



ICRISAT Innovations Shape the Future of Drylands

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ICRISAT Innovations Shape the Future of Drylands

This is the 4th anthology of my appreciative and interpretive essays on the theory and practice of science by the International Crops Research Institute for the Semi-Arid Tropics. All are original articles published online in the *American Chronicle* as well as the author's blog *ICRISAT Watch*; they have been collected, revised and edited into this present volume.

Frank A Hilario



**International Crops Research Institute
for the Semi-Arid Tropics**

Patancheru 502 324, Andhra Pradesh, India

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Contents

Author's introduction	v
Managing results/losses.	
The politics/science of climate change	1
ICRISAT's iMODE.	
The village as minimum development goal.....	5
Science journals.	
World Bank adds value to technical publishing	11
InfoDev 2012.	
ICRISAT, ICT & Nokia in a science context	17
William Dar leads.	
ICRISAT leads the way	21
Waters of Addakal.	
Woman, the deadlier species	25
The saluyot Ambassador.	
Lessons from India, Philippines	29
Sahel H₂O.	
ICRISAT & AVRDC in Africa	33
Isabela principle 1.	
In dry, don't look at the water!	37
Isabela principle 2.	
In rain, don't look at the water!	41
InfoDev means business.	
ICRISAT means dryland farmers	45
ICRISAT strat.	
Drylands & the economics of the little	49
ICRISAT IMOD.	
AT Magazine encourages India's leaders	55
Hyderabad Declaration.	
Marketing agri-business models	61
Grey-green.	
Folk wisdom & science grow grass	65

Earth Day 2010.	
ICRISAT for bracing against a perfect storm	69
Dryland challenge.	
Science, folklore, political will	73
Dar speaks.	
ICRISAT science with a human face	77
Creative climate science.	
What ICRISAT can teach US	85
CMU.	
Blue oceans and green harvests	89
Chickpea on dry.	
Science steps in, roots go deeper	93
Adarsha revisited.	
Impacts of CGIAR research	97
An African revolution.	
IMOD power to the women!	101
Adarsha alliance.	
William Dar as ICRISAT manager	107
Tanzania & Mali for Mbaazi.	
The black revolution in Africa	111

Adarsha & Arusha.

My favorite things ICRISAT

MANILA – Here's added knowledge for you: With Adarsha, you have additional water; with Arusha, you have additional income. In both, you harness people power in groups.

This is my 4th book on the institute, and now I can tell you my favorite things ICRISAT, and actually these are quite a few: *Team ICRISAT*, *Adarsha*, *sweet sorghum*, *microdosing*, *African Market Garden (AMG)*, *public-private partnerships*, *The Arusha Declaration*, and now *IMOD*. I like people; I love ideas. Let us just say I have been a quiet science observer in the last 35 years and been writing sporadically. Writing about science intensely in the last 5 years in my blogs and publishing online in the *American Chronicle*, it has been my pleasant experience that ICRISAT has managed to surprise me by coming up with a new or improved science idea every year. It must be the leadership; it must be the team.

Are ICRISAT's ideas Earth-shaking? Maybe not, but they are Earth-saving, each in its own way. Thus, in this book you will find these:

Team ICRISAT is the one that has accomplished all those things that ICRISAT is now known for. The Director General, Dr William D Dar, is just one man; he can't do a thing without his team. And so I have noticed that this team, once it knows what Good is, goes for Great!

Adarsha in Kothapally, India, harvests rainwater and stores it on the watershed for community use. Here, you can find diverse crops growing, women and landless folks busy with their livelihood endeavors, including poultry and livestock, with net returns more than doubled. I consider the development of the Adarsha watershed the most successful people-public-private partnership that ICRISAT has ever come up with. Here, the people and the scientists learned from each other, scientists *first*.

Sweet sorghum is my favorite climate change adaptation crop, ICRISAT's choice of a biofuel crop. This plant has multiple uses, more than sugarcane, and it grows well in the drylands where irrigation water is scarce or none at all. Perfect for my country, the Philippines.

Microdosing is designed to be small and beautiful. ICRISAT has found a way to use just a pinch of fertilizer to grow a hill of a crop where none grew before. Thus, William Dar says, "fertilizer microdosing increased yields 120% and incomes 150% in West and Eastern Africa." This is even better than what the British novelist-satirist Jonathan Swift

described: "Whoever could make two ears of corn, or two blades of grass, to grow on a spot of ground where one grew before, would deserve better of mankind and do more essential service to his country."

The *African Market Garden* is drip irrigation that is stingy on water but is lavish on results. Through the AMG, water is carefully rationed, delivered when needed, where needed. How good is it? The AMG is the secret behind landless Sahel women successfully growing indigenous vegetables on 7 hectares of marginal sites and, 3 years later, rehabilitating 70 hectares of degraded lands.

Public-Private Partnerships are not the invention of ICRISAT, but with them the institute has inspired many public institutions, private companies and philanthropists to contribute their time, initiative, means and efforts for the good of the people, especially the poor, in the semi-arid tropics of Asia and Africa. William Dar says, "In 2010, we were involved in 190 active partnerships and distributed 20% of our budget to partners to execute joint research-for-development activities." I dare say ICRISAT has been applying the creative capitalism that Bill Gates has challenged the world with.

The Arusha Declaration of the Governing Board of ICRISAT issued on September 2010 in the city of Arusha in Tanzania is historic and a great awakener of the Tanzanian breakthrough (my term) with ICRISAT pigeonpea, as the institute's Governing Board declares:

In seven short years, the lives of many smallholder farmers in the Babati District of Tanzania have prospered beyond imagination. I know the Tanzanian breakthrough has been achieved by linking the poor farmers to the market through producer marketing groups (PMGs).

IMOD is the acronym of inclusive market-oriented development, and is ICRISAT's new conceptual framework that will guide the institute's work for the next 10 years from 2011. It is explained at length in the *ICRISAT Strategic Plan to 2020*, downloadable at www.icrisat.org/strategic-plan-2020.htm. IMOD revolutionizes extension work from the science station to the farmer's field in that it targets the poor farmer and his family and links them to the market so that they can enjoy the values added along the way. The producer marketing groups in Africa are the inspiration. Since IMOD targets the poor farmers, it is so much like Grameen banking, targeting the millions of poor families.

Of course, you will find more about ICRISAT's theory and application of "Science with a human face" in this book than those I have listed above. Also, you will find along with some drops of knowledge precipitated by the institute, some drips of humor and wit rationed by me.

There remains for me to say that there are other things ICRISAT that I don't understand. So, I avoid writing about marker-assisted something because I can't put a handle on it. Finally, I get to like the ICRISAT website; now it's lively and lovely. The Agri-business Incubator is still a metaphor that I can only half appreciate incubated, for some reason, some eggs don't hatch at all.

In my last book, *Exploiting the Power of Science, Transforming the Semi-Arid Tropics* (2010), I had said, "Suddenly, the community watershed has become the first and minimum goal and, thereby, the first unit of measurement of successful countryside development." In this book, I present "the village as minimum development goal." The connection? It takes a village to develop a watershed.

Now I would like to quote from the Foreword of the Strategic Plan:

Since ICRISAT is already a thriving institution, we sought a tone of celebration in our strategic planning, rather than one of crisis management. We challenged ourselves to be bold and imaginative rather than defensive. We were determined to build on past accomplishments and expertise, but not to rest on them.

Borrowing from that quote, I dare say:

Since ICRISAT is already a thriving institution, I sought a tone of celebration in my creative writing, rather than one of critical thinking. I challenged myself to be bold and imaginative rather than offensive. I was determined to build on my past writings and abilities, and not merely to recite them.

I invite you to read on. I assure you that just to browse, you'll enjoy the views!



Managing results/losses.

The politics/science of climate change



MANILA – Every so often, an odd thought suddenly appears – and sometimes an old book you were not looking for. What do you do? Welcome the thought, open the book. The thought may change your mind, the book may change your perspective. If you're in luck, the perfect photograph will appear too.

