

**“Show them who we are”**

**Characterizing farmer access to agricultural information and technologies in Morogoro, Tanzania**



By Karol Sadkowski

2012 Borlaug-Ruan International Intern  
The World Food Prize Foundation

The World Vegetable Center Regional Center for Africa  
Arusha, Tanzania

8 June – 6 August 2012

## **Contents**

Acknowledgements .....	2
Introduction .....	2
The World Vegetable Center .....	3
The Seed Fair .....	3
Feed the Future .....	7
Africa RISING .....	8
My Main Research .....	9
Results .....	10
As a Visitor .....	14
A Personal Project .....	15
Reflection .....	15
Works Consulted .....	18

## **Acknowledgements**

I extend deep thanks and gratitude to the following individuals for the ways they shaped and enriched my internship:

Dr. Norman Borlaug and Mr. John Ruan, who created the World Food Prize and the Borlaug-Ruan International Internship;

Ms. Inviolata Dominick, for sharing with me important insights on survey data collection;

Dr. Xavier Escandell, for his invaluable help in data analysis;

Mrs. Lisa Fleming, for turning my hopes into realities;

Ms. Nadine Kwazi, for ensuring my accommodations and safety abroad;

Mr. Omary Mbwambo and Mr. Mohamed Kombo, for patiently translating Swahili words into English;

Mr. Felix Nandonde, for his inspirational advice;

Dr. Chris Ojiewo, for acting as my research mentor and supporting me throughout my internship; and

Dr. Abdou Tenkouano, Director of the World Vegetable Center for Sub-Saharan Africa, for graciously accepting me as a young intern.

I also thank my parents and older brother for their encouragement and guidance throughout the internship process. My parents emigrated to the United States from Poland and have been the greatest positive influence in my life. They guide me in thinking about everything with scrutiny and compassion. My brother is the most important person in the world to me and I could never ask for a better sibling.

## **Introduction**

My name is Karol Sadkowski. I was born in Ann Arbor, MI, but have lived in Cedar Falls, IA, since I was two years old with my family. Global development became a serious interest of mine when I began studying the developing world in my junior year of high school. In particular, my “Developing Nations” class stimulated in me a strong fascination with Africa and especially the problem of “conflict mining” in the eastern regions of the Democratic Republic of the Congo (DRC). My interest in global development expanded in April 2011 after I heard Mr. Keegan Kautzky of the World Food Prize speak about global food security at the Iowa High School Model United Nations Conference at the University of Northern Iowa. That led to my participation in the Global Youth Institute, which, as I will forever repeat, was an amazing experience. This chain of events and the constant nurturing from my parents and friends strongly influenced me to want to improve food security in the world.

Even before my participation in the Global Youth Institute, I was eager to become a Borlaug-Ruan Intern. Then, when I saw the previous year’s interns at the World Food Prize in October 2011, I could do little more than gaze at them with envy—I wanted to be one of them! Asking questions about their research assignments and cultural experiences simply was not good enough

when I too wanted to partake in my own explorations. And with that, I submitted my application for the Borlaug-Ruan International Internship.

In my application, I stressed my strong interest in Africa. Although I certainly would have accepted placement anywhere in the world, I particularly wanted to carry out a research assignment somewhere in Sub-Saharan Africa. When an internship opening in Tanzania was suggested during my interview, I responded with, "Oh, that would be cool!" In combination with my fascination with Africa, my exclamation may have settled my internship placement. That summer, I boarded an airplane to pursue a truly perspective-changing experience.

### **The World Vegetable Center**

From June 8 until August 6, 2012 I spent my internship in Arusha, Tanzania, at the World Vegetable Center's Regional Center for Africa, or AVRDC-RCA. The World Vegetable Center, whose headquarters are in Shanhua, Taiwan, was founded in 1971 as the nonprofit Asian Vegetable Research and Development Center. When its scope of research expanded and its regional affiliates began to spread across various continents, however, its name changed to accommodate its new global focus. The center in Arusha, which I will refer to as AVRDC, was established in 1992.

The mission of AVRDC is "to alleviate poverty and malnutrition in the developing world through the increased production and consumption of safe vegetables" while remaining mindful of environmental protection. AVRDC emphasizes the development of effective indigenous and exotic vegetable seed varieties to strengthen production and supply systems in the private sector, especially in Sub-Saharan East Africa. Particularly important are different varieties of tomato, onion, sweet pepper, mungbean, cabbage, Chinese cabbage, eggplant, and African eggplant.

