Africa Rice 1

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

In Africa, particularly in Benin and Nigeria, rice production and processing tasks are divided on the basis of gender, with women being responsible for much of the drudgery work involved in processing. Rice parboiling, an important rice processing step, reduces the breakage rate during milling and greatly enhances the nutritional quality of rice. Parboiling is an important income generating activity for them and their families. The traditional rice parboiling method is still prevailing and does not lead to quality rice. To address this, an improved rice parboiling technology was introduced and captured into farmer-to-farmer video initiated by AfricaRice and disseminated through Benin and Nigeria. This parboiling technology being promoted has improved the quality of the rice and therefore the income of women. It will be of great interest to know the impact of using the improved parboiling technology and video on quality and demand and supply of local produced and parboiled rice and on the livelihood and welfare of rice women processors and communities.

2) Name of technology or technique that resulted or policy influenced

Improved parboiling equipment combined with video for technology dissemination

3) Year of first release or policy implemented (list by country if more than one)

Benin: 2007

Nigeria: 2009

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)
Number of farmers reached per country:
Benin: 8659
Nigeria: 995

5) Relevant indicators of impact on poverty and/or under nutrition – For a prospective impact assessment case-study

- Poverty (income, expenditure, health, etc..)
- Food security
- Capital assets (social, human, physical and financial)
- Women empowerment
- Local rice quality, supply and demand
- Energy and water use efficiency (environment).

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

Potential outcome framework

7) Relevant data currently available or plans for data to be collected

Currently, around 10 000 processors have benefited from watching the videos in Benin and Nigeria. 4 NGOs organize the video shows and training on the new equipment in Benin for the dissemination of the technology. In Nigeria, Agricultural Development Program (ADP) was involved in the dissemination of the improved technology through the distribution of the parboiling video in his extension network in Ekiti states where the video was well received and has interested farmers. Analyzing the impact of this parboiling technology on women processors income and their social capital reveals important and interested. Some qualitative studies were already done in Benin to assess the power of the video. There is a need to assess the quantitative impact in Benin as well as in Nigeria. For impact assessment analysis, socio economic data on individual farmers are planned to be collected for further appreciation of video impact on their rice farming systems and livelihoods.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Video on parboiling rice was already used in Benin to improve the technology and the dissemination of parboiling practices. Following the organization of video shows, three studies were done:

- Zossou, E., Van Mele, P., Vodouhe, S. and Wanvoeke, J. (2009a). The power of video to trigger innovation: rice processing in central Benin. International Journal of Agricultural Sustainability 7(2) 2009, PAGES 119–129
- Zossou, E., Van Mele, P., Vodouhe, S. and Wanvoeke, J. (2009b). Comparing video with workshops to train rural women in improved rice parboiling in Central Benin. Journal of Agricultural Education and Extension, 15: 4, 329 - 339.
- Zossou, E., Van Mele, P., Vodouhe, S.D. and Wanvoeke, J. (2010) Women groups formed in response to public video screenings on rice processing in Benin. International Journal of Agricultural Sustainability 8(4), 271-278.
- DANDEDJROHOUN , L. (2009). Impact of improved rice parboiling equipment on non-farm income and children schooling in Benin: Case study of department “les collines” . Post graduate, FSA UAC, Benin
- ADJOGNON, S. (2009). Technical and economical efficiency of rice parboiling: case study of Collines department in Benin. Post graduate Thesis , FSA UAC, Benin

AfricaRice 2

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Under the Participatory Adaptive Research and Dissemination of Rice Technologies in West-Africa (PADS), AfricaRice has developed and implemented a Participatory Learning and Action Research (PLAR) approach which is used to support adult learning on inland valley rice development. The heart of the approach is a curriculum composed of farmer learning modules that allow farmers to better manage their resources, emphasizing adaptive responses to context-specific problems. Through weekly sessions with groups of about 25 farmers, farmers analyze their own practices, discover problems and seek the solutions to solve them through the use of their local resources and practice. PLAR was widely used in West Africa by AfricaRice and in Madagascar by Aga Khan Foundation. There is a need to assess the impact of PLAR on farmers' income, yield, productivity and livelihood.

2) Name of technology or technique that resulted or policy influenced

Participatory Learning and Action Research (PLAR)

3) Year of first release or policy implemented (list by country if more than one)

2005-2007: Ghana, Mali, Guinea and the Gambia

2008: Madagascar

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

Number of farmers trained and involved in PLAR per country:
Ghana: 159, Guinea: 202,
Mali: 822, The Gambia: 65

5) Relevant indicators of impact on poverty and/or under nutrition – For a prospective impact assessment case-study

- Poverty (income, expenditure, health, etc..)
- Food security
- Social, economic and institutional outcomes
- Productivity (yield)
- Capital assets (social, human, physical and financial)
- Women empowerment
- Environment

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

Potential outcome framework

7) Relevant data currently available or plans for data to be collected

In sum, 183 PLAR training sessions in the four PADS countries reached 1248 participants (including 761 women). 26 villages were involved in the implementation of the PLAR approach. Key PLAR facilitators were identified in each country to facilitate the process of realizing the PLAR which is based on weekly sessions.

Individual data of farmers which were involved in the PLAR need to be collected and assess the impact of the approach and tools. Somme villages and farmers should be targeted during the impact assessment study of PLAR on farmers yield, income and livelihoods.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

- Antwi Kwaku Dei (2007). Investigating the Socio-Economic and Institutional outcomes of PLAR -IRM in some Inland valley rice producing communities in Ghana. Thesis, M.Sc. thesis, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.
- Kaburi Noella (2008). Investigating the opportunities and mechanism of out- and up-scaling participatory social processes and technical options in lowland rice farming in the upper east region. BSc Thesis. Faculty of Agriculture, University for development studies, Tamale, Ghana
- Seidu Issahaku (2008). Exploring opportunities and mechanisms of out-scaling and up-scaling participatory social learning processes and technical options in low land rice farming in the upper west region of Ghana. BSc Thesis. Faculty of Agriculture, University for development studies, Tamale, Ghana
- Rowley, J., Dugué, M-J. (2010) Effectiveness and appropriateness of PLAR Approach. Sofia Regional Support Programme For Integrated Rural Development (PSSDRI). Report 33 p.

AfricaRice 3

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Since 1996, the Africa Rice Center (AfricaRice) has adopted the Participatory Varietal Selection (PVS) methodology to enable Sub-Saharan African countries to have a quick access to new NERICA other improved rice varieties. Participatory Varietal Selection (PVS) involves farmers early in the varietal creation and testing process. One advantage of this methodology is to shorten the time lapse between varietal development and release to 3 years for PVS when compared to 7 years for conventional breeding. PVS can also be considered as a technology transfer tool that has facilitated the adoption and release of new rice varieties in various countries where the process for introducing new varieties still has many bottlenecks. There is a need to assess the impact of the PVS on varieties adoptions, yield and income in some targeted countries.

2) Name of technology or technique that resulted or policy influenced

Participatory Varietal Selection (PVS)

3) Year of first release or policy implemented (list by country if more than one)

- 1996: Cote d'Ivoire & Guinea:
- 1997: Benin, Ghana, Togo.
- 1998: Burkina Faso, Gambia, Guinea-Bissau, Nigeria, Sierra Leone
- 1999: Cameroun, Chad, Liberia, Mali, Mauritania, Niger, Senegal

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

Dates and numbers of farmers involved:

- 1996-2009 Cote d'Ivoire (550)
- 1997-2009 Benin, Ghana, Guinea, Togo (1402)
- 1998-2009 Burkina Faso, the Gambia, Guinea-Bissau, Nigeria, Sierra Leone (2480)
- 1999-2009: Cameroun, Chad, Liberia, Mali, Mauritania, Niger, Senegal (3840)
- 2000-2009: Other ARI members' countries (6698)

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

- Poverty (income)
- Food security
- Women empowerment
- Adoption of the varieties
- Productivity (yield, acreages)
- Environment

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

Potential outcome framework

7) Relevant data currently available or plans for data to be collected

- More than 30 countries in SSA using PVS approaches for rice varieties introduction
- IFAD WCA, CFC and ARI projects coordinating by AfricaRice have the list of the PVS sites, list of farmers involved, list of varieties evaluated and the list of varieties released
- Number of farmers who adopted the release varieties and the actual area under adoption need to be collected and analyzed.
- Through PVS, 17 upland NERICA varieties have been adopted/released in 19 SSA countries and 20 lowland NERICA varieties have been adopted/released in 12 SSA countries

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

- Avillez Luz Coruche M. P. (2009) The impact of participatory varietal selection on farmers' adoption, productivity and income. A cote d'Ivoire case study. MSc Thesis. School of Oriental and African Studies (University of London).
- Gridley, H. E., Jones, M. P., and Wopereis-Pura, M. (2002),'Development of New Rice for Africa (NERICA) and Participatory Varietal Selection', paper presented at a workshop on Development of the New Rice for Africa (NERICA) and Participatory Varietal Selection, March, WARDA, Bouaké, Côte d'Ivoire.
- Sie, M. et al (2008) Participatory Rice Varietal Selection in rainfed lowland in West Africa with reference to Burkina Faso. In Book: Participatory plant breeding and knowledge management for strengthening rural livelihoods. Edited by Arunachalam. Pp: 41-47

AfricaRice 4

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Africa Rice Center (AfricaRice) has implemented Participatory Learning and Action Research (PLAR) and supported adult learning on inland valley rice development by making use of the knowledge and experiences of farmers and facilitators. Realizing that PLAR can only reach a limited number of farmers, a series of eleven videos on rice seed, crop and post-harvest management and processing have been developed and titled **Rice advice**. The rice advice videos were translated in more than 30 African languages and distributed to more than 33 African. Video shows were organized in many African countries for knowledge and technology dissemination and to improve farmers' knowledge attitude and practices. There is a need to assess the impact of video use rice farming systems and farmers livelihoods.