Today, I am re-reading a 42-year old volume I love very much, paperbound; I'm browsing actually, guided by my handwritten notes of years ago. It's Peter F Drucker's self-confidence-busting *The Age Of Discontinuity with the subtitle Guidelines To Our Changing Society*. For probably 20 years now, I have always associated this book with Drucker's radical thought and have been intellectually guided by it: *Knowledge has become the central capital, the cost center, and the crucial resource of the economy.*

I'm not an economist, but I was formally trained as a teacher, informally training myself as a writer, editor, desktop publisher and knowledge manager – so you can imagine the quadruple impact on me of Drucker identifying knowledge as the new capital. They don't teach that in UP, or any other University for that matter.

That's in the very Preface of Drucker's book. Beyond that, I am reading these words:

The first question to ask in an innovative organization is: "Is this big enough so that we will have at least a new business, if not a new industry or a new technology if we succeed? If not, we cannot afford the risks." This is a very different question from the ones asked in the managerial organization when it does "long-range planning" or allocates resources. There one tries to minimize the possible loss. In innovation one has to maximize the possible results.

Suddenly a thought comes to me: What we're doing in climate change affirmative action is more minimizing the possible losses and less maximizing the possible results. We're not being SMART in managing climate change, are we? Sure, what we're doing is Specific, Measurable, Achievable, Realistic, and Time-Bound, but that's not SMART enough.

I have been writing intensely about ICRISAT and climate change and about Albay and climate change. So it doesn't surprise me that two names now pop up in my mind: Albay Governor Joey Salceda and ICRISAT Director General William Dar. Salceda is in the Philippines; Dar is in India; both are brilliant leaders and results-driven; both are award-winners; both are Filipinos. One is into politics, the other is into science. Now I see that what they're doing separately though thousands of miles apart are actually running parallel to each other. Now I think that the two should meet, exchange experiences – and then emulate each other, meaning, also do what the other is doing at the same time. When they do, I would mark that as Climate Change Day in my calendar.

What Salceda is doing in Albay along with his provincial government team and proselytizing all over the world, is climate change mitigation, but which he prefers to call disaster risk reduction; he's an economist, so I understand. "Disaster risk reduction is not a cost," Salceda loves to say. "It's an investment." What Dar is doing with his team at ICRISAT, and proselytizing all over Asia and Africa, not to mention Australia, is climate change adaptation. "We have climate change-ready crops," Dar likes to say. We should be listening to both of them.

Strange bedfellows? Now maybe I have succeeded in confusing you. Which is precisely my point. First, we have to understand where we're coming from so that we can plan on where to go, and how.

Let us take the ICRISAT sweet sorghum as ICRISAT's case of affirmative action and for climate change adaptation, and the Albay mantra of zero casualty in natural disasters as the case for climate change mitigation. Albay appears unique in that aside from climate change, it suffers every now and then from Mayon Volcano erupting and Planet Earth quaking, but there are common grounds. Climate change is the environment striking back as man-made natural disaster. You have flashfloods in India and you have flashfloods in Albay, for the same reasons aside from climate change: You have deforested your watersheds; you have destroyed your soils. One is action, the other is reaction. Both are necessary – are they of equal importance? I say:

ICRISAT, when you plant the seeds of sweet sorghum, you are planting a climate change adaptive crop: it is resistant to drought or hot weather, and therefore doesn't need irrigation; it thrives even in an infertile soil; and it has multiple uses: food, feed, fodder, forage, fuel, fertilizer. Your crop is climate-change ready.

Albay, when you plant the seeds of zero casualty, you are planting a climate change mitigation crop: it is resistant to typhoon, flood and volcanic eruption; it thrives even in an unwelcome environment; and it has multiple effects: commerce continues, education continues, science continues, the arts and the living continue in calm. Your people are climate-change ready.

All that considered, my proposition is that we need to be doing climate change adaptation and climate change mitigation. That is to say, we need both the crops of sweet sorghum and zero casualty. We have to grow them together, side by side. Even as we do better when we intercrop sweet sorghum with pigeonpea, we have to intercrop ideas. We will also need to be building/rebuilding watersheds and soils.

My further proposition is that ICRISAT and Albay gather their teams and in a 3-day workshop in January 2011 in suburban Legazpi City under the legendary watchful eyes of Daragang Magayon (Beautiful Maiden), work out one common project for the next 10 years that I shall refer to here as Magayon 2020: Sweet sorghum for maximizing results and zero casualty for minimizing losses.

Where there is a scientific will, there is a scientific way. ICRISAT has just come out with its Strategic Plan to 2020, so my proposal fits. ICRISAT's strategic move is called inclusive market-oriented development, IMOD, among other things especially including the poor farmers who are thereby linked directly to the market and all its attendant values added. IMOD transforms the farmers into entrepreneurs like they have never been before. IMOD is a brilliant move. So why not make it inclusive of the poor farmers of Albay? That would be maximizing results.

Where there is a political will, there is a political way. With Magayon 2020 as a common project, ICRISAT and Albay can then rightfully claim that they are into affirmative action/reaction as far as climate change is concerned. ICRISAT and Albay will then be both into innovation and management. Joey Salceda and William Dar will then easily become the co-champions of climate change of the United Nations.

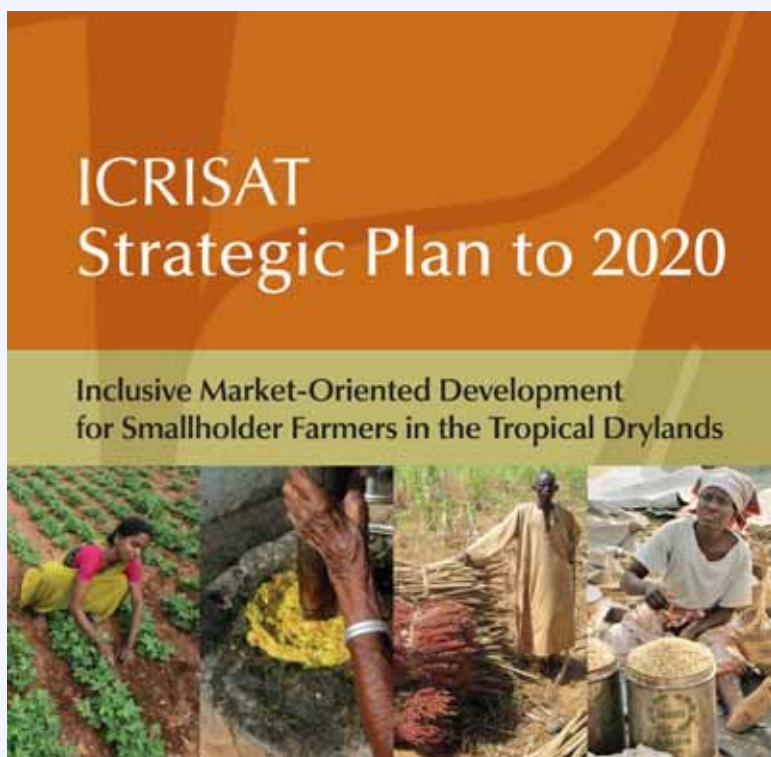
In doing Magayon 2020, ICRISAT and Albay would have proved that to what Drucker implies as the need to choose between minimizing losses and maximizing results, there is another choice: You don't have to choose. You can do both. With climate change, you have to do both.

When you do adaptation and mitigation side by side, you turn climate change affirmative action into a win-win situation.

(Published in the American Chronicle on 27 December 2010)

ICRISAT's iMODE.

The village as minimum development goal



MANILA – ICRISAT is quietly reinventing market-oriented agriculture, so you may not have heard of it. They call their approach inclusive market-oriented development. For that, they use the acronym IMOD; I prefer the acronym iMODE, to call attention to the concepts of inclusive and development, that which are ICRISAT's twin intellectual contributions to market-oriented agriculture (MOA). The central idea is to link farmers to markets in an inclusive way in order to escape poverty. Certainly a radical notion.

To appreciate the importance of that, let us consider Michael Porter's notion of the value chain, but in a modified manner. All things being equal, to a farm produce, there is value added along the way as it goes to the market. In MOA, the value chain actors are: (1) input providers, (2) producers, (3) traders, (4) processors, and (5) marketers (fiji-taro-and-kava.com). I interpret that quite simply as that the chain is like this:

Inputter --> Producer --> Trader --> Processor --> Marketer.

