



Farm Mechanisation and Conservation Agriculture for Sustainable Intensification

Newsletter Issue 2: September 2014

Welcome to this second issue of the FACASI Newsletter, 2014

In this issue we have exciting News on.....

- ◆ The Business modeling design training in Ethiopia
- ◆ The complex African smallholder drudgery
- ◆ Increasing Energy input and self Organization
- ◆ FACASI Review & Planning meeting Kenya and Tanzania
- ◆ FACASI—a glance at a year of Progress
- ◆ Searching for Best Bet 2WT Seeding Technology &

Much more.....

- ◆ In the news briefs



Participants during a field trip at the Ethiopia/Zimbabwe review meeting

Business Model Design Training - Adama, Ethiopia

The Business Modeling training was conducted at Adama, Ethiopia from 23rd to 28th June, 2014. The training aimed at equipping the newly recruited CIMMYT national agribusiness development officers as well as the National Agriculture Research System officers involved in the FACASI project from the four countries of Ethiopia, Kenya, Tanzania and Zimbabwe, with practical skills in market development and business modelling. It also aimed at orienting the participants to the project design and understanding how and what milestones are expected to be achieved.



Participants at the Business Modeling Design Training

The training designed by Dr. David Kahan of CIMMYT, Agribusiness Specialist, was supported by iDE (Richard Rose and Conor Riggs) and FAO (Heiko Bammann). The training programme included a theoretical overview of a range of methodologies for market development and business modelling followed by a series of practical exercises designed to take the participants through the key activities of business model design. Learning was conducted through discussions, practice and reflection with an emphasis given to practical aspects of instruction for application in the field.

Read more about this training at: <http://bit.ly/1tsBV5A>

Do not jump the gendered queue! An illustration of complex African smallholder drudgery

by M. Misiko



The combination of rudimentary tools, weedy fields, scattered plots, routine define drudgery.

Reducing drudgery in farming which is disproportionately placed on women and makes farming less attractive to the youth is a main objective of FACASI. Last April, three focus group discussions were held in Hawassa and two in Assela respectively, in Ethiopia to better understand drudgery and its gender implications.

Just what is drudgery? According to participants, drudgery emanates first from the nature of the work: "you bend, or walk a lot". It is linked to the use of tools that requires excessive muscle power for little returns, it is associated with torturous operations that are hard to replace with machinery and lastly it may be the result of performing tasks in lonely plains with no shade, no stories or music, no meals and especially with diminishing returns to increased effort.



Farm Mechanisation and Conservation Agriculture for Sustainable Intensification

Do not jump the drudgery queue continued from pg 1:.....

Are there gender inequities when it comes to drudgery? By and large, analyses of on-farm and off-farm tasks showed that women performed more chores than men and/or handled more tasks that required more time or routine. Many women regularly multi-tasked to cover more than 24 hours of work a day, especially in households with young children. Male dominated chores more than female dominated chores benefited from animal draught power, carts and bicycles.

Should we mechanize women tasks if we are to improve women welfare? This was not thought to necessarily be a priority. The discussions found out that women chores were linked to and in fact dependent on men's tasks. In all the focus group discussions, women listed tillage as the top priority to mechanise, although this is a male-dominated activity. The rationale given by women was that if tillage was delayed, or was performed poorly, there would be more weeds, untimely planting, and poor harvest. Moreover, tillage is the main task accomplished by oxen. It was mentioned that the price of oxen was escalating, and that animal feed, which was mostly sourced by women, was becoming less available and more expensive. Therefore, mechanising tillage would have a far reaching effect, by increasing male participation in other chores such as fodder processing. It would also eliminate travel requirements among women who carry food to men tilling distant fields.

This exercise showed that we need a deeper understanding of the potential effect of mechanization on drudgery, particularly if the core goal is to improve the welfare of women. A nuanced approach is needed, with more rational and calculated investments in tasks that have potential to yield positive ripple effects among household members besides reducing women drudgery burdens. In the language of Dore Bofena women, "do not jump the queue of gendered drudgery



A woman farmer shown how to operate a 2 -Wheeled tractor.

Newsletter Issue 2: September 2014

Increasing energy input and maintaining self-organization: can we have both?

by Frédéric Baudron

The fundamental hypothesis of FACASI is that energy in the form of labour, animal draught power and engine power is limiting productivity of many farming systems in sub-Saharan Africa. Increasing energy supply through mechanization and the supply of energy-dependent inputs (e.g. fertilizer) - has been key to the large productivity increases witnessed by Asia and Latin America during the Green Revolution.