On occasion, AVRDC organizes three-week and four-month training courses devoted to vegetable production systems based on in-country smallholders' needs. Additionally, "improved varieties are promoted through field days, information leaflets, distribution of seed kits for home gardens, training programs for farmers and workshops for collaborating scientists." AVRDC's current major initiative is "Vegetable Breeding and Seed Systems for Poverty Reduction in Africa." More than 100 indigenous and exotic vegetables are being developed and will be released to small African seed companies, which should allow them to grow as they provide sustainable seeds to customers (AVRDC).

### **The Seed Fair**

On June 15, 2012, AVRDC hosted its annual "Seed Fair," inviting Arusha farmers and other local agriculturalists to collaborate with each other and learn about new crop varieties and technologies offered by AVRDC. Farmer groups and other agricultural organizations also attend the Seed Fair every year to sell and share their own products with participants, such as fertilizers, seeds, and prepared foods. This is an opportunity for AVRDC and similar organizations to advertise themselves to primarily local farmers. The Center's demonstration plot, which displays crop varieties developed by AVRDC and varieties from elsewhere in East Africa, is an effective method for AVRDC to communicate new technologies to farmers. As an informational event, the Seed Fair ultimately intends to answer questions posed by farmers.

Additionally, AVRDC asks visitors of its annual Seed Fairs to respond to short questionnaires inquiring about some of their crop preferences and their reasons for coming to the Seed Fair. These short questionnaires help AVRDC learn about changing farming tendencies in the Arusha

area and to plan some of its own research projects accordingly. Because everyone has an equal opportunity to attend the Seed Fair at AVRDC, the data these questionnaires provide give fairly representational samples of Arusha-based farmers' characteristics.

My work at AVRDC initially involved the compilation and analysis of data collected from the 2012 Seed Fair questionnaires. Though this was not my primary assignment at AVRDC, it gave me an important background to survey research that prepared me for my main research assignment.

Concerning the Seed Fair questionnaires, my first objective was to create a questionnaire codebook. A codebook is a reference point used in data entry to help categorize information (in this case, the questions and various responses in the questionnaires). Every piece of information a codebook provides receives a unique abbreviation, increasing the efficiency of data analysis once data entry is completed. Since AVRDC prepared two versions of its questionnaire—one in English and the other in Swahili—my creation of the codebook required the help of Mr. Omary Mbwambo and Mr. Mohamed Kombo, whose office at the Center I frequently visited for translations of vegetable names written by respondents in Swahili.

Below are several sections of my codebook, asking farmers about their reasons for coming to the Seed Fair and their vegetable interests.

Abbreviation	Description	Code
WhyCome	Why did you come to the seed fair?	(1) To know and/or collaborate with AVRDC researchers; (2) Interested in new varieties and technologies; (3) To ask questions related to vegetable production; (4) To meet other vegetable farmers; (5) To know what seed companies have to offer; (6) To experience the seed fair; (7) Other
Top5Veg	What are the top 5 vegetable seeds you want to receive?	(1) Tomato variety - Duluti/Tengeru 2010; (2) African Nightshade variety - BG 16 (105); (3) African Eggplant variety - TW (Tengeru White); (4) Moringa variety - RCA 1; (5) Amaranth variety - AH TL; (6) Pumpkin variety - GKK 174; (7) Ethiopian Mustard; (8) Spider Plant variety - PS; (9) Cow Pea variety - Vuli
OtherVeg	What other vegetables are you interested in growing?	(1) Sweet Pepper; (2) Onion; (3) Okra; (4) Pumpkin; (5) Spider Plant; (6) Cowpea; (7) Soybean; (8) Moringa; (9) Jute Mallow; (10) Other
EatHome	What vegetables do you consume at home?	(1) African Eggplant; (2) African Nightshade; (3) Amaranth; (4) Cowpea; (5) Ethiopian Mustard; (6) Okra; (7) Spider Plant; (8) Sweet Potato; (9) Other

Data entry and analysis followed the creation of the codebook. Data entry involves the recording of information collected in research, which I quickly learned is a far more challenging activity than I had originally expected because it requires the inclusion of every sliver of information provided in a survey. I repeatedly had to revise my Microsoft Excel tables in order to make them more readable.

Data analysis, then, calculates and interprets this recorded data, generating clearer research results. When my data was ready for analysis, Mr. Mbwambo transferred it to SPSS, a computer program used for creating meaningful statistics from masses of numbers.