Note that the producer (farmer) is only #2 in the value chain. Above all, he is dependent on the inputter, who is #1 in the chain. Inputters include capitalists. The dependence of the producer is clearly illustrated by the fact that in the Philippines, farmers have to purchase on credit from the suppliers of inputs such as fertilizers and chemicals, these pair being the most expensive items in modern farming.

And if you notice, as the chain gets longer, the value keeps adding and adding, but nothing goes back to the producer. Now you don't wonder why the farmer remains poor. In this marketer-biased value chain, the farmer is totally dependent on what the chain can afford to give him in terms of a discount (by the input supplier) and of a price that he cannot dictate (by the trader).

Now, in this modern world, with scientific agriculture, especially with the advent of climate change, I believe the value chain is longer, like this:

- (1) Input providers - Suppliers of seeds, fertilizers, chemicals
- (2) Software providers - Suppliers of new knowledge or methods
- (3) Hardware providers - Suppliers of technologies: tools, equipment
- (4) Producers - Farmers and farm workers
- (5) Traders - Buyers in bulk or in excess of table needs
- (6) Processors - Manufacturers: semi- or full processors
- (7) Marketers - Businessmen: Developers of markets.

As it happens, the businessman may be in control of the whole production-to-marketing process. He may be the supplier of inputs, software, and hardware; he may provide capital to the producer, trader, processor, and marketer – if so, he controls the entire value chain; he controls who gets the added values.

What happens if you have the farmer as himself the businessman, as an active, decisive actor in all the stages of value-adding? Now you have an idea of iMODE.

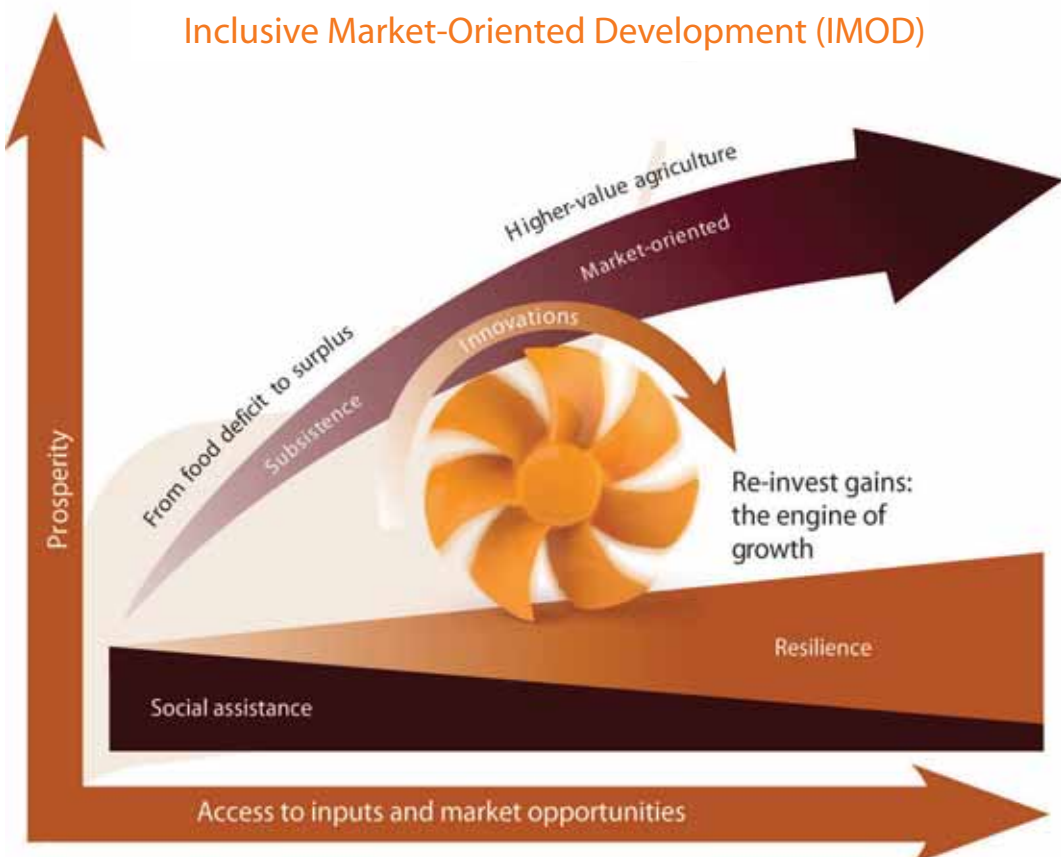
Already, there is market-oriented agriculture in general and market-oriented agriculture projects in particular. MOA is a beautiful name for commercial farming and gardening, but it unnecessarily limits the share given to the producer from the values added. iMODE brings the concept to a higher level with a wider sweep of the horizon, including the farmer as a sharer of the benefits along the way from inputting to marketing.

Did you notice that in the term inclusive market-oriented development, the word agriculture does not appear? My explanation is this, if I understand where ICRIAT is coming from:

Inclusive refers to the poor farmers being included, those who have little or no access to capital, credit, land, extra labor, and technology. I suggest that it also is inclusive of marginalized lands where you find marginalized farmers.

Inclusive also suggests that the farmers are in fact active participants and decision makers beginning with the supply of inputs and in each stage where their produce keeps adding value. In other words, with an appropriate business organization, such as a producers marketing group or a cooperative, the farmers can themselves be the input providers, software providers, hardware providers, producers, traders, processors, and marketers all in one.

Market-oriented refers to commercial purposes, producing for other consumers other than one's household; if in agriculture, this is the farmer producing beyond his family's food needs – theoretically, the more, the better. Market-oriented agriculture is commodity-specific, like market-oriented rice, corn, and potato. MOA is for improving the future of individual farmers with their favored crops and businessmen with their favored companies. I understand.



Market-oriented can mean two things: (1) you supply the product that is most in-demand by consumers, and/or (2) you create the market for a new product or an old but improved product. What the experts are calling market-oriented agriculture in the Philippines is planting high-value crops, such as what they have in Cotabato with cardava banana, hybrid coconut, oil palm, and rubber (soccsksargen.com), but those are good only for some farmers, not the great majority, and certainly not the poor ones. Also, under MOA, the producers are the same helpless farmers largely dependent on the benevolence of inputters, traders, processors, and marketers. MOA is more for improving the lives of other than producers. I can see that.

In contrast, where the market orientation is inclusive, the view is wider than simply a focus on commodity. I see that iMODE is for improving the future of villages. Indeed, I believe that the village is the minimum development goal and iMODE is the way to go. Inclusive of inputters, producers, traders, processors, marketers. Inclusive of stewardship of the environment. Development refers to a sea change, a socially shared growth. Inclusive market orientation brings about widespread socio-economic development that begins with the poor farmers.

If you talk ICRISAT, you talk of the semi-arid tropics, the drylands. Remember, there you will find 600 million poor people. You must think beyond agriculture so that “there is hope of breaking the stubborn grip of poverty, hunger, malnutrition and environmental degradation”. This calls for public-private partnerships.

I note that in 2005, ICRISAT designed an institutional new Vision and Strategy to 2015. This year, 2010, five years later, they found the need to reformulate and came out with the ICRISAT Strategic Plan to 2020, subtitled “Inclusive Market-Oriented Development for Smallholder Farmers in the Tropical Drylands.”

This conceptual framework of IMOD envisions a path to end poverty, not just alleviate it. This concept relies on unleashing the energies of the poor by enabling them with diverse, purposeful, innovative and action-oriented partnerships, more productive and resilient technologies, and supportive policies. The poor will have to be active actors working for the development of their own villages, inclusive of their own.

Throughout the history of agriculture, one path has provided a consistently effective way out of poverty: the generation of surpluses that are stored for later use, or sold into markets to earn income. Stored food provides a buffer in times of hunger, and higher incomes make it possible to purchase more food when needed. Income also enables the poor to purchase inputs, such as seed, fertilizer, labor, tools, livestock, insurance and education. These inputs raise farm productivity and prosperity further and enable another round of investment and productivity growth, creating a self-reinforcing pathway out of poverty.

About IMOD, ICRISAT says, “Rather than considering poverty to be a ‘normal’ and inevitable state in the drylands, this conceptual framework seeks a fundamental transformation to a different state – one of markedly higher agricultural growth and prosperity. Our strategy is designed not to alleviate poverty but to help end it.”