Jean-Yves Duriaux weighing the quantity of firewood used daily by a rural household in Ethiopia. A large share of the total energy used by rural households in Africa is represented by fuel'

The resulting systems, however tend to be characterized by low energetic efficiency and low resilience. Natural ecosystems (and low input traditional production systems) are powered by solar energy and stabilized by self-organization resulting from complex internal flows of energy. Under-

standing the tradeoffs between increased energy input and reduced self-organization is essential to identify compromises where increasing the former leads to a less than proportional decrease in the latter

To look at these issues, FACASI Ethiopia hosted a MCs student from the Farming System Ecology group of Wageningen, Jean-Yves Duriaux from February to June 2014. Jean-Yves analyzed the energy use efficiency and energy flow (using Ecological Network Analysis) of a diversity of farms from the Hawassa lake region, one of the SIMLESA sites in Ethiopia. Farms were purposefully selected along a gradient of perennial-based systems (lower energy input, higher self-organization) to annual-based systems (higher energy input, lower self-organization).

Initial results confirmed that greater diversity of internal energy flow paths is related to higher resilience and stability but also to lower total farm productivity.. *Continued on next page*



Farm Mechanisation and Conservation Agriculture for Sustainable Intensification

Newsletter Issue 2: September 2014

Increasing energy input..continued from pg. 2

Perennial-based systems were generally more diverse than annual-based systems, resulting in higher diversity of energy flow paths. In both perennial-based and annual-based systems, livestock was an important vector of internal energy flow. Similarly, multi-functional components (e.g. maize used for food, feed, and fuel) promoted internal flow of energy in both systems. These results suggest that loss of resilience and stability as a result of mechanization could be avoided, provided perennials, livestock and multi-purpose crops are retained.

Jean-Yves will be defending his MSc thesis early September 2014.

FACASI Review and Planning Meeting held for Kenya and Tanzania at Nanyuki, Kenya.

by Elias Berta

Stakeholders and partners reviewed the progress made in the first year of FACASI in Kenya and Tanzania, and planned for the second year during the RPM held from 11th to 14th March, 2014 at Laikipia, Kenya.

This Review and planning meeting was attended by representatives from ACIAR/AIFSRC, Australian Higher commission, Kenyan and Tanzanian Ministries of Agriculture, members of the private sector, farmers, NARS, CIMMYT and PSC members.

The format of the meeting consisted of presentations, field visits and demonstration of equipment. Reports were made by the respective project coordinators on the progress in each country. Presentations were also made on the "Analysis of the likely demand for Small Mechanization in Kenya and Tanzania" "Review of Global Success Stories on mechanized" and the FACASI Communication Strategy.

On-Station and on-Farm testing of best-bet 2WT-Based Technologies in Kenya and Tanzania as well as the problems, challenges and opportunities related to FACASI strategic focus areas were discussed.

Other topics discussed included Market analysis and the initial activities on Business Model Development in Kenya and Tanzania.

Other presentations and discussions were held on the Governance and Management of the Project, the International Mentoring Platform and the experience of 2WT-Based Conservation Agriculture in Bangladesh.

During this review meeting, field visits were made to a large Scale farm that grows wheat using Conservation Agriculture farming practice under rain-stressed conditions. Other visits were to an equipment demonstration exhibition and a community meeting where several entrepreneurs and companies participated. The visit gave participants the opportunity to experience how FACASI works in practice and in the Field.

Way forward

In a closing of the Review and Planning meeting the following issues of emphasis were raised and discussed:

- ◆ The possibility of scaling up or applying business modeling to other areas other than the current project sites.
- ◆ Conservation vs. other farm operation.
- ◆ Maze and other crop (intercropping) rotation.
- ◆ Best Bet Technologies to focus on for scaling out.
- ◆ Spillover communities.
- ◆ the involvement of the private sector and
- ◆ bringing the two cultures i.e. research and business process together.



Participants visiting the equipment demonstration exhibition



Farm Mechanisation and Conservation Agriculture for Sustainable Intensification

Newsletter Issue 2: September 2014

FACASI — a glance at a year of progress

By Elias Berta

The FACASI project, had its inception in Kenya & Tanzania March 2013 and later in Ethiopia & Zimbabwe in February 2014. Since then there has been significant progress made in the four countries with the formation of research teams, appointment of a project coordinator, setup of management and governance structures in each country and at the coordination office in Addis Ababa. Initial steps have been taken to lay the ground for smooth and coordinated implementation of the project.

