

# Fact Sheet • TECHNOLOGY ASSESSMENT STUDIES

▸ FOOD SECURITY II COOPERATIVE AGREEMENT-DEPARTMENT OF AGRICULTURAL ECONOMICS, MSU ◀  
▸ ACTIVITY TIME PERIOD: OCTOBER 1, 1992- SEPTEMBER 31, 1995<sup>1</sup>

## 1. Cooperating Institutions

Agency for International Development, Africa Bureau, Office of Sustainable Development, Productive Sectors, Growth and Environment Division, Technology Development and Transfer Unit (AFR/SD/PSGE/TDT)

Agency for International Development, Global Bureau, Economic Growth Center, Office of Agriculture and Food Security (G/EG/AFS)

International Service for National Agricultural Research (ISNAR)

Southern African Center for Cooperation in Agricultural Research and Training (SACCAR)

Department of Agricultural Economics, Michigan State University (MSU)

USAID Missions and Host Country Collaborating Institutions:

USAID/Yaoundé

- *Institut de Recherches Agronomiques (IRA)*
- National Cereal Research and Extension Project (NCRE)
- Purdue University Bean/Cowpea CRSP Team
- Bean/Cowpea CRSP Management Office at Michigan State University

USAID/Nairobi

- Kenya Agricultural Research Institute (KARI)
- University of Nairobi, *Institute for Development Studies (IDS)*

USAID/Lilongwe

USAID/Bamako

- *Institut d'Economie Rurale, Département de Planification et Economie Rurale (IER/DPAER)*

USAID/Niamey

- *Institut National de la Recherche Agronomique du Niger (INRAN)*

USAID/Kampala

- Makerere University, Faculty of Agriculture and Forestry (MUFAF)
- Ministry of Agriculture, Animal Industries and Fisheries (MOAAIF)
- Manpower for Agricultural Development Project (MFAD)

USAID/Lusaka

- Ministry of Agriculture, Food and Fisheries (MOAFF)
- Rural Development Studies Bureau (RDSB), University of Zambia

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<sup>1</sup> Version of Fact Sheet: May 1994

## 2. Researchers Involved

**ARTS/FARA/TDT:** Jeff Hill

**G/EG/EID/RAD:** Gloria Steele

**Host Country and MSU In-Country Researchers:**

Cameroon: Georges Dimithé, (IRA); James Sterns (MSU In-Country Researcher)

Kenya: Daniel Karanja, (KARI/MSU In-Country Researcher), David Makanda (MSU/IDS In-Country Researcher), Valentina Mazzucato (MSU/ISNAR)

Malawi: James Oehmke

Mali: Dr. Bino Témé, Amadou Diarra, Sidi Diallo, Mme. Boré Assa Kante, (IER/DPER); Duncan Boughton and Bruno Henry de Frahan (MSU In-Country Researchers); Bakary S. Coulibaly, and professional staff of the "Commodity Subsector Economics Program" of IER, and commodity specialists of IER

Niger: Samba Ly, (INRAN); Valentina Mazzucato (ISNAR and MSU In-Country Researcher)

Uganda: Bernard Bashaasha, Elizabeth Balirwa, Godfrey Turiho-Habwe (MUFAF); Rita Laker-Ojok (MSU In-Country Researcher)

Zambia: George M. Chitalu, (RDSB), Sylvester M. Kalonge (MOAFF); Julie Howard (MSU In-Country Researcher)

**MSU Campus Backstop:** Jim Oehmke, Eric Crawford, Richard Bernsten, Jim Shaffer, John Staatz, Carl Eicher, Duncan Boughton, and Michael Weber

**ISNAR:** Dr. Philip Pardey

## 3. Objectives of the Research

The Development Fund for Africa (DFA) has a target of assisting African Countries to achieve sustained increases in agricultural productivity, in part through the increased utilization of higher yielding technologies, in order to increase the agricultural sector's contribution to economic growth. As part of its focus on enhancing food access and income growth, the FS II Cooperative Agreement has a priority applied research theme of studying ways to design more cost-effective food systems, and related technologies and institutions. To help inform these DFA and FS II objectives, the technology assessment research focuses on: (1) Critically reviewing the literature on *ex post* and *ex ante* evaluation of agricultural research with emphasis on implications for Africa and methodologies applicable to Africa; (2) Assessing the potential for application of current methodologies to evaluate African agricultural research; (3) Collaborating with staff of AFR/ARTS/FARA/TDT to design studies in selected African countries on the impacts of investment in agricultural research; (4) Determining factors that contributed to or inhibited research impact; and (5) Undertaking other selected activities to evaluate the effects of alternative investments in agricultural research.

#### **4. Research Approach**

Following the review of literature and a workshop to discuss methods of choosing and undertaking the country studies, three countries (Kenya, Malawi, Mali) were chosen for Phase I studies, and four other countries (Cameroon, Niger, Uganda, Zambia) were chosen for Phase II studies. Short-term studies (five months or less) were conducted in Cameroon, Kenya (maize), Malawi, and Niger; long-term studies (twelve months or more) were conducted in Kenya (wheat), Mali, Uganda, and Zambia.

#### **5. Outputs to Date**

##### **5.1. Written Outputs on Technology Assessment Topics**

- **Reports**

Howard, Julie, with George Chitalu and Sylvester Kalonge. "The Impact of Investments in Maize Research and Dissemination in Zambia. Part I: Main Report." International Development Working Paper No. 39/1. East Lansing, MI: Department of Agricultural Economics, Michigan State University. 1993. PN-ABS-724.

Howard, Julie, with George Chitalu and Sylvester Kalonge. "The Impact of Investments in Maize Research and Dissemination in Zambia. Part II: Annexes." International Development Working Paper No. 39/2. East Lansing, MI: Department of Agricultural Economics, Michigan State University. 1993. PN-ABS-727.

Laker-Ojok, Rita. "The Rate of Return to Agricultural Research in Uganda: The Case of Oilseeds and Maize." East Lansing, MI: Department of Agricultural Economics, Michigan State University. 1993. PN-ABS-730.

Laker-Ojok, Rita. Potential Returns to Oilseeds Research in Uganda: The Case of Groundnuts and Sesame." East Lansing, MI: Department of Agricultural Economics, Michigan State University. 1993.

Oehmke, James F. and Eric W. Crawford. "The Impact of Agricultural Technology in Sub-Saharan Africa: A Synthesis of Symposium Findings." International Development Paper No. 14. PN-ABP-321. (French version No. 14F). East Lansing, MI: Department of Agricultural Economics, Michigan State University. 1993. PN-ABQ-056.

Sterns, J. A. and R. Bernsten. "Assessing the Impact of Cowpea and Sorghum Research and Extension in Northern Cameroon." Department of Agricultural Economics, Michigan State University, East Lansing, MI. 1993. PN-ABS-731.

Boughton, Duncan and Henry de Frahan, Bruno. "Agricultural Research Impact Assessment: The Case of Maize Technology Adoption in Southern Mali." Department of Agricultural Economics, Michigan State University, East Lansing, MI. 1992. PN-ABS-729.

Mazzucato, Valentina and Samba Ly. "An Economic Analysis of Research and Technology Transfer of Millet, Sorghum, and Cowpeas in Niger." The Hague, Netherlands: ISNAR/Michigan State University, East Lansing, MI. 1992.

- **Working Papers**

- **General:**

Crawford, Eric W. "Constraints to the Development and Use of Improved Technology." MSU Staff Paper No. 93-64. Department of Agricultural Economics, MSU. 1993.

Crawford, Eric W. "Assessment of the Economic Impact of Agricultural Research: Summary of Studies Conducted by Michigan State University." MSU Staff Paper No. 93-66. Department of Agricultural Economics, MSU. 1993. PN-ABS-777. (Also available in French. PN-ABS-778.)

Bernsten, Richard H. and John M. Staatz. "The Role of Subsector Analysis in Setting Research Priorities." Paper presented at the Symposium on the Impact of Technology on Agricultural Transformation in Africa, Washington, D.C., October 14-16, 1992. MSU Staff Paper No. 92-104. Department of Agricultural Economics, MSU. PN-ABS-772.

Oehmke, James F. "Technology, Impact and Agricultural Transformation: Lessons Learned from Impact Assessments." Paper presented at the Symposium on the Impact of Technology on Agricultural Transformation in Africa, Washington, D.C., October 14-16, 1992. PN-ABT-274.

Choe, Y. C. and J. F. Oehmke. "Dynamic Analysis of Returns to Research I: A Time Series Methodology." MSU Staff Paper No. 92-54. Department of Agricultural Economics, MSU. 1991. PN-ABS-767.

Choe, Y. C. and J. F. Oehmke. "Dynamic Analysis of Returns to Research II: An Application to Kenyan Maize." MSU Staff Paper No. 92-55. Department of Agricultural Economics, MSU. 1991. PN-ABS-768.

Kangasniemi, J. and B. Kupfuma. "Minutes: Technology Assessment Workshop, June 17-21, 1991, Michigan State University, Department of Agricultural Economics." Department of Agricultural Economics, MSU. 1991. PN-ABT-268.

Daniels, Lisa, et al. "Assessment of Agricultural Research: Ex-Post, Ex-Ante, and Needed Methodologies." Paper presented at AID/Washington Africa Bureau (TR/ARD) sponsored workshop on returns to investment in agricultural research, April 24-25, 1990, Washington, D.C.

Daniels, Lisa, et al. "The Impact of Agricultural Research: A Review of the Ex-Post Assessment Literature With Implications For Africa." East Lansing: Michigan State University, Department of Agricultural Economics, 1990. PN-ABS-958.

Oehmke, James F. and James A. Sterns. "Assessing Returns to Research: Implications for Sub-Saharan Africa." MSU Staff Paper No. 92-43. 1992.

Oehmke, James F. and Ruben G. Echeverria. "Sequential Evaluation of Agricultural Research: Foundations, Indicators and Use." MSU Staff Paper No. 90-40. Department of Agricultural Economics, MSU 1990. PN-ABS-762.

**Cameroon:**

Sterns, James A. and Richard Bernsten. "Assessing the Impact of Cowpea and Sorghum Research and Extension: Lessons Learned in Northern Cameroon." (Revised version) Department of Agricultural Economics, Michigan State University, East Lansing, MI. 1993.

Sterns, James A. and Richard Bernsten. "Assessing the Impact of Cowpea Research and Extension in Northern Cameroon: Lessons Learned." Proceedings of the Symposium on the Impact of Technology on Agricultural Transformation in Africa, Washington D.C., October 14-16, 1992. PN-ABT-284.

**Kenya:**

Choe, Y. C. and James F. Oehmke. "Dynamic Analysis of Returns to Research II: An Application to Kenyan Maize." MSU Staff Paper No. 92-55. 1992. PN-ABS-768.

Karanja, Daniel. "The Payoff to Maize Research in Kenya: An Institutional and Economic Analysis." Working Paper, Department of Agricultural Economics, Michigan State University, March 1992.

Karanja, Daniel. "Wheat Research in Kenya: The Challenge Ahead." Department of Agricultural Economics, MSU. 1992.

Makau, Boniface P. "The History of Wheat Research in Kenya." Nairobi, 1991. PN-ABT-269.

**Malawi:**

Oehmke, J. F. "Assessing the Impacts of Malawian Maize Research." Department of Agricultural Economics, MSU. 1991.

**Mali:**

Boughton, Duncan. "The Impact of Maize Research in Mali." Paper presented at the Symposium on the Impact of Technology on Agricultural Transformation in Africa, Washington, D.C., October 14-16, 1992.

Staatz, John M. "The Role of Market Conditions in Influencing the Adoption of New Agricultural Technologies in Mali." Department of Agricultural Economics, MSU, East Lansing, MI. 1989. PN-ABS-761.

**Niger:**

Mazzucato, Valentina and Samba Ly. "An Economic Analysis of Research and Technology Transfer of Millet, Sorghum and Cowpeas in Niger: Issues Raised." Paper presented at the Symposium on the Impact of Technology on Agricultural Transformation in Africa, Washington, D.C., October 14-16, 1992. PN-ABT-283.

**Uganda:**

Laker-Ojok, Rita. "The Rate of Return to Agricultural Research in Uganda: The Case of Oilseeds and Maize." Department of Agricultural Economics, Michigan State University, November 1992. PN-ABS-730.

Laker-Ojok, Rita. "The Impact of USAID Supported Research on Maize and Oilseeds in Uganda." Paper presented at the Symposium on the Impact of Technology on Agricultural Transformation in Africa, Washington, D.C., October 14-16, 1992. PN-ABT-282.

Balirwa, Elizabeth. "Maize Research and Production in Uganda." July 1992.

Laker-Ojok, Rita. "A Preliminary Assessment of the On-Farm Research Into Maize, Soybeans and Sunflower in Uganda Which Was Sponsored by USAID Under the MFAD Project." July 1992.

Turiho-Habwe, Godfrey. "The Accomplishments and Constraints of Sunflower Research in Uganda." July 1992. PN-ABT-275.

Bashaasha, Bernard. "Soybean Research in Uganda." June 1992. PN-ABT-271.

**Zambia:**

Howard, Julie, George Chitalu, and Sylvester Kalonge. "The Impact of Investments in Maize Research and Dissemination in Zambia: Preliminary Results." Paper presented at the Symposium on the Impact of Technology on Agricultural Transformation in Africa, Washington, D.C., October 14-16, 1992. PN-ABT-285.

Howard, Julie. "The Impact of Maize Research in Zambia: Methodology and Preliminary Results." Paper presented at the SADCC/ICRISAT Sorghum and Millet Improvement Program Research Planning Meetings, September 21-26, 1992, Bulawayo, Zimbabwe. PN-ABT-279.

- **Theses**

Makanda, David. "Research and Policy Impacts on the Kenyan Wheat Sector." Ph.D. dissertation, Department of Agricultural Economics, Michigan State University. Draft, December 1992.

Mazzucato, Valentina. "Non-Research Policy Effects on the Rate of Return to Maize Research in Kenya: 1955-88." M.S. thesis, Department of Agricultural Economics, Michigan State University. 1992.

Sterns, James A. "Ex-Post Assessments of Investments in Cameroon's Cowpea and Sorghum Research and Extension Systems." M.S. thesis, Department of Agricultural Economics, Michigan State University. December 1992. PN-ABS-946

- **Journal Articles**

Makanda, David W. and James F. Oehmke. "Promise and Problem in the Development of Kenya's Wheat Agriculture." Submitted to *Economic Development and Cultural Change*. Dept. of Agricultural Economics Staff Paper No. 93-33, July 1993. PN-ABS-773.

Oehmke, James F. and Eric W. Crawford. "The Impact of Agricultural Technology in Sub-Saharan Africa." Submitted to *Journal of African Economics*. 1993. PN-ABP-321.

Oehmke, James F. and Eric W. Crawford. "Evaluating the Impacts of Selected Investments in Agricultural Technology in Sub-Saharan Africa." *AID Evaluation News*. Vol. 4 No. 4:17-21. 1992. PN-ABS-766.

## **5.2. Oral Presentations–Technology Assessment Topics**

Presented methods and results of MSU TDT studies at conference in Kampala, Uganda, November 1993.

Presented methods and results of MSU TDT studies at conference in Accra, Ghana, November 1993.

Presented research impact assessment methodology and implications for training and design of future studies in Southern Africa at informal meetings with SACCAR and USAID staff, Botswana, October 25-27, 1993.

Presented a summary of the MSU TDT studies, in French at PRISAS workshop entitled "Développement et Transfert de Technologies dans un Environnement en Mutation Rapide," Bamako, Mali, August 30-September 2, 1993.

Presented paper on constraints to development and use of improved technology, at AID/TDT Collaborators Workshop, Washington, D.C., seminar, June 28-30, 1993.

Briefings on the results of the impact studies were given to USAID Missions and local collaborating institutions by MSU in-country researchers in Cameroon (August 1991), Niger (June 1992), Uganda (July 1992), Zambia (November 1992), Kenya (January 1993) and Uganda (January 1993).

Presentation of the symposium synthesis, Kenya maize studies by Oehmke, and Karanja, respectively. REDSO Conference on Regional Networking in Agricultural Research, Nairobi, Kenya, January 18-22, 1993.