“We will carry out research to improve assistance programs and policies, strengthen safety nets, and build resilience – thus opening doors to IMOD.” Environmental resilience, to ICRISAT, is the ability “to withstand and recover from such recurring stresses as drought, heat, windstorms and disease epidemics.” I see those as climate change adaptation and climate change mitigation.

Ultimately, IMOD/iMODE is all about sharing by the poor from value chain systems. “IMOD should be geared (towards increasing) the proportion of total value within the chain that is captured by the poor, eg, through cooperative land and farm operations management, collective marketing and related strategies.”

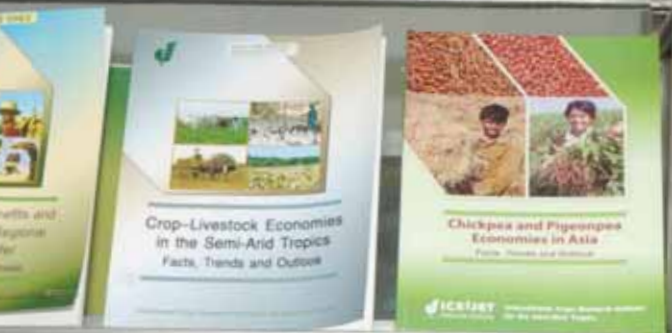
With market-orientation as part of its new unifying concept, will ICRISAT stop improving the genetic stocks of its five mandate crops – chickpea, groundnut, pearl millet, pigeonpea, and sorghum? Of course not! New varieties are great inputs into inclusive market-oriented development of communities.

So, inclusive market-oriented development includes women, the landless, unemployed youth, the elderly, and ethnic communities. ICRISAT and public-private partners will contribute to the common endeavor the required inputs, software, and hardware; will link farmers to traders, processors and marketers, if the farmers themselves do not assume such roles.

In iMODE, everything is included, considered. Now there is market access for the farmers; distorted market prices become a thing of the past; you make the farmers competitive, even given lack of infrastructure – which is merely a challenge to ingenuity. In iMODE, development is shared specially with the poor. Where there is a will, there is a way to share values added.

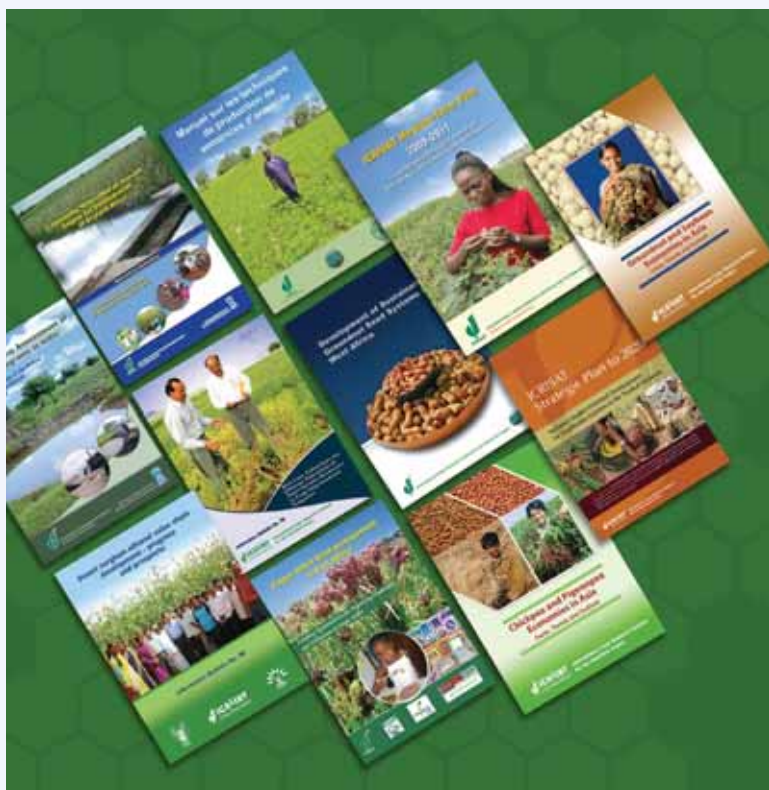
Inclusive of poor farmers. In ICRISAT’s iMODE, I see the future.

(Published in the American Chronicle on 10 December 2010)



Science journals.

World Bank adds value to technical publishing



MANILA – Publish or Perish! is as true in 2010 as it was in 1985 BC (Before Computers). Many a scientist finds it literally a matter of life or death – the life of keeping one’s job, or the threat of losing it. Technical journals remain problematic as ever. Some things never change.

There are 15 centers under the aegis of the Consultative Group on International Agricultural Research (CGIAR); two of these that I am familiar with are ICRISAT and the International Rice Research Institute (IRRI) based in the Philippines. Since within ICRISAT and IRRI as it is within the rest of CGIAR, Publish or Perish! is a common concern.

Institutionally, ICRISAT should know by heart Publish or Perish! Institutions are not exempt from the hegemony of technical journals. ICRISAT is aware of the positive impact of being able to publish as well as the negative impact of not being able to publish in a journal of repute. For the institute, publishing a number of papers may mean the highest rating of Outstanding, or the lower rating of Superior, where for Outstanding, you may get a bonus funding support courtesy the World Bank; and for Superior, you get a bonus "Thanks for trying." Rated O not only gives the institution the honor of being on top it also greatly attracts millions of dollars for projects.

Scientists are expected to publish for several reasons: (a) to advance knowledge, (b) to test new or improved ideas, (c) to contest conventional knowledge, and (d) for monetary considerations. It is also an indirect measure of value added.

ICRISAT knows better about the value of having enough papers published in world-class publications, having won the annual rating of Outstanding in 2006 and 2007. Understand that the CGIAR Performance Measurement is based on the following, my summary (bic.searca.org):

- (1) Results - outputs, outcome and impact
- (2) Potential to perform - quality and relevance of research: peer-reviewed publications, publications with developed country partners
- (3) Institutional health - governance, culture of learning and change, diversity, and financial health.

Note that effectively, CGIAR assigns a great value to the "potential to perform" and declares that this is equal to "quality and relevance of research" which in turn is measured in terms of publications and publications only. So, how important is it for a CGIAR institute to be able to publish in appropriate journals? Extremely important. To ensure quality, these papers must have been published in peer-reviewed journals, that is to say, critiqued by colleagues or co-equals. The authorship may be individual; if the paper has two or more authors, co-authorship with scientists from developed country partners is given higher points.

All things being equal, the higher points are crucial; thus, in 2005, ICRISAT got 43% for co-authorship and was rated Superior; in 2006 and 2007, ICRISAT got 49% for co-authorship in both years and was rated as Outstanding. The mathematical difference of 6% is minor, but the ranking difference from S to O is major, and this lies in the quality of papers published.

With CGIAR, science publishing has never been this important. This is quite a revelation to me: Technical publishing contributes about 1/3 of the performance ratings of CGIAR centers. If such is the case, to attract more support from CGIAR, its

allies and advocates, it stands to reason that those CGIAR centers devote 3 out of 9 institutional moves in support of publishing papers in world-class journals. One cannot over-emphasize technical publications.