2) Name of technology or technique that resulted or policy influenced

Using **Rice Advice** videos for knowledge and technology dissemination

3) Year of first release or policy implemented (list by country if more than one)

2007: Ghana, Mali, Guinea and the Gambia

2010: Benin, Uganda, DRC

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)
Number of farmers reached per country:
Benin: 100922, DRC: 5200
Ghana: 230, Guinea: 11747,
Mali: 8020, The Gambia: 2700,
Uganda: 9428

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

- Poverty (income and well-being)
- Food security and nutrition
- Environment
- Gender (women empowerment)
- Productivity
- Economy

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

Potential outcome framework

7) Relevant data currently available or plans for data to be collected
Currently more than 160,000 rice farmers and processors benefited from watching the videos in Benin, Nigeria, Guinea, Sierra Leone, Senegal, Mali, Ghana, The Gambia, Uganda and Ethiopia. While various countries broadcast the rice videos on their national television, they are also used as training and resource material by extension and education institutions. Types of organizations who received the rice videos are available. Names of organization and villages where rice advice videos were shown are available.
For impact assessment analysis, socio economic data on individual farmers are planned to be collected for further appreciation of video impact on their rice farming systems and livelihoods.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study
Video on parboiling rice was already used in Benin to improve the technology and the dissemination of parboiling practices. Following the organization of video shows, three studies were done:
- Zossou, E., Van Mele, P., Vodouhe, S. and Wanvoeke, J. (2009a). The power of video to trigger innovation: rice processing in central Benin. International Journal of Agricultural Sustainability 7(2) 2009, PAGES 119–129
- Zossou, E., Van Mele, P., Vodouhe, S. and Wanvoeke, J. (2009b). Comparing video with workshops to train rural women in improved rice parboiling in Central Benin. Journal of Agricultural Education and Extension, 15: 4, 329 - 339.
- Zossou, E., Van Mele, P., Vodouhe, S.D. and Wanvoeke, J. (2010) Women groups formed in response to public video screenings on rice processing in Benin. International Journal of Agricultural Sustainability 8(4), 271-278.
There is a need to access the impact of rice advice video on farmers farming systems and livelihoods.

Bioversity International

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Since 1999 Bioversity International in partnership with national plant genetic resources programmes and local partners have conducted extensive research on plant genetic resources in home gardens with the intent of improving people livelihoods and maintaining agrobiodiversity. Research activities focused on understanding and documenting the dynamics (historical perspective, structure, composition, utilization and underlying indigenous knowledge systems) of Nepalese home gardens and on developing technologies, approaches and methods for a sustainable management of relevant plant genetic resources in order to improve food security, nutrition and income of poor farmers. This project fostered appropriate policy changes to promote home gardening as a conservation and development strategy.

2) Name of technology or technique that resulted or policy influenced

- Home Garden Conservation Strategy

- Community Biodiversity Management Approach

3) Year of first release or policy implemented

In 2008 the Ministry of Agriculture and Co-operative in Nepal approved the norms for establishing and managing home gardens. Moreover the Ministry issued a circular, titled 'Home Garden Norms' to 16 out of 75 District Agriculture Development Offices as an implementing guideline developed based upon the project results.

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

16 out of 75 districts in Nepal adopted the Home Garden Norms in 2008

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

1) Increased consumption of products grown in home gardens

2) Improved diet diversity as a result of the establishment of home gardens

3) Increased income as a result of the marketing of home garden products

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

7) Relevant data currently available or plans for data to be collected

A stratified random sampling was applied for a number of households in projects sites.
Baseline data currently available comprises information on:

- Ethnic as well as economic composition of the study/project sites
- Composition and diversity of home gardens
- Management activities of home gardens
- Market status of home garden products

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

- Bragdon, S.; Jarvis, D.I.; Gaucham, D.; Mar, I.; Hue, N.N.; Balma, D.; Collado, L.; Latournerie, L.; Sthapit, B.R.; Sadiki, M.; Fadda, C.; Ndungu-Skilton, J.: 2009 "The agricultural biodiversity policy development process: exploring means of policy development to support the on-farm management of crop genetic diversity' International Journal of Biodiversity science and management Vol 5, No.1 pag 10-20
- Sthapit, B.R.; Gauchan, D.; Subedi, A.; Jarvis, D. 2008 On-farm management of agricultural biodiversity in Nepal: lessons learned, Bioversity International
- Smale M., 2206 Valuing crop biodiversity: on farm genetic resources and economic change, Cabi Publishing

CIMMYT 1

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Drought tolerant maize technology development has been one of the main focus areas of CIMMYT and its partners for over a decade. A number of drought tolerant OP and hybrid varieties have already been developed and disseminated along with different components of drought coping capacity enhancing conservation agriculture practices. Despite the enormous achievement in development of the technologies, not much assessment has been done as to what and how much impact (s) the technologies have on the wellbeing of the rural poor maize growers of Africa. Identifying and measuring the impact (s) of the technologies that have been in use would play an important role in increasing the efficiency and effectiveness of the research which is being redesigned for a bigger scope.

2) Name of technology or technique that resulted or policy influenced

OPVs: ZM521, ZM421, ZM523, ZM309, ZM623, ZM721, ZM725, ZM401

Hybrids: Pan53 (Many countries), CAP9001 (many countries), WH403 (Kenya), TanH600 (Tanzania), Pris601 (Zimbabwe), KAM601 and KAM605 (Zambia), LongeH7 (Uganda), PGS61 (Zambia), Arganne (Ethiopia), ZMS737 (Zambia), MH26 (Malawi)

3) Year of first release or policy implemented (list by country if more than one)

(SEE ATTACHED TABLE)

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

(SEE ATTACHED TABLE)

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

- Immediate impact - yield level, yield stability, knowledge of options
- Intermediate -changes in vulnerability to drought and other major agricultural shocks such as price hike/drop, frequency of meal, family labor employment,
- Ultimate - changes in disposable income/ proportion of expenditure on food and medication, housing, literacy, possession of productive assets, household demography and child growth.

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

Quasi-experimental approach will be used with the reasonable assumption of random access to the different maize technologies by the farming communities. As we will be generating a cross-sectional data over a sample population of users and non-users of DT maize technologies, the way to be followed to select a comparison group will be using as a control for each participant a non-participant with the same observed characteristics. As it is unlikely to get comparisons with the same characteristics, the propensity score method will be employed.

7) Relevant data currently available or plans for data to be collected

There are hardly any baseline data which can be used to measure the impact of such technologies given the challenges of attribution, incrementality, and causality. Hence, we are planning to generate data from the same populations of households who were and were not exposed to the technologies. Same set of survey instruments will be employed to generate data from a reasonably representative sample population in the continent.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

La Rovere, R., G. Kostandini, T. Abdoulaye, J. Dixon, W. Mwangi, Z. Guo, and M. Bänziger. 2010. *Potential impact of investments in drought tolerant maize in Africa.* CIMMYT, AddisAbaba, Ethiopia.

(-AND REFERENCES THEREIN!)

CIMMYT 2

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Practicing Conservation Agriculture (CA) in agricultural systems with gravity irrigation, using permanent beds in order to conduct water through depth of furrow, and just to re-form the bed when necessary; using the three components of CA (crop rotation, residue retention, and permanent beds

2) Name of technology or technique that resulted or policy influenced

Permanent raised beds

3) Year of first release or policy implemented (list by country if more than one)

Experimental: started in year 1993

Release: year 2000

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

Bajio: 10,000 ha

Sonora: 2,000 ha

Total: 12,000 ha

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

Reduction of production costs about 20%, depending of the crop.

