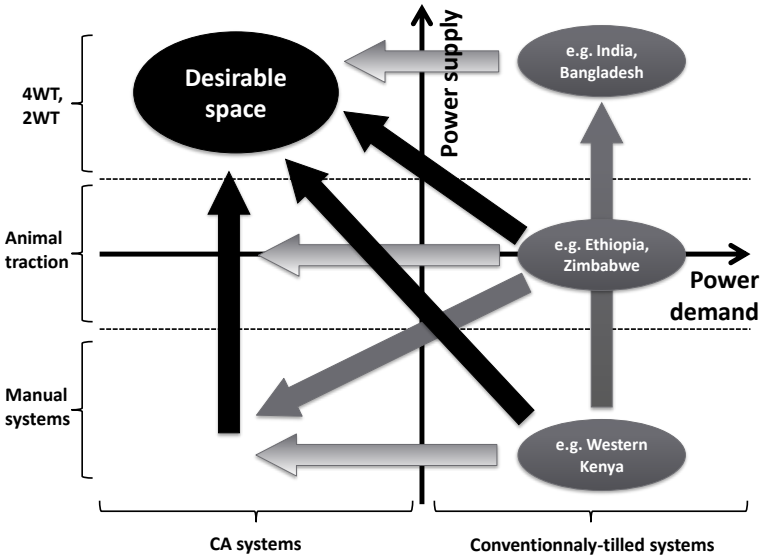

Figure 3 – FACASI will exploit synergies between CA and mechanization to improve the farm power balance.

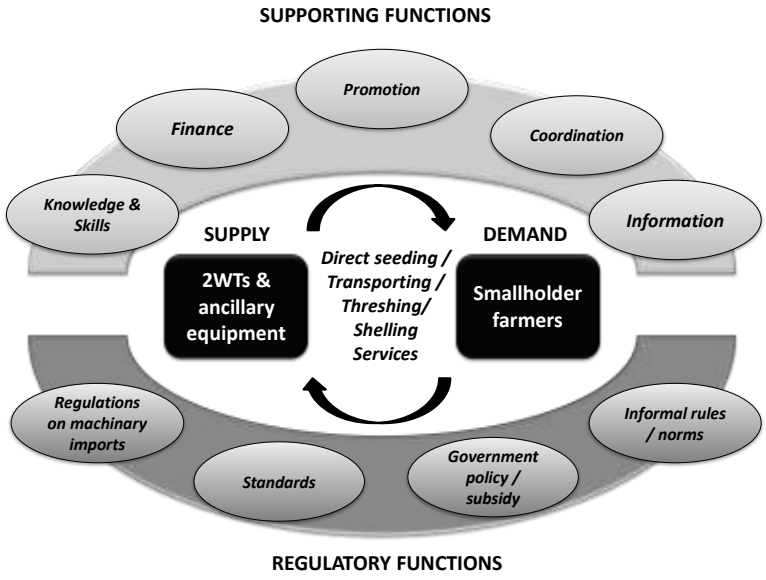

Figure 4- Components of a generic 2WT-based technology business model

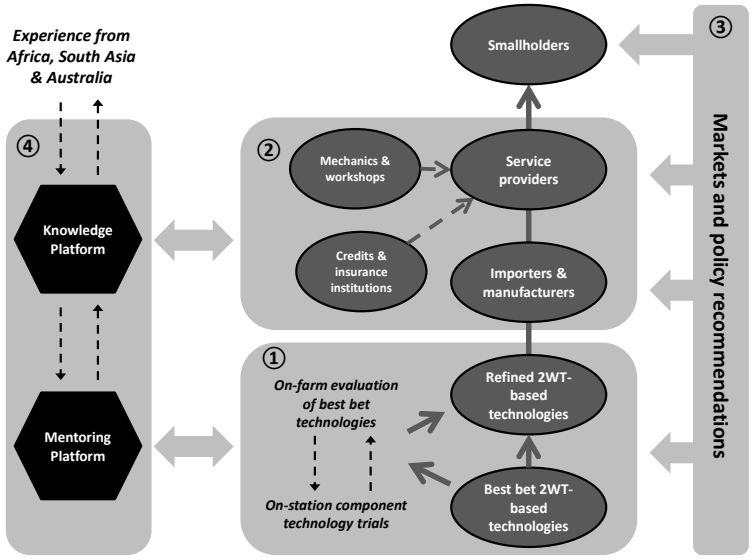

Figure 5 - Schematic representation of the project methodology, aiming at accelerating the delivery of 2WT-based technologies to smallholders in eight sites (four countries) of Eastern and Southern Africa. Symbols ①②③④ correspond to Objective 1, Objective 2, Objective 3 and Objective 4, respectively.

2.5. Review of Global Success Stories on mechanized CA (Output 3.1) (Dr Moti Jaleta): see annex 6 for full presentation

- Background: this review feeds into the review of national policies (identification of key policies for the success of mechanized CA)
- Definition of concepts: agricultural mechanization, mechanization vs; tractorization
- Analytical framework: machinery and intensification; machinery and labour market; CA and production costs; CA and sustainability
- Selected success stories: Brazil, Bangladesh, Kazakhstan
- Drivers of mechanization/mechanized CA
    - Labor shortage (high land-to-labor ratio)
    - Credit facilities in expansion of machinery use
    - Import policy
    - Availability of local manufacturers of farm implements
    - Extension services
    - Champions/Pioneers/Lead actors
- Preliminary conclusions: a successful mechanized CA requires
    - Availability of conducive markets, institutional and policy environments
    - Integration of diverse actors that could help in putting the necessary inputs, information and knowledge together.
- Way forward
    - Finalize the revision and submit the manuscript for a journal publication
    - Synthesize the role of policies in adoption of mechanized CA and use them in the national policy review and dialogue.
- Challenges: few documents/references on farm-scale, mechanized CA (subset of mechanization, etc.)

Level of mechanization (source of power)		**Tillage practices**	
		Conservation Agriculture	Conventional Tillage
		1	2
Motorized/ mechanical	A	• Direct seeding/planting using 2WTs, 4WTs • No soil disturbance (at least not in less than 4-5 years to break the hard pan).	• Planted on seedbeds prepared using 2WTs, 4WTs under conventional tillage • Land is cultivated each cropping season
Draft animal	B	• Direct seeding/planting using draft animal power	• Seedbed preparation under conventional tillage using draft animal power
Manual	C	• Planting in basins made manually • Direct seeding using Jab-planter and other hand tools	• Seedbed preparation using human muscle and hand tools each cropping season (mainly female labor in most SSA countries)

Table 1 - Matrix of agricultural mechanization and CA gradients

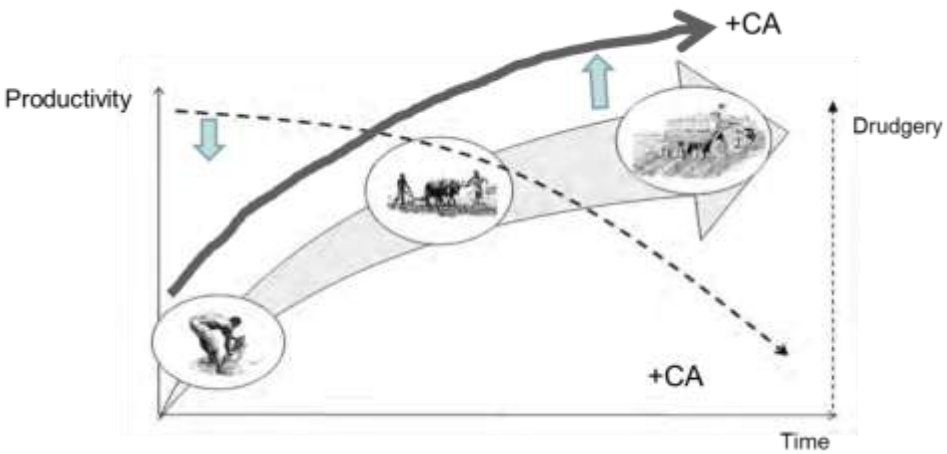

Figure 6 – Productivity and drudgery as a function of mechanization level and CA (modified from Houmy et al., 2013)

Point of emphasis

- The need for policy provisions as CA requires different approach from that of the conventional tillage.
- The need for popularizing the experiences/success factors of exemplary people to push CA forward

Question: why is more focus given to policies in the expansion of mechanized CA?

Response: Technologies are adopted when they generate some kind of net benefits to farmers (economic, environmental and/or social). Policies create incentives that could drive the adoption of technologies. Looking from mechanized CA perspective, farmers need to see the benefits of mechanized CA to change their conventional practices to this new mode of production. However, having a proper policy alone may not guarantee that farmers get the necessary incentives created through policies. Markets and institutional arrangements play crucial role in structuring the distribution of incentives created by policies. Thus, having proper policies is a starting point in generating incentives encouraging farmers in technology adoption.

In addition, there is a specific activity (3.1.2.) in of the project that deals with country level assessment of policies affecting mechanization. Synthesis of policy effects in the review of global success stories could help in identifying which policies need to be analyzed in the four FACASI target countries.

Question: Would the smallholder be able to afford 2WTs?

Response: the problem of unaffordability of 2WTs by a stallholder could be resolved by collective ownership (through cooperatives or associations) or provision of hiring services.

2.6. Analysis of the Likely Demand for Small Mechanization: Focus Group Discussion and Farm Survey in Kenya and Tanzania (Output 1.1) (Dr Michael Misiko): see annex 7 for full presentation

- Main findings
  - Machinery (esp. tractors) are few and sparse, or dedicated to commercial production only
  - Little multi-functionality: tillage and transport mainly
  - Weak smallholder business orientations
  - Little knowledge on mechanization
  - Inappropriate institutional arrangements (along value chains) for technology generation, multiplication and delivery
- Other findings: FGD
  - Activities characterized by high drudgery are usually scattered, routine
  - Mechanization: mainly power-saws and animal carts
  - Processing (grinding, chopping) – although not large scale – is a major source of drudgery
  - Expansion of mechanization mainly in timber and construction
  - Transport is mainly a male job
  - Weeding is the main source of on-field drudgery, but was not said to be affected (either positively or negatively) by mechanization
  - Hired labour performs mainly 'mean's duty' (e.g. tillage)
  - Smallholders did not (independently) own draft animals or (tillage) equipment - they primarily hired, joined forces, or relied on goodwill
  - Limited (5-10%) smallholders reliance on tractor for tillage
  - Beyond tillage, most farm work was manually done
  - Lowest mechanization in activities handled more by women
  - Tillage has become lighter, as plots get smaller and are repeatedly tilled
  - Increasing feminization of agriculture
  - Oxen only used seasonally
- Other findings from the survey
  - Women and children contribute the highest share of the family labour
  - Animal draught power does not substitute to human muscle power (rather seem correlated)
  - Labour peaks are more pronounced for farmers with the lower available power
  - Farm productivity increases with increasing power
  - Women's contribution to farm labour decreases with increasing access to farm power
- Mechanization entry points
  - Opportunity for service provision, as joint ownership is almost non-existent
  - Need for versatile (multi-purpose), accessible, handy tools
  - More demand for off-farm activities than for on-farm activities
- So what?
  - Demand exists, but mainly for off-farm activities

- Need to change perceptions about animal power
- Need to facilitate commercial clusters/ Agri. Innovation. Platforms
- Importance of understanding gender and decision making

Question: If cultural factors have been identified that would hinder uses of 2WTs by female?

Response: The barriers are not only cultural but also social. The cultural barriers are to deal with the division of roles between male and female. In the first instance, ploughing is traditionally men's activity consequently when a machine is introduced it would be seen as men's item to operate on even though females are able to operate. Secondly, it deals with the importance that the community has given to owning of cattle as indication of wealth and security which implies owning of 2WT to be associated with the male superiority.

On the other hand the social factors are associated with the social status male and female have in the society. People in rural areas have given ways of doing. Machines are taken as rich men's item and women do not have the resource to buy them.

Hence, the following measures needs to be considered to overcome the barriers:

- Targeting and involving women in the trials of the machines (2WTs) under the project
- The business models should take the issue of gender in to consideration
- Creating awareness and changing the perception of the society that the machines (2WTs) are for all (male or female, rich or smallholder). The business modeling process in that regard should play important role by showing the affordability of the machines.

Question: What are the arrangements sought in which sustainable adoption could take place?

Response: the adoption 2WT could take place through:

- providing cheap and affordable hire services as all are not able to afford to own
- Creation of demand for the machines, by pulling of demand and organizing farmers so that there will be enough land for ploughing, and
- Making the machines to be multifunctional, (ploughing, harvesting, threshing, transporting, pumping etc.) so that it could be utilized through the year.

Point of emphasis

- The business modeling should be able to play a leading role in insuring the sustainability of the adoption of the 2WTs
- Insuring ways for 2WTs to be suitable for use by people with disability.

2.7. Overview of Outputs 4.1 and 4.2: Communication Strategy (Mrs Janet Achora): see annex 8 for full presentation

- Communication strategy for awareness and dissemination of FACASI outputs
- Need for feedbacks
- What's in the FACASI communication strategy? (can be downloaded from the FACASI website)
    - Sources of Information/ Knowledge
    - FACASI Stakeholder Analysis
    - Product and Information Audit by product
    - Communication flow Chart
    - Communication outputs and outcomes
    - Target audience
- The FACASI website (www.facasi.act-africa.org)
    - Sections available to the public
    - Section available to project member only
- Who authenticates posts at Project level? The Project Leader.
- Frequency of Posts? At least one post per month per country.
- Who moderates the discussions? ACT
- Social media- do we want both FB & Twitter? Yes
- Newsletter - Articles from countries who is contributing? The staff member in charge of Objective 4 in the country.

In each country, the staff member in charge of Objective 4 in the country shall provide feedbacks on the communication strategy and the website framework by the end of March 2014.

Points of emphasis

- Target audience should include wider population other than partners of the project
- The use of TV and radio should also be considered so as to be able to reach a wider audience
- partners should regularly contribute to the publications and the website

Remark: there is a plan for developing a medium by which it will be possible to reach audiences who are not able to access website or newsletter.

2.8. On-Station and on-Farm Testing of best-bet 2WT-Based Technologies in Kenya, Year 1 (Outputs 1.2 and 1.3) (Dr Joseph Mutua): see annex 9 for full presentation

- Objective
- Selection criteria
    - Adapted to 2WT
    - Ability to handle trash/mulch
    - Commercially (or potentially) available in realistic numbers
    - Adequate quality

    - Relatively cheap
    - Can perform in rain-fed, maize/legume production systems.
- Selected best-bets & highlights
- Training in the operation of the 2WTs and associated seeders of engineers from KENDAT, KARI, MoA, UoN, ATDC, as well as members from the private sector and rural service providers was done by Scott E. Justice (CIMMYT) and Jeff Esdaile.
- Test protocols
    - Replicated on-station researcher-led researcher-managed trials
        - Seven treatments in a randomized block design with 3 replicates
    - Non-replicated on-farm researcher-led farmer-managed trials.
    - Data to be collected: agronomic data, equipment parameter data, economic data, farmers' perception

Seeder	**Type of CA**	**Seed metering system**	**Minimum row spacing (cm)**	**Maximum row spacing (cm)**	**Features for transport**	**Cost (US$)**	**Challenge**
2BFG-100	Strip tillage	Fluted rollers		80 cm	Rear wheel and seat	772	Stony fields
National Zero Till Multi Crop Planter	Strip tillage (when mounted behind a rotovator) or direct seeding (inverted T/shoe type openers)	Inclined plates		70 cm	None	1649	
Fitarelli two row direct seeder	Direct seeding (double disc furrow opener)	Horizontal plates	70	80	Seat on the seeder		
Fitarelli single row direct seeder	Direct seeding (tine furrow opener + cutting disc)	Horizontal plates	NA	NA	None	1156	
Gongli seeder	Direct seeding (tine furrow opener)	Fluted rollers			None	863	No coulter
Gongli Africa +	Direct seeding (tine furrow opener + cutting disc)	Spoon type		80	Platform	800	
JEM Seeder	Direct seeding (tine furrow opener with cutting disc and rake)	Dual fluted roller		NA	Wings at the back of the seeder	2826	

Table 2- seeders tested - Kenya

Points of emphasis:

- Local manufacturing for affordability, suitability and sustainability of the CA technologies

Challenges:

- Delay in the importation and higher price of the 2WTs
- The non-suitability of some seeders for maize and compatibility to 2WT
- the use of herbicide for weed control

Remark: Rather than retaining an arbitrary 30% of the residue yield, F. Baudron proposed to harvest the stover above the ear and retain the stover below the ear, anchored in the field as long as possible

Remark: Moti to help develop a protocol for economic evaluation

2.9. On-station and on-farm testing of best-bet 2WT-based technologies in Tanzania, Year 1 (Outputs 1.2 and 1.3) (Dr John Sariah) : see annex 10 for full presentation

- Introduction: FACASI rationale
- Activity 1.2.1
    - Training of 14 researchers, manufacturers, and importers
    - Production of 2 Gongli Africa + based on the commercially available Gongli
- Activity 1.2.2: Protocols developed by J. Sariah in collaboration with J. Blackwell: completely randomized design with 3 replications
- Activity 1.2.3.: Researcher-managed trial was planted on 23/12/2013 in Mbulu
- Activity 1.3.2: Protocols developed by J. Sariah in collaboration with J. Blackwell: mother baby trial (one farm site, one treatment/planter)
- Criteria considered by farmers to evaluate seeders: (1) proper seeding (seed rate, covering), (2) weight of the machine, (3) easy transport from farm to farm, (4) easy to hitch, (5) easy to adjust seed rate, (6) easy to repair, (7) availability of spare parts, (8) affordability
- From the seeders available (note: seeders purchased by the project were ordered late and are thus not part of the testing), the Gongli Africa + ranked first, the Nandra second, and the 2BG third, both for men and women.
- General common comments across gender
    - Easy road transportation: Gongli Africa + only
    - Very good seed rate and singulation: Nandra only
    - Yang yang 2BG throws trashes and soil to the operator
    - Difficult to maintain straight rows with Gongli Africa +
    - It was difficult to operate the Nandra, because it is trailed
    - Seeds breakage occurred with Nadra
    - Turning very difficult for all seeders
- Challenges encountered with objective 1 so far:
    - Unreliable weather
    - Delay in arrival of the imported equipment, especially from China (however, it should be noted that orders for all equipment were sent out late, around November 2013)
    - Transport – difficulties encountered in sharing transport with SIMLESA

MATRIX RANKING OF THE SEEDRS

CRITERIA	Women			Total	Rank
	GONGLI	NANDRA	YANG 2BG		
Proper seeding	4	5	3	**12**	1
Light machine	3	1	4	**8**	4
Easy to hitch	4	5	1	**10**	3
Easy to adjust seed rate	4	5	2	**12**	1
Easy to transport	5	1	1	**7**	5
Easy to maneuver	2	1	2	**5**	6
Total	**22**	**18**	**13**		
Rank	1	2	3		

Score scale
1 = less applicable
5 = Most applicable

N = 10, Age range 27- 43 years

Table 3 – Ranking of 3 seeders by women in Bargish Uwa community, Mbulu district.

MATRIX RANKING FOR THE DIFFERENT SEEDRS

CRITERIA	MEN			Total	Rank
	GONGLI	NANDRA	YANG 2BG		
Proper seeding	4	5	3	**12**	1
Light machine	4	1	4	**9**	3
Easy to hitch	4	5	2	**11**	2
Easy to adjust seed rate	3	4	1	**8**	4
Easy to transport	5	1	1	**7**	5
Easy to maneuver	3	1	3	**7**	5
Total	**23**	**17**	**14**		
Rank	1	2	3		

Score scale
1 = less applicable
5 = Most applicable

N = 15, Age range 24 - 54

Table 4 – Ranking of 3 seeders by men in Bargish Uwa community, Mbulu district.

Points of emphasis:

- Involvement of the private sector from the initiation of the demonstration

Question: Has a feedback been given to the manufacturers regarding the price and the problems faced during testing.

Response: A feedback has been given to local manufactures. A point will be taken for future to provide feedbacks to manufacturers in a structured way.

Remark: none of the FACASI best bet seeders are included in on-station and on-farm testing, due to late ordering and delays in shipment

2.10. Open Discussion on Problems, Challenges and Opportunities Related to Objective 1 (Dr Frédéric Baudron, CIMMYT) :

Equipment:

- None of the seeders considered is the perfect 'best bet'. There are tradeoffs between cost, precision, transportability, etc.
- The price of virtually all the imported seeders is too high. This may call for the local manufacturing of seeders (tool bar based), with the advantage that such arrangement would generate business for local manufacturers. The Gongli seeder has been improved for African smallholder conditions into the Gongli Africa +, with far better performances. However, the Gongli Africa may still need improvement. I particular, units mounted on parallelograms or spring-loaded may be needed for uneven fields. However, the project should not get caught in a spiral testing, improving, retesting, improving again, etc. The focus of this project is not engineering but commercialization (and resources allocated to the project are mainly for commercialization, whist virtually no resource is available for engineering).
- Lot of emphasis on soil engaging parts in CA engineering, but seed metering equally important
- Access to more people to be beneficial

Test of Equipment

- The designing of testing protocols was good
- Socioeconomic evaluation needs to be incorporated in the test. Accordingly, Dr Moti Jaleta and Dr. Michael Misiko has been assigned to lead the same.

Operational issues

- Issue of transport reliance on SIMLESA which needs an immediate solution.

Exposure visit: There was a successful exposer visit to India in May 2013**.** Seventeen participants from Ethiopia-4, Kenya-4, Tanzania-4, Zimbabwe-3, ACT-1 and CIMMYT-1 had taken part in the exposure visit which was organized by CIMMYT in partnership with ICAR. There will be a visit to Bangladesh next December. The exposure visit aims at bringing the experiences, technologies and expertise of this countries to Africa and influence policy making.

2.11. Market Analysis and Early Activities on Business Model Development in Kenya (Outputs 2.1 and 2.2) (Dr Pascal Kaumbutho): see annex 11 for full presentation

- The KENDAT 'Agribusiness Health Centre' model
  - Farmer managed platforms that support conversion of information to knowledge
  - Structured and supported access to technology, means, input and output markets
  - Competent Communities of Practice modeling win-win mergers of efforts among Government, Research, NGO, Input /Output actors, financiers, farmers, etc.

Emphasis on Community Based Adaptation strategy; implemented by local actors to enhance resilience and adaptive capacity of communities and ecosystems to fight climate change. And a process that considers local conditions, practices and indigenous groups, local knowledge and fosters community-driven innovation.

Figure 7 Diagrammatic presentation of KENDAT's one stop-shop Agribusiness Health Centre model

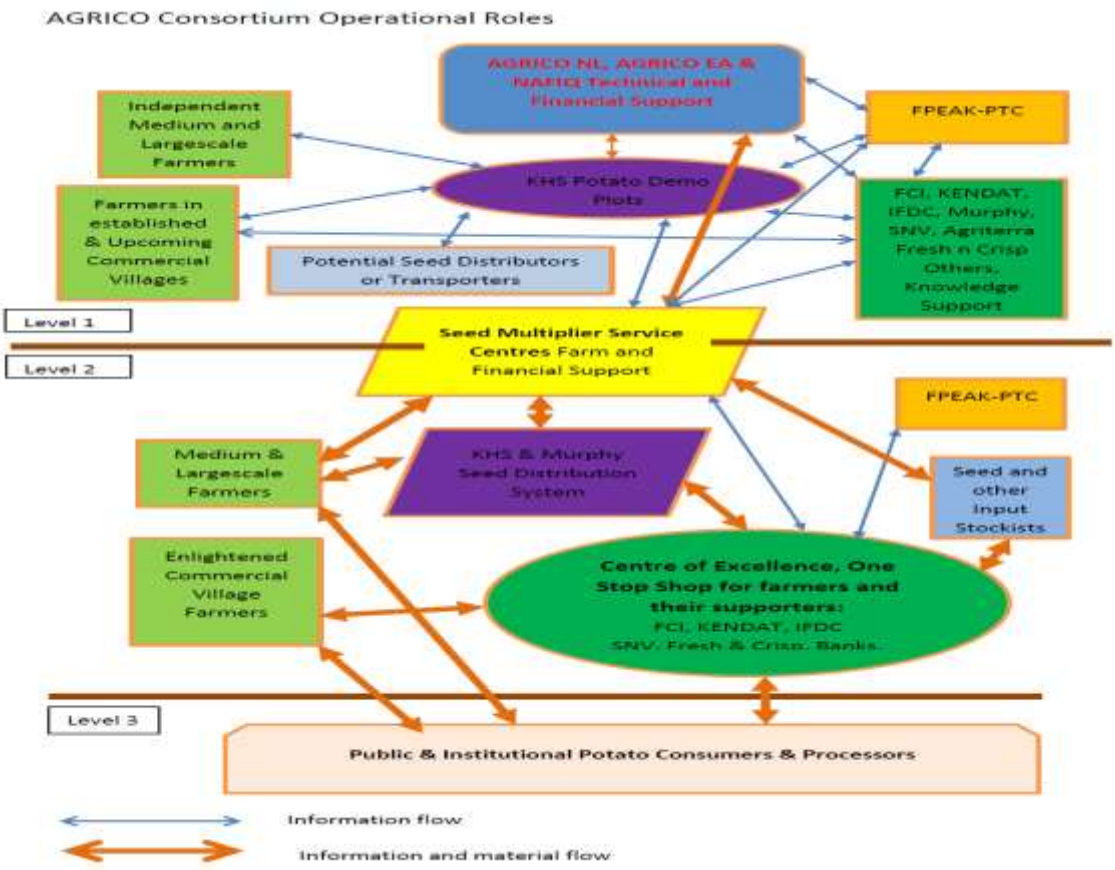

Figure 8-Diagrammatic presentation of AGRICO consortium operational roles

- The **Centre of Excellence** Approach borrowing from the KENDAT's ***Agribusiness Health Centre Approach,*** A **One-Stop-Shop** Technology Transfer and Services Hub for farmers to grow and make business deals and meet their supporters on equal footing. It provides:
    - Machinery and tools hire services,
    - Agro-Vet shops for certified inputs and products,
    - Training grounds with specialised training equipment,
    - Demo-farm with approved planting and spray programme,
    - Value-adding facilities like grading shed, charcoal and more advanced (Tolsma) coolers, solar crop drying etc.
    - Social aspects: meeting ground for farmers and their supporters from finance, research etc.
    - Youth, Women and Service Provider training/support
    - Field days of all forms including potato tasting days, farmer competitions for enlightenment etc.
    - Input suppliers can book days for exposure to farmers, open kiosks at the center among many other off-shoots.

As a step forward prepare a detail Business Plan and seek more support (AUSAID).

2.12. Market Analysis and Early Activities on Business Model Development in Tanzania (Outputs 2.1 and 2.2) (Bentesa Tutis): see annex 12 for full presentation

Overview of the Tanzanian agriculture sector: the agri. Sector in Tanzania is dominated by smallholder farmers Provides livelihood to more than 80% of the population, accounts for 24 % GDP, 30% of total exports; and 65% of raw materials for Tanzanian industries.

About 62 % of its crop area is cultivated by hand hoe, 24 % by ox plough, 10% by tractor and 4% by 2WT; mostly rain-fed agriculture.

Trends of Mechanization with Tractors in Tanzania: number of tractors in the country- approximately 21,500 by 2010, 24 tractors per 100 sq. kilometers, Government interventions (Kilimo Kwanza/Agriculture first) and government under (DASIP) procured and distributed 300 power tillers to 300 farmer groups in year 2010/11. Focus on selected areas. Putting more efforts to farmers get modern and affordable machines to sustain their agricultural undertakings.

Experience of 3 wheeler and 2 wheeler shows that the same supply chain, importers, retailer's shops in the district and village level, repair centers in the village and small towns, mechanics, spears supplies and fabricators in the small town and villages near the operations were adopted for 2WTs.

The demand of 3 and 2 wheelers is high due to availability and accessibility of its spare parts, availability of services even in remote areas, cheapest means of transportation.

Innovations in 2WTs sub-sector to fit with the requirements of farm operations. Adequate distributors/suppliers innovations/technology that reduces the price, local manufacturer involvement proposed to be instrumental to expand 2WTs in Tanzania.

Market size of the 2WT Sub- sector:

There is an increasing demand for two wheel tractor use because of the opportunity to increase yields and reduce work drudgery. In 2010 Tanzania was having a total of 4,571 2WTs. according to NSCA 2007/08, 14,608 households (or 0.3 percent) are using power tillers in Tanzania.

Supply chain of 2WT Sub-sector

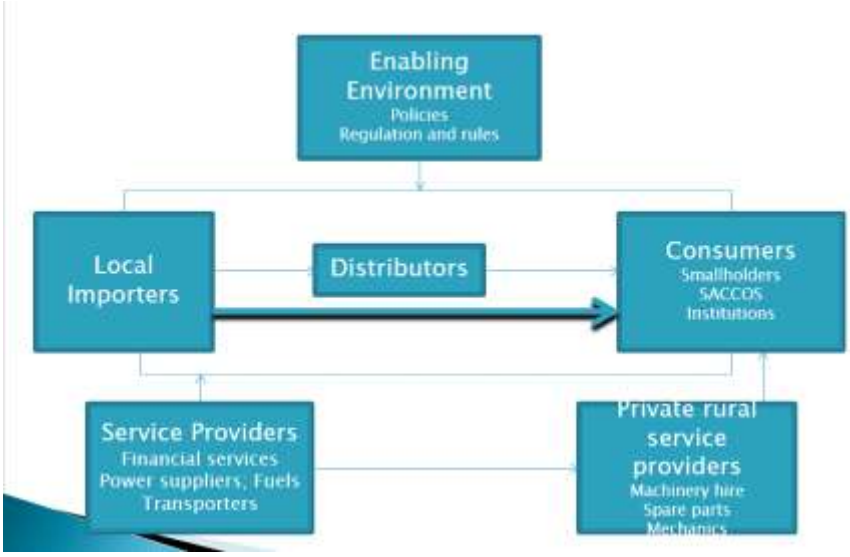

Figure 9- Supply chain diagram of 2WT Sub-sector in Tanzania

Competitiveness of the sector: preliminary assessment shows several numbers of importers, distributors the level of competition in agricultural machinery sector**.**

Opportunities and challenge: government support, duty free, subsidy, affordable loans.

Challenges: purchasing power and management skills in operation and maintenance Lack of knowledge and awareness among farmers on available farm machinery.

Remark: the study is ongoing, missed some issues and will addressed as the study progresses.

2.13. Open Discussion on Problems, Challenges and Opportunities Related to Objective 2 (Dr David Kahan): see annex 13 for full presentation

Rationale:

Objective two is about Identifying Commercial Models for testing delivery of 2WT services to smallholders. The rationale for this objective is the scaling-up of technologies which can best be achieved by following a demand driven approach to develop business linkages and alliances with supply chain stakeholders – the private sector. This can further be strengthened by linking to the market. Market linkages are recognized as necessary to adopt technologies that increase agricultural productivity and support sustainable intensification.

It was noted in the presentation that the prerequisites for mechanization in SSA rests on the existence of effective demand, the economic use rates of machinery and the development of a machinery and equipment supply chain.

Definitions

The presentation went on to clarify differences between supply chains, value chains and business models explaining the principles underlying the market system of development. Definitions of business models were presented and some of the anomalies regarding its application were discussed. It was noted that the business model concept was not used consistently both in research and in business practice (Hedman and Kalling, 2003) and the term is often used sloppily "being stretched to mean everything and ending up meaning nothing" (Magretta, 2002). The point was also made that the quantitative evaluation of business models is difficult, because they are mostly only developed informally (Heinrich and Winter, 2004) and the dynamic characteristics of a business model were difficult to predict owing to the interdependencies of value networks and complex feedback dynamics (Sterman, 2000), (Warren, 2002).

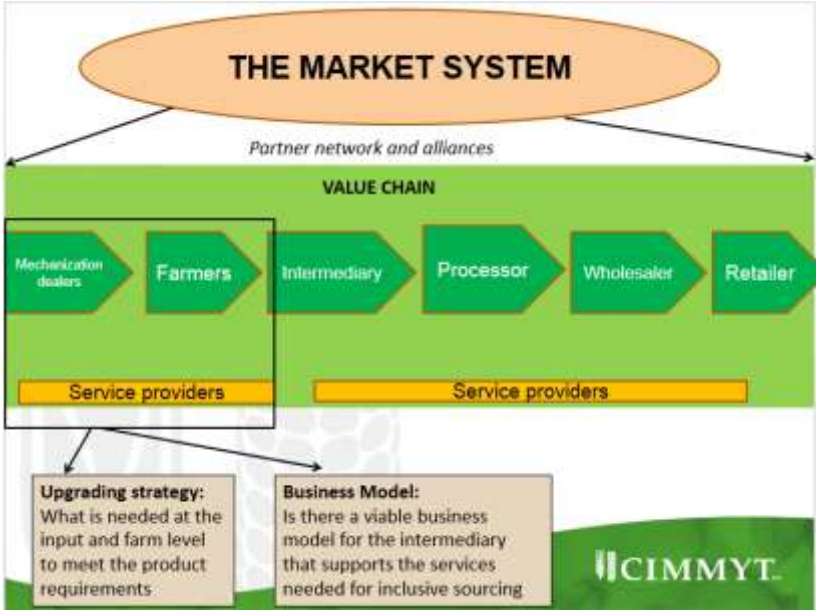

Figure 10 – Diagrammatic presentation of a value chain and business model in the wider market system