Therefore, CGIAR centers must in-house pay extra attention to technical manuscripts submitted for publication. All the more so because, there are seven problems when it comes to publishing in science journals:

- (1) Editorial assistance. Science publications go after high quality of manuscripts submitted, as they should; nonetheless, science editors do not feel it is their duty to assist authors in achieving such quality, so authors are left to their own devices.
- (2) Institutional support. Institutions expect high quality of manuscripts submitted by their staff, as they should; however, they do not assist authors in meeting the high standards of journal editors.
- (3) Time spent publishing. Assuming promising quality of manuscripts submitted to journals, it takes from 1 to 3 years before the paper is finally published, an unforgivable delay, especially with lightning-speed information and communication technologies, IT in terms of hardware and software available today for word and image processing, up to and including desktop publishing. With IT within reach, delays in peer reviews and author revisions are poor excuses for delays in publishing. I know a technical manuscript can be expertly reviewed in 4 hours, so why does it take 4 months times 6 for a journal to come out of the press?
- (4) Knowledge of subject evaluated. Since papers published are highly technical, it is doubtful that CGIAR-assigned evaluators who are not specialists understand holistically the papers they are evaluating in terms of "potential to perform." To correct this situation, subject matter specialists may be assigned to pre-evaluate published papers.
- (5) Expertise in technical writing. Scientists are only minimally trained on how to produce quality technical papers. Aside from the problem of grammar and style, there is the problem of substance, which not only must observe appropriate technical content but also must be governed by the 4 Cs of Communication: Comprehensiveness, Coherence, Conciseness, and Clarity; and no, you can't have one without the other. Experience is necessary; expertise is a must.
- (6) Statistical analysis. Often, statistical analysis of data is either lacking or inadequate to support any conclusion. This oversight may be indirectly explained by the fact that frequently, in many a manuscript submitted, a table is "discussed" in one sentence such as, "Table 13 shows that the mean yields declined from 2007 to 2008." There is no effort by the author to discuss further the relationships of the data shown, hence he sees no need for further statistical investigation.
- (7) Conclusions made. Also often, conclusions and recommendations are made on the basis of the results of only one study using 2 or 3 replications. This is against reason and yet it continues to be practiced.

In the age of computers, that is, with the lightning speed of processing and exchanging data & information, why is technical publishing 1 to 3 years behind

publishing time? And I'm talking not only of the Philippines; in this country and elsewhere, the journals themselves publish the dates of receipt of a manuscript, review, revision and final acceptance for publication for each paper.

I think I can explain the unforgivable delay in publishing: It's the inadequate knowledge and understanding of authors, editors, reviewers, and page designers (layout artists) of the art & science of the whole publishing process. Publishing isn't just author writing; it's critic reviewing; it's editing; it's proofreading; it's author revising; it's page layouting; it's copyreading and proofreading; and it's finalizing for camera-ready printing. The delay can happen in any of the stages; it can happen in all.

To improve the flow of experimental results from studies to scientists, from fields to farmers, I strongly recommend that science institutions take matters into their own hands. Huge science offices like ICRISAT and IRRI should not only be active but also pro-active users of information technology. For the institute staff to optimize their use of IT, my editorial recommendations are twofold, that is, for each institution itself to:

- (a) Assist technical and popular authors. The institute can redefine the role of what I shall refer to here as its Department of Communication to assume an expanded power of communicating science not only to its clientele, allies and advocates but also to the experts, both in their individual language of ease. This calls for reorganizing the Department of Communication into two units: technical division and popular division. The technical division assists authors with their manuscripts before submission to journals; the popular division takes care of popular-language communication efforts. And since there is no formal training in writing technical papers, the Department of Communication should provide for free informal, hands-on workshop-seminars. In the institutional pursuit of quality, all this is crucial. To paraphrase Shakespeare: The quality of papers is strained; it does not drop gently from heaven.
- (b) Publish its own technical journal. Better yet, the institute becomes its own science publisher. The institute can then appoint the staff and manage them in such a way that they can dedicate their utmost to the publication of high-quality papers. Modern IT should be harnessed to the full. Once the whole publishing system has been established and routines learned by heart by the editorial staff, it should take only 4 months to come out with a journal issue, not 12. This will encourage the scientists to write more technical papers and more often – and ensure more than enough quality papers come the time for CGIAR evaluation.

This essay was inspired by the recent request given to ICRISAT by a European body to submit five papers published in "significant technical journals", as indicators of the high quality of ICRISAT research. The phrase "significant technical journals" was not explained, but I can easily take it to mean "prestigious" or "ISI-listed," meaning it has at least these four characteristics:

- (1) It comes out regularly and on time.
- (2) It has a working international board of editors

(3) The papers are of international appeal and application

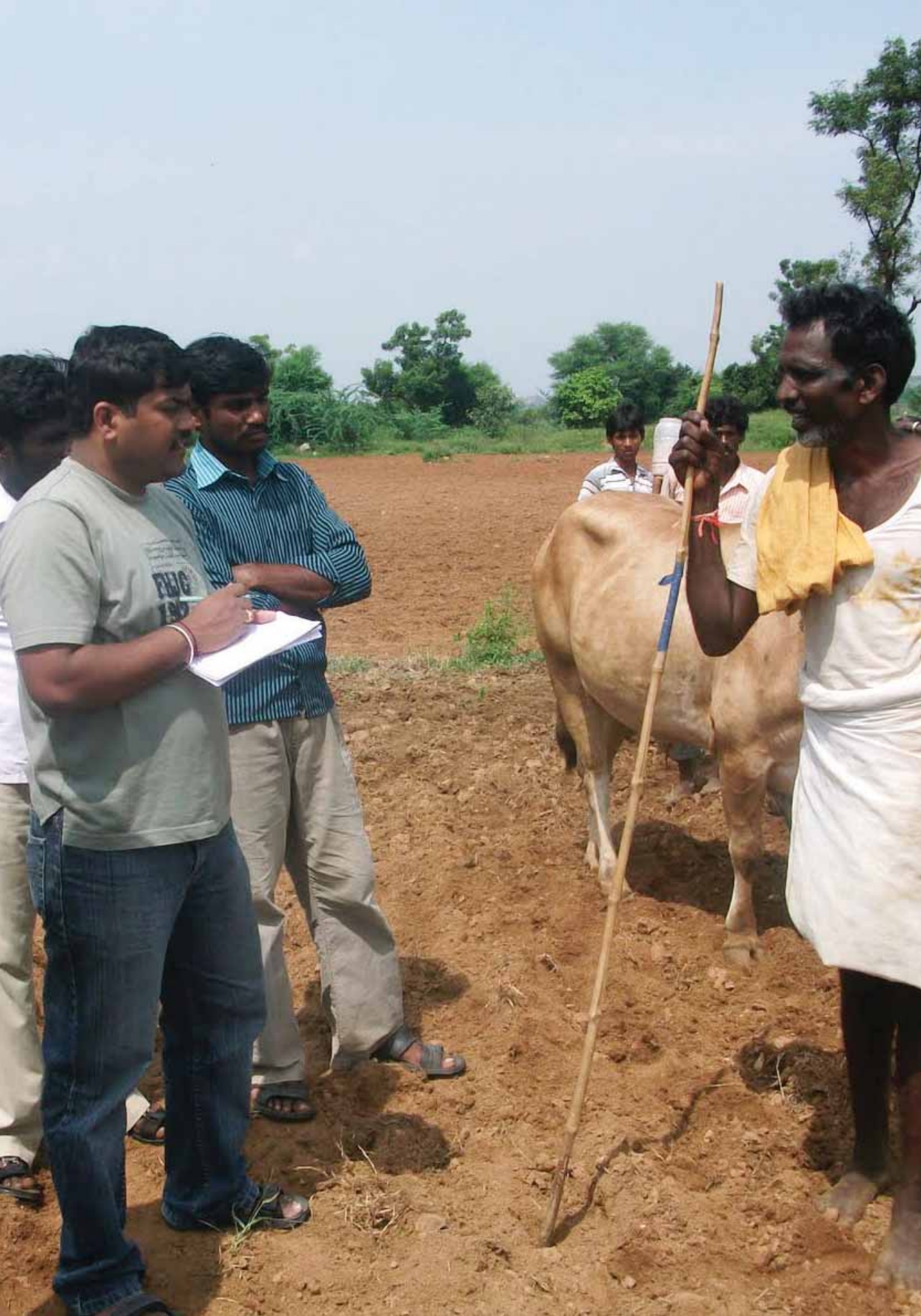
(4) The journal is well-edited.

In short, the journal is world-class. ISI is acronym for Institute for Scientific Information, an American database of technical journals around the world. When men of science anywhere ask about your paper or journal, "Is it ISI?" they mean, "Is it world-class?" The ISI was purchased by Thomson Reuters in 1992 (Wikipedia), and is now referred to as "Web of Knowledge," but I know the old name "ISI" rings a bell that the new name doesn't, so "ISI" remains in widespread use, at least in the Philippines.