Saving irrigation water for 20-25%

Additional saving water of 5% due residue retention

Crop diversification, and decrease on the use of fuel

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

7) Relevant data currently available or plans for data to be collected

Database for Sonora and Sinaloa, available using Google Earth (with CA Program).

Database for Bajio with ASOSID (farmers organization around Conservation Agriculture) external to CIMMYT.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Sayre, K. D., Limon-Ortega, A., and Govaerts, B. Experiences with permanent bed planting systems CIMMYT/Mexico. Roth, C. H., Fischer, R. A., and Meisner, C. A. (121), 12-25. 2005. Griffith, Australia, ACIAR. Evaluation and perfomance of permanent raised bed cropping systems in Asia, Australia and Mexico. Proceedings of a workshop held in Griffith, Australia. ACIAR Proceedings 121.

Govaerts, B., Sayre, K.D., Lichter, K., Dendooven, L., and Deckers, J. 2007c. Influence of permanent raised bed planting and residue management on physical and chemical soil quality in rain fed maize/wheat systems. *Plant Soil* 291:39-54.

CIMMYT 3

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

This technology utilizes sensors to establish which if the optimum rate of nitrogen fertilization in wheat. The technology has three components; first is the establishment of a reference strip with a high rate of N application, this is what we call the N rich strip. Second, we measure in the N rich strip and the field that is going to be diagnosed the reflectance of red and infrared light from the canopy to calculate a vegetative index called NDVI (normalized difference vegetative index). Third, we enter the NDVI data from the N rich strip and the field that is being diagnosed into a crop algorithm which was previously developed for a given crop in a given region. The algorithm gives that farmer a recommendation for nitrogen application hi his field.

2) Name of technology or technique that resulted or policy influenced

Sensor based site specific nitrogen management

3) Year of first release or policy implemented (list by country if more than one)

2002-2003 and 2003-2004 validation of the technology in farmer's fields.

2004-2005 begins technology transfer

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

7,363 hectares in Cajeme, Navojoa and Hutabampo (Yaqui and Mayo Valleys).

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

There is no information on poverty or malnutrition. Most of the adopters of the technology are medium to large farmers therefore, impact on poverty or malnutrition is not available. However, there is information on increased income by the adoption of the technology. Savings are of 60 to 70 kgN/ha with the same grain yield.

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

7) Relevant data currently available or plans for data to be collected

There is information on the name of the farmer, location, amount of fertilizer used, grain yields of each fields where the technology has been adopted since 2004-2005. In the first years when the technology was transferred there was information for these four variables under farmers' management and under sensor management. In the more recent years there is only information on the sensor management and the reference strip. There is also general information for the price of wheat and price of fertilizer.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Ortiz-Monasterio, J. I and W. Raun. 2007. Reduced nitrogen and improved farm income for irrigated spring wheat in the Yaqui Valley, Mexico using sensor based nitrogen management. Journal of Agricultural Science 145 (3) 1-8.

CIMMYT 4

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description -

CIMMYT and its partners in the Rice-Wheat Consortium as advocates of conservation agriculture (CA) have been adapting and promoting CA principles in the irrigated Indo-Gangetic Plains of South Asia. The most notable success thus far has minimal soil disturbance for wheat using first generation zero tillage (ZT) seed drills. There is on-going adaptation work to further adapt seed drills and to adapt minimum tillage practices for the subsequent rice crop, as well as address the other CA principles of crop residue management and crop rotation. Due to the partial adoption of this complex crop management package, adoption and impact have been problematic to assess systematically.

2) Name of technology or technique that resulted or policy influenced

Conventional ZT seed drill

Power Tiller Operated Seeder (PTOS) in Bangladesh (2-wheel tractor)

Turbo/Happy Seeder in Punjab (India)

3) Year of first release or policy implemented (list by country if more than one)

Conventional ZT drill: 2000 (popularization)

PTOS (Bangladesh): 1998

Turbo/Happy Seeder: 2007

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

Conventional drill (India): approx. 4.5 million acres; PTOS (Bangladesh): approx. 50,000 acres; Turbo/Happy Seeder: 1800 acres (and expanding rapidly)

5) Relevant indicators of impact on poverty and/or undernutrition

All the aforementioned tractor-based CA-based technologies are found more or less effective in reducing the resource use, enhance yields (timeliness) and facilitate sustainable agriculture. Need to substantiate the reduction in cost of cultivation and yield enhancement and resulting profitability for farmers. Need to assess whether the technologies make production systems less vulnerable (eg less input use) and any changes in labour use pattern in cereal production. Changes in both farmer and labourer livelihood status could be subjected to the study. In addition, the factors - ranging from agronomic to economic and social, and technology related aspects - that pose constraints in small-holder adoption and achieving impact should be examined.

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

7) Relevant data currently available or plans for data to be collected

CIMMYT socio-economist, under Objective 6.2. of CSISA project, will be conducting two case-studies, one on diffusion of reduced tillage technologies in first half of 2011. In addition to this, the baseline surveys are expected to provide some information on the current status of the technology diffusion.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Erenstein, O. and Laxmi, V., 2008, Zero tillage impacts in India's rice-wheat systems: a review. *Soil & Tillage Research*, 100, 1-14.

Hossain M.I., C.A. Meisner, M.A. Sufian, M.H. Rashid and M.R. Amin (2002). Performance of power tiller operated seeder for wheat cultivation. *Bangladesh Journal of Agricultural Research* 27(3): 393-400.

Hossain, Md.I., SUFIAN, M.A., Haque, M.E., Justice, S., Badruzzaman, M., 2006. Development of power tiller operated zero tillage planter for small land holders. Bangladesh Journal of Agricultural Research, 31, 471-484.

Sidhu, H.S., Humphreys, E., Dhillon, S.S., Blackwell, J., and Bector, V., 2007, The Happy Seeder enables direct drilling of wheat into rice stubble. *Australian Journal of Experimental Agriculture* 47(7): 844-854. 2007.

Wohab, M.A., Roy, K.C., Haque, E., Amin, M.N., 2006. Adaptation of minimum tillage seeder as high speed rotary tiller for upland farming. Bangladesh J. Agril. Res., 31, 525-531.

CIMMYT 5

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Developing maize varieties resistant to field pests (stem borers) and storage pests (maize weevil and the Large Grain Borer) through both conventional breeding and genetic engineering within the Insect Resistant Maize for Africa (IRMA) project covering 8 countries (Ethiopia, Kenya, Malawi, Mozambique, Tanzania, Uganda, Zambia, and Zimbabwe)

2) Name of technology or technique that resulted or policy influenced

- Stem borer resistant maize varieties released in 2006-2007
- Same varieties were screened for resistance to LGB and maize weevil with encouraging results

3) Year of first release or policy implemented (list by country if more than one)

Three maize OPVs and six maize hybrids with conventional stem borer resistance were released in Kenya in 2006-2007

International collaborators in China, Indonesia, Mali, Nigeria, Philippines, Peru, Thailand and Vietnam requested and received experimental stem borer resistant maize germplasm for evaluations and use in their breeding in 2006 and 2007

Three hybrids with conventional stem borer resistance were released in Kenya in 2010

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

- Study on impact and level of adoption for new varieties being conceptualized by SEP

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

- Reduced losses due to field and storage pests
- Increased maize productivity and production
- Increased income from maize sales
- Reduced input (chemical usage)
- Reduced period that a household relies on maize purchase in a year

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

7) Relevant data currently available or plans for data to be collected

- Baseline survey of 1850 households in all maize zones in Kenya conducted in 2002
- Data from trials carried out by CIMMYT in Kenya showing percentage crop loss due to stem borers (similar study for Malawi being planned)
- A national household survey of 1500 farmers is being undertaken (mainly on Aflatoxin) in Kenya has is rich in information on losses due to storage pests
- On-farm trials being completed in Kenya and Malawi to measure loss due to maize storage pests

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

- Aflacontrol project by IFPRI and CIMMYT being undertaken in Kenya
- Effective Grain Storage project being funded by SDC-currently in Kenya and Malawi but being expanded (from 2011) to include Zambia and Zimbabwe
- Postharvest studies being undertaken by FAO and Ministry of Agriculture in Malawi on impact of stakeholders' efforts to reduce maize storage losses

CIMMYT 6

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

- Developing maize varieties with high quality protein through conventional breeding within the Quality Protein Maize Dissemination (QPMD) project funded by CIDA in Kenya, Tanzania, Uganda and Ethiopia.