Here is the information collected from several farmers' completed questionnaires, now coded and ready for analysis:

Name	Gender	Status	Occu	Org	WhyC ome	Top5Ve g	Other Veg	EatHo me	Want More
Mario M. Memuruti	1	2	1	1	8	10	11	10	10
Urassa Boniface Rogatti	1	2	3	2	6	11	12	11	11
Patricia Martin	2		1	1	9	12	13	5	
N. E. Magubu	2	2	3	2	10	13	14	12	12

Below is one data frequency table created from the analysis of the Seed Fair questionnaires with SPSS. For the purpose of this report, data frequencies indicate the percentages of people who offer certain responses to questions.

Why did you come to the Seed Fair?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	To know and/or collaborate with AVRDC researchers	7	11.1	11.7	11.7
	Interested in new varieties and technologies	13	20.6	21.7	33.3
	To ask questions related to vegetable production	1	1.6	1.7	35.0
	To know what seed companies have to offer	2	3.2	3.3	38.3
	To experience the seed fair	2	3.2	3.3	41.7
	Other	35	55.6	58.3	100.0
	Total	60	95.2	100.0	
Missing	System	3	4.8		
Total		63	100.0		

This table indicates that more than half of questionnaire respondents had other reasons for attending the Seed Fair. This finding, however, is questionable. Because respondents completed this questionnaire without facilitation by an enumerator, the "Other" option in the questionnaire

may have held various meanings for participants. Nevertheless, the data show that thirteen respondents, or nearly 21%, attended the Seed Fair to learn about new crop varieties and agricultural technologies offered by AVRDC and its partners, a significant number. If the concern with the “Other” option is taken into account, this number may be quite higher.

A second data frequency table lists Seed Fair participants’ primary occupations:

<b>Occupation</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Farmer	16	25.4	26.2	26.2
	Ministry Personnel/ Government Representative	7	11.1	11.5	37.7
	Educator	2	3.2	3.3	41.0
	Researcher	3	4.8	4.9	45.9
	NGO/Agency Representative	6	9.5	9.8	55.7
	Student	1	1.6	1.6	57.4
	Other	26	41.3	42.6	100.0
	Total	61	96.8	100.0	
Missing	System	2	3.2		
Total		63	100.0		

The above table points out that sixteen respondents, or just over 25%, are farmers. Twenty-six respondents, or slightly over 41%, on the other hand, practice some other profession. This may be attributed to the fact that some individuals who attended the Seed Fair work only as part-time or subsistence farmers and keep other primary occupations.

Another frequency table created with SPSS concerns membership in a farmer group or organization:

<b>Do you belong to a farmer group or organization?</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	35	55.6	56.5	56.5
	No	27	42.9	43.5	100.0
	Total	62	98.4	100.0	
Missing	System	1	1.6		
Total		63	100.0		

The above table states that more Seed Fair participants are members of farmer groups than not. This suggests a possible avenue through which farmers may access information that could improve their agricultural techniques and livelihoods.

Data analysis concluded my work with the Seed Fair questionnaires. I passed on the information I created from the questionnaires to AVRDC, where it will be further interpreted to determine how to adjust some of its other research projects in order to meet the interests of Arusha-based farmers. This will ultimately help improve their incomes and crop yields through the development of enhanced crop varieties.

The Seed Fair also will help AVRDC gauge the extent to which Arusha-based farmers receive agricultural information helpful to their personal farming practices. This provides a strong link to my main research project. As noted earlier, the Seed Fair offered an excellent introduction to my larger project because it taught me the basics of creating codebooks and data entry and analysis. It additionally served as an excellent example of the importance of making relevant agricultural information available to farmers because of its potential for increasing livelihoods, which was the essence of my greater research assignment in Tanzania.

### **Feed the Future**

The Feed the Future (FtF) Program is the US government initiative, begun in 2009 and led by the US Agency for International Development (USAID), to combat global food insecurity and contribute to reaching the 2015 Millennium Development Goal of reducing by half the number of people in the world suffering from hunger and poverty. The initiative works to achieve this through country-driven approaches led by various partners and stakeholders at the private, civil, and multilateral levels.

Through FtF, the United States supports 20 selected countries in their effort to strengthen their agricultural sectors and become food-secure. The criteria used to select these target countries included “Level of need,” “Opportunity for partnership,” “Potential for agricultural growth,” “Opportunity for regional synergy,” and “Resource availability.” By increasing these twenty countries’ agricultural independence, international food relief to them also only will become necessary during natural or human-created disasters such as drought or war (Feed the Future).

