



INTSORMIL

More Than 30 Years of Excellence

A deeper look into the commitment, passion and hard work INTSORMIL continually invests in reducing and preventing global hunger and poverty in developing countries.

INTSORMIL

Wishing to expand the effort to increase worldwide agricultural production, the U.S. Congress in December 1975 approved an amendment to the Foreign Assistance Act of 1961. Included in the amendment was Title XII, "Famine Prevention and Freedom from Hunger." A main objective of the new Title was to provide the means by which U.S. universities could make their expertise in science and technology more available to low-income countries, and thus help them solve food and nutrition problems. One component of the Title XII program is "support for long-term collaborative university research, in developing countries themselves, on food production, distribution, storage, marketing and consumption." Collaborative Research Support Programs (CRSPs) are one of the avenues of achieving this objective.

The Sorghum/Millet Collaborative Research Program (INTSORMIL) established in 1979 combines the resources and research talent of host-country research institutions, six U.S. land grant universities, USDA/ARS and the U.S. Agency for International Development (USAID). This 30-year



report shows that the INTSORMIL research program is one in which researchers from the U.S. and host countries can effectively collaborate.

Sorghum and millet are basic food grains for millions of people. Most of them are located in the poorer nations of the world where economic, labor, soil and water resources are limited. The research is challenging because sorghum and millet production and use in less-developed countries are impeded by problems such as heat and drought stress, insects, diseases, and storage and marketing difficulties. INTSORMIL has strived to overcome these problems through a collaborative program of research, technical assistance, training and institution building.

The impacts of INTSORMIL research in the host countries are multiplied through workshops, newsletters, webpage updates, information exchanges, scientist exchanges and an international exchange of sorghum and millet germplasm.

INTSORMIL's research program helps to alleviate world hunger and, thus, to realize the goals of USAID and the Board for International Food and Agricultural Development (BIFAD); INTSORMIL's research applies to all farms in the world where sorghum and millet are grown.

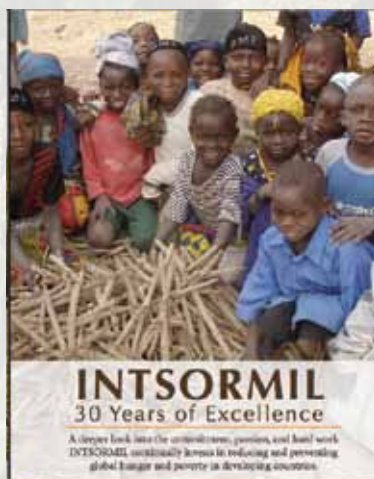
The INTSORMIL team is a large one. We appreciate the Grant and Leader with Associates Cooperative Agreement support from USAID. Also the cooperation of the International Agricultural Research Centers, particularly ICRISAT and the USAID Missions, has been vital to the success of our collaborative research.

Institutions in the host countries have been able to improve sorghum and millet varieties and production techniques, food quality, farming systems, agricultural policy, and scientist training. The results are core to INTSORMIL's effort to fight hunger with research.

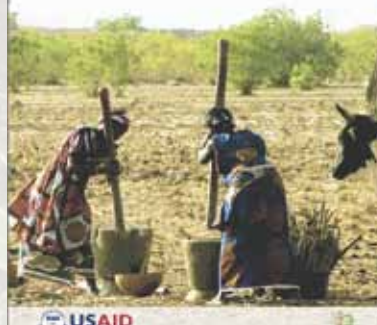
– John Yohe
INTSORMIL Program Director

Happy Malian children gathered around recently harvested pearl millet heads while their mothers are threshing pearl millet nearby.

Photo courtesy of E.A. "Short" Heinrichs



Fighting hunger and poverty with research



Women threshing recently harvested pearl millet heads in a village in Mali, western Africa.

Photo courtesy of E.A. "Short" Heinrichs

Fighting hunger and poverty with research

In Zambia in southern Africa, a farmer can afford to build a new house for his family. In Ethiopia in the Horn of Africa, farmers are using new varieties of sorghum and millet to feed their families. In Burkina Faso in western Africa, the residents of a village give USAID and INTSORMIL the credit for providing new storage facilities for their grain crops. In El Salvador in Central America, bakers experiment with sorghum flour in making bread. At several U.S. universities, aspiring plant breeders from Central America and Africa learn the ropes from established INTSORMIL scientists.

Despite these successes, INTSORMIL's work isn't complete. The challenges presented by climate change and the mandates issued by USAID's "Feed the Future" initiative and by the U.N. Millennium Development Goals make the work of INTSORMIL even more critical. With ample funding, scientists and staff members of the International Sorghum, Millet and Other Grains Collaborative Research Support Program (the SMOG CRSP, best known by its common

name INTSORMIL) will continue to contribute to the world's food security. Although INTSORMIL scientists in the U.S., Africa and Central America have worked diligently for more than 30 years, they still have work to do to develop varieties of food grains that will contribute to food security among hungry people in Africa and Central America.

This report has three goals:

- 1** To identify INTSORMIL's accomplishments over the last 30 years,
- 2** To tell stories of farmers who use INTSORMIL research to improve their families' lives and of scientists who have learned how to help those farmers, and
- 3** To describe current efforts by INTSORMIL scientists.

In this report, you will also find short explanations of processes and concepts central to the INTSORMIL objectives, such as an explanation of

the concept of food security and of the process of crop rotation.

The stories were written by six undergraduate students in the University of Nebraska-Lincoln College of Journalism and Mass Communications (CoJMC), with the collaboration of one CoJMC graduate student. All the students worked on the U.S. stories in the spring of 2010; in May 2010, three students accompanied me to Africa to see for themselves the work of INTSORMIL in Zambia, Ethiopia and Burkina Faso and to attend the West Africa regional meeting of INTSORMIL scientists. In the fall of 2010, advertising students and an advertising professor developed a plan to distribute this report and to spread the word about INTSORMIL's accomplishments over more than 30 years. In the spring and summer of 2011, a CoJMC graduate student worked along side three CoJMC faculty members in designing and laying out the report.

– Carolyn Johnsen
Managing Editor

INTSORMIL



INTSORMIL An Introduction **4**

- 5** A brief history of INTSORMIL
- 8** Food security defined
- 9** INTSORMIL CRSP objectives
- 10** INTSORMIL makes personal impacts
- 13** INTSORMIL by the numbers

Variety Development and Research **14**

- 16** Texas A&M plant-breeding program supports INTSORMIL
- 19** Plant-breeding methods explained: Traditional vs. genetic engineering
- 22** Germplasm: Agriculture's insurance policy
- 23** Seed companies take INTSORMIL science to the world
- 26** International collaboration benefits sorghum farmers in the Nicaraguan dry zone
- 28** INTSORMIL in Central America

Plant Protection **30**

- 32** Biotic & abiotic stresses imperil INTSORMIL crops
- 33** The fight against insect pests
- 36** Drought tolerance
- 37** Sorghum downy mildew
- 38** Moldy grain
- 41** World food prize confirms impact of scientist's research
- 44** *Striga* infests sorghum
- 46** INTSORMIL in Africa

Table of Contents



Farming Practices **48**

- 50** KSU scientists research cropping systems in Kansas & Africa
- 53** Crop rotation
- 55** Intercropping
- 56** Grain-storage problems in Africa



Marketing **58**

- 60** Poultry project
- 62** Move over wheat; bread has a new flour – sorghum
- 66** Sorghum & millet foods
- 70** Ohio State’s research
- 72** Sorghum clear-beer in Zambia
- 74** Technology adoption study



Collaboration and Training **76**

- 78** Collaboration
- 80** Mentorships fulfill INTSORMIL goals
- 84** INTSORMIL mentorship at UNL
- 86** Purdue’s INTSORMIL Team