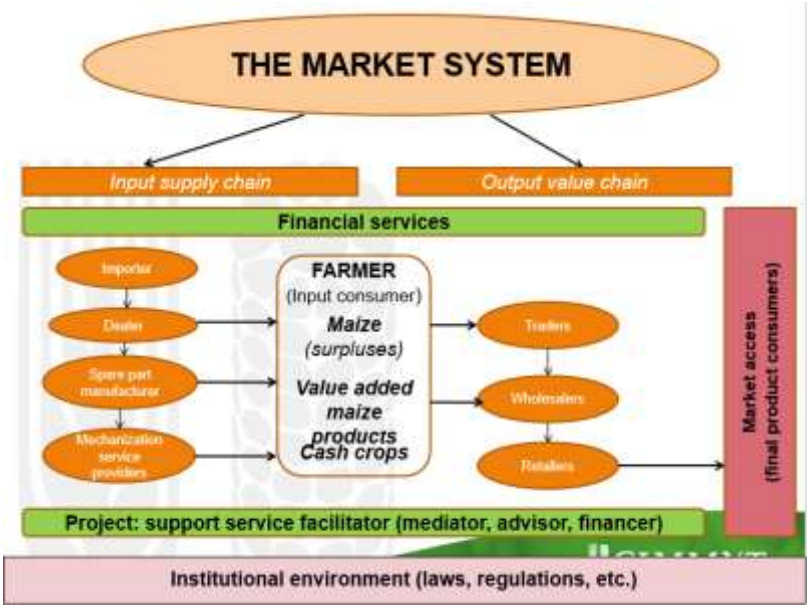

Figure 11 – Input supply chain vs output supply chain in the wider market system

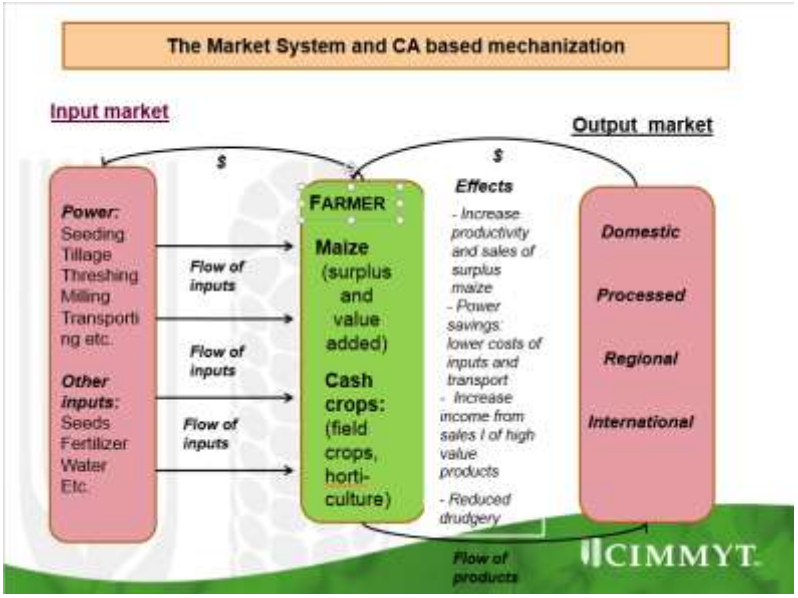

Figure 12 – Diagrammatic presentation of the market system and CA based mechanization interfaces

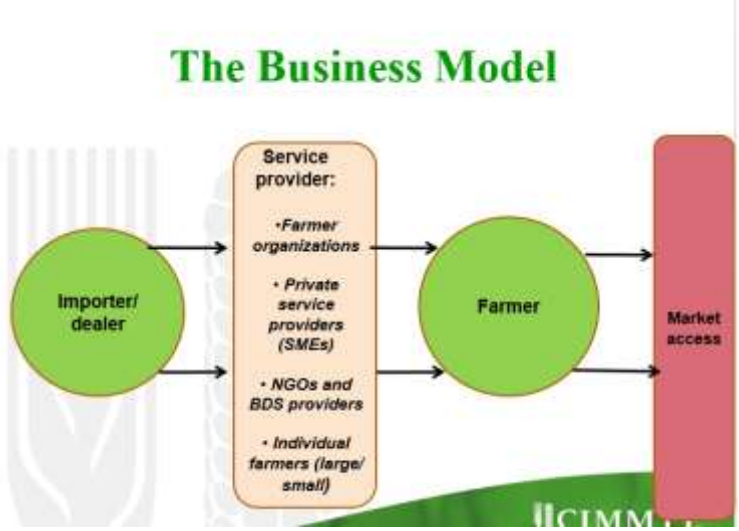

Figure 13 Diagrammatic presentation of business model

A point was also made that to support the mechanization supply chain some consideration needs to be given to accessing output markets. The interrelationship between input and output markets was highlighted in supporting crop productivity and sustainable intensification. These relationships suggested that development of the mechanization supply chain may in some cases require development of interlinked business models. This was highlighted as follows: 1) Business model A: For mechanization: the farmer is the customer 2) Business Model B: For agricultural produce: the farmer is the supplier.

Anticipated Challenges in Business Development for FACASI

The presentation went on to highlight come of the design and operational challenges facing FACASI. These were listed as follows:

- proof of concept which might be necessary before commercialization
- the appropriateness of timing and phasing
- financial attractiveness of 2WT-based services to farmers
- incentives to develop the supply chain (training/ promotional materials) for importers and dealers
- How to develop the demand for CA mechanization services without facilitator/ broker organizations (core function of NARS).
- Willingness of financial institutions to work on new financial products?
- How to develop trust among actors of the value chain and a 'fair' pricing structure?
- How to establish sustainable business enterprises for machinery provision – with or w/o government financial assistance (concessional loans/ taxes/ grants)? The issue of incentives?
- How to influence the broader business policy environment?

Operational issues: Capacity development, demand for mechanization and the need to work with farmers, hiring of NRS, logistics and flexibility in budget use. It was noted that the project design

appears rigid with limited resources available for unscheduled activities. Other issues raised included the role of the broker – individual or organization; research or development; art or science? The issue of facilitation – the concept and the roles - public or private sector was also highlighted. The issue of geographic focus was also raised making the point that business models are likely to extend beyond the spatial boundaries of the demarcated districts and this may require flexibility in defining the boundaries of intervention. The presenter went on to give examples of 'good practices' in the development of business models to guide the R&P workshop.

Some lessons learned:
The need for flexibility was reiterated to adjust the direction of the programme – if need be - to respond to changes as development occurs. Reference was made to guidelines prepared to support M4P interventions. Additionally, the time dimension for market development was mentioned with examples of iDE taking up to seven years to develop the market for tubewells. Facilitator capacity was also identified as critical for "making the deal" and facilitators needed the knowledge and confidence to engage credibly with the private sector. Also most often programmes had additional resources available to engage in 'win-win' relationships with private sector actors (dealers, service providers, and local entrepreneurs). Often "kick start" grants might be provided to try a new product, try a new service, invest in a new process, link with a new set of suppliers and demonstrate machineries and technologies in the field.

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3. Day 2: Field visit

The meeting participants visited Lengetia Farm that grows wheat under large scale CA, and in rain-stressed conditions. According to the farm manager, one of the key issues to be addressed for CA adoption is to change negative perceptions, intercrop styles, work to reduce poverty and institutionalize CA in government. There is also need for farmer organization, an entity to enable hiring, pooling and/ or even resource sharing or even rationalization. Such organization would also enable the emergence of, or visibility of CA and machinery champions.

The second visit was to Timau, for an equipment demonstration, exhibition and community meeting. Several entrepreneurs and companies (including Car and General) participated. There was a lengthy Q&A. First, local community members asked a wide range of questions, and the Project members answered. The then vice versa. Some of the fundamental issues raised include i) integrating irrigation, CA and machinery ii) gender and training in machinery(-related) skills iii) scaling out, to attain necessary scale iv) multi-functionality of machines v) inclusion of the community in decision making on types of machines, equipment, etc. v) focus or need to integrate plans for reducing cost of equipment, including 2WT.

4. Day 3: Planning

4.1. Governance and Management of the Project (Dr Frédéric Baudron, CIMMYT): see annex 14 for full presentation

- Matrix structure: 4 objectives across 4 countries
- Role of the Project Leader and the Project Manager:

    - Manage project implementation and reporting in a timely fashion
    - Liaise with the project partners to ensure that milestones and outputs are delivered according the agreed timeframe
- Role of the Project Management Committee:
    - Meets quarterly (sometimes through teleconferences)
    - Reviews progress and help planning, following the M&E
    - Minutes shared with the project scientists.
- Role of the Project Coordinator in each country:
    - Coordinates all project activities in the country
    - Supported by CIMMYT offices in Ethiopia, Kenya and Zimbabwe (when needed)
- Role of the Advisory Group in each country:
    - Composed of government Ministerial policy makers, R&D leaders, NGOs, and private sector, etc.
    - Reviews, oversights and guides implementation in country
    - Builds alliances for scaling out within country
- Role of the Project Steering Committee:
    - Composed of senior professionals not associated with implementation partners
    - Receives progress reports semi-annually and meet annually
    - Provides oversight, reviews progress and advises the Commissioned Organization and ACIAR on adjustments in implementation arrangements

In line with the above provision it was pointed out that an advisory group meeting has taken place in each country (Kenya and Tanzania) during the first year implementation of the programme. A part from that the PMC had one teleconference in each of the countries.

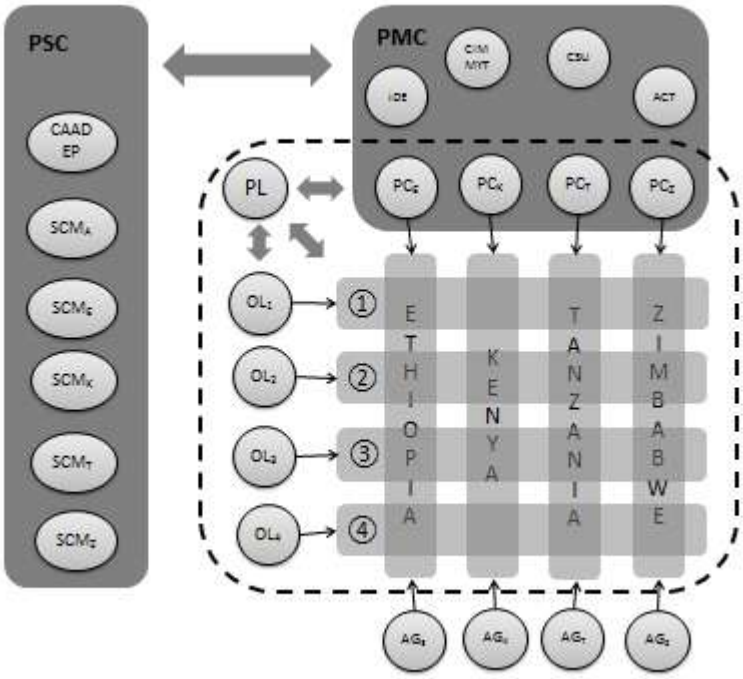

Figure 14– Governance and management of FACASI

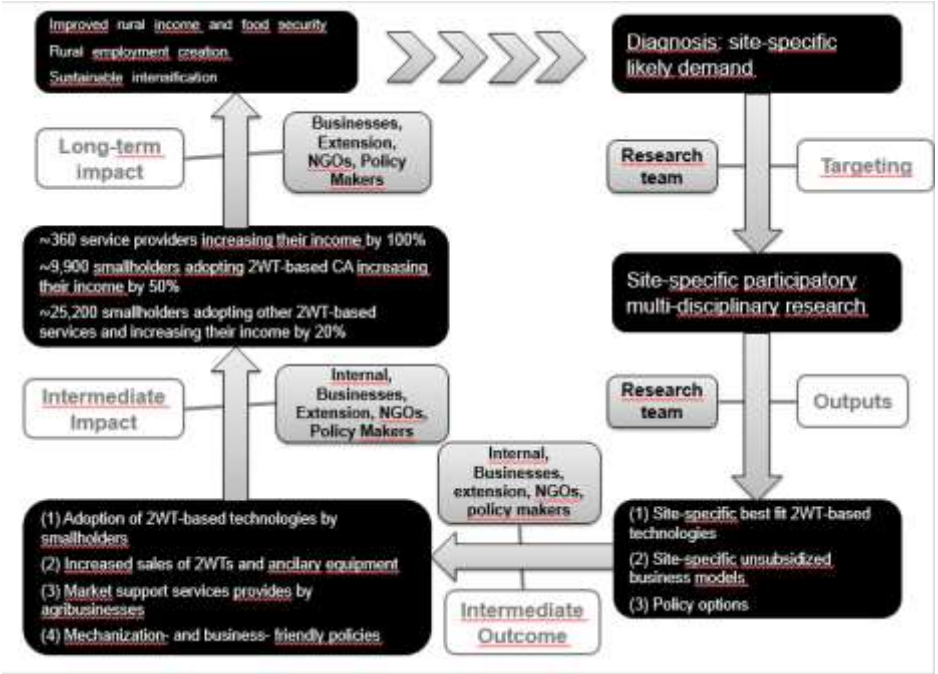

Figure 15 – FACASI out put- Impact Pathway

- Country-level M&E: Outputs:
  - Most promising 2WT-based technologies identified and acquired
  - Best bet 2WT-based technologies evaluated on-station and on-station component technology research
  - Best bet 2WT-based technologies evaluated on-farm and continuously refined
  - Exploration of short term incentives and long-term impact of 2WT-based technologies on farmer livelihoods through farm bio-economic models.
  - Country- and site-specific market analysis of small-scale mechanization
  - New or upgraded business models designed and re-designed
  - New or upgraded business models supported
  - Performance of the new or upgraded models assessed
  - Policy options for wider delivery of 2WT-based mechanization
  - Outputs from the project available to project partners and partly available to the public
  - Awareness on 2WT-based technologies created at various levels
  - International mentoring platform created

- Country-level M&E: Outcomes, Int. Impact and Long Term Impact
- Outcomes
  - Adoption of 2WT-based technologies by smallholders
  - Increased sales of 2WTs and ancillary equipment
  - Market support services provided by agribusinesses
  - Mechanization- and business- friendly policies
  - National agricultural engineering and mechanization research revitalized
  - Improved awareness of 2WT-based technologies

- Intermediate Impact
    - Increased labour productivity and reduced drudgery
    - Reduced biomass tradeoffs
    - Rural employment creation
- Long-term Impact
    - Improved rural income and food security
    - Sustainable intensification
    - Women and youth empowerment in agriculture

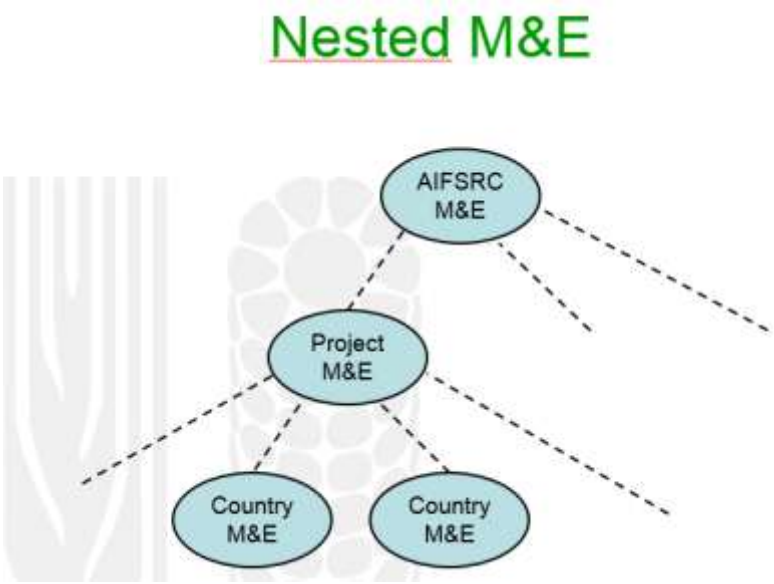

Figure 16 – ACIAR's Nested M&E

Figure 17 ACIAR's M&E pillars

- **Project partner M&E Obligations**
  - To ensure development outcomes (Pillar 1) are clearly identified against project objectives
  - To ensure adoption 'processes' (Pillar 2) for the project are identified up front and measures put in place for their monitoring
  - To ensure key data requirements are identified and included in work plan development and collected

Project M&E contributes to Centre level M&E

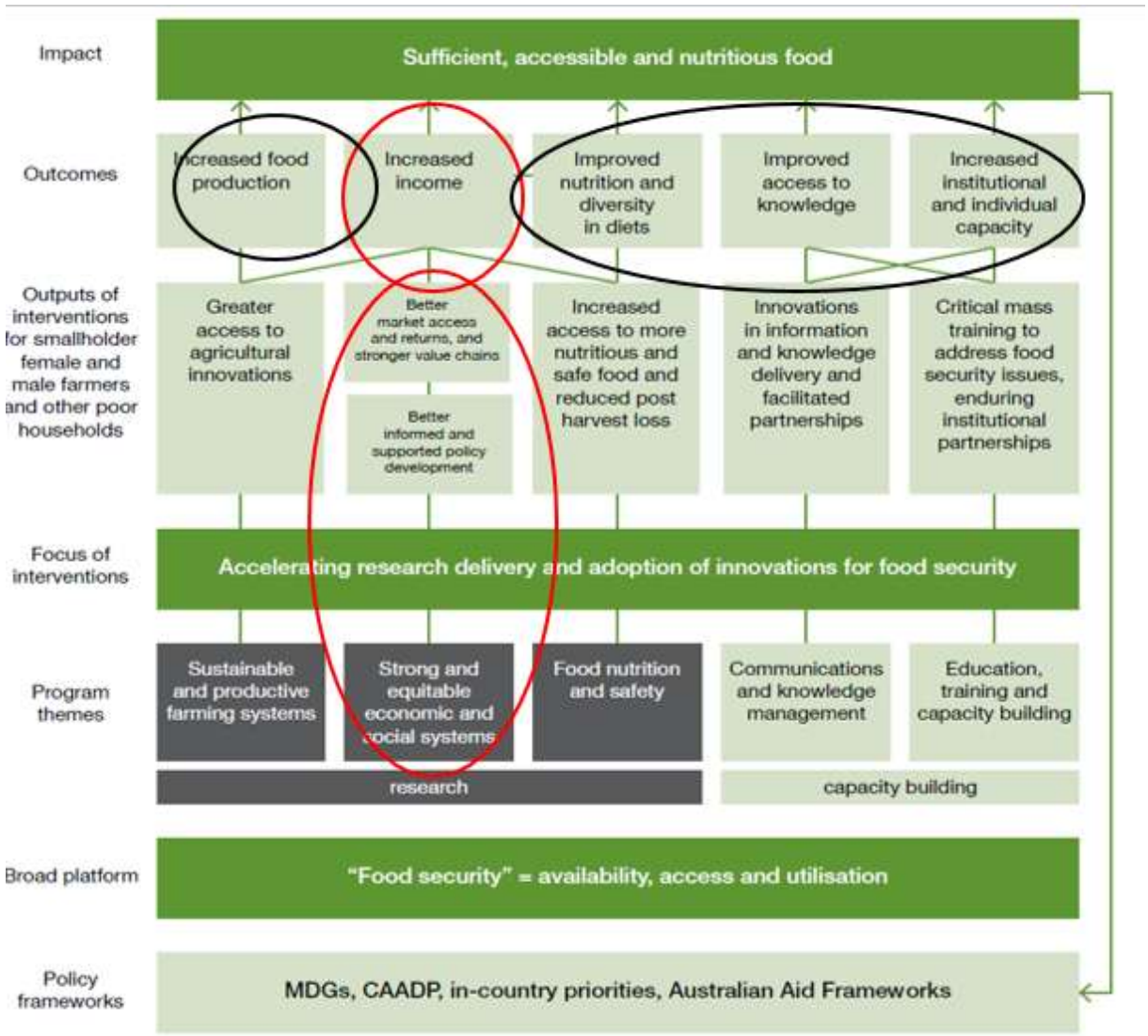

Figure 18 - Project M&E contributes to Centre level M&E

Currently the draft FACASI M&E framework has been developed following the experience of SIMELESA but a simplified one. The next step in that regard will be finalizing the alignment of the FACASI impact indicators with that of the ACIAR's M&E pillars.

4.2. 2WT-Based CA in Bangladesh (Dr Richard Bell): see annex 15 for full presentation

Background of the project: Floods and cyclone devastated livestock (including draft oxen/bullocks), removal of restrictions on Chinese 2WTs imposed, and World Bank's push on market liberalization in Bangladesh, Reduction in import tariffs and increased import of small engines, tillers and pumps

Opportunities and Drivers:

- The need for Mechanize planting due to the non-availability of labour
- Mechanized tillage already well-established Elements of CA practice already in place in Bangladesh
- Save time in crowded cropping calendar- handle crop establishment in periods of peak labour demand
- Reduce costs of production and Improve timeliness of planting

Conservation Agriculture technology:

- Minimum tillage, crop residue cover, rotations
- Four major study area covering different ecology
- Intensive cropping- irrigation from groundwater

Among the 2WTs were:

- Chinese-made, imported 6BG-2A known as PTOS
- Versatile Multi-crop Planter (VMP)- locally developed based on Chinese design supported by CIMMYT.

Operation of 2WTs:

In comparison to the conventional highbred Tract: Saved ~45-65 % fuel and Yields similar or improved compared to conventional

Limited R&D and Limited farmer knowledge was a challenge. With an appropriate training it was overcomed.

- 6 R&D hubs based around service providers, Rajshahi- 3, Rajbari – 1, Thakurgon -1, Mymensingh – 1
- On-farm and on-station minimum tillage demo trials by Service Providers
- Creating demand-demonstrations by Service Providers

Commercialization of CA: it did not go as smoothly as initially thought. The quality of the machines were having problems. As a machine would not work everywhere, it had to be adopted to local conditions.

The process: Partnering-sales promotion-creating brand image-Marketing-Training service providers.

Challenges/Constraints: the initiative is under treat due to

- Over exploitation of underground water that increased the cost of ground water pumping
- Labor cost becoming very high
- High cost of production.
- Crop residue declining due to usage for animal feed and fire

Question: who are the providers of CA mechanization services?

Response: there are two types of Service Providers. One type is wealthy farmers who are able to buy and own the machine while the others are those who don't have a farm but would like to make a leaving by providing hiring services.

Question: who are undertaking the promotion work? As it would encompasses conflict of interest if the manufacturers themselves are undertaking the promotion.

Response: Initially the promotional task was being handled by the manufacturers which had resulted in to over-presentation of the technology and it was resolved by the farmers and farmers' group taking over the responsibility of promotion.

4.3. The International Mentoring Platform (Dr Frederic Baudron, CIMMYT): see annex 16 for full presentation

Aim of the International Mentoring Platform under FACASI: To build capacity of the NARSs in the four countries to engage in mechanization related research, CA, and business models: CIMMYT has allocated flexible AUS$ 200,000.

Modality:

- Scientist mentoring visits from around the world.
- Training visits by African Scientists to relevant institutions and countries. Possibility of MSc and PhDs.

Items in the IMP

- Study tour in South Asia- NARS budget- The first visit was to India and the second one is planned for 7th to 11th December 2014 to Bangladesh. At least one person each from NARSs
- Capacity-building trips from each African country to Australia-NARS budget
- Mentoring trips from Australia to Africa-CSU budget.
- Flexible fund- CSU budget CIMMYT Aus$200,000: The fund should be used on a need bases with a strong support from PMC and NARSs.

Comments:

- The PMC in each country should pull the information and put a data matrix (budget, deadline, criteria etc.) and help candidates, pre-review of proposals so that they would have a stronger chance of success.

- People taking part in a training or exposure visit should be able to share the lessons gained to others.

Question: What is the maximum limit to request for funding form IMP and what are the topics it covers?

Response: This issue would to be decided by the PMC. The PMC would prioritize and make a suggestion as to the limit of funding for each individual and also on the topics that the IMP be focusing.

4.4. What is expected under Objective 1 during Year 2 (Dr Frederic Baudron, CIMMYT): see annex 17 for full presentation

There are five activities under objective one to be undertaken in the second year implementation of the project. Out of which the two are ongoing (1.2.3 and 1.3.4) while the rest (1.4.2, 1.4.3 and 1.4.4) are to be initiated

- 1.2.3. Researcher-managed field evaluation of most-promising 2WT-based technologies
- 1.3.4. Participatory evaluation and adaptation of best bet 2WT-based technologies
- 1.4.2. Selection (or development) of a farm-scale model, calibration and validation
- 1.4.3. Identification of realistic scenarios of change in available farm power and simulation of these scenarios
- 1.4.4. Participatory workshops discussing simulation outputs within each innovation platform

Evaluation of technologies:

- Best bests = suitable + commercially available (affordability) engaging local manufacturers and involving in other mechanized operations to be vital.

Testing:

- Protocols

  - Site characteristics *(soil?)*
  - Operations
  - Equipment characteristics *(fuel consumption? field capacity?)*
  - Agronomy (*phenology? grain and residue yields? mulch?)*

    - Perception (ranking, rating) → Moti, Michael
    - Economic analysis → Moti
    - National testing center?