Overall, the project has four strategic intervention focus

- ◆ The evaluation and demonstration of 2WT-based technologies to support CA systems,
- ◆ using expertise and implements from Africa, South Asia and Australia.
- ◆ The testing of site-specific commercial systems to deliver 2WT-based mechanization.
- ◆ the improvement of policies for wide adoption of 2WT-based mechanization, and
- ◆ the improvement of capacity to create awareness of 2WT-based technologies in the sub-region, as well as share knowledge and information.

The milestones

Evaluation and demonstration of 2WT-based technologies

In terms of evaluating and demonstrating the 2WT-based technologies, data collection for the farm survey, inventory and characterization of most promising technologies, importation of 2WTs and ancillary equipment, and on station testing have been completed in most countries. The development of protocols, on-station as well as on farm trials have been undertaken. While the manufacturing of Multi-Use Sheller/thresher/chopper/Trailer (MUST) by CAMARTEC of Tanzania has been undertaken. This has been supplemented by the training of 18 Kenyan and 14 Tanzanian FACASI research team on operation and maintenance of 2WTs and seeders.

Testing of site-specific commercial systems

Commercial systems require market development and business modeling skills. To achieve this focus, FACASI under the guidance of the International agribusiness specialist has conducted international trainings in business modeling to equip the national agribusiness development officers as well as the other

support actors in the National Agriculture Research Systems of the four project countries with practical skills in market development and business modelling. The trainings also gave an opportunity for orientation into the project design.

Awareness of 2WT-based technologies

A study tour was under taken to India involving seventeen FACASI scientists to create awareness on the 2WT-based technologies. A mentoring trip by Jeff Esdaile also resulted in the modification of the commercially available Gongli seed drill into Gongli Africa. Mentoring trips from Australian researchers to Africa and training of key research staff in mechanization centers of Australia are some of the activities in the pipeline to enhance awareness and skills. To support awareness a communication strategy for the project has been developed and is implemented through trainings, documentation, a website and a quarterly newsletter.

Integration of Gender

Attempts have been made to address issues of gender. Gender aspects in FACASI were discussed during the project launch workshop held in Zimbabwe. In Ethiopia, a gender sensitiveness checklist was applied for the focus group discussions. The FACASI-project has also established a link with CRP Maize which is currently conducting a gender analysis study in the maize growing FACASI sites in Ethiopia and Kenya.



Gongli Africa+ planting maize in Laikipia during the Long Rains of 2014



Farm Mechanisation and Conservation Agriculture for Sustainable Intensification

Newsletter Issue 2: September 2014

Searching for Best-Bet 2WT Seeding Technology

By John Mutua



Morrison CA-seeder model 1000 planting maize in Bungoma

Lack of appropriate planting technologies in smallholder Conservation Agriculture systems has been cited as one of the bottlenecks in the successful adoption of Conservation Agriculture. Hand tools are drudgerous and inefficient while Draft Animal power is threatened by droughts, diseases and shortage of biomass. 4WT technologies have proved inappropriate for small and fragmented fields and are too costly for African smallholders. Consequently, planting operations remain largely hand-hoe based with its inherent low efficiency and drudgery.

In the recent past there has been a noticeable increase on the number of 2WT imported in East Africa region, mostly for use in transport services in the flower industry. 2WT have been used successfully in Asian countries such as Bangladesh where agriculture is characterized by small and fragmented fields such as exists in Sub-Sahara Africa. Moreover, several No-till planters adapted to 2WT have been developed and some are now commercially available. Borrowing from the successes of Asian countries, the Farm mechanization and Conservation Agriculture for Sustainable Intensification (FACASI) project is currently testing several planters adapted to 2WT with the aim of establishing best-bet(s) for adaptation to African conditions.

Key considerations in choosing the planters were their ability to handle trash/mulch, adequate quality, feasible cost and commercial availability (or potential to be commercially available).

Test are been carried out in Kenya, Tanzania, Ethiopia and Zimbabwe. In Kenya up to six different planters are currently being tested at both on-station and on-farm under rain-fed maize/legume systems in two sites- Bungoma and Laikipia. The aim of the tests is to establish functionality, performance and economic viability of the different planters under different soils and biomass conditions. Successful best-bet(s) will be made available through innovative business models to effectively deliver mechanization to smallholder farmers. The business model(s) envisage strong private sector involvement.