Feed the Future seeks to broaden economic growth and reduce poverty and hunger by:

- Supporting the plans of 20 countries to remodel their agricultural systems;

- Contributing to economic growth by strengthening value chains between local, regional, and global markets to prevent volatile food prices;

- Building communication and coordination between partners and stakeholders in order to more effectively control resources;

- Maintaining a system for integrating agricultural growth and self-sufficiency with better humanitarian food assistance; and

- Improving the accountability of participants through extensive progress tracking methods.

Ultimately, through the Feed the Future Program, millions of vulnerable family members—especially women and children—and smallholder farmers will break away from abject hunger and poverty. Through nutrition interventions, FtF will help end stunting and child mortality due to the unavailability of healthful foods (Feed the Future).



Tanzania, a country with a population of 42 million, is one of the 20 target countries within the FtF initiative. While agriculture employs 75% of the labor force, it makes up only 25% of the country's GDP, a startling disparity. Despite its current state of underdevelopment and huge amounts of governmental corruption, however, Tanzania's peaceful history and significant resources give it huge potential for sustained economic growth. But without major intervention, the chances of Tanzania achieving the Millennium Development Goals are highly doubtful.

Although communications, trade, mining, and tourism also have influenced Tanzania's economic growth over the last decade, high population increases have extended the number of Tanzanians living below the poverty line to 34%, while 42% of children fewer than five years old suffer from stunting due to undiversified diets at the household level. This simply is unacceptable, since agriculture is the main component of Tanzania's economy. Through careful policy commitments and institutional investments, Feed the Future's mission for its next five years in Tanzania is to help bring out of hunger and poverty 834,000 women, children, and other family members, most of whom are small-scale farmers, as well as to help improve the nutrition of more than 430,000 children (Feed the Future).

Tanzania's main staple crop is maize, but its production meets only the level of national self-sufficiency. As a net importer of rice, which Tanzanians increasingly prefer to maize, Tanzania could meet even regional demands with its own improved rice yields. Although rice is currently farmed in very few places in Tanzania, its development would make a significant impact in the country's ailing economy. The current work of Africa RISING has great capacity to guide the future of rice farming in Tanzania.

## **Africa RISING**

Africa RISING, or Africa Research in Sustainable Intensification for the Next Generation, is part of the Feed the Future Program under USAID. Led by a number of research organizations including AVRDC, the major regions where Africa RISING operates are West, East and Southern Africa and the Ethiopia Highlands. Africa RISING seeks to transform agricultural systems in these regions, giving special attention to sustainable intensification in its projects. It follows the International Journal of Agricultural Sustainability to define sustainable intensification as "producing more output from the same area of land while reducing the negative environmental impacts and at the same time increasing contributions to natural capital and the flow of environmental services." Among this definition's points are bettering farmer knowledge and capacity through effective information and communication technologies, and strengthening social infrastructure to build trust between individuals and organizations (Africa RISING).

These points especially relate to Africa RISING's "Baseline Survey of Rice-Vegetable Production Systems, Marketing and Consumption Patterns" under the USAID-supported project "Enhancing vegetable value chains in rice-based and sole crop production systems to improve farm household income and consumer access to safer vegetables in Morogoro, Tanzania." The survey, used to learn about the status of farmers and farmer households in the Morogoro region in Tanzania, includes the mission:

...To establish the baseline status of household socioeconomic characteristics, vegetable cultivars, farm input usage, production practices and constraints, vegetable farming profitability, knowledge and training needs of vegetable farmers, marketing channels, household welfare indicators and vegetable consumption levels within rice-based production systems. (Baseline survey)

Nine sections comprise this twenty-page survey. Together, they provide a detailed picture of farmers' lives in Morogoro:

“Household Socioeconomic Characteristics”;

“Farmers’ Perception of Factors Determining Integration of Vegetable-Rice Production Systems”;

“Factor Endowments/Characteristics”;

“Costs and Returns of Vegetable and Rice Production”;

“Constraints Inhibiting Profitability in Vegetable and Rice Farming”;

“Post-Harvest Handling and Produce Quality of Produce”;

“Training and Extension Needs”;

“Other Household Income & Welfare Indicators”; and

“Household Vegetable Consumption”

Enumerators from Sokoine University of Agriculture and AVRDC interviewed 240 individuals in sixteen villages in Morogoro between June 29 and July 5, 2012. The completed baseline surveys of Africa RISING made up the heart of my summer research.