4.5. What is expected under Objective 2 During Year 2 (Dr David Kahan): see annex 18 for full presentation

David indicated that there will be a rescheduling of actives from the original planned date of implementation in the project document as a result of a delay in the recruitment of Agribusiness Development Officers. Based on the experience of working with the NARS over the first year a revised strategy for implementation of Objective 2 was presented. The strategy was developed in collaboration with iDE and some consultation with FAO. A prerequisite for implementation of the programme was the recruitment of the Agribusiness Development Officers and the organization of a training programme schedule for May 2014. A comparison with the original timeline was presented with revised dates for completion of activities.

Output 2.1: Market analysis of small-scale mechanization

Activity	Original date due		Revised date due
	Kenya/ Tanzania	***Ethiopia/ Zimbabwe***	
1. Literature review and key informant interviews	*September 2013*	*April 2014*	July 2014
2. Interview market actors and Government partners	*June 2013*	*June 2014*	August 2014
3. Multi-stakeholder roundtable discussions in each Innovation Platform	*November 2014*	*August 2014*	October 2014

Output 2.2: Business models design

Activity	Original date due		Revised due date
	Kenya/ Tanzania	Ethiopia/ Zimbabwe	
1. Focus group discussions with each actor group	January 2014	October 2014	28th February 2015
2. Multi-stakeholder roundtables	February 2014	January 2015	31st March 2015
3. Ex-ante business study and financial analysis	June 2014	May 2015	31st May 2015
4. Focus group discussions	July 2014	July 2015	30th June 2015
5.Annual multi-stakeholder			Flexible

meetings			

Output 2.3: Business model support/1

Activity	Original date due		Revised due date
	Kenya/ Tanzania	***Ethiopia/ Zimbabwe***	
1. Market integration of companies and service providers	*Tanz. March 2014* *Ken April 2014*	*Eth Aug 2015* *Zim Jan 2015*	31st August 2015
2. Training of local companies in 2WT and CA	*Tan July 2014* *Ken June 2014*	*Eth Oct. 2015* *Zim March 2015*	31st July 2015
3. Training of local companies in agribusiness	*Tan July 2014* *Kenya June 2014*	*Eth. Oct 2015* *Zim. March 2015*	*31st August 2015*
4. Regular backstopping of 2WT-CA and agribusiness training by companies	TAN: Nov 2014 to Feb 2017; KEN: Aug 2014 to Feb 2017;	ETH: Apr 2016 to Feb 2017; ZIM: Sep 2015 to Feb 2017	30th September 2015
5. Develop financial products for different actors	*TAN: Nov 2014; KEN: Aug 2014*	*ETH: Apr 2016; ZIM: Sep 2015*	Included under 2.3.1
6.Develop range of promotional materials	*TAN:Dec 2014, Dec 2015, Dec 2016; KEN: Aug 2014, Feb 2015, Aug 2015, Feb 2016, Aug 2016, Feb 2017*	*ETH: Apr 2016, Feb 2017; ZIM: Oct 2017*	November 30th 2015

Output 2.4: Business model performance assessment

Activity	Original date due		Revised due date
	Kenya/ Tanzania	***Ethiopia/ Zimbabwe***	
1. Actor specific financial analysis	*Tan: Oct. 2016* *Kenya Aug 2016*	*Eth Jan 2017* *Zim June 2016*	January 2016
2. Gender and country specific adoption and impact survey	*Dec. 2016*	*Eth Jan 2017* *Dec 2016*	June 2016

The presentation assumed that as progress to date under 2.1 for Kenya and Tanzania was slow there was not much difference between the implementation status of these two countries with Ethiopia and Zimbabwe. Moreover the proposed training of NRS and NARS staff involved in agribusiness development would take place in the same venue at the same time in May 2014. While the startup

process was slower than originally envisaged it was pointed out that the implementation of activities would speed up by 2015.

Discussion was held on the schedule and duration of the proposed strategy and concerns were raised that there might not be sufficient results to present at the mid-term review meeting to be held in the first quarter of 2015. These concerns were taken into account during the country planning exercises and accelerated plans prepared and presented.

4.6. What is expected under Objective 3 during Year 2 (Dr Moti Jaleta)

There are four activates to be undertaken under objective three in year two. While activity 3.1.1 "Review of Global Success Stories on Mechanized CA" is almost through and just requires to be finalized,

- Activity 3.1.2. "Review of national policies affecting mechanization" (import taxes and regulation, local movement of machinery, etc.), agricultural profitability (e.g. subsidies), industrialization, and businesses and enterprises; and
- Activities, 3.2.1, 3.2.2.and 3.2.3 are ongoing across the life of the project.

5. Day 4: Planning and Conclusion

5.1. Presentation action plan for Kenya (Dr Pascal Kaumbutho): see annex 4 for full Action Plan

The action plan for Kenya for the second year implementation FACASI was presented by Dr. Pascal and the following issues/concern were noted:

- ✓ The ongoing literature review work will be completed by 31st March 2014.
- ✓ A consultant will be hired starting 31st March 2014 to undertake activity 2.1.2 and 2.1.3.
- ✓ The plan (especially the rescheduling under objective 2) should take the project period and the season appropriate for testing of a model in to consideration.
- ✓ Activity 2.3.6 should be coordinated with the ACT knowledge management
- ✓ The bringing the hirers for the beginning of the –
- ✓ The need to add more service providers.
- ✓ Equipment should be provided to the hirers on time so that they will be able to make uses of the seasonal work and be able to pay on time
- ✓ More commitment to media outlet and publicity.
- ✓ Be prepared to exploit the mentoring and training opportunities.

5.2. Presentation action plan Tanzania (Dr John Saria and Bentesa Titus) see annex 3 for full Action Plan

The action plan for Tanzania for the second year implementation FACASI was presented by Dr. John Saria and Benesta Titus and the following issues/concern were noted:

- ✓ Field day has to be part of the communication strategy and ACT should be invited to be involved
- ✓ Danyang seeder imported from china should be used for this season

Finally it was pointed out that the issues/concerns raised on the action plan of one country should also be considered for the other as appropriate and the final action plan should be submitted by 17th March 2014.

5.3. Conclusion

The following issues were discussed to be points of emphasis:

I. The possibility of scaling up or applying business modeling to other areas other than the current project sites. (David Kahan)

   Response/agreed point (Frederic Baudron)**:** it is possible to extend the application of business modeling to the extent of point of adjacent to the project site. However it would not be justifiable to test a business model faraway the project area unless/until additional budget is obtained.

II. **Conservation vs. other farm operation (Frederic Baudron):** 2WTs should also be utilized for non-CA activities, i.e. for harvesting, post-harvest (trashing, transport), irrigation activates. This would enable to make efficient uses of the machines throughout the year.

   The major issue that need to be resolved is planting a crop in CA thus needs to be a number one priority.

   Response/agreed point: Concerning objective two it is a must to consider other operations whereas under objective one it could be taken as alternative.

III. **Maze and other crop (intercropping) rotation (Berney):** the need for mechanizing legumes alongside maize.

   The maize covering the legume from sunlight was raised as possible challenge for intercropping while making the right number of rows & spacing were pointed out as possible solution.

   Response/agreed point: intercropping is a possibility that would be attained after continues research. Thus the two countries need to continue making trails in their respective sites.

IV. **Best Bet Technologies to focus on for scaling out**: What are the machines already available for commercialization?

   Response/agreed point: for Tanzania the seeders are still under experimenting whereas the locally made Sheller could go ahead. For Kenya the machine of Fitarrili appears to be promising.

Hence, agreed to carry on experimenting to get best bets while focusing on the available ones at hand.

V. **Spillover communities (John Saria):** the demonstration of the machines appropriated under the project to the nearby community (through Kilimomarkets) such as Karatu so that they could also be benefited.

Response/agreed point: scaling up to the point of adjacent as the budget under the project is limited.

VI. **Involvement of the private sector from day one of the testing of equipment (Edward):** The need for the involvement of the private sector from the beginning of testing of the equipment (2WTs) was emphasized as it is the private sector that would take the CA mechanization forward after the termination of this project.

Response/agreed point: As it was the case in the first year implementation of the project, the involvement of the private sector in testing of the equipment (2WTs) will continue with greater emphasis. Moreover a feedback mechanism to manufacturers and importers will also be put in place.

VII. **Bringing the two cultures i.e. research and business process together (Richard Bell):** ACIAR looking for the impact on the investment in this project hence there is a need for this project to bring the linkage between the research and business.

Response/agreed point: This particular project is focusing on smallholders aiming at creating a linkage between the actors. To that end the provision of seed capital and involving from the start would enable the private sector to be able to take the product forward.

Final remark: (Frederic) urged partners to be demanding and make uses of the backstopping for success of the project.

Annex 1

Workshop Programme

Farm Mechanization & Conservation Agriculture for Sustainable Intensification (FACASI)

Review and Planning meeting for activities in Kenya and Tanzania

Sportsman's Arms Hotel, Nanyuki, Kenya, from the 11th to the 14th of March 2014

Day 0, 10th of March 2014: NAIROBI – NANYUKI (Departure of the bus at 14h00 from Nairobi, Jacaranda Hotel Westlands, via Comfort Gardens, Gigiri, Nairobi)

Day 1, 11th of March 2014: REVIEW

8h30 – 8h45	Registration	
8h45 – 9h15	Welcome remarks by AIFSRC	Ms Liz Ogutu
9h15 - 9h45	Project's overview: justification, objectives and major activities.	Dr Frédéric Baudron
9h45 – 10h00	Welcome remarks by the Governor of Laikipia County	Hon Joshua Irungu
10h00 – 10h30	Official opening Chief Engineer, Agricultural Engineering Services, Ministry of Agriculture	Engineer Jasper A.M. Nkanya
10h30 – 11h00	**TEA BREAK**	
11h00 – 11h30	Review of global success stories on mechanized CA (Output 3.1)	Dr Moti Jaleta
11h30 – 12h00	Analysis of the likely demand for small mechanization: focus group discussion and farm survey in Kenya and Tanzania (Output 1.1)	Dr Michael Misiko
12h00 - 12h30	FACASI Communication Strategy	Mrs Janet Achora
12h30– 14h00	**LUNCH BREAK**	
14h00 – 14h30	On-station and on-farm testing of best-bet 2WT-based technologies in Kenya, Year 1 (Outputs 1.2 and 1.3)	Dr Joseph Mutua
14h30 – 15h00	On-station and on-farm testing of best-bet 2WT-based technologies in Tanzania, Year 1 (Outputs 1.2 and 1.3)	Dr John Sariah
15h00 – 15h30	Open discussion on problems, challenges and opportunities related to Objective 1	Dr Frédéric Baudron
15h30 – 16h00	**TEA BREAK**	
16h00 – 16h30	Market analysis and early activities on business model development in	Dr Pascal

	Kenya (Outputs 2.1 and 2.2)	Kaumbutho
16h30 – 17h00	Market analysis and early activities on business model development in Tanzania (Outputs 2.1 and 2.2)	Mrs Upendo Titi
17h00 – 17h30	Commercial village opportunities for Mechanized Ag in East Africa	Mr. David Ruchiu
17h30-18h00	Open discussion on problems, challenges and opportunities related to Objective 2	Dr David Kahan
18h00 – 19h00	**COCKTAIL**	

Day 2, 12th of March 2014: FIELD VISIT

Wednesday 12th Mar, 2014: *Field Visit will take the delegates to Lengetia Farm (Naro Moru) to be there by 9am. We will view a Large-scale farmer who is integrating smallholders in his network through support to Farmer Field Schools, equipment demonstration and an annual field day. The farmer gets his own equipment from Australia and has compelled other Kenyan large-scalers to apply CA, with great overall impact. 11:30 am will find the delegates at the Buuri Cooperative society grounds who are collaborating with KENDAT to on-station and on-farm test FACASI equipment. Various CA direct seeders will be demonstrated as a few companies will display their mechanization products. The highlight of the day will be a structured discussion between delegates and community members (farmers), including equipment hirers. The topic will be the place for the 2 Wheel Tractor and agricultural mechanization as game changers in their rural livelihoods.*