2) Name of technology or technique that resulted or policy influenced

Quality Protein Maize (QPM) with double the amount of lysine and tryptophan, the two essential amino acid found in humans and monogastric animals

3) Year of first release or policy implemented (list by country if more than one)

- One OPV released in Uganda in 2000
- Two hybrids and one OPV released in Tanzania in 2001
- One hybrid released in Ethiopia in 2003
- Two hybrids and one OPV released in Kenya in 2005
- One hybrid released in Tanzania in 2006
- One hybrid released in Uganda in 2008

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

Kenya-1000 ha in 2008

Tanzania-15000 ha in 2008

Uganda-125000 ha in 2008

Ethiopia-9000 ha in 2008

5) Relevant indicators of impact on poverty and/or under nutrition – For a prospective impact assessment case-study

- Improved nutrition (and thus health) of resource-poor farming families
- Improved farm income of resource-poor farming families by developing and facilitating adoption of stress-tolerant QPM cultivars

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

7) Relevant data currently available or plans for data to be collected

- A survey of a total of 962 household undertaken in Tanzania, Uganda and Ethiopia in 2008, and again in 2010 to measure adoption and consumer acceptance

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

- QPM DONATA, a project coordinated by ASARECA and FARA, sponsored by African Development Bank and involving national partners in Kenya, Tanzania, Ethiopia, DR Congo, Uganda

CIP 1

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Both as subsistence and cash crop, potato plays a major role in the predominant agricultural systems of its center of origin in the Andean region of Latin America. In these systems, Late blight (LB) is the major constraint faced by commercial and subsistence farmers, reducing yields due to early loss of photosynthetic area and increasing production costs due to an increase in the number of fungicides applications to control the disease. Climate change has also altered the incidence of LB, with the disease pressure reaching higher altitudes and threatening areas where native potatoes are grown and where very little alternatives exist. The risk of loss of native germplasm and thus of the source of variability for breeding programs is also increasing. CIP, in collaboration with national potato programs, has released several LB resistant varieties in LAC. Area under improved varieties is consistently growing, but there is little information on the ultimate impacts of their adoption on nutrition, health and the food security of rural households of the potato-based systems of the Andes.

2) Name of technology or technique that resulted or policy influenced

Late blight resistant potato varieties

3) Year of first release or policy implemented (list by country if more than one)

In Peru: 1990 (Canchan), 1993 (Amarilis)

In Bolivia: 1995 (Robusta)

In Ecuador: 1995 (INIAP-Fripapa)

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one) In Peru, 39% of the total potato area is under late blight resistant varieties coming from CIP breeding program. In Bolivia, share is 13% and in Ecuador 22%. Total potato area in each country is 260, 135 and 52 thousands has, respectively.

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

Percentage of potato growers under poverty line and extreme poverty, number of days under relative scarcity of food, proportion of income from potato sales, changes on health outcomes, dietary diversity, changes on household intake of potatoes, extent of underweight children, changes in proteins, calcium and vitamin C intake and intra-household distribution

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

Survey data identifying areas and communities with different share of area under improved varieties and including other relevant variables such as access to markets and year in which first adopted improved varieties.

7) Relevant data currently available or plans for data to be collected

Targeting of hotspots with high potato production and under the poverty line is being conducted based on aggregate agricultural census data and national household surveys data, for each of the three countries. Sites falling within defined ranges of potato production and poverty will then be identified to conduct household surveys based on stratified sampling and complemented with information from GIS data to assess asset indexes and relative infrastructure condition. The overall objective of the project is to identify innovation strategies to improve food security in the potato based systems of the Andes. Work planned for 2011-2014.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Thiele, G., G. Hareau, V. Suárez, E. Chujoy, M. Bonierbale and L. Maldonado (2008). Varietal change in potatoes in developing countries and the contribution of the International Potato Center: 1972-2007. International Potato Center (CIP), Lima, Peru. Social Sciences Working Paper Series 2008-6. 46 pp.

Cavatassi R., M. González-Flores, P. Winters, J. Andrade-Piedra, P. Espinosa, and G. Thiele (2009). Linking small-holders to the new agricultural economy. Evaluation of the Platforms Program in Ecuador. FAO, ESA Working Paper. no. 09-06

IMPACT ASSESSMENT CGIAR

IFPRI INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
sustainable solutions for ending hunger and poverty
Supported by the CGIAR

CIP 2

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Late blight (LB) is a major constraint faced by small-scale potato farmers in Sub- Saharan Africa. Annual yield losses due to LB and costs of fungicide use have been estimated in billions of dollars. In addition, the frequent manual application of fungicides with no protective clothing poses a health risk for farmers and their families. CIP, in collaboration with national potato programs in Sub-Saharan Africa, has released several LB resistant varieties. However, the impact that the adoption of these varieties has achieved in the region has not been documented. Researchers have demonstrated capacity to model LB severity geospatially using disease forecast models and geo-referenced weather data. Attempts to estimate the real contribution of LB resistant varieties to offset yield losses due to different levels of LB attack have been thwarted by the inability to incorporate farmers' disease management capacity (fungicide use, IPM) into models. A better modeling of yield losses would result in improved estimates of impact of LB resistant varieties on poverty, health and nutrition outcomes among potato growers in the region. This project proposes a methodology for incorporating LB management capacity of farmers into a geo-referenced disease forecast model and GIS based aggregation and mapping to assess farmer level impacts across different recommendation domains and agro-ecological zones.

2) Name of technology or technique that resulted or policy influenced

Late blight resistant potato varieties.

3) Year of first release or policy implemented (list by country if more than one)

Rwanda in 1989, Kenya in 1998 and Ethiopia in 2000.

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

In Rwanda around 37% of the total potato area is under late blight resistant varieties with CIP attribution. In Ethiopia, Uganda and Kenya this coverage reaches 23%, 18% and 36% respectively.

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

Percentage of potato growers under poverty line, crop yield lost due to late blight, changes in fungicide applications, changes in cost of chemical control, changes on health outcomes due to exposure to pesticides, net increased farm revenue through deployment of LB resistant varieties disaggregated by agroecology and farm size (income level), changes in household food security because of a) income and b) improved quantity and quality of food available

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

Ongoing studies on the adoption of improved potato varieties in Ethiopia, Rwanda, Kenya and Uganda would be one source of building the counterfactual of non adopters of LB resistant varieties

Complementary, on-going CIP projects in these countries targeting to expand the dissemination of LB resistant varieties would allow to design randomized control trials (RCT) where new LB resistant material would be distributed to treatment areas and would also allow the construction of a counterfactual group unexposed to this new varieties. The identification of the RCT areas would also benefit from adoption studies.

7) Relevant data currently available or plans for data to be collected

Data on adoption of LB resistant varieties in the 4 countries would be available by June 2011. With this information the design for a baseline impact survey and the implementation of RCT could be planned for the next main season in 2011) A follow up survey would be planned after 2 years of intervention.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Studies on the adoption of improved potato varieties in Ethiopia (DIIVA), Rwanda (USAID) and Kenya and Uganda (CFC and USAID)

Studies on adoption and impact of improved sweetpotato/beans varieties in Uganda and Rwanda (CIP-CIAT-Virginia Tech, DIIVA)

Studies on adoption and impact of orange fleshed sweetpotato varieties in Uganda and Mozambique (Harvest Plus)

Applications of TOA-MD model in semi-subsistence systems (Kenya & Senegal) and dual purpose sweetpotato (Kenya)

CIP 3

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Potato is an important food and cash crop in many Sub-Saharan countries (ranks second after maize in Kenya). However, farmers obtain yields far below the yield potential due to the limited availability of virus-free seed and diseases like late blight (LB) and bacterial wilt (BW). Research and development institutes have given more attention to find solutions to LB, but recently BW has been recognized as another very important constraint for potato growers and responsible for large yield losses. CIP is working on the dissemination of appropriate control methods for BW that would result in lower yield losses and therefore in higher farm income. Lack of virus free potato seed at affordable prices has also been a major limitation for potato growers. CIP has been proposing to reduce the cost of producing virus-free seed in less field multiplications using aeroponics and specialized seed multipliers. In addition CIP is promoting positive selection as a complementary technology for better managing seed at farm level. The adoption and combination of these two technologies is expected to boost considerably potato yields and farm income and food security.

2) Name of technology or technique that resulted or policy influenced

Affordable virus-free potato seed

Positive selection of potato seed

Control of bacterial wilt (tolerant varieties and crop rotation)

3) Year of first release or policy implemented (list by country if more than one)

Affordable Virus fee seed (since 2007 in Kenya, Uganda and Rwanda)

Positive selection (Kenya 2004; Ethiopia, Uganda & Rwanda 2006)

Control of bacterial wilt (Kenya & Uganda 2003)

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

Virus free potato seed (5% of potato area)

Positive selection (10% of potato area)

Control bacterial wilt (5% of potato area)

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

Percentage of potato growers under poverty line, frequency of purchase of virus free seed, number of seasons using positive selection with own seed, variation of potato productivity due to seed degeneration, length of potato rotation, changes in yield loses due to BW with and without BW tolerant varieties, frequency of potato home consumption, changes in household intake of potatoes, changes in proteins, calcium and vitamin C intake

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

Randomized experiment to measure impacts of best technologies seems to be the most appropriate method. However, the cost and feasibility of this method is downside. An alternative is to use recently developed "parsimonious" technology impact assessment methods. We propose to compare both methods. We would use the data gathered for the baseline survey of RCT to implement a parsimonious impact assessment, using the minimum-data Tradeoff Analysis (TOA-MD) simulation model. We will use the model in an ex post sense to quantify impacts for observed adoption rates, and we will also test its validity by comparing predicted adoption rates and impacts to observed adoption rates and impacts.

7) Relevant data currently available or plans for data to be collected

Data on adoption of improved potato varieties and disease management in the 4 African countries would let us design a set of RCT for measuring the impacts of virus-free seed, positive selection and BW control methods (tolerant varieties and crop rotation). A baseline and a follow up after two years of RCT are expected. Baseline information would also provide the data from heterogeneous populations of farms within statistical strata to parameterize the TOA-MD model. The adoption component of the model would simulate different impact indicators of poverty and malnutrition. A sensitivity analysis would complement the analysis.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Studies on the adoption of improved potato varieties in Ethiopia (DIIVA), Rwanda (USAID) and Kenya and Uganda (CFC and USAID)

Studies on adoption and impact of orange fleshed sweetpotato varieties in Uganda and Mozambique (Harvest Plus)

Applications of TOA-MD model in semi-subsistence systems (Kenya & Senegal) and dual purpose sweetpotato (Kenya)

HarvestPlus

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

HarvestPlus seeks to reduce hidden hunger and provide micronutrients to billions of people directly through the staple foods that they eat. We use a novel process called biofortification to breed higher levels of micronutrients directly into key staple foods. HarvestPlus activities are organized around five main disciplinary programs: 1) Product development – breeding and improvement of crops 2) Nutrition – setting target levels, evaluating nutrient bioavailability, assess nutrient retention and measure nutrient impact on human health 3) Impact and policy – assess consumer acceptance, measure adoption rate, evaluate improvements in various agricultural and health outcomes) 4) Product delivery – promote marketing, adoption and consumption of biofortified staples 5) Communications.

2) Name of technology or technique that resulted or policy influenced

Biofortified staple crops including:

- Provitamin A sweetpotato
- Iron rich beans
- Iron rich pearl millet
- Provitamin A maize
- Provitamin A cassava

3) Year of first release or policy implemented (list by country if more than one)

- Provitamin A sweetpotato – 2007 - Uganda and Mozambique
- Iron rich beans – 2011 - Rwanda
- Iron rich pearl millet – 2011 - India
- Provitamin A maize – 2012 - Zambia
- Provitamin A cassava – 2013 - Nigeria

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

We aim to have 100,000 households adopt and consume biofortified varieties of target crops across four countries (Rwanda, Nigeria, Zambia and India) by the end of 2013.

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

- Number of rural households that adopt/ consume biofortified varieties
- Area allocated to biofortified varieties
- Income from crop sales and costs of crop production (input use)
- Nutrition/biochemical indicators where possible

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

7) Relevant data currently available or plans for data to be collected

Planning baseline data collection in Rwanda, India and Zambia first half of 2011, and in Nigeria second half of 2012.

Planning follow-up data collection in Rwanda, India and Zambia first half of 2013, and in Nigeria second half of 2014

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Alan de Brauw, Patrick Eozenou, Daniel O. Gilligan, Christine Hotz, Neha Kumar, Cornelia Loechl, Scott McNiven, J.V. Meenakshi, Mourad Moursi. Forthcoming. “The Impact of the HarvestPlus Reaching End Users Orange-Fleshed Sweet Potato Project in Mozambique and Uganda”, HarvestPlus Report

ICARDA

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

ICARDA lentil breeding program produced a variety FLIP 89-63L. The new lentil variety was tested in Ethiopia by Debrzeit Research Station, which demonstrated that the new verity is resistant to major lentil diseases and has higher yields and other preferred attributes. The variety soon became popular with farmers who have received seeds and information. The variety was named "Alemaya" and released in Ethiopia in 1997.

2) Name of technology or technique that resulted or policy influenced

Lentil variety Alemaya

3) Year of first release or policy implemented (list by country if more than one)

Ethiopia 1997

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

Ethiopia: adoption estimates made in 2003 varied from 15% to 35% in different districts based on farmers access s to extension information and seeds. Adoption rates are now much higher than that and have expanded to new districts.

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

Income, poverty reduction, human nutritional improvement, environmental: soil nutrition improvement, reduced fertilizer use of following cereal crop.

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

We propose to apply village-CGE model following the approach developed by Dyer and Taylor (2002) to integrate simple individual household models into a micro-regional model. This model permits one to analyze the full distribution of impacts of policies across the local population (Taylor and Yúnez-Naude, 2004).

7) Relevant data currently available or plans for data to be collected

1) Information of the cost of the technology generation and dissemination can be easily from research institutions.
2) Adoption data from earlier surveys that can be used to track the diffusion process are available.
3) Data to be collected include: full household production and consumption, technology adoption, income and anthropometric measurements for children below 5 years.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

1. Aw-Hassan, et . (2009) in William Erskine, Fred J. Muehlbauer, Ashutosh Sarker and Balram Sharma (Editors). CABI. 2009.

2. Erskine, et al (1998), 3. Regassa, S., Dadi, L., Mitiku, D., Fikre, A. and Aw-Hassan, A. (2006) EARO Research Report No. 67.

IFPRI

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

IFPRI has sustained a program of research, capacity building and outreach for the past 25 years in Ethiopia, and which was formalized into a country strategy support program with a small resident staff in 2005. The objective of the case study is to determine what the cumulative impact of this 25 year investment has been on agricultural growth, food security and poverty reduction in Ethiopia.

IFPRI's program in Ethiopia has been very comprehensive and has included work on: Policies for managing droughts and famine; Land tenure security and land reform issues; Policies for the sustainable development of the highlands; Soil and water conservation technologies and practices; Collective action and community management of natural resources; Performance of agricultural markets and marketing institutions, including helping to set up a national commodity exchange; Nutrition programs; Food aid and food security; Gender and poverty; Dynamics of poverty; Smallholder dairying; Returns to public investment in agriculture and the rural sector; Farmer adaptation to climate change; Urbanization; Agricultural development strategy;

Since 2005, IFPRI has, at the request of the Government, provided a coordinated program of support to the national agricultural development strategy, with a small resident team of researchers[1] working within a network of national counterparts, and supported by IFPRI researchers in Washington DC.

2) Name of technology or technique that resulted or policy influenced

Many individual lines of research have impacted on Government and donor policies in Ethiopia, but the key questions are has a) the aggregate impact been larger than the sum of the impacts of the individual parts, and b) given a favorable return to the amounts of money invested. Has this multifaceted program of research, capacity building and dialogue with government led to important synergies that have amplified IFPRI's influence in the country, and led to larger than expected impacts on agricultural growth, food security and poverty reduction?

3) Year of first release or policy implemented (list by country if more than one)

IFPRI's work in Ethiopia began in the early 1980s, but reached a watershed in 2005 when the Government requested that IFPRI place a senior researcher in Addis to lead an Ethiopia Strategy Support Program (ESSP) that would help build national capacity for policy analysis as well as support the government in developing and implementing key planks of its agricultural development strategy. While an impact assessment of the ESSP would be worthwhile, its impact cannot easily be separated from the cumulative impact of IFPRI's much longer research efforts in the country.

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

The policy research extends from household level work on poverty dynamics and risk management in a handful of villages, to helping the government develop its national agricultural strategy with the aid of agricultural sector and economy wide models. It is expected that the impact of this work can be measured at regional and national levels.

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

National and regional time series data on the incidence and depth of poverty, plus panel data from selected villages on poverty and malnutrition at the household level.

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

The basic approach would be first to try and link IFPRI's work to specific policy outcomes, and then to simulate the impact of those policy changes on agricultural growth, food security and poverty using household level models based on panel data and an economy wide model that incorporates a detailed agricultural sector model. The models already exist as an output from IFPRI's research in the country.