### **My Main Research**

Initially, I did not know what my greater research project would be. I began my work at AVRDC entering survey data from its June Seed Fair and later joined the AVRDC team of enumerators for their survey work in Morogoro. However, I was uncertain of my role in Morogoro because I could not play a significant part in the enumeration process because I did not have a hired English-Swahili translator. Although I did manage to interview one farmer whose English was strong enough to speak with me, the evident language barrier between us often required translation assistance from other enumerators. I was stuck, unsure of how to help.

After our visit to the villages in Morogoro, I spoke again with my mentor, Dr. Chris Ojiewo, about my research plans. Because of my strong interest in the socioeconomic aspect of agriculture, we agreed that I would help learn about the extent to which farmers in the area are receiving important agricultural information that could help improve their crop yields, value chains and livelihoods. I would do this through the data collection of different sections of the Morogoro baseline survey.

I spent about four weeks in my office at AVRDC, sifting through the completed baseline surveys and collecting certain pieces of information from the 238 surveys available—two had somehow been lost. Needless to say, the Excel files that helped me to organize this data became terribly difficult to sort through. The work was tiresome at times, but this early effort was more than worth it in the end.

Upon my return to the United States, I began the data analysis component of my work with Dr. Xavier Escandell of the University of Northern Iowa. A professor of sociology, his assistance was

invaluable to me. He helped me to analyze my data and gave me his professional opinion on how to prepare and present my research findings.

My ambitious goals for this report during my data entry work at AVRDC led me to collect data from four of the nine sections of the twenty-page Morogoro baseline survey. However, as I began data analysis with Dr. Escandell, I quickly realized that data from even four sections of the survey was too much to present in this report and that I would not be able to tell the full story of the farmers as I had anticipated.

Of the nine survey sections, I collected selected data from the following four:

**“Household Socioeconomic Characteristics”:** In this section, personal information is recorded such as name, marital status, family size and age, occupation(s), and the household head’s years of experience and decision making as a farmer. This section also asks about specific crops grown and specific rice farming practices.

**“Farmers’ Perception of Factors Determining Integration of Vegetable-Rice Production Systems”:** Here, farmers give reasons explaining why they grow vegetables in association with rice, as well as tell which vegetable and rice varieties are most important to them.

**“Constraints Inhibiting Profitability in Vegetable and Rice Farming”:** Of the data available in this section, I recorded farmer responses about the effects of pests and diseases on certain focus vegetables and rice and their control methods.

**“Training and Extension Needs”:** The data of this section contains information on interaction opportunities between farmers and agricultural agencies, the availability of agricultural information, and farmer involvement in farmer organizations.

I created separate codebooks and Excel files for each of these sections’ recorded survey data. As Dr. Escandell advised me, I then combined the codebooks and Excel files together into master documents in order to ease the data analysis process with SPSS by reducing unnecessary clutter. The greatest challenge I faced in doing this was ensuring the cleanliness and consistency of the coded data, which sometimes was recorded in ways that SPSS could not read. I filtered everything to confirm that all data followed the same coding guidelines.

Originally, I planned to analyze all the data I collected in the above four sections and use it to provide a very specific profile of every village Africa RISING visited in Morogoro. Instead, I gave my master codebook and unified Excel data file to AVRDC for further interpretation. In an indirect way, though, the data I prepared for analysis will help reduce food insecurity in Tanzania—AVRDC and its partners will use this information to shape their four-year action plan in Morogoro to teach farmers about more effective rice-vegetable growing practices, culminating with farm families’ increased incomes and nutrition.

## **Results**

The data that I did analyze and interpret, on the other hand, provides a more particular profile of the interviewed Morogoro farmers. This data came from the survey sections “Household Socioeconomic Characteristics” and “Training and Extension Needs.” They attempt to characterize farmers’ agricultural knowledge and access to agricultural information through

indicators such as whether they communicate in farmer groups or with agricultural agencies. The table below is the codebook I created for this data:

<b>Abbreviation</b>	<b>Description</b>	<b>Code</b>
(1A6) FarmOrg	Are you a member of a farmer organization?	(1) Yes; (2) No
(1B2.1) HHHEd	Household head education level	(1) Never; (2) Primary; (3) Secondary; (4) Tertiary / College; (5) University
(1C4) 2YrRType	Major type of rice farming practiced over last two years	(1) Irrigated; (2) Upland with supplementary irrigation; (3) Upland strict; (4) Upland with groundwater; (5) Lowland; (6) Mangrove; (7) Other
(1C5) RVSameYr	Do you grow rice and vegetables in the same year?	(1) Yes; (2) No
(1C6) RVProSys	Major production system for producing rice and vegetables	(1) Vegetables grown in temporal rotation; (2) Vegetables grown as sole crop on non-rice-associated land; (3) Vegetables grown as an intercrop with upland rice; (4) vegetables grown as a sole crop after harvesting upland rice; (5) Vegetables grown as relax crop with rice; (6) Vegetables grown as an intercrops with other crops
(7FT0) Meetings	How often have you met with public agricultural agencies in the last four months?	(1) 0; (2) 1-3; (3) 4-6; (4) 7-9; (5) 10-12; (6) 13-15; (7) 16-18; (8) 19-21
(7FT1) VegTrain	Have you or any member of your household ever attended any kind of agricultural training program on vegetables?	(1) Yes; (2) No
(7FT6.1A) Material	Do you have any written material or reference guide explaining practices on vegetables?	(1) Yes; (2) No
(7FT7.1) AgRad	Are you aware of any radio program that provides information on agriculture?	(1) Yes; (2) No

After coding and creating data frequencies of the data identified in this codebook, Dr. Escandell and I cross-tabulated the frequencies with all sixteen Morogoro villages to illustrate trends and disparities among villages. These cross-tabulations are very revealing of the extent to which farmers currently receive useful agricultural information. Cross-tabulation is the process used to find the relationship between two data sources by putting their results against each other.

As an example, below is the data frequency of 7FT1, followed by its cross-tabulation with the sixteen target villages. They help visualize the method I used to learn about the interviewed Morogoro farmers in respect to their villages.

**(7FT1) Have you or any member of your household ever attended any kind of agricultural training program on vegetables?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	48	20.2	22.4	22.4
	No	166	69.7	77.6	100.0
	Total	214	89.9	100.0	
Missing	System	24	10.1		
Total		238	100.0		

**(7FT1) Have you or any member of your household ever attended any kind of agricultural training program on vegetables?—Cross tabulation with Village**

			VegTrain		Total
			Yes	No	
Village	Kipera	Count	10	5	15
		% within Village	66.7%	33.3%	100.0%
	Mlali	Count	10	4	14
		% within Village	71.4%	28.6%	100.0%
	Dibamba	Count	0	15	15
		% within Village	0.0%	100.0%	100.0%
	Wami	Count	2	13	15
	Dawaka	% within Village	13.3%	86.7%	100.0%
	Hembeti	Count	3	12	15
		% within Village	20.0%	80.0%	100.0%
	Msongozi	Count	5	10	15
		% within Village	33.3%	66.7%	100.0%
	Lumemo	Count	2	11	13
		% within Village	15.4%	84.6%	100.0%
	Kilama	Count	7	9	16
		% within Village	43.8%	56.2%	100.0%
	Signal	Count	1	11	12
		% within Village	8.3%	91.7%	100.0%
	Kisawasawa	Count	3	12	15
		% within Village	20.0%	80.0%	100.0%
	Ichonde	Count	0	12	12
		% within Village	0.0%	100.0%	100.0%
	Kiberege	Count	2	9	11
		% within Village	18.2%	81.8%	100.0%
	Mang'ula B	Count	0	9	9
		% within Village	0.0%	100.0%	100.0%
	Mang'ula A	Count	2	13	15
		% within Village	13.3%	86.7%	100.0%

Katulukila	Count	0	9	9
	% within Village	0.0%	100.0%	100.0%
Mkula	Count	1	12	13
	% within Village	7.7%	92.3%	100.0%
Total	Count	48	166	214
	% within Village	22.4%	77.6%	100.0%

The above data frequency shows that 70% of farmers and their families in all sixteen target villages in Morogoro have never attended any vegetables training program. The cross tabulation expounds upon this point and shows the exact number of farmers who have not received training per village, helping distinguish highly isolated villages from well-connected ones. As evidence, no farmer in Dibamba, Ichonde, Mang’ula B or Katulukila claimed ever having received training in growing vegetables, in contrast to the 67% in Kipera who did. It should be noted that no more than sixteen individuals were interviewed per village.

The bolded codes below refer to the original survey questions used to interview the Morogoro farmers, which are in the codebook on page 11. Interpreted frequencies data are listed as statements after their respective codes.

**1A6:** 87 respondents are members of farmer organizations. 138—54%—are not.

**1B2.1:** 87%, or 207 interviewees, have only received primary-level educations.

**1C4:** 51% (122), or just over half of respondents, said they practiced lowland rice farming over the last two years.

**1C5:** 73% (174) of respondents said they grow rice and vegetables in the same year.

**1C6:** Respondents use four major production systems to grow rice in tandem with vegetables. About 19% of respondents use each production system: “Vegetables grown in temporal rotation”; “Vegetables grown as sole crop on non-rice-associated land”; “Vegetables grown as a sole crop after harvesting upland rice”; and “Vegetables grown as relax crop with rice.”

**7FT0:** In the four months leading up to July 1, 57% (136) of respondents had not met with any agricultural agency. 19% (46) of respondents had met 1-3 times.

**7FT1:** 70%, or 166 respondents, have never “attended any kind of agricultural training program on vegetables.

**7FT6.1A:** 118 respondents (51%) do not “have any written material or reference guide explaining practices on vegetables.” However, 81 surveys do not include responses to this survey question. It is likely that almost 200 respondents do not have any tangible materials explaining vegetable farming practices.

**7FT7.1:** 125 respondents are not aware of any agriculture-related radio program, as opposed to 68 respondents who do know of such radio programs. The missing 44 responses may suggest that these respondents also are not aware of any radio programs that provide agricultural information.

So, based on these results, it is clear that farmers in the targeted Morogoro villages especially lack outreach from agricultural organizations. Not only this, but almost all have not pursued education beyond their primary-level years, which can have very debilitating effects. The cross-tabulations of these frequencies with the villages are not listed here because they show very few outstanding pieces of data. In reality, all villages lack sufficient resources to effectively improve farmers' livelihoods. Therefore, the original hypothesis of my research is correct, which states that Morogoro farmers receive insufficient information on agricultural technologies and thus use outdated or poor technologies due to lack of proximity with agricultural organizations such as AVRDC.

Africa RISING chose the region of Morogoro for this research because it is where rice is a common crop. With the growing popularity of rice in Tanzania, agricultural research centers especially should reach out to rice farmers and offer them improved access to information on new technologies. As this report proves, rice farmers in Morogoro are in critical need of agricultural training and communication. Such improved access would not only directly help these farmers, but it also would strengthen value chains and markets in Tanzania and bring the country closer to a state of food security. Beginning with building relationships between Morogoro rice farmers and nearby agricultural organizations, organizations in other regions should follow suit by developing their own methods for more efficient technology transfers from themselves to farmers. The annual Seed Fairs of AVRDC could be a useful model to push movement in this direction, as well as its information leaflets and distribution of seed kits.

The data I was able to collect and interpret has helped guide the shaping of the four-year action plan Africa RISING will soon implement to teach farmers in Morogoro. Hopefully, it has quickened its initiative "to improve farm household income and consumer access to safer vegetables in Morogoro, Tanzania" (Baseline survey). It is a wonderful feeling to have contributed to improving livelihoods in Tanzania through AVRDC, Africa RISING and the Feed the Future Program of USAID.

### **As a Visitor**

Something I looked forward to most before leaving for my internship was to know the feeling of living as an ethnic minority. Having grown up in a predominantly white culture in the Midwestern United States, I always was a member of the majority. Now, I wanted to see the view from the other side.

In Arusha I attracted attention from the moment I arrived to my departure two months later. At first, it was difficult—being stared at for the color of my skin was nothing I had encountered before, and the concept of being overcharged for goods and services because of my status as a Westerner was completely foreign to me. I was never so self-conscious of myself as a white person as I was in Tanzania. Fortunately, outright prejudice against whites is rare, and many locals actually hold Westerners in high esteem.

Admittedly, my eagerness to be a minority in Tanzania was a little strange. I never entirely got used to the looks people would steal at me, but I appreciate greatly the experience I had of being a minority. I think it is important for us all to recognize our immense diversity as human beings and to develop our capacity to appreciate one other. This is what makes us wonderful, but it is how we react to our diversity that especially matters.

I also would like to mention my observation of the Maasai, a people that live between Tanzania and Kenya. Having studied them in an anthropology course I once took, I liked seeing firsthand

examples of what I had previously learned about their cultural practices. On my first night in Arusha, one of the first people I met was Robat, the Maasai night watchman of the lodge I stayed at. To my surprise, I found out that a great many Maasai men have left their villages in the countryside to work as night watchmen in cities like Arusha due to the lure of decent pay.

It took me some time to connect the dots between Maasai men leaving their villages and then moving into cities. What is happening is both good and bad: good, because Maasai families are earning higher incomes and therefore are improving their standard of living; bad, because slowly, their culture is being shaped and lost with many men living away from their families and not meeting their traditional village responsibilities. We live in an increasingly interconnected world, but the effects of this are not easy to judge. Even as a supporter of cultural preservation, I cannot say whether risking cultural degradation for higher income is worth it. I am not a Maasai providing for himself and his family, but simply a privileged observer.

### **A Personal Project**

The day I left Iowa and the United States, I undertook a small project that I wanted to continue throughout my two months abroad: to take portraits of all the interesting people I met and interacted with. Not only would this give me a chance to put my new digital camera to good use, but it also would allow me to remember these individuals in more complete detail. Early in my internship, my older brother wrote to me by email, “Collect as much ‘data’ as you can.”—But he was not only referring to the data I would be collecting in my formal research. Although I did not manage to take the portraits of all the interesting people I met, at the end of this report are some of my favorites. I hope they give a deeper perspective of some of the people I interacted with in Tanzania. They constitute some of the great social and economic diversity in Arusha and Morogoro, alongside which I am so glad I was able to stand.

At this point, I also should explain the photo of the man on the cover of this report. He is a farmer who my friend and AVRDC colleague, Mr. Kombo, interviewed in the first village in Morogoro we visited. Mr. Kombo translated for me the man’s response when I asked if I could photograph him: “Show this picture to the people of highest importance. Show them who we are.” I am simply honoring that man’s request by including him in this report.

### **Reflection**

The fact that approximately one billion people in the world suffer from hunger and undernourishment still astonishes me, though nowhere is this fresh news; even today, no country can claim to have achieved complete food security. With climate change now becoming a threat to global agriculture, it is no surprise that a great deal of work remains to be done to reach the goal of feeding everyone on this blue planet. My experiences in Arusha and Morogoro helped me to realize the magnitude of this work.

It startled me how quickly I began to recognize people in Arusha. Once, when walking through the city center to go home, I identified a man whom I had seen in my neighborhood days before hobbling on a crutch. This time, I saw him sitting on a cement block begging for food, his cupped hands shaking in front of him, too ashamed to lift his eyes or say anything. As I passed, I quickly gave him the fried cassava I had just bought and kept walking. What startled me more than recognizing him was the fact that his situation was not unique.

I knew before I left home in Iowa that East Africa would have a great many surprises waiting for me; however, before leaving, I was not aware of the extent to which these surprises would



influence me. My cross-cultural experiences were the other half of my internship in Tanzania, giving me new world perspectives to think of. They helped me to better evaluate the person I am now and the person I want to become. Conversely, my work with AVRDC taught me how formal research is conducted, how to work with adults, and what it means to be an adult. The research I participated in opened doors for me I may never have opened on my own.

Thanks to my summer experiences in Tanzania, I now have a newfound interest in environmental protection and its relation to agriculture. Before arriving in Arusha, I had never seen trash burned on the street because no proper waste disposal system existed. The black smog emitted by cars and other vehicles made me question Arusha's air quality. Thus, my curiosity for climate change developed. I currently am a first-year at Grinnell College in Grinnell, IA, and am considering pursuing environmental studies in the future.

Tanzania constantly occupies my thoughts and creeps into my conversations and will forever remain a part of how I think. Its beautiful people have made me a happier and more confident person. I appreciate the richness of my life so much more. Truly. My two months abroad in 2012 left a deep imprint on my mind.



## Works Consulted

*Africa RISING*. WordPress, n.d. Web. Sept. 2012.

Africa RISING. "Africa RISING Jumpstart Project: Baseline Survey of Rice-Vegetable Production Systems, Marketing and Consumption Patterns." June 2012. Raw data.

Africa RISING. "Enhancing Vegetable Value Chains in Rice-Based and Sole Crop Production Systems to Improve Farm Household Income and Consumer Access to Safer Vegetables in Morogoro, Tanzania." Apr. 2012. TS.

*AVRDC - The World Vegetable Center*. AVRDC, n.d. Web. Sept. 2012.

AVRDC - The World Vegetable Center. *AVRDC - The World Vegetable Center Regional Center for Africa*. Arusha: AVRDC, n.d. Print.

Escandell, Xavier. Personal conversation. Aug. 2012.

*Feed the Future*. USAID, n.d. Web. Sept. 2012.

Feed the Future. *Overview*. Feed the Future, 2012. PDF file.

Kombo, Mohamed. Personal conversation. July 2012.

Mbwambo, Omary. Personal conversation. July 2012.

Ojiewo, Chris. Personal conversation. July 2012.

Pretty, Jules, Camilla Toulmin, and Stella Williams. "Sustainable Intensification in African Agriculture." *International Journal of Agricultural Sustainability* (2011): n. pag. Print.