Presentation of the draft symposium synthesis report to AID/ARTS/FARA by James Oehmke, Washington, D.C., November 24, 1992.

Organized, with AID/ARTS/FARA, the Symposium on the Impact of Technology on Agricultural Transformation, Washington, D.C., October 14-16, 1992.

Presented Bernstein/Staatz paper on "The Role of Subsector Analysis in Setting Research Priorities," at 1992 ADO Conference.

Conducted workshop on issues and methods of assessing the impact of agricultural research, Department of Agricultural Economics, MSU, June 1991.

Presented results of literature review at USAID-sponsored workshop on returns to agricultural research, Washington, D.C., April 24-25, 1990.

### **5.3. Short-Term Training–Technology Assessment Topics**

In-service training conducted by MSU in-country researchers and faculty on backstopping trips in Cameroon, Mali, Niger, Uganda, and Zambia.

Oehmke presentations at Malawi and Zimbabwe workshops, March 1994.

### **5.4. Long Term Training**

Duncan Boughton is expected to complete a Ph.D. degree in Agricultural Economics at MSU in 1994, working with project support on a dissertation topic of the economics of the maize subsector in Mali.

Georges Dimithe is expected to compete an MS degree in Agricultural Economics at MSU in 1994, working on an assessment of returns to investment in commodity research in Cameroon. (Dimithe worked with Sterns on the in-country work in Cameroon.)

Julie Howard is expected to complete a Ph.D. in Agricultural Economics at MSU in 1994, working with project support on a dissertation topic dealing with the economic impact of investments in maize research and technology adoption in Zambia, with emphasis on the influence of policy and institutional factors.

Rita Laker-Ojok completed a Ph.D. in Agricultural Economics in 1994 at MSU, working with project support on a dissertation topic dealing with the economics of the oilseed subsector in Uganda.

Lydia Neema Kimenye completed a Ph.D. in Agricultural Economics at MSU in 1993, receiving assistance from Professors Shaffer and Crawford on the topic of the economics of smallholder flower and french bean production and marketing in Kenya.

David Makanda completed a Ph.D. degree in Agricultural Economics at MSU in 1992, working with project support on a dissertation topic dealing with research and policy impacts in the Kenyan wheat sector.

Valentina Mazzucato completed an MS degree in Agricultural Economics at MSU in 1992, working with project support on a research topic examining the non-research policy effects of the rate of return to maize research in Kenya.

James Sterns completed an MS degree in Agricultural Economics at MSU in 1992, working with project support on an ex-post assessment of investments in Cameroon's cowpea and sorghum research and extension system.

## **5.5. MSU Backstop Trips to In-Country Team–Technology Assessment**

Cameroon: June 1991 (Bernsten)

Kenya: November 1990, May 1992, January 1993 (Oehmke)

Malawi: October 1991, May 1992 (Oehmke)

Niger: November 1991 (Crawford); February 1992 (Pardey/ISNAR)

Uganda: June 1991, December 1991, July 1992 (Crawford); January 1993 (Oehmke)

Zambia: July 1991, December 1991, July 1992 (Crawford)

## **5.6. Examples of Impact of Project Findings–Technology Assessment**

The State of the Arts submission by ARTS/FARA to the Africa Bureau in September 1993 included the following statement: "The 22 detailed case studies at the [MSU/AID-organized Oct. 1992] symposium represented the largest collection ever of such information

for sub-Saharan Africa. Presented to the public for the first time, the results and findings challenge much of the conventional wisdom about changes in productivity in Sub-Saharan Africa and the returns to research." These materials and subsequent deliberations were instrumental in turning around A.I.D. thinking about the value of investment in agricultural research.

## **6. Ongoing Research Activities**

Support to USAID-funded SACCAR-implemented research impact assessment training and studies, including scheduled Lilongwe and Harare workshops in March 1994, and planned workshops in Zambia and Tanzania later in 1994.

Editing and publishing of final ROR reports, and proceedings of October 1992 Symposium.

## **7. Outputs Anticipated**

Final ROR reports and proceedings of October 1992 Symposium.

Concept papers and synthesis report on impact assessment in a commodity sector and regional perspective, under USAID-funded contract with USDA.