Day 3, 13th of March 2014: PLANNING

8h30 – 9h00	Recap	Mr Peter Kirimi
9h00 – 9h30	Governance and management of the project	Dr Frédéric Baudron
9h30 - 10h00	Promoting 2WT-based CA in Bangladesh	Prof Richard Bell
10h00 - 10h30	The International Mentoring Platform	Dr Frédéric Baudron
10h30 – 11h00	**TEA BREAK**	
11h00 – 11h30	What is expected under Objective 1 during Year 2	Dr Frédéric Baudron
11h30 – 12h00	What is expected under Objective 2 during Year 2	Dr David Kahan
12h00 – 12h30	What is expected under Objective 3 during Year 2	Dr Moti Jaleta
12h30– 14h00	**LUNCH BREAK**	
14h00 – 15h30	Group work: country action plan for Year 2 (per task: responsibility, others involved, deadline, time needed, costs) Internationals as Resource Persons	All
15h30 – 16h00	**TEA BREAK**	
16h00 – 17h30	Group work (continued) All international scientists as resource persons	All

Day 4, 14th of March 2014: PLANNING

8h30 – 9h00	Recap	Mr Wilfred Mariki
9h00 – 9h45	Presentation action plan Kenya	Dr Pascal Kaumbutho
9h45 - 10h30	Presentation action plan Tanzania	Mr Wilfred Mariki
10h30 – 11h00	**TEA BREAK**	
11h00 – 12h30	Round table (All international Scientists as resource persons)	All
12h30– 17h00	**LUNCH AND DEPARTURES**	

Annex 2

List of participants

	Name	Organization	Email/Tel.
1	George Mburathi	ACIAR	gmburathi@gmail.com
2	Liz Augutu	ACIAR	lizogutu@aciar.gov.au
3	Louisa Cass	Autralian Higher commission	Louisa.cass@dfat.gov.au
4	Tom Agwa	MOA, ATDC	agwatom@gmail.com
5	Wafula Mutoro	MoAFLA	wafulamutaro@ymail.com
6	Roselyane U. Juma	KARI	rjoside@yahoo.com
7	Henry Mwiti	Farmer, Laikipia	0721524744
8	David Mbogo	SSGRC	0721937903
9	Ernest Wangombe	SSGRC	0724321811
10	T.B Mukele	Private	baremukele@gmail.ca
11	Josphai M. Kiama		j.kiama2yahoo.com
12	Pascal Kaumbutho	KENDAT	pkaumbutho@kendat.org
13	Joseph Mutua	KENDAT	jmutua@kendat.org
14	Antohny Karimy	UON/KENDAT	antkarimi@gmail.com
15	Janet Achora	ACT Nairobi	janet.achora@act-africa.org
16	David Kahan	CIMMYT Addis	d.kahan@cgiar.org
17	Frédéric Baudron	CIMMYT Addis	f.baudron@cgiar.org
18	Moti Jaleta	CIMMYT Addis	M.Jaleta@cgiar.org
19	Michael Misiko	CIMMYT Addis	M.Misiko@cgiar.org
20	Elias Berta	CIMMYT Addis	e.berta@cgiar.org
21	Benesta Titus	CIMMYT Tanzania	titusbenesta@yahoo.com
22	John E. Saria	SARI, Tanzania	jsariah@yahoo.com
23	Wison Baitani	CAMARTEC, Tanzania	wbaitani@yahoo.com
24	Evarist Makene	MAFC, Tanzania	makeneevarist@gmail.com
25	Edward Charles	Kilimo Markets	technicaldirector@kilimomarkets.com
26	Geoffrey Marema	Sokolne University of	geoffmrema@yahoo.com
27	Richard Bell	Murdoch University, Australia	r.bell@murdoch.edu.au

Annex 3: Year Two Action Plan for Tanzania

Activities	Tasks (sub-activities)	Responsibility	Others involved	Start	Deadline	Remark
1.2.3. Researcher-managed field evaluation of most-promising 2WT-based technologies	*Trial material preparations (Input purchases ; Fertilizer, seeds, herbicides, twines)*	J.Sariah	Mariki	Mar-14	Dec-14	March (Arumeru), Nov (Mbulu)
	Calibration of the seeders and run test at station and transportation of machineries to the sites.	J.Sariah	Baitani, Mwinama, Mariki	Mar-14	Nov-14	March (Arumeru), Nov (Mbulu)
	Training of local machine operators (operate and maintenance)	J.Sariah	Baitani, Mwinama, Mariki	Mar-14	Dec-14	March (Arumeru), Nov (Mbulu)
	Trial sowing Arumeru and Mbulu	J.Sariah	Baitani, Mwinama, Mariki, Upendo and SARI technicians	Mar-14	Dec-14	March (Arumeru), Nov (Mbulu)
	Trial management (Weeding, pest control, harvesting)	J.Sariah	SARI technucians	Mar-14	Dec-14	March (Arumeru), Nov (Mbulu)
	Data taking (crop phenology, weather)	J.Sariah	Mariki, SARI tecnicians	Mar-14	Dec-14	March (Arumeru), Nov (Mbulu)
	Soil sampling	J.Sariah	SARI SOIL LAB Technicians	Apr-14		Arumeru site only
	Soil analysis (SARI LAB)	J.Sariah	SARI SOIL LAB Technicians	May-14	Jul-14	Arumeru site only
	Conduction of field days in both sites (Involving IPs, policy makers, media people, enterpreneurs, business people etc.)	*Wilfred Mariki*	*J. Sariah, Baitan, upendo, Banesta*	May, (August Meru)	*June (Mbulu) (September Meru)*	

Activities	Tasks (sub-activities)	Responsibility	Others involved	Start	Deadline	Remark
	Data analysis (agronomic, soils and weather)	*Baitani*	*Mwinama*	*Jun-14*	*Jul-14*	
	Publicity/Dissemination of technology through (leaf lets, brochures, radio,TV channel and newspapers)	*Wilfred Mariki*	*J. Sariah, ACT.*	*May -14*	*Cont…*	
1.3.4 Participatory evaluation and adaptation of best bet 2WT-based technologies						
1.3.4. 1 Participatory evaluation of the best bet technology	*Protocol improvement (farmers evaluation)*	Upendo Titi	Mariki, Sariah	Early March	late March	Farmers evaluation protocol refining
	Farmers evaluation of the seeders					
	Social economic data analysis.			Mar-14	Dec-14	
	Feed back to the farmers and other stake holders (IP members)	Upendo/Ben	sariah, Mariki, Baitan	Jun-14	Mar-15	June (Arumeru) and March (2015 Mbulu)
1.3.4.2 Adaptation of best bet 2WT-based technologies	Working on possible/ needed modifications on seeders for adaptation	*Baitani*	*Mwinama*	Apr-14	Jan-15	Seeders mechanical operation modified to suit the purpose
	Testing of the modification functionality at factory/station (CARMATEC)	*Baitani*	*Mwinama*	Apr-14	Jan-15	
	Feed back to manufacturer for any necessary action	*Baitani*	*Mwinama*	Apr-14	Jan-15	
1.4.4. Participatory workshops discussing simulation outputs within each innovation	Identification of workshop participants	*Wilfred Mariki*	*J. Sariah*	May-14	Jun-14	
	Organize and implement	M. Misiko, F.	Mariki/Sariah	May-14	May-14	

Activities	Tasks (sub-activities)	Responsibility	Others involved	Start	Deadline	Remark
platform	workshop	Baudron				
	Dissemination/Sharing of workshop outcome through report, leaf lets, brochure etc.	M. Misiko, F. Baudron	ACT	Sep-14	Dec-14	
	Annual report writing	*Wilfred Mariki/Sariah*	SARI, CARMATEC	Jul-14	Aug-14	
2.1.1. Country-level literature review, complemented by a quick appraisal using key informants, of the following markets: 2WT, ancillary equipment, two-wheelers and three-wheelers, spare parts	Validate draft report with review with key informant interviews with key machinery dealers with key actors in machinery market (dealers, manufacturers, importers).	Upendo/Ben	Mariki	15/3/14	15/4/14	
	TRA information on ag machinery imports from Dar es Salaam, Arusha, Namanga	Upendo/Ben	Mariki	1/4/2014	30/4/14	
2.1.2. Interview of national and local market actors (local importers, manufacturers, financial organization, mechanics and workshops) including the Government institutions	Design survey checklist	Upendo/Ben	Mariki	15/3/14	15/4/14	
	Conduct surveys in Arusha, Moshi, Mwanza, Dar es Salaam	Upendo/Ben	Mariki	15/4/14	15/5/14	
	Write-up and submit 1st draft to CIMMYT	Upendo/Ben	Mariki	15/6/14	30/6/14	
2.1.3. Multi-stakeholder roundtable discussions in each IP to identify underlying causes for		Upendo/Ben	Mariki		Aug-14	

Activities	Tasks (sub-activities)	Responsibility	Others involved	Start	Deadline	Remark
market systems weakness						
2.2.1. Focus group discussions with each actor group to prioritize critical success factors related to actor linkages and supporting services	Preparation of FGD checklist	Upendo/Ben	Mariki			
	Conduct FGD with importers, dealers, manufacturers, farmers, extension, Service Providers, researchers, mechanics			15/4/14	15/5/14	Conduct this activity at same time as 2.1.2 above
2.2.2. Multi-stakeholder roundtables to secure agreement on an action plan for the design of new business models or the upgrading of existing ones	Select main actor groups where interventions are critical and are likely to have high impact.	Upendo/Ben	Mariki	1/8/2014	15/8/14	Business analysis in 2.2.3 and 2.2.4 contributes to this task
	Action plan with selected groups	Upendo/Ben	Mariki	1/8/2014	15/8/14	
	Draw up agreements with selected groups	Upendo/Ben	Mariki	1/8/2014	15/8/14	
2.2.3. Ex ante business study to assess the potential impact of new/upgraded business models (considering the size of the market, profit along the market chain, etc.)	Analysis of business profitability for the main actor groups where the intervention takes place	Upendo/Ben	Mariki	1/8/2014	30/8/14	This contributes to the tasks of 2.2.2

Activities	Tasks (sub-activities)	Responsibility	Others involved	Start	Deadline	Remark
2.2.4. Focus group discussions to 'demonstrate incentive' (cost-benefit analysis, net present value, breakeven point) to each group of market actor (including financial institution)	Validate the ex-ante business study with the main actor groups of the interventions.			1/9/2014	15/9/2014	This contributes to the tasks of 2.2.2
2.2.5. Annual multi-stakeholder roundtable in each IP to evaluate and refine (if need be) the new/upgraded business models	Evaluation	Upendo/Ben	Mariki	1/12/2014	15/12/14	
	Write-up evaluation	Upendo/Ben	Mariki	15/12/14	15/1/15	
2.3.1. Lobbying for greater market integration of local importers and manufacturers, workshops/mechanics and rural service providers	Engage main actors in the supply chain in order to foster better business environment.	Upendo/Ben	Mariki	15/1/15	30/1/15	
2.3.2. Training of local importers/manufacturers/dealers in 2WT-based CA (including machinery operation, machinery maintenance, rotational requirements, agronomy, mulch	Preparation of training materials and selection of trainers and trainees	Upendo/Ben	Mariki	15/3/2015	15/7/15	
	Conduction of training	Upendo/Ben	Mariki	15/3/2015	15/7/15	

Activities	Tasks (sub-activities)	Responsibility	Others involved	Start	Deadline	Remark
conservation, fertilizer management, weed control)						
2.3.3. Training of local importers/manufacturers/dealers for them to become trainers of rural service providers in business and financial management and marketing	Preparation of training materials and selection of trainers and trainees Conduct training and produce training report	Upendo/Ben	Mariki	1/10/2014	30/10/2014	
2.3.4. Backstop training of rural service providers in 2WT-based CA and business and financial management and marketing by the importers/ manufacturers/dealers and workshop owners/mechanics	Preparation of training materials and selection of trainers and trainees	Upendo/Ben	Mariki	15/10/2014	30/10/2014	
	Conduction of training	Upendo/Ben	Mariki	15/10/2014	30/10/2014	
2.3.5. Development of appropriate financial products targeting (1) rural service providers, and (2) farmers seeking 2WT-based services	Identify financial institutions for supporting the provision of suitable financial instruments to service providers and farmers	Upendo/Ben	Mariki	15/7/14	30/7/14	
	Inform and encourage key stakeholders of the availability of potential financial services	Upendo/Ben	Mariki	1/8/2014	15/72015 and on	

Activities	Tasks (sub-activities)	Responsibility	Others involved	Start	Deadline	Remark
2.3.6. Development of promotional materials (1) targeting service providers to support and raise awareness on importers//dealers, and (2) targeting farmers to support service providers	Produce at least one promotional material for each actor group	Upendo/Ben	Mariki	15/1/15	15/2/15	
2.3.7. Quarterly IP meetings on 2WT-based market systems	Organize IP meetings each quarter	Upendo/Ben	Mariki	15/6/14	15/12/14	
3.1.2. Review of national policies affecting mechanization (import taxes and regulation, local movement of machinery, etc), agricultural profitability (e.g. subsidies), industrialization, and businesses and enterprises	Identify, collect and review information on current policies and strategy directly/indirectly affecting mechanization			15/3/2014	1/5/2014	
	Report writing and submission to CIMMYT				1/5/2014	
W. Advisory Group Meetings (2 in 2014)	June meeting (after annual report)		National PSC member		6/30/2014	
	December meeting (after semi-annual report)		National PSC member		12/31/2014	

Activities	Tasks (sub-activities)	Responsibility	Others involved	Start	Deadline	Remark
X. Review the communication strategy and the website framework		Wilson Baitani	ACT		3/15/2014	
Y. Review the country M&E			E. Berta, F. Baudron		4/30/2014	
Z. Propose trainings, mentoring trips, studies		John Sariah	J. Blackwell, F. Baudron		3/31/2014	

Annex 4: Year Two Action Plan for Kenya

Activities	Tasks (Sub-Activities)	Responsibility		Start	Deadline	Remark
1.2.3. Researcher-managed field evaluation of most-promising 2WT-based technologies		JM Mutua (Team Leader)		March, 2014	MARCH,2015	
	Soil sampling and Analysis (Research Plot)	Mutua	Pascal	31st Mar 2014	April 30 2014	
	Farmer Site selection (Laikipia & Bungoma)	Mutua	Kiama,Muriuki, Tom	1st Mar 2014	20th Mar 2014	6 sites in Laikipia, 5 sites in Bungoma
	Transport equipment to Bungoma	Mutua	Tom		5th Apr 2014	
	Develop Equipment-Hirer Handover/Operation Protocols	Pascal	Mutua, Key Hirers	20th Mar 2014	10th Apr 2014	Hirers to be engaged right from Research to Farmers plots as possible
	Collection of data	Mutua	Karimi, Ian, Tom	24th Mar 2014	20th Apr 2014	See Test Protocols
	Data collation	Mutua	Karimi,Ian, Muckle,Ayaga	24th Mar 2014	April 30 2014	See Test Protocols, Engage CSU John Blackwell
1.3.4. Participatory evaluation and adaptation of best bet 2WT-based technologies		JM Mutua (Team Leader)		March, 2014	MARCH,2015	
	Soil sampling (on farm) and Analysis	Mutua	Tom/Pascal	15-Apr-14	May 31 2014	
	Equipment hirer training	Mutua	Tom	May 1 2014	May 31st 2014	Will follow planting as this is urgent, unless proven hirers already exist
	Farmer exchange visits	Mutua	Karimi,Muriuki, Kiama,Tom	24th Mar 2014	20th Apr 2014	To be done when crop is is in full bloom
	Collection of data	Mutua	Karimi, Ian, Tom, Hirers	24th Mar 2014	20th Apr 2014	See Test Protocols
	Data collation	Mutua	Karimi,Ian,Muckle,Ayaga	24th Mar 2014	31st May 2014	See Test Protocols, Engage CSU John Blackwell

Activities	Tasks (Sub-Activities)	Responsibility		Start	Deadline	Remark
1.4.4. Participatory workshops discussing simulation outputs within each innovation platform	Organize workshops		M. Misiko, F. Baudron		12/31/2014	
2.1.1. Country-level literature review, complemented by a quick appraisal using key informants, of the following markets: 2WT, ancillary equipment, two-wheelers and three-wheelers, spare parts	Finalize literature review and appraisal	P G Kaumbutho (TL)	Mutua, Karimi, Moti	15-Jan-14	3/31/2014	
2.1.2. Interview of national and local market actors (local importers, manufacturers, financial organization, mechanics and workshops) including the Government institutions	Develop TOR for Consultant to conduct study pending the hiring a BDS Professional	Pascal	D. Kahan	15th Mar 2014	31st Mar 2014	
2.1.3. Multi-stakeholder roundtable discussions in each IP to identify underlying causes for market systems weakness	Hire consultant to conduct industrial and business study in the 2 localities	Pascal	D. Kahan	1st Apr 2014	5/31/2014	
2.2.1. Focus group discussions with each actor group to prioritize critical success factors related to actor linkages and supporting services	Hold IP meetings and Focus group Discussions during the OCnsultancy in Laikipia and Bungoma and Report Outcome	Consultant/Pascal	Tom, Ayaga, IFDC(Kirimi)	1-Jun-14	30-Jun-14	
2.2.2. Multi-stakeholder roundtables to secure agreement on an action plan for the design of new business models or the upgrading of	Mobilize stakeholders from both Bungoma and Laikipia, industrial importers, dealers, Service Providers, bankers etc, following Consultant's final	IFDC (Kirimi)/Pascal	Tom, Kiama,Mutoro, Muriuki,Ayaga	1-Jul-14	30-Jul-14	IFDC has agreed to fund this sitting, aimed at a Business Plan serving all in the mechanization supply chain.

Activities	Tasks (Sub-Activities)	Responsibility		Start	Deadline	Remark
existing ones	report to sit at a Cluster Business Plan forum					
2.2.3. Ex ante business study to assess the potential impact of new/upgraded business models (considering the size of the market, profit along the market chain, etc.)	Analysis of workings of the new and agreed Busuness model and supply chain, M7E and way forward for enhaced business performance	BDS Officer of CIMMYT Kenya	Mutua, Tom, Karimi,Kiama, Mutoro,	1-Aug-14	30-Aug-14	
	Report of findings clear on shortcomings and way forward.	BDS Officer of CIMMYT Kenya	Mutua, Tom, Karimi	20th August	30-Aug-14	
2.2.4. Focus group discussions to 'demonstrate incentive' (cost-benefit analysis, net present value, breakeven point) to each group of market actor (including financial institution)	Group level testing of new Business Plan and its promising impact where it has worked.	BDS Officer of CIMMYT Kenya	Mutua, Tom, Karimi	1-Sep-14	30-Oct-14	
2.2.5. Annual multi-stakeholder roundtable in each IP to evaluate and refine (if need be) the new/upgraded business models	Stakeholder meeting in each of Laikipia and Bungoma to assess progress with Business Cluster (IP) implementation	BDS Officer of CIMMYT Kenya	Mutua, Tom, Karimi	1-Jul-15	End July 2015	
2.3.1. Lobbying for greater market integration of local importers and manufacturers, workshops/mechanics and rural service providers	Lobby importers and dealers to accommodate local service providers and farmer groups	BDS Officer of CIMMYT Kenya	Mutua, Tom, Karimi	1-Dec-15	End January 2015	

Activities	Tasks (Sub-Activities)	Responsibility		Start	Deadline	Remark
2.3.2. Training of local importers/manufacturers/dealers in 2WT-based CA (including machinery operation, machinery maintenance, rotational requirements, agronomy, mulch conservation, fertilizer management, weed control)	Prepare training materials, identify trainees and conduct training	Pascal	D. Kahan	1st May 2014	End of Oct.2014	
2.3.3. Training of local importers/manufacturers/dealers for them to become trainers of rural service providers in business and financial management and marketing	Prepare training materials, identify trainees and conduct training	Pascal	D. Kahan	1st Nov 2014	Dec 31st, 2014	
2.3.4. Backstop training of rural service providers in 2WT-based CA and business and financial management and marketing by the importers/manufacturers/dealers and workshop owners/mechanics	Conduct meetings with all concerned parties	Pascal	D. Kahan	1st June 2014	Dec 31st, 2014	
2.3.5. Development of appropriate financial products targeting (1) rural service providers, and (2) farmers seeking 2WT-based services	Engage finaciers early and in the Business Cluster formation, among other meetings and interactions	BDS Officer of CIMMYT Kenya	D. Kahan	Jul-14	Dec-15	
2.3.6. Development of promotional materials (1) targeting service providers to	Prepare Flyers, posters video clips and other media/promotional products	Pascal	D. Kahan	Jul-14	On going	

Activities	Tasks (Sub-Activities)	Responsibility		Start	Deadline	Remark
support and raise awareness on importers//dealers, and (2) targeting farmers to support service providers	Organize media coverage during field days (Radio, TV, captions and newspaper highlight, media breakfast)	Pascal	D. Kahan	Aug-14	On going	
2.3.7. Quarterly IP meetings on 2WT-based market systems	Semi-annual meetings of key IP stakeholders	Pascal	D. Kahan	Mar-15	On going	Quarterly is not realistic. Semi-annually, beginning March 2015
3.1.2. Review of national policies affecting mechanization (import taxes and regulation, local movement of machinery, etc), agricultural profitability (e.g. subsidies), industrialization, and businesses and enterprises	Identify, collect and highlight policies and strategies directly and indirectly affecting mechanization and what review can be conducted.	Pascal	Mutoro	Jun-14	April, 2014	Ministry of Ag, Livestock and Fisheries support needed. A small consultancy may be needed.
W. Advisory Group Meetings (2 in 2014)	June meeting (after annual report)	Pascal	National PSC member		6/30/2014	
	December meeting (after semi-annual report)	Pascal	National PSC member		12/31/2014	
X. Review the communication strategy and the website framework	Review in support to ACT	Pascal	Janet (ACT)		4/15/2014	
Y. Review the country M&E	Review in support to CIMMYT	Pascal	E. Berta, F. Baudron		4/30/2014	
Z. Propose trainings, mentoring trips, studies	Any support from Australia/India in establishing a Mechanization Hire Hub	Pascal	J. Blackwell, F. Baudron		3/31/2014	
	Dr. Mutua to attend Conference on CA for Smallholders in Asia and Africa to also learn about the Multi-	Mutua	Frederic/R Bell		Dec-14	

Activities	Tasks (Sub-Activities)	Responsibility		Start	Deadline	Remark
	crop Planter from Bangladesh (Dec 7-11 2014 (Re: Prof R. Bell)					
	Support in Socio-economic aspects through short assignments of CIMMYT personnel or locally engaged support staff.	Pascal	D. Kahan	Jun-14	Ongoing	
Z1. See specific requests made on a separate letter to John Dixon via Frederic Baudron	Requests include support to purchase more equipment, establishing a mechanization hire hub, funds to do a photo-story on mechanization in Kenya, etc.	Pascal	Frederic/John Dixon	Apr-14	Ongoing	We lost US$4900 in Bangladesh purchasing the Multi-Crop Planters. More equipment is needed in the areas of smallholder wheat harvesting (reaper binder) and threshing, if not livestock feed processors that farmers yearn for.