The six planters include:

1. 2BFG-100 – originating from China. The planter utilizes fluted roller seed and fertilizer meters and can be set for strip till.
2. National Agro Zero till multi crop planter from India. This planter operates in conjunction with a rotorvator and can be set for strip till. It has inclined seed meters and fluted roller for fertilizer metering.
3. Fitarelli 2-row direct seeder from Brazil. This planter is fitted with double disc furrow openers, horizontal plate seed meters and star-wheel fertilizers meters.
4. Fitarelli 1-row direct seeder, also from Brazil, fitted with tine furrow opener, horizontal plate seed meter and star wheel fertilizer meter.
5. Gongli Africa+. A tool bar based 2-row seeder using spoon type seed meters, fluted roller fertilizer meters and tined furrow openers.
6. Morrison CA-seeder model 1000, a tined single-row seeder fitted with universal seed meters. The seeder is from USA.

Testing of the above seeders will continue into the coming season and beyond to collect adequate data for analysis.



National Agro No-Till planter planting maize in Laikipia



Farm Mechanisation and Conservation Agriculture for Sustainable Intensification

Newsletter Issue 2: September 2014

News Briefs

ACIAR launches new Africa office in Nairobi

ACIAR officially launched a new Africa office on March 10 by the Australian High Commissioner to Kenya, H.E Geoffrey Tooth. The launch also included the launch of the new Canadian IDRC offices. Along with the new office, is a new position of the ACIAR African Regional Manager taken on by Ms Liz Ogutu, who was previously the Food Security Centre Liaison Officer.

Read more at

<http://aciar.gov.au/aifsc/news/aciar-launches-new-africa-office>

Sixth World Congress on Conservation Agriculture held in Winnipeg—Canada

The 6th World Congress on Conservation Agriculture (WCCA) gave nearly 400 participants from 51 countries the opportunity to learn from and network with an international gathering of agricultural experts. It was held from the June 22-25, 2014 in Winnipeg Manitoba, Canada.

The FACASI project was presented by Frédéric Baudron in an oral presentation titled 'Appropriate and Equitable Mechanization in Africa through Conservation Agriculture, Use of Two-Wheel Tractors, and Involvement of the Private Sector'.

For the proceedings, please visit: <http://www.ctic.org/WCCA/Proceedings/>

CA Equipment Manufacturers' Workshop held in Dar Es Salaam—Tanzania

The African Conservation Tillage Network in partnership with COMESA, FACASI and NORAD organized a two days workshop for CA Equipment Manufacturers, Suppliers and Service Providers. Held at the Protea Courtyard Hotel, Dar Es Salaam, Tanzania from the 28 - 29th November 2013, Thirty five participants from nine countries were drawn from Kenya, Malawi, Mozambique, Brazil, India, South Africa, Tanzania, Zambia, and Zimbabwe.

The workshop objectives included:

- ◆ Sharing of key lessons on CA equipment manufacturing & supply as a basis for COPMSSP knowledge sharing & networking.
- ◆ Discussion on Guidelines for manufacturers & importers of CA equipment on compliance to standards, principles and clients.
- ◆ Formation and networking of a CoP for CA equipment manufacturers, suppliers and service providers
- ◆ A practical CA Equipment Manufacturers Climate Change roadmap
- ◆ Business opportunities secured through the Tanzania Trade Fair & role of ACT /FACASI to help nurture the business opportunities defined.

Workshop outputs

- ◆ Establishment of a CA Manufacturer's CoPs
- ◆ Creation of a CA Manufacturer's database accessible at <http://www.act-africa.org/directory.php?com=85>
- ◆ Establishment of a working group to act as a CoP & champions.

Climate impacts on Agriculture and Food security

A blog post in a series of input data blogposts for cgair "Living Data" online competition.

By Cecilia Schubert (CCAIFS)

The combination of increasing temperatures and shifting rainfall amounts and patterns will have severe impacts on our agriculture systems and food security. Already we are witnessing significant changes in physical and biological systems on all of the world's continents and in most oceans. Smallholder and subsistence farmers, pastoralists and fisherfolk, are suffering from uncompromising impacts of climate change due both to constrained adaptive capacity and additional impacts of other climate-related processes such as snow-pack decrease and sea level rise (Thornton and Cramer (ed.), 2012:13-14).

Read more <http://dialogues.cgiar.org/blog/climate-impacts-on-agriculture-and-food-security/>