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Maintaining Quality Research With Reduced Funding

Most of us have by now heard the forecast that there will be 9.2 billion people in the world by 2050. But current projections suggest human numbers will not stop there, assuming the trend will continue the numbers will keep on climbing, to at least 11.4 billion, by the mid 2060's creating an enormous food shortage.

The predicted food shortage is greatly different from the global food scarcity many of us worked on in the 1960s. At that time the constraints seemed to be around skills and technology. The generous sharing of modern agricultural knowledge and technology by many of us in foreign countries during the Green Revolution was partially able to overcome the food shortage problem. Was it a success or a temporary solution to a long-term problem? In 1900 every human had 8 hectares of land to sustain them. Today the number is 1.63 and falling. Put another way, between 1990 and 2005, world demand for food grew 15 times faster than the area of land being farmed.

Today the world faces looming scarcities of just about everything necessary to produce high yields of food. These include water, land, nutrients, oil, technology, skills, and stable climates. Each of these limited resources plays into and compounds the others. In developed countries we throw away from a third to half of all food produced. In developing countries we lose similar amounts post-harvest. All told, the Stockholm Institute (below) calculates we waste 2,600 out of every 4,600 kilocalories of food harvested (56%).

It would seem that given the increasing demand for food and the limited resources mentioned above there is an "obvious" need for production and post-harvest agricultural research. It has been stated by the coalition on funding agricultural research missions that Research in Agriculture:

- Improves the quality of life
- Ensures a safe and nutritious food supply
- Stimulates the economy
- Is an investment in disease prevention
- Enables farmers and ranchers to produce the highest quality food and fiber in the world
- Is important to maintaining good health
- Fosters sustainable communities

So, why is agricultural research funding being reduced? Is it because the states and federal government have less money available? Has there been a change in state and national priorities regarding agricultural research? Have state and national policies regarding agricultural research changed?

The question facing us as research center administrators is, can we maintain quality research with reduced funding? Is it something we should even try to do? Should we re-evaluate the Mission Statement of our centers, stations and research facilities? Should we be considering non-USA needs for agricultural information?

In the face of the reality of reduced funding the automatic tendency is to look at what we are doing to determine if it is relevant and then see if we can continue worthwhile research while reducing costs? One of the most profound suggestions is to implement a critical needs survey of the industry. This can be done through a survey of producers, shippers, handlers, suppliers, and managers of all of the required inputs and processes involved in production through harvest, handling, shipping, storage, and merchandizing agricultural products. This critical needs survey will do two very important things for the research centers. It will eliminate all irrelevant research and assure industry support for on-going research and for grant applications. Most research stations and centers have advisory committees and/or advisory groups that they work with on an annual basis. One drawback to the current advisory groups is that they tend to be staffed by people that are in agreement with the current mission and current research direction. For long-term survival of the agricultural research facility there needs to be a complete inclusion of all players in the agricultural supply chain as members of the advisory committee. This more diverse group with different interests may possibly provide guidance in a different and more sustainable direction for the research centers. This may provide challenges and road blocks as well as opportunities for the management of the research centers. Alternatively, it has been suggested that providing more short-term practical information for the surrounding farmers and ranchers will have huge benefits during legislative times.

A more immediate need for the research administrator is to determine ways to reduce costs. At the local station level there have been several things suggested. Some of the suggestions include trying to place donations and funding in accounts that have the lowest administrative and management costs. Foundation accounts generally have reduced administrative costs. A drawback to foundation accounts is that the funds are required to be a donation with no strings attached and no expected return from the donation. Generally farm sales are placed into a general sales account with limited access to the revenue by the center directors.

In reviewing the cultural operations of the centers several cost saving suggestions have been made. Most stations plant the entire cultivated land in a cover crop during the winter season. Costs can be reduced by eliminating irrigation of the cover crop and relying on rainfall

exclusively. Planting more legumes in the cover crop should reduce the need to purchase nitrogen fertilizers during the cropping season. Reducing the number of times an implement crosses a field will reduce costs. Intense scouting of crops and development of a strong IPM program will reduce numbers of insecticide, fungicide and herbicide sprays thus reducing costs.

Other cost saving suggestions include better planning of research projects. Use of macro-schedules will reduce "forgotten" operations by encouraging scientists to plan in advance and communicate their plans to the station personnel. Some scientists seem to function in "crisis mode" on a regular basis. Having a flexible work schedule of farm crew members should eliminate overtime and also allow for a longer time period that someone from the farm crew is in the field assisting the research scientists and their technicians. By anticipating needs better, purchases can be made in bulk and purchases can be made in low-demand periods when prices are generally lower and delivery costs may be lower.

When equipment are involved, suggestions include taking better care of the equipment you have, and repairing damaged or broken equipment immediately rather than later. Schedule non-critical repairs for the off-season if possible. Do the repairs yourself if possible. Hold off on new purchases if possible. When purchasing parts, research for value, quality and durability and multiple use. Use on-line services and the internet to do the searching rather than driving to dealers. Buy it used. This last suggestion is currently not possible under current university purchasing regulations. Continuing budget short-falls should encourage a change in these regulations.

At many stations the job classification system has placed a single person responsible for specific needed skills. It is suggested to cross-train all employees in all jobs (spraying, repairs, irrigating, servicing equipment). This can reduce overtime and reduce stress when a critical employee is sick or unavailable to perform the needed task.

Lastly, it is suggested that the managers of research centers DO NOT Go Shopping. Develop a long-term plan with needed inputs. Develop a chronological "needs" list to reduce forgetting a particular item. Only buy what is on the list.

Suggestions were made for researchers that are utilizing off-campus research centers to reduce costs of their research projects. They can reduce travel costs by using the internet for meetings between the research scientists and farm and field crews. Use of e-mail attachments to transfer plot protocols and to transfer plot data also reduces costs.

A second way that researchers can reduce costs of data is to use secondary data. Researchers using secondary data need to not only understand research concepts related to designing a new study, but additionally must be aware of challenges specific to conducting research using an

existing data set. If an existing data set is suitable for answering a new research question, then a secondary analysis is preferable since it can be completed in less time, it can be completed for less money, and it can be completed with far lower risks of failure due to weather uncertainty.

A third way quality data and publications can be developed with reduced funding is through collaborative research projects whereby scientists share the research design and costs for a particular field plot which can provide data useful to more than one discipline. Frequently, with a small addition to the research protocol a single research plot can provide additional information that can be the basis for an additional publication. In these cases each of the participating scientists will have authorship on additional manuscripts with a very small increase in cost.

The previous suggestions were provided to assist myself and other research center administrators in thinking about and planning how we can reduce our costs while still providing a continuous source of unbiased, quality agricultural research information. It is not expected to be a complete list but a means to begin our planning process.