I noted that to comply with the request, ICRISAT submitted 5 best scientific papers and two recent papers on impact assessment. I thought the request should have been for more papers and more diversity in subjects covered. I also remembered ICRISAT Director General William Dar telling me a couple of years ago, when I asked why the institute was not ranked Outstanding by the World Bank for the 3rd consecutive year (2008), that one reason was the lack of technical papers published because of the staff turnover, retirees being replaced by junior scientists who are not ready with their own work to publish something worthy.

Mediocrity is not an option. So I say: Publish! Or Perish! the thought of being Outstanding.

(Published in the American Chronicle on 6 December 2010)



InfoDev 2012.

ICRISAT, ICT & Nokia in a science context



HYDERABAD – Nokia was there listening in to the science and business conversations, with 50 participants from 15 countries attending. The slogan as well as the vision of Nokia is, “Connecting people.” In that 3-day meeting, 26-28 October, as this mobile company partnered with the Government of Finland, the department for information for development or infoDev of the World Bank Group, and ICRISAT, for agri-business incubation for developing countries of the world, in time I imagine that vision will read “Connecting people to science.”

The mobile phone can be one of the key elements in that transformation. That explains the presence of Nokia in the 26-28 October global launching, by the World Bank's arm for the global sharing of information on technology for development, infoDev of the Community of Practice (CoP) for Agri-business hosted by ICRISAT.

The CoP for Agri-business is one of the programs of infoDev. The kick-off meeting was designed to be a sharing of knowledge and knowhow in order to shape the global agri-business CoP work program for up to the year 2012. The CoPs for Agri-business work programs for Youth, Women and High Growth have already been planned for.

ICRISAT is no stranger to ICT for the extension of science; it already has its Virtual Academy for the Semi-Arid Tropics (VASAT), in which computers, the Internet and mobiles play necessary roles as media for question and answer exchanges for empowering villagers with modern knowledge. With women volunteers, among other things, VASAT informs farmers of good agricultural practices as the villagers' basis of response to the harsh and adverse conditions in their communities.

The Hyderabad meeting was "to understand the key challenges and opportunities for agri-business in developing countries and emerging markets," Steve Giddings of infoDev said, "and to share successful incubator models that have supported and graduated successful agri-business SMEs" (quoted by Business Line as cited). The actual networking of the partners is through the infoDev Incubator Support Center (iDISC). Small and medium enterprises (SMEs), are the targets of infoDev through the iDISC.



I am impressed that Nokia is part of this World Bank-led science partnership. I can therefore imagine a Nokia-handheld agri-business growth in the developing countries as a result of the CoP of Agri-business in the near future. Nokia is aggressive when it comes to mobiles. In 1992, with its new President and CEO Jorma Ollila, Nokia began focusing on telecommunications and in 1998, it became the world leader in mobile phones. Thus, it is easy to imagine that Nokia will come up with an application or two to bring science to callers or texters in ear-size or thumbnail-size bites and in adjustable, readable, even floating texts to give the CoP of Agri-business some world-wide success.

So, Nokia is a welcome partner in communicating science to non-scientists. This is welcome and necessary, as the context is as important as the message itself. Context must be emphasized in all knowledge user-scientist exchanges at all times.

That's the power of mobiles, with which ICRISAT is quite familiar. Mobiles are no longer a luxury but a necessity. The Institute's VASAT is designed to use modern information and communication technologies, as well as distance learning, "as an innovative and cost-effective medium to inform, educate, and mobilize a critical mass of our partners and clients spread across big geographical areas in Asia".

A case in point is the performance of the pilot site in Magalang, Pampanga, of the Open Academy for Philippine Agriculture (OPAPA), which is the counterpart of VASAT in the Philippines. ICRISAT reported that "the accomplishment of OPAPA Pampanga is a global success – first-time ever, particularly in using text messaging (SMS) and AM radio as extension tools to efficiently relay agricultural information" for countryside development (8 February 2007, openacademy.ph). I'm not surprised – the Philippines is the text capital of the world.

In partnership with an all-women self-help group called Adarsha Mahila Samaikhya (AMS), ICRISAT through VASAT shares knowledge with villagers in India, for instance on how to combat drought in the villages, and this is done via an information hub with computers and cell phone-based Internet connections. Sharing the right information with poor dryland farmers at the right time can help them overcome the effects of drought," Dar says. Cell phones can see to that.

Also, through VASAT, farmers learn about alternative crops and vegetables that are hardy even with lack of rain: castor, pigeonpea, green leafy vegetables like spinach and amaranth, tomato, etc.

The World Bank is interested in agri-business because it knows that it can help increase the gross domestic product (GDP) of developing countries, in order to help the poor. And why business in agriculture? In his inaugural speech at the 3-day meeting, Director General William Dar said, "The World Bank estimates that GDP growth originating in agriculture is about four times more effective in reducing poverty than GDP growth originating outside the sector." Dar pointed to China's modern experience as showing that agriculture is the key to the door of development in disadvantaged countries.

Dar said the conceptual framework of ICRISAT for reducing poverty and hunger in the drylands, in the semi-arid tropics of the world, is called inclusive market-oriented development. This is within the context of the CoP for Agri-business. IMOD enables farmers to reap the benefits of markets because, as a group, they handle the marketing of their own produce and receive value-added for their labors that would otherwise accrue to the middlemen. Thus, IMOD helps improve livelihoods and contributes to the mission of eliminating poverty in the drylands.

Under the context of ICRISAT's IMOD and the CoP of Agri-business of infoDev, ICT in general and Nokia in particular will be there as partners to relay the messages. And with its experience, ICRISAT would be on top of the ICT situation. All for one: The drylands poor.

(Published in the American Chronicle on 1 December 2010)

William Dar leads.

ICRISAT leads the way



INDIA – 2010 is the Chinese Year of the Tiger. It might as well be, as the tiger is one of the endangered species.

The year's name goes well with the UN declaration of 2010 as the International Year of Biodiversity – a global call to prevent the irrevocable loss of the world's plant and animal species either due to natural disasters or human activities, legal and not. That means, ideally, that the vegetation and wildlife we see today can be reproduced anywhere today or in the future if necessary. The nature we experience today, our grandchildren should be able to experience in more ways than one. We owe it to them. It's called intergenerational equity. A simpler term is legacy.

Some 40% of the world's economy and 80% of the needs of the poor are derived from biological resources, according to a report. In April 2002, the Convention on Biological Diversity committed itself to reducing the rate of biodiversity loss by 2010. The world needs biodiversity.

But then again, biodiversity is such a discouraging word I'd like to simplify it. Bio, life; diversity, variety. The word has actually been derived from biological diversity. But it is much more than just variety of life.

My definition does not limit biodiversity to the variety of life; it goes on to imply the web, the network, the interconnectedness of all life, the complexity of all that and yes, and more importantly, connecting to man, pointing to man...

I'm glad to find that I wasn't whistling in the wind early this year. Based in India, Team ICRISAT, led by Director General William Dar, has come up with its own wide-ranging interpretation of biodiversity.

For more than three decades, ICRISAT focused its research on five "mandate" crops, but current thinking has steered the Institute into a more holistic approach in its mission. ICRISAT's approach to the preservation of biodiversity is multi-pronged – conservation of genetic resources, diversifying the uses of its mandate crops, developing farmer-friendly pest management strategies and the employment of modern scientific tools, such as GIS, to trace progress of land erosion and degradation in order to save and protect the affected areas.

"Current thinking has steered the Institute into a more holistic approach" – that is to the credit of Dar. Holistic – everything is related to everything else. The whole is greater than the sum of its parts.



To conserve the genetic resources – that is, the genes contained in a germplasm such as a seed – of its mandate crops, ICRISAT maintains accessions (additions) of its collections of chickpea, groundnut, pearl millet, pigeonpea and sorghum under long-term storage in the Institute's genebank. Even so, samples of the seeds are freely available for research purposes. ICRISAT has also contributed duplicate samples to the Svalbard Global Seed Vault in Norway.

One life into another life. One other way ICRISAT conserves the variety of life is by injecting into the life stream of domestic species some desirable traits from wild species, such as resistance to late leaf spot (injected into groundnut), resistance to the army worm (into the tobacco plant), as well as high protein content, dwarf growth habit, and resistance to insect pest (into pigeonpea). That's the modern interpretation of "acquired traits" versus "inherited traits." Natural breeding is too slow and the pests are too fast.

"ICRISAT's work on crop diversification," says Dar, "hinges on three objectives: improving the livelihood options of the farmer, the effective use of scarce resources, and sustainability." If not the farm, the sources of income must be diversified. The costs of farming must be reduced. Farming must not only survive; it must improve the life of the farm family.

Thus, ICRISAT encourages the additional use of pearl millet, sorghum and as fodder (stems and leaves) for livestock. Likewise, the Institute urges the use of grains of pearl millet and sorghum in the poultry feed and brewing industries. Added uses are added values.

"Sorghum is a super crop," says Dar. You use the grains for food; you extract the juice from the stems to make bio-ethanol, and you use the collection of crushed stems and leaves, called bagasse, as livestock fodder. You can also use the bagasse as organic fertilizer. In just those, sorghum beats sugarcane as a crop.

Because of its multiple uses, I called sweet sorghum the "Sweetheart Crop". For one thing, American corn is food elsewhere but now is being turned into bio-ethanol; in contrast, sweet sorghum does not diminish the corn supply like American corn does, and yet sweet sorghum increases the bio-ethanol supply. Sweet sorghum does not rob Peter to pay Paul.

Aside from sorghum, ICRISAT also promotes the use of *Jatropha* and *Pongamia* as sources of biodiesel. "These crops grow well on degraded lands," Dar says. In so doing, these crops trap the moisture in the soil and thereby increase the watershed value of that degraded land.

Aside from all that, ICRISAT promotes the cultivation of medicinal and aromatic crops. "Medicinal and aromatic crops require less water and fetch better prices for the farmers," says Dar. You bring down the cost of production, you bring up the returns. That counts towards sustainability. These crops are values added.

A miserly drip irrigation system, the African Market Garden, is a good example of an ICRISAT-based technology that brings down the cost of production of vegetable gardening and brings up the returns. Along with the World Vegetable Center, ICRISAT helps the farm families in West and Central Africa put food into people's stomachs and income into the farmers' wallets – in this case, the women's wallets first, as the ladies have been found to be the best farmers yet: Unlike the men, the women think of their family first.

In the matter of pests, ICRISAT entomologists have come up with a non-chemical pesticide against the single infamous worm of many guises and that attacks many a crop, as you can guess by the five names of this single insect pest (scientific name *Helicoverpa armigera*): cotton bollworm, tobacco budworm, corn earworm, tomato fruitworm, and gram pod borer (Discover Life & Wikipedia) – the worm refers to its larval stage. It's a moth, and it's deadly.

Against that worm, one non-toxic method that ICRISAT prescribes is simply shaking those crawling things off the plants; another is the use of the nuclear polyhedrosis virus as a bio-pesticide. I will leave the virus alone. In the first method, the Indians see to it that chickens follow the shaking of the leaves – the worms drop and they fall almost right into the open mouths of the birds. It's a chicken-and-worm situation. I like *au naturale*.

(Published in the American Chronicle on 19 April 2010)

Waters of Addakal.

Woman, the deadlier species



ADDAKAL – We are in a cluster of 37 villages spread over 19,397 hectares in Addakal Mandal in Mahabubnagar District of Andhra Pradesh in India. Here, ICRIASAT tells me there are many more animals (87,000 head) than humans (52,000 heads) (vasat.icrisat.ac.in). I find that funny, as I think the animals must multiply faster than the humans. I find it interesting that we are in one of the poorest regions in India, and considering the drought getting severe, yet the animal species outnumber the human species. Addakal had a severe drought in 2002, and a less severe one in 2005. In 2009, the rainfall was below 20% of normal, and the larger region had the driest June-July period in 80 years. Sadly, I learn that in Addakal, migration and suicide had been reported to as coping mechanisms. We are here to see that science is a better coping mechanism.

And so, sheep, cattle and goat are “helping the poor people of Addakal to survive the vagaries of the harsh climate,” according to ICRISAT. I find a curious situation in Addakal. All those animals eat grass and related species – so, there must be enough vegetation living around. Which means that there must be enough soil moisture to grow the vegetation. But ICRISAT also tells me most of the tube-wells, open wells and tanks in the area had dried up and the area was now highly drought-prone. Where are the waters of Addakal coming from?

We must go back six years. In 2004, the all-women group calling themselves the Adarsha Mahila Samaikhya (AMS), with the advocacy of the State Government of Andhra Pradesh, approached ICRISAT for help in setting up an information center or something to help the farmers in the Addakal Block survive and, even more so, surmount the drought. Scarcity is the mother of invention. This was highly unusual – this was the knowledge user seeking help from the knowledge creator, a bottom-up transaction; here was knowledge that was demand-driven, where before it was supply-pushed. Knowledge is power; these were knowledge seekers empowering themselves. The women knew what they wanted; could ICRISAT deliver?

In response, ICRISAT, through the Virtual Academy for the Semi-Arid Tropics (VASAT), a partnership, set up an Internet facility at the AMS campus with personal computers to support basic operations. ICRISAT provided technical assistance and advice; the AMS ran the facility. The AMS is a federation of successful all-women micro-credit self-help groups with a membership of 6,300 from 21 villages in Addakal. It has been active since 1994. The women have proven to be more successful in managing credit than the men. And now here they are starting to show that they are more successful in managing information than the men!

ICRISAT and partners have since set up Village Information Centers with their own Internet facilities in all 21 AMS villages of Addakal Mandal: Addakal, Chakrapur, Dasarpalli, Gajulapet, Guidibanda, Janampet, Kandur, Kankapur, Kataram, Komireddipalli, Nandipet, Nizalapur, Polkampalli, Ponnakal, Rachal, Shakapur, Timmailpalli, Timmapur, Turkanipur, and Vemula, with the one in Moosapet as hub. There is now even a 2-way video-conferencing facility, courtesy of the Indian Space Research Organization (ISRO).

Specifically addressing the worsening drought, using modern information technologies, including remote sensing and geographic information systems (GIS), ICRISAT and partners created what they call micro-level drought vulnerability prediction maps. The GIS-based framework of the Indian Institute of Technology (Mumbai) for water-deficit calculations – actual water requirements against predicted rainfall availability – had been validated in 2007. Also simplifying their science lives, I imagine the AMS women probably simply refer to them as color-coordinated maps.

A drought map tells you how much drought to expect in any Addakal AMS village in the coming year given a predicted annual rainfall of say 400 mm: 50% to 75% (the red areas in the map), 0% to 50% (yellow areas), and 0% to 25% (green areas) where there is up to 25% surface water available. A drought map is distributed at the beginning of

the planting season so that the farmers can adjust their plans. If the predicted rainfall is more, or less, the colors change accordingly.

Red is Stop and consider; Green is Go. Through the all-women AMS, the farmers in Addakal were taught to interpret the drought maps and plant their crops according to the best lights of science and not the best lights of tradition. There is another tradition broken here – where the extension people were usually male (at least in the Philippines), they (referred to as information mediators) were now all-female. In extension, the female of the species is proving to be deadlier than the male.

Which meant that in the red and yellow villages, modern science was changing the generations-old patterns of cropping into reality-based farming.

Plant drought-resistant crops!

That in fact is only the first of a 4-part dryland strategy developed by ICRISAT, according to DG Dar, in the face of climate change. Here's my interpretation:

1st, Plant drought-resistant crops. Farmers must match crop to season and soil moisture. This calls for the growing of crop varieties that tolerate severe lack of moisture. ICRISAT has developed such varieties of sorghum, pearl millet, chickpea, pigeonpea and groundnut.

2nd, Grow shorter-duration crops. With delayed monsoon rains, farmers cannot grow their traditional crops. So, crops must follow the water. "Short-duration crops thrive and yield well even with scarce water," says Dar, "as they mature before soil moisture gets depleted."



3rd, Conserve soil & water. Harvest water during the rainy season. Enrich the soil with good agricultural practices that build the soil as well as keep the soil moisture where it should be.

4th, Empower dryland farmers. Train the farmers; advocate for rural institutions and urge government to formulate policies in favor of dryland agriculture.

Not forgetting the reality of climate change, thinking of the waters of Addakal and having in mind all those micro-level drought vulnerability prediction maps, I just had the idea and I hope that ICRISAT and partners will now go ahead and develop color-coded soil-water maps to encourage more farmers to enrich their soils naturally and, naturally, those soils will hold more moisture, drought or no drought. That should be interesting if not easy. ICRISAT already knows how to create those drought maps; it already knows conservation agriculture. With those colorful soil-water maps, the early adopters in the villages will appear green in the soil-water maps, and the laggards will appear red or yellow, so I'm sure they will get shamed and/or jealous and be encouraged to go and do likewise. I'm a farmer's son; I know farmers follow other farmers who are successful, success here being measured in how much more you earn from your crop than the others. And don't forget the AMS are very successful extensionists.

Bangladesh through Grameen first showed that women are better in managing credit than men; India through ICRISAT has shown that women are better in managing information than men. I rather think that these watersheds in history show the women are the deadlier of the species!

(Published in the American Chronicle on 27 May 2010)

The saluyot Ambassador.

Lessons from India, Philippines



PATANCHERU – This November, Ambassador of the Philippines to India Ronald Allarey visited the ICRISAT main campus here where Director General William Dar received him and showed him around. Among other things, Allarey saw saluyot (jute) growing there and said it was the secret of his good health. In the same month, on the other side of the world, pigeonpea harvests grown from seeds from ICRISAT were being turned into food products at the City of Batac in Ilocos Norte in the Philippines. The material is new, the manner is old. I say: The Filipinos can learn from India; the Indians can learn from the Philippines.

Allarey, from Quezon Province, may be of Tagalog stock, but his saluyot knowledge must be of Ilocano origin. The Ilocanos are saluyot eaters as the islanders found by Odysseus were lotus eaters, but with the opposite effect – the saluyot makes you active (you get high in vitamins and minerals), while the lotus makes you inactive (you get into a stupor). The saluyot is also good for “maintaining strong bones and teeth and a healthy count of red blood cells” (vegstalk.org). The saluyot is well-known in India, but only as a medicinal herb. I say if it’s a vegetable and a medicinal at the same time, it must be doubly good.

Popular in India, the kardis (pigeonpea) is not a popular crop among the Ilocanos of northern Luzon, or anywhere else in the Philippines. The Filipinos may not know it, but the seed is a nutritious food and the plant is resistant to drought, a double-benefit that applies especially to the Ilocano provinces of Northern and Central Luzon, especially the very parched hills and valleys of the Ilocos Region, or anywhere in the Philippines considering the advent of climate change.

Like the pigeonpea in the Philippines, the saluyot is hardly used as a vegetable in India. The ICRISAT visit of the Philippine Ambassador has pointed to the added value of this plant to Indian nutrition.

I can imagine ICRISAT giving the Ambassador the itinerary of visiting dignitaries, but I was surprised when the Institute also reported that “the Ambassador showed considerable interest in the water conservation (efforts) at ICRISAT (on campus), farm management, watersheds, vermicomposting and the *Jatropha* plantation” and that “the Ambassador said that the visit had been a very good learning experience on rainfed agriculture and its contribution to food production”. Such observations reflect either Allarey’s stored knowledge on dryland agriculture and/or his interest in learning more.

It looks to me like the Ambassador went to ICRISAT as a farmer looking for solutions to the problems of dryland agriculture in the Philippines, where irrigation water remains to be a headache for farmers, and that the saluyot was accidental. Truth to tell, there’s dryland where there are irrigation canals, as in Isabela in northern Philippines – and there’s water, water everywhere but not a drop to drink, if you were a farmer’s crop. I’ve seen it with my own eyes. There’s water in the canal, but it’s like 5 meters too low, and the farm is in the town of Burgos, very near the Magat Dam in Ramon, both in Isabela. You can have your cake and not eat it too.

At the ICRISAT campus in Patancheru, they’re practicing what they preach, harvesting rainwater like the Indians do when in India. When the rains come, they have hardly any runoff but instead they have large pools of water that collect in ponds that feed the campus – and the underground water table. In short, the ICRISAT campus is treated like a watershed, as any campus should be.

The Filipinos can learn much from ICRISAT when it comes to the development of watersheds. The most famous one of ICRISAT is by far the Adarsha watershed in Kothapally. At Adarsha today, you can see among others rainwater harvesting ponds

and gully control structures, diverse crops, women and landless folks busy with their livelihood options, including poultry and livestock. This is what ICRISAT experts call “integrated watershed management.” At Adarsha, monocropping is avoided, as science tells us that large tracts of the same crop become the breeding ground of insects that easily multiply into infestation numbers. The multiple crops insure that there are enough natural enemies that would provide a check to the population of insect pests.

The Philippine Ambassador was interested in learning about vermicomposting, whereby earthworms produce organic fertilizer. He was also interested in the ICRISAT *jatropha* plantation.

Where the crop has good science behind it, ICRISAT brings the seeds out to the world. That is how pigeonpea from the institute reached the City of Batac in the Ilocos Region in the Philippines. In the same month of the Ambassador’s visit at Patancheru, the Mariano Marcos State University (MMSU) trained 19 family heads and members of their immediate family on turning pigeonpea seeds into local consumer products: embotido (meatloaf, Filipino style) and meaty balls for meals, buchi (a local delicacy) and caramel bar for snacks.

The trainers were Fernando P Sugui, National Pigeonpea Coordinator and Vina May Grace Cabugon, Food Service Supervisor of MMSU. With a grant-in-aid of PhP 100,000 (about \$2,500) from the Department of Social Welfare & Development, the 1-day demo & hands-on training were conducted at the premises of the Sumader Association of Family Entrepreneurs (SAFE) multi-purpose center at the village of Sumader in Batac City on 7 November. Organizers-coordinators of the event were SAFE Chairman Engineer Rogelio and Adviser Criselda Balisacan. SAFE is registered with the Department of Labor and Employment. The training was in preparation for the harvest from the 2-ha pigeonpea farm of SAFE, the crop being at the podding stage at that time. To appreciate the impact of pigeonpea on the local rainfed or dryland economy, let us fly to Africa. We are in the Babati District in northern Tanzania, and we see that farmers have planted two ICRISAT varieties and pigeonpea alone contributes 50% of the cash incomes of small farmers. These pigeonpea varieties are resistant to pests and diseases. The farmers’ produce is sold through producer marketing groups, associations “that allow smallholders to benefit from collective action.” There’s strength in numbers.

I would not be surprised if the adopted 2020 institutional strategy of ICRISAT they call IMOD was also inspired by the success of the PMGs in Africa. IMOD especially calls for poor farmers to be assisted in marketing their harvests to reduce or eliminate the participation of middlemen and optimize the incomes of the farmers. Dar says that once IMOD has been successfully initiated in the villages, their multiplier effects in terms of livelihood opportunities will increase. The PMGs ensure not only higher incomes for farmers but also their access to high-quality seeds of other crops during normal and disaster times. There’s strength in systems.

From the experiences in Africa with producer marketing groups, I can imagine the Sumader farmers in the Philippines espoused by ICRISAT being benefited by setting up

their own PMGs assisted by public and private partners, including international donor agencies, with pigeonpea. Learning from the Sumader farmers, other small Filipino farmers can then set up their own PMGs for other farm crops, including poultry and livestock.

If we can succeed with PMGs on pigeonpea of small farmers, we can succeed with PMGs on saluyot or any other farm crop of poor farmers. A PMG is only a little application of economics as if small people mattered.

(Published in the American Chronicle on 28 November 2010)

Sahel H₂O.

ICRISAT & AVRDC in Africa



THE SAHEL – The plot thickens! You are in West Africa, in Sahel, between the devil (Sahara Desert) and the deep blue sea (actually the Red Sea). Where is the *corpus delicti* here, the body of crime? Who was responsible for those 100,000 dead bodies? Sherlock Holmes: “Elementary, My Dear Watson, elementary. The killer goes by the code name H₂O.”

Elementary, that is, of the elements hydrogen and oxygen. Water. Between 1968 and 1973, because of drought, the USAID estimated 100,000 died (faqs.org). The vegetation of the region was “virtually wiped out” (globalsecurity.org). In fact, a study published in the New Scientist suggests that in the last 3000 years, the African Sahel has had more severe droughts (Catherine Brahic, 16 April 2009). The Sahel – which covers parts of Senegal, