

In Search of Research Entrepreneurship: A Tribute to Robert F. Chandler Jr.

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It is a pleasure to participate in the Chandler Memorial Symposium and address the topic of Bob Chandler's legacy as a research manager and institution-builder. This topic is especially appropriate at this time, when so many agricultural research systems concerned with the developing world seem to be in crises.

I first met Bob Chandler in 1947, when he took leave as a professor of Forest Soils at Cornell and came to Mexico as a soil scientist with the Mexican Government-Rockefeller Foundation Agricultural Program. I was quickly impressed with his intellectual and leadership skills. It was in Mexico, I believe, that he became convinced of the urgent need for, and challenge of, assisting food-deficit developing nations to improve their agriculture and food supply.

Within the year, he was appointed Dean of the College of Agriculture and Director of the Agricultural Experiment

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Station at the University of New Hampshire. He served in that capacity for three years. He then became President of the University, a position he held for four years. Our paths come together again, when he joined the Rockefeller Foundation in 1954, serving as Assistant Director, and later Associate Director, for the Agricultural Sciences Division.

In his years with Rockefeller Foundation, Bob worked as sort of a roving agricultural staff member, traveling extensively in Asia and Africa, and to a lesser extent in Latin America. In 1959, he was asked to establish the International Rice Research Institute (IRRI). He served as its Director until 1972, when he officially retired because of his age. But he continued with the Rockefeller Foundation for another three years, and given a special assignment to establish and serve as the first Director of the Asian Vegetable Research and Development Center (AVRDC) in Taiwan.

Bob Chandler's legacies as a research manager and institution-builder are many. However, I focus my comments on his role as founding Director of IRRI. I was privileged to visit him during this formative period and we had many discussions, especially concerning international germplasm exchange and testing, and the training of young scientists of developing nations.

In establishing IRRI and in shaping its research agenda, Bob took full advantage of the Rockefeller Foundation's experience in international agricultural research and development, first in Mexico and in South America and Asia. The Ford Foundation's role, especially on the financial side, was also central to the launching and rapid success of IRRI.

None of us involved in the creation of the first four international agricultural research centers -- IRRI, CIMMYT, IITA and CIAT (and others that followed) -- and the creation of the Consultative Group for International Agricultural Research (CGIAR) will forget the leadership of the late George G. Harrar of the Rockefeller Foundation and the late F.F. Frosty Hill of the Ford Foundation. They, in turn, were guided by the wise counsel of scientist-giants, such as E. C. Stakman, Paul Mangelsdorf, and Richard Bradfield, among a list of luminaries too long to mention fully.

A remarkable convergence of research talent and mentoring came together in the creation of IRRI. It was a new type of international agricultural research organization, clear in focus and purpose, which applied the best available scientific knowledge to expand the food supply for much of the world. Bob Chandler was one of those pioneers whose boundless energy and enthusiasm -- and complete dedication to a cause -- helped to

make rice available for hundreds of millions of people in the developing world.

### **Institution-Building**

One of Bob Chandler's outstanding leadership qualities was his attention to careful staffing. The way he combined very experienced rice researchers, like Hank Beachell, Akira Tanaka, and S.H. Ou in the early years, to mentor younger scientists like Peter Jennings and later, Gurdev Khush, was brilliant. An anecdote from Colin McClung captures Bob's philosophy on staffing:

"Find the person who has the background and wants to do the job and give him an environment in which he can excel. The person had to be well qualified in the basics of his field but prior knowledge of rice was far less important under Chandler management than a desire to take the ball and run with it. In retrospect it may be hard to believe but there was a concern when Gurdev Khush was being considered for employment at IRRI. Did he really want to be rice breeder or would he prefer to be a geneticist who worked out principles and left the job of developing varieties to others? Gurdev's response was unequivocal and the rest is history." Gurdev Khush today is the world's most successful rice breeder.

Chandler and his program directors at IRRI brought together a range of scientists with different professional skills that complemented each other and added value to the collective whole. Weekly seminars and symposia were enormously valuable in fostering cross-discipline understanding of the research program (personal communication, Colin McClung). This was an interdisciplinary institutional structure with a purpose.

The in-service and degree-related training programs instituted under Chandler's leadership were another great contribution, and followed in the tradition of Rockefeller Foundation agricultural programs. Trainees were involved fully in the grubby fieldwork of rice cultivation -- from planting to harvest. They helped prepare the international nurseries that went out each year to national rice research programs in Asia and beyond. David Hopper captured well the spirit (personal communication).

"The trainees became IRRI's best ambassadors to the farmer and the agricultural science community throughout the region. On the return of each to their home institutions, they brought back genetic material and the new practices to make this material more than double traditional 'best yields.' It was not just a revolution in rice production, for many in Asia it was also a revolution in teaching applied agricultural practices."

Strategic planning in Chandler's day was not a formal corporate activity, yet it certainly went on, and Chandler was instinctively good at it. Collin McClung (personal communication) described Bob's style well.

"Bob put in place a plan very early in the development of IRRI that was particularly effective in orienting the new organization and keeping it on track in a complex and constantly changing environment. He did it with the input of staff, trustees and others, often without them being really aware of it. He never mentioned the subject as such, or called a meeting to discuss it, but plans were steadily improved, modified, and refined."

Chandler was also an agricultural development leader, unafraid to venture into to what I often call "the no man's land" of economic policy. He took the case of rice modernization to political leaders with evangelical zeal. He knew that science alone would not bring a Green Revolution to Asian agriculture. Battles would have to be fought at the level of public policy. Farmers would need access to inputs, such as the seeds of the new high yielding varieties, fertilizer, pesticides, and the credit to buy them. They would also need price incentives to adopt these modern inputs and adequate access to markets to sell their surpluses. This was not a message happily received by

those who favored the status quo. But Bob worked tirelessly to bring these institutional and market changes to fruition.

### **Research Entrepreneurship**

Bob Chandler wasn't inclined to talk about himself, or his style of management. He talked instead about the results of research being achieved by IRRI scientists.

"On my trips to IRRI, I was struck by the fact that there was no doubt that Robert Chandler was the Director General, but there was also no doubt that each scientist, indeed, each employee enjoyed the freedom to undertake his or her duties and to challenge the DG's judgment as the results unfolded.

Chandler was truly a classic leader of a top caliber scientific research institution. Would that there were many more leaders cut to his mold." (W. David Hopper, personal communication)

All I can say to David's comment is "Amen." Bob Chandler is gone in body but not in spirit. My concern now is how we keep this sort of research leader and the sort of agricultural institution he headed so effectively for more than a decade, alive, dynamic, and thriving.

### Keeping the CGIAR Relevant

Frosty Hill, a key force in the creation of the international agricultural research center (IARC) system, told me in 1968 as we traveled across the Punjab looking at the wheat revolution and reflecting about the future of the not yet founded CGIAR, "Norm enjoy this moment while you can. From my experience with other institutions, I doubt that the international centers will have more than 25 years of productive life, before they succumb to the twin ills of bureaucracy and complacency." He added, "If this happens, my guess is that it will probably be easier to build a new set of institutions rather than trying to reform the old ones."

I find myself increasingly asking the question, are Frosty's predictions coming true? I hope not, but I must confess that I am not sure, especially with the reports I read, and the stories I hear, about the multitude of CGIAR committees, review panels, and meetings. These continue to grow, taking more and more of the time of research directors and program leaders away from the more productive work of the centers -- to generate new technology for farmers -- both small-scale and large.

I understand that more than 400 people now attend the CGIAR Centers' Week and mid-term meetings. How things have changed since the first Centers' Day (not week), which Bob Chandler and I attended in Washington in 1971. I would be surprised if we were more than 35 people present in the room. Moreover, virtually everyone at the table could speak for his or her organization, including making financial pledges, almost literally on the spot. Basically, it was an informal gathering of scientists and investors, in which the center directors reviewed their recent work and progress and laid out their financial requirements for the coming year, or years. Representatives from the donor organizations, often the CEOs themselves, listened to the technical presentations and financial requirements of the Centers, and made their commitments in a spirit of trust and respect. Then everyone returned home and went to work.

Although IARC and national agricultural research systems (NARS) scientists have advanced the frontiers of knowledge over the past four decades, I believe their more significant contribution has been the integration of largely known scientific information. Its application in the form of improved technology has raised farmers' incomes and overcome pressing crop production problems and food shortages. This should continue to their primary mission. Moreover, impact on farmers'

fields should be the primary measure by which to judge the value of IARC and NARS work.

Unfortunately, agricultural science -- like many other areas of human endeavor -- is subject to changing fashions and fads generated from both within the scientific community and imposed upon it by external forces, especially the politically-induced ones that affect the actions of financial donors. Increasingly, I fear, the CGIAR centers, and NARS as well, are falling prey to development bandwagons that will not solve Third World food production problems. One dangerous trend, I believe, has been the shift among donors away from promoting and supporting new high-quality agricultural research and technology generation and toward funding to foster social and environmental reforms that the CGIAR has no comparative advantage in addressing.

In his path-breaking book, *Transforming Traditional Agriculture*, and in other writings, the late T.W. Shultz, Nobel Laureate in Economics, argued forcefully about the importance of modernizing traditional agriculture, not maintaining it.

"When farmers are limited to traditional factors of production they ... can make little or no contribution to economic growth because there are few significant inefficiencies in the allocation of factors, ...and because the investments made to increase the stock of traditional

factors would be a costly source of economic growth...Accordingly, there would be virtually no entrepreneurial function, routine management would suffice.

But agriculture is not in such an equilibrium state. On the contrary, the transformation of agriculture into an increasingly more productive state, a process that is commonly referred to as 'modernization,' entails changes in what farmers do as new and better opportunities become available."

Clearly, our objective should be to establish the policies and institutions that will make it profitable for small-scale farmers to undertake modernizing investments to increase the productivity of agriculture. Much yet needs to be done on the policy making front. How can African agriculture modernize, for example, with farm gate fertilizer prices three to five times higher than the world price, and farm gate grain prices one half the world price? What incentive would any farmer have to buy these inputs at such prices? Why are we just accepting horrendous market failures such as these? Where is our righteous indignation?

I hear much minimalist talk today in CGIAR centers about helping farmers just to "feed themselves", rather than really "prospering" from their efforts in agriculture. Such thinking is

likely to slow future agricultural production, accelerate environmental degradation, and contribute to social and political chaos, not only in the developing world but in rich, complacent nations as well, where adequate food supplies and high standards of living are taken for granted.

Let there be no mistake about it, unless small-scale farmers see the possibility to make substantially better incomes from agriculture in the future, and also to reduce the terrible drudgery that traditional agriculture entails, they will abandon farming by the millions, and migrate to the cities to join the battalions of unemployed urban poor. The social, political, and human health meltdowns that could ensue from such a chaotic exodus might well threaten human civilization.

Agricultural research has become a substantial enterprise over the past century. It is so extensive that no research director can keep abreast of the many advances in science and no scientist can stay on top of all the changing conditions in agricultural production. Certainly, there are many management problems that must be addressed to improve the efficiency of agricultural research. But what needs to be done is far from clear.

I agree with T. W. Shultz that most working scientists are research entrepreneurs and that centralized control is an anathema to research progress. Yet this seems to be the

direction that CGIAR donors and leadership want to take the international centers. I quote Shultz,

“In the quest for appropriations and research grants all too little attention is given to that scarce talent which is the source of research entrepreneurship. The convenient assumption is that a highly organized research institution firmly controlled by an administrator will perform this important function. But in fact a large organization that is tightly controlled is the death of creative research. No research director...can know the array of research options that the state of scientific knowledge and its frontier afford.

Organization is necessary. It too requires entrepreneurs...But there is an ever-present danger of over-organization, of directing research from the top, of requiring working scientists to devote ever more time to preparing reports to ‘justify’ the work they are doing, and to treat research as if it was some routine activity.”

In today’s world, CGIAR director generals and program leaders are forced to spend more and more time chasing money, while demonstrating to a growing multitude of critics -- many of whom have little idea what farmers and developing countries really need from research -- that their centers are politically

correct. The result is that CGIAR leaders spend less and less time on the ground with their scientists, national counterparts, policymakers and farmers monitoring what is happening -- or not happening.

Some of the recent IARC downsizing, while painful, has probably been for the better, since many centers had grown too big. However, in this process, staff morale often has declined considerably. In particular, the perception that good career opportunities no longer exist within the CGIAR system needs to be dispelled. Thirty-five years ago, the centers were able to attract the best and the brightest outstanding young scientists who wanted to direct their talents to helping to solve Third World agricultural problems. Is this still true today?

I believe that the CGIAR centers must attempt to retain the best and brightest of their staff for as long as they can. This notion of forced staff turnover, following a rigid formula, is one of the craziest and most nonsensical ideas I have ever heard. An outstanding senior IARC leader is much more than a scientist. He, or she, must have strong networking (communications) skills and also have a good understanding of development. These talents take considerable time to develop.

Another worrisome trend in the CGIAR system in recent years has been the weakening of links with NARS, most of which are in greater financial and management crisis than the IARCs

themselves. The CGIAR centers cannot be a substitute for effective national research systems, much of which, because of the nature of research on food crop technology for small-scale farmers, will continue to require public sector funding. Thus, any strategy to maximize CGIAR investments in technology generation and transfer for food crops in the developing countries must find ways to fund adequately -- and with stability -- the NARS as well. Funding one without the other will not result in maximum impact.

One important IARC function is to serve as hub for various research networks. In addition to research collaboration on specific problems, IARC networking functions include germplasm and information exchange, which should include, I believe, continuing opportunities for practical in-service training for mid-career researchers from national programs, as well as visiting scientist opportunities for senior level visiting scientists. Even with all the advances in information technology, there is still a need for face-to-face contact. This means that NARS scientists need to visit the IARCs fairly frequently, while IARC scientists need to spend significant time visiting NARS scientists and touring agricultural areas.

In closing, permit me to quote from an article written by Andre and Jean Mayer, titled *The Island Empire*, which appeared

in the Summer 1974 issue of *Daedalus*, and remains relevant in the 21<sup>st</sup> Century and to this meeting:

“Few scientists think of agriculture as the chief, or the model science. Many, indeed, do not consider it a science at all. Yet it was the first science – the mother of all sciences; it remains the science which makes life possible; and it may well be that, before the century is over, the success or failure of Science as a whole will be judged by the success or failure of agriculture.”

The record of agricultural research and development over the past 50 years has been outstanding in many parts of the developing world. We have been able to keep food production ahead of population growth, especially in Asia, and to raise farm incomes and simultaneously lower the real cost of food to the consumer. In particular, the adoption by hundreds of millions of farmers of productivity-enhancing technology in rice, wheat, maize and other important food crops has especially benefited the poor.

But we need to keep working vigorously to keep food production ahead of population growth, and in a way that benefits farmers and consumers alike, without damaging the resource base. In this quest, we must be ever vigilant against the negative efforts of pseudo-scientists and “neo-Luddites,” many of whom, it seems, want to stop science in its tracks. My

last conversation with Bob Chandler, in October 1998, was exactly on this subject. His concern was about all of the nonsense maliciously being spread around in the popular press about biotechnology, and the negative effect this sort of reactionary thinking could have on agricultural progress.

Finally, let me express a fervent hope that those still working on the food production front will find new motivation and dedication in our work by remembering the stellar way in which Bob Chandler lived his professional and personal life.