7) Relevant data currently available or plans for data to be collected

Existing household panel data from several regions in Ethiopia. National data series and sector and economy-wide models. Interviews with key stakeholders. Ex post impact assessments of some individual research projects, plus an ex post assessment of the ESSP in late 2007.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

IFPRI researchers have published over 300 papers, books and book chapters from their work in Ethiopia. A precise total is difficult to ascertain since many early publications were released at a time when IFPRI did not categorize its output by country.

IITA

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

The research is whether or not developing, testing and promoting technologies throughout the cassava value chain using the agricultural research for development approach (R4D) works and has impact. The R4D approach incorporates into the research process such as breeding and on-farm agronomy the simultaneous development of farmers' groups; extension and technology delivery systems for disease-free planting materials of improved varieties, crop management practices and processing technologies; input and output market; and rural credit. The R4D approach is based on the principle of horizontal and vertical integration of different partners/players through a common platform. This generates synergies among market access, on-farm, productivity and sustainable natural resource management, thereby driving adoption and impact.

2) Name of technology or technique that resulted or policy influenced

Improved cassava varieties plus crop management technologies plus processing technologies plus integrated pest and disease management plus improved extension methodologies plus institutional innovations for supplying clean planting materials of improved varieties and processing equipment and credit and linking farmers to markets.

3) Year of first release or policy implemented (list by country if more than one)

Nigeria: 1995

Ghana: 2000

Togo: 1998

Benin: 1998

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

Nigeria (60 % cassava area planted to improved varieties); Ghana (30 % cassava area planted to improved varieties); Togo (40 % cassava area planted to improved varieties); Benin (50% cassava area planted to improved varieties)

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

Food security: household ability to meet its annual staple food requirements from its own production

Household food consumption expenditure

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

Quasi-experimental methods: Compare outcomes for households that lived in villages exposed to R4D interventions to households that lived in villages without R4D interventions using propensity score matching, differences-in-differences matching, and instrumental variables to control for omitted variables and selection biases.

7) Relevant data currently available or plans for data to be collected

Farm survey data 2009: 630 households in Nigeria and 522 households in Ghana

Farm survey data 2010: 952 households in Nigeria

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Johnson, M.E., Masters, W.A., 2004. Complementary and sequencing of innovations: new varieties and mechanized processing for cassava in West Africa. Economics of Innovation and New Technology 13 (1): 19-31.

Johnson, M.E., Masters, W.A., Preckel, P.V., 2006. Diffusion and spillover of new technology: a heterogeneous-agent model for cassava in West Africa. Agricultural Economics 35 (2): 119-129.

Manyong, V.M., Dixon, A.G.O., Makinde, K.O., Bokanga, M., and Whyte, J., 2000. Impact of IITA-improved germplasm on cassava production in Sub-Saharan Africa. International Institute of Tropical Agriculture, Ibadan.

ILRI

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

IITA, ILRI and partners began doing research on fodder as well as grain quality and yield in the 1980s. Varieties were identified and released in the 1990s. Supporting research on systems and on livestock feeding was also conducted. Emphasis on seed multiplication and dissemination began in 1997.

2) Name of technology or technique that resulted or policy influenced

We are interested in the impact of 2 specific varieties: IT-90K-277-2 and IT-89KD-288 –and also in the effect of the shift in CG breeding strategies on national programs.

3) Year of first release or policy implemented (list by country if more than one)

1992-1997 in Nigeria

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

A study of 462 households in 80 communities in Kano and Jigawa states in 1999-2000 found that that 55% had heard of the varieties, and 41% had adopted. It was planted on an estimated 38% of cowpea area.

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

The welfare measure would be income and assets, disaggregated by gender. We would also measure changes related quantity, quality and value of cowpea production (grain and residue) and livestock productivity.

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

We have detailed household data sets from some areas that we could resurvey to get impacts on adopters and non adopters. We can also collect data in areas where on-farm trials were conducted and where they were not. Other techniques would be used to estimate adoption and impact over the broader recommendation domain (see below).

7) Relevant data currently available or plans for data to be collected

See above. To assess adoption and impact beyond these areas, we would use existing agricultural census data and nationally representative household data sets (eg Nigerian Living Standard Survey 2004–2005, FADAMA surveys, 2009/10) to identify and characterize cowpea regions, and the HarvestChoice-developed V-GET tool to obtain meso-level, gridded estimates of "crop area by variety by year" and related information through expert opinion.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study (not all, only 3 fit!)

Alene, A and V. Manyong, 2006, Farmer-to-farmer diffusion and yield variation among adopters: the case of improved cowpea in northern Nigeria, *Agricultural Economics*, 35: 203-211;

Kristjanson, P., I Okike, S Tarawali,, V Manyong, B Singh, (2002) Genetically improved Dual-Purpose cowpea: assessment of adoption and impact in the Dry Savannah region of West Africa, ILRI Impact assessment series No 9, September 2002 3)

Kristjanson, P et al, 2005, Farmer's perceptions of benefits and factors affecting the adoption of improved dual-purpose cowpea in the dry savannas of Nigeria, *Agricultural Economics*, 32:195-120

IRRI 1

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Rice landraces tolerant of up to 2 weeks of complete submergence were collected from farmers' fields in the 1950s. Success in fine mapping of SUBMERGENCE 1 (SUB1), a robust quantitative trait locus from the submergence tolerant FR13A landrace, has enabled marker-assisted breeding of high-yielding rice capable of enduring transient complete submergence. At the molecular level, SUB1 is a variable polygenic locus encoding two or three ethylene responsive factor (ERF) DNA binding proteins. The induction of SUB1A expression by ethylene during submergence disrupts the elongation escape strategy typical of lowland and deepwater rice, by limiting ethylene-induced gibberellic acid-promoted elongation. Microarray and metabolite studies confirm that SUB1A orchestrates its effects on metabolism and growth in a submergence-dependent manner. Due to the conditional activity of SUB1A, new "Sub1" mega-varieties effectively provide submergence tolerance without apparent ill effect on development, productivity, or grain quality. (quoted from Bailey-Serres, et al., 2010)

2) Name of technology or technique that resulted or policy influenced

Widely grown "mega" varieties are usually intolerant of abiotic stresses such as submergence. The Sub1 gene provides a yield advantage of 1-3 t ha^{-} in all varieties tested following submergence for up to 2 weeks under field conditions.

3) Year of first release or policy implemented.

Swarna-Sub1 was the first variety developed and its extensive testing began in 2006. It was officially released in India in 2009 and in Bangladesh in 2010. IR64-Sub1 was released in the Philippines and Indonesia in 2009. BR11-Sub1 was officially released in Bangladesh in 2010.

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

The expected amount of seed available for 2011 for Sub1 varieties is approximately: India: 35,000 t, Nepal: 320 t, Bangladesh: 2,725 t This is about 38,000 t which could cover about 750,000 ha in the 3 countries in 2011 if most of that seed is actually used to plant a crop. Thus it is possible that we would have 2 million ha or more in 2012.

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

Production loss avoided, retransplanting costs avoided, intensification enabled through reduced risk, economic surplus due to supply shift, benefits to producers below specific poverty lines, benefits to consumers below specific poverty lines, additional calories available for subsistence net rice purchasing households, food security effects of expenditure reductions for consumers below specific poverty lines, multiplier effects of benefits generated.

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

Interviews with IRRI and partner scientists to identify likely delay to identification of the Sub1 gene without the existing project that did so.

7) Relevant data currently available or plans for data to be collected

2011-2012, data to be collected on Sub1 seed production and multiplication in India and Bangladesh, remote sensing of Swarna-Sub1 diffusion (experimental piloting), ,2012 survey of on farm benefits of adoption in South Asia, remote sensing of submergence affected areas ongoing.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Baseline survey conducted of stress prone environments of South and Southeast Asia in 2008-2009, with data compiled and cleaned in 2010. PVS data on farm varietal performance collected during 2009 and 2010.

IRRI 2

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Laser land leveling has been practiced in developed country agriculture for around three decades. However, appropriate research to extend laser land leveling to small-scale tropical agriculture has been much more recent, and has been largely spearheaded by IRRI-NARS collaborative efforts. This technology was first developed and evaluated in Cambodia in 1997 by IRRI by designing and constructing the leveling bucket and setting up and field proofing all of the laser control components supplied by Laser Precision. This technology was then transferred to Thailand by IRRI in 1999 where IRRI supplied the drawings and oversaw the development of the "bucket" and set up the necessary laser control systems. In 2001 IRRI, under the aegis of the Rice Wheat Consortium, introduced the technology to India where it worked with a local machinery manufacturers (Berri Industries) in a factory at Karnal and built leveling buckets in their workshops. Since then, laser leveling has taken off in northwestern India and Pakistan (Rickman, pers comm.)

2) Name of technology or technique that resulted or policy influenced

Locally adapted, produced and promoted tractor drawn laser levelers

3) Year of first release or policy implemented (list by country if more than one).

Late 1990s – early 2000s

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

Current use estimates are (Ladha, pers comm..):

India: 7500 units

Pakistan: 4500 units
Nepal: 1 unit
Bangladesh: 3 unit

Each unit can cover 170-190ha/yr, given prevalent cropping calendars. Assuming 70% utilization, this implies 1.4 million ha under LLL

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

Reduction of water use, enablement of expanded irrigated area, increase in germination, improvement in yield, reduction of unit cost of production, increase in employment in leveling services, economic surplus benefits, benefits to consumers under a given poverty line, benefits to producers under a given poverty line, food security effects of expenditure reductions for consumers below specific poverty lines, multiplier effects of benefits generated.

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

Interviews with IRRI and partner scientists to identify likely delay to introduction of laser land leveling by the private sector without the adaptive IRRI-partner research.

7) Relevant data currently available or plans for data to be collected

2011-2012 plans for a case study by CIMMYT on the effects of LLL on water use, baseline survey for Cereal Systems Initiative for South Asia

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Unfortunately, there was not sufficient time for a literature review, but various agronomic and farm profitability studies have been conducted on LLL for different crops.

IWMI 1

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

About a 100 districts that cuts across Central India are home to about 55 million tribal people that account for nearly 70% of the tribal population of India. Despite favorable resource conditions rich vegetation and good rainfall this belt has one of the highest concentrations of rural poverty in the world. The tribal people live in forests and engage in hunting and gathering for their livelihoods. With population pressures and resource constraints the traditional livelihoods systems are no longer viable forcing them to migrate often under distress to derive incomes. from migration often under distress. Moreover, these areas have been overlooked by government investments in irrigation and other infrastructure developments, agriculture development programs and also social services. In 2002 the IWMI Tata Policy program (ITP) in collaboration with two NGOs Satguru Foundation and PRADAN initiated the Central India Initiative (CInI). The program involved applied research and development aimed introducing a package of innovative small scale locally appropriate land and water management interventions and institutional strengthening programs to promote agriculture development and improve the living standards of the tribal population in four distinct socio-ecologies in the region.

2) Name of technology or technique that resulted or policy influenced

The Central India Initiative (CInI) involved a package of interventions which included the following:

a) Diversion based irrigation from streams and rivulets

b) Lift Irrigation from low cost diesel and treadle pumps.

c) Homestead development through agro-horticulture-forestry systems (WADI system)

e) Watershed development by constructing check dams and other groundwater recharge structures.

f) Kharif Paddy stabilization through SRI method of Rice cultivation

g) Institutional and capacity building of community based organizations.

h) Micro finance and livelihood enhancement

3) Year of first release or policy implemented (list by country if more than one)

The CInI program was initiated in 2002.

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

The initiative focused on the Central Indian tribal homelands across 130 districts falling in the 9 states of Rajasthan, Andhra Pradesh, Gujarat, Maharashtra, Madhya Pradesh, Chhatisgarh, Orissa, Jharkhand and West Bengal. The projects are being implemented by NGOs involved in improving the livelihoods and quality of life of about 400,000 tribal families.

The CInI initiative now functions as an independent NGO known as Collectives for Integrated Livelihood Initiatives which is dedicated to improve the livelihoods of the tribal families.

5) Relevant indicators of impact on poverty and/or under nutrition – For a prospective impact assessment case-study

a) Household incomes b) Infant mortality c) maternal mortality d) under-nourishment of children under 5 years e) standard of housing f) incidence of diarrheal diseases g) access to clean water h) school attendance of children i) participation in CBO j) number of female headed households k) distress migration

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

CInI interventions have been implemented in 100 of the 130 districts. The counter factual situation can be compared with the districts/households which have not been involved in the initiative.

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

IWMI 2

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description – In the 1960's, in their enthusiasm to promote energy and groundwater use in agriculture, many Indian states began offering subsidies on farm power used to pump groundwater. Some leaders declared free power to farmers; others removed meters and offered subsidized flat tariff unrelated to consumption. This created a groundwater economy that bled electricity boards and depleted aquifers. Now, many states are trying hard to wriggle out of the mess. The text-book solution offered has been to reinstall meters and charge farmers consumption-based power tariff. But Chief Ministers realized that trying this would be committing political hara-kiri. IWMI suggested a second-best alternative with three components:[a] undertake intelligent and tamper-proof rationing of farm power supply; [b] provide farm power on a reliable schedule; [c] provide the power-ration at 420-440 voltage and with minimum interruptions.

Government of Gujarat worked these suggestions fully into their *Jyotigram Scheme* which invested US $ 245 million in rewiring the country-side so that farm power could be rationed, while non-farm rural consumers could get 24*7 power supply. An IWMI assessment of impact found all round benefits but noted that marginal and tenant farmers who depended on purchased groundwater irrigation were hit hard as water prices shot up. GoG responded by allocating 200,000 new farm connections exclusively to the poor, who have now emerged as aggressive, competitive water sellers to their poor neighbors. Though second-best , the Gujarat solution is the best feasible compromise between social equity and environmental sustainability.

2) Name of technology or technique that resulted or policy influenced

Govt. of Gujarat's *Jyotigram* Scheme under which tubewells were attached to an exclusive feeder.

3) Year of first release or policy implemented (list by country if more than one)

2003, Gujarat

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

18000 villages, some 3.5 million ha of net irrigated land; 800,000 electrified tubewells; some 35 million people's lives bettered

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study
[a] quality of power supply to all users in villages
[b] depth and breadth of pump irrigation service markets
[c] terms of water sale to marginal and tenant farmers
[d] difference between cropping patterns, cropping intensities, and land and water productivity of tubewell owners and water buyers

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

The core hypothesis is that tubewell owners subject to subsidized but rationed power supply are anxious to use their power ration to the full, and in the process create a buyers' water market highly beneficial to the poor of Gujarat. One counter-factual might be West Bengal which provides farmers 24*7 power supply charged on the basis of metered consumption. Such tubewell owners should be reluctant water sellers, and tenant farmers dependent on them for irrigation service would face high price and poor service.

7) Relevant data currently available or plans for data to be collected

Some indicative and anecdotal evidence available; also available is some data from Aditi Mukherji's doctoral work in West Bengal. Some preliminary student research too is underway.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Shah, T., Scott, C.; Kishore, A. and Sharma, A. 2004. *Energy-Irrigation Nexus in South Asia: Improving Groundwater Conservation and Power Sector Viability.* Colombo, Sri Lanka: International Water Management Institute Research Report # 70

Shah, T. and Verma, S. 2008. Co-management of Electricity and Groundwater: An Assessment of Gujarat's Jyotirgram Scheme. *Economic and Political Weekly,* Vol.43(7): 59-66

Shah, T., Bhatt, S., Shah, R.K. and Talati, J. 2008. Groundwater Governance through Electricity Supply Management: Assessing an Innovative Intervention in Gujarat, western India. *Agricultural Water Management* 95(11):1233-1242

IWMI 3

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Integrated Water Resources Management in the Ferghana Valley (IWRM-FV) is an action research project by IWMI and its regional partner (SIC-ICWC), to influence policy level and comprehensively reform local water management in three countries of Central Asia - Kyrgyzstan, Tajikistan and Uzbekistan - in line with the widely promoted IWRM paradigm. With ongoing transitional reforms in full sway in the region the project has been developing and implementing a comprehensive package of IWRM-based reforms on three pilot main canals – one per each project country. As effective water management is the main outcome-based objective through which the project strives to contribute to enhancing rural livelihoods/poverty reduction there are three key drivers that the project uses to bring about required change. These are hydrographisation of water management units, user participation in water governance and capacity building. Using a systemic approach, bottom-up processes and users-centered participatory institutional arrangements (such as water user groups, water users associations and canal water committees) these principles have been consistently promoted, put in place, integrated and strengthened both within and across different water management levels from farmer fields up to the entire basin catchments.

2) Name of technology or technique that resulted or policy influenced

A comprehensive water management reform package for three Central Asian countries based on IWRM paradigm involving all operational water management levels within selected pilot sub-basin catchments (of the Syr-Darya river)

3) Year of first release or policy implemented (list by country if more than one)

Since 2002 in three countries of Central Asia - Kyrgyzstan, Tajikistan and Uzbekistan

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

Kyrgyzstan – 20,000 ha

Tajikistan - 15,000 ha

Uzbekistan – 108,000 ha

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

As poverty is a multi-dimensional concept and has to do with a whole range of wellbeing deprivation factors such as those related to health, education, employment, income generation, empowerment, etc., the pertinent developmental impacts that can be attributed in one way or another to the proposed project intervention technology would be through the achievement of more effective, equitable and environmentally responsible water management, if any. Thus the pertinent impact indicators would be those that effectively measure a range of water management performance dimensions with relation to the irrigated agricultural system as a whole. Thus, impact assessment of the project in question should be able to look into a range of performance measures to denote an overall effectiveness of water service provision with regard to water delivery (e.g. adequacy, timeliness, equity), infrastructure maintenance, irrigation staff qualities, dispute incidence, users' willingness to pay for water services, crop productivity, users' satisfaction with services and their household's wellbeing. Most importantly all such measures are to be taken for two most extreme locations along an irrigation system – those in the upstream and those in the downstream. This allows arriving at differences and comparisons between these two extreme locations across all impact measures. All such indicators can be based on both real physical data, if and when available, and/or perceptive judgments by the project beneficiaries as to what extent they feel those performances were effective or not.

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

As purely experimental design involving randomly assigned treatment and comparison groups (i.e. those from the project and non-project areas) are hardly applicable in the context of this particular project as well as in the context of most other development projects due to real world settings, the design proposed here is quasi-experimental aiming to produce as unbiased estimates of project impacts as possible through comparisons with non-project areas. As baseline surveys were never conducted for the project areas (let alone non-project areas), determining counterfactuals represents a key concern for the proposed study. With this in mind comparison groups are formed from the non-project areas and settings that are similar on most features expect those representing the project intervention technology. In addition, a propensity score matching technique can be also applied to those sampled in order to minimize selection bias.

7) Relevant data currently available or plans for data to be collected

Survey data for the year 2009 based on the responses of a random sample of 516 farmers from project and non-project areas were collected, analyzed and presented as an impact study report. Other background data to support and inform the study included an overview on each study canal, rosters of all primary water users (WUAs) for each study canal as sampling frames for random selection of WUAs; farmer rosters for each individual WUA along each study canal as sampling frames for selection of respondents; background information on all WUAs along each study canal regarding their physical, technical, demographic, water use, crop production and governance features for a number of years. Also planned if additional money is available, to try to collect real physical data, in addition to farmers' perception of project impacts, for more objective measurements and conclusions. This would allow installing water measuring devices at field locations of all randomly sampled and surveyed 516 farmers and ask them or hire somebody to record and provide data on all inputs including water, costs and crop yields for better reality check.

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

SIC-ICWC & IWMI (2009). Annual Progress Report (January-December 2009). IWRM-Ferghana Project Report: Tashkent.
Yakubov, M. (2009). Project's Impact Assessment Framework and Design. IWRM-Ferghana Project Report. IWMI-Central Asia: Tashkent
Yakubov M. (2010). The 2009 Impact Assessment Study. IWRM-Ferghana Project report. IWMI-Central Asia: Tashkent

World Agroforestry Centre

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed
Inadequate protein reduces milk production and forces many farmers to spend scarce cash on commercial dairy meal supplements. Collaborative research on fodder shrubs with national partners and farmers in the 1990s resulted in recommended species, planting arrangements and feeding strategies. Farmers produce seedlings of *Calliandra calothyrsus* and six other species in nurseries; the shrubs are planted in hedges along field and farm boundaries, on contour bunds, and intercropped with Napier grass**.** Within a year of planting, shrubs are ready to be pruned for feeding livestock. Most farmers cut them at a height of about 1m to ensure that they do not shade adjacent crops. A farmer needs about 500 shrubs to feed a cow throughout the year at a rate of 2 kg of dry (6 kg of fresh) matter per day, increasing milk production by roughly 0.7 to 1.4 litres per day, and annual incomes by about $62 to $122/household/year.

2) Name of technology or technique that resulted or policy influenced

Fodder shrubs

3) Year of first release or policy implemented (list by country if more than one)

Widespread planting began in 1995 in Kenya, Uganda, Rwanda, and northern Tanzania

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

Last reasonably accurate estimate was made in 2005: 206,000 farmers planting fodder shrubs across Kenya, Uganda, Rwanda and northern Tanzania. Numbers are presently much higher.

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

Increased income from milk produced (for either sale or home consumption)

Reduced expenditures on purchased concentrate feed

Increased availability of high protein fodder in dry season leading to any of the above.

Improved health of animal and reduced risk of animal illness or death

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

Farmers in same areas with same attributes (income levels, numbers, breeds and quality of livestock, etc.) but not using fodder shrubs

7) Relevant data currently available or plans for data to be collected

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Place, F., Rootheart, R., Maina, L., Franzel, S. Sinja, J., and Wanjiku. 2009 The impact of fodder trees on milk production and income among smallholder dairy farmers in East Africa and the role of research ICRAF Occasional Paper No. 12: World Agroforestry Centre.

Franzel, S., Wambugu, C., Arimi, H. and Stewart, J. 2008. Fodder shrubs for improving livestock productivity and sustainable land management in East Africa. In: World Bank, Sustainable Land Management Sourcebook. Agriculture and Rural Development Department, Washington DC pp. 88-94.

WorldFish Centre

Case-study information: Details about specific technologies, techniques or policies for small group work

1) Brief Description - Describe the research behind the technology, technique or policy for which an impact is proposed

Integrated agriculture-aquaculture technologies including improved seed (fry), feed, and management practices introduced into privately owned or group common property managed ponds, mono- and poly-culture, specifically targeted at small farmer settings. Systems focus stresses resource sharing between agriculture production and pond production.

2) Name of technology or technique that resulted or policy influenced

Integrated agriculture-aquaculture (IAA)

3) Year of first release or policy implemented (list by country if more than one)

Malawi: early 1990's
Bangladesh: late 1980s
Other countries could be included depending on data availability: Philippines …

4) Estimate of area under adoption or scale over which policy applies (list by country if more than one)

Malawi: ~5,000 ha of ponds

Bangladesh: ~276,000 ha of ponds

5) Relevant indicators of impact on poverty and/or undernutrition – For a prospective impact assessment case-study

Improved farm income of IAA producing families, aquaculture is an additional farm enterprise. Some are entirely within the farm, some utilize shared non-individually owned water resources.

Improved nutritional status of IAA producing families, in numerous countries fish comprises the biggest source of animal protein in the diet.

6) Proposed method for constructing a counterfactual – Optional at this stage. This is the focus of the workshop brainstorming

For comparisons of improved farm income, non-adopting households in same villages.

Fish from IAA, are very locally marketed, especially in Malawi. Thus non-adopting neighbors in a village with IAA producers would have local market access to fish. A counterfactual could be households in villages without aquaculture or market access to capture fisheries.

7) Relevant data currently available or plans for data to be collected

Farm-level survey data from Malawi 2004 survey of 315 respondents (166 adopters and 149 nonadopters) and Bangladesh panel data of 260 project and 126 control farmers who were monitored 2002/3 to 2005/6. (WorldFish surveys). There are numerous additional aquaculture and nutrition surveys (several with very large sample sizes) for Bangladesh from various research contracts.

Bangladesh food-consumption surveys, laboratory analyses of commonly consumed fish species (see Roos citation below)

Secondary data set from WB second Malawi Integrated Household Survey 2005 (see IFPRI study below)

8) List all relevant studies related to this technology that could be drawn on to inform a new case-study

Kumar, N. and A. Quisumbing, Access, Adoption, and Diffusion Understanding the Long-term Impacts of Improved Vegetable and Fish Technologies in Bangladesh IFPRI Discussion Paper 00995 June 2010

Dey et al. The impact of integrated aquaculture–agriculture on small-scale farms in Southern Malawi Agricultural Economics 41 (2010) 67–79

Khondker Murshed –e- Jahan, K and D. Pemsl. The impact of Integrated Aquaculture Agriculture on small-scale farm sustainability and farmers' livelihoods: Experience from Bangladesh (submitted to Agricultural Systems).

Asian Development Bank. Special Evaluation Study on Small-Scale Freshwater Rural Aquaculture Development for Poverty Reduction. Operations Evaluations Department SS-59. 2004 (reviews ADB investments in Bangladesh).

Ecker, o. and M. Qaim. Analyzing Nutritional Impacts of Policies: An Empirical Study for Malawi. IFPRI Discussion Paper 01017. August 2010. (includes demand elasticities for food baskets including fish).

Roos et al. Linking human nutrition and fisheries: incorporating micronutrient-dense, small indigenous fish species in carp polyculture production in Bangladesh. Food Nutr Bull. 2007 Jun;28(2 Suppl):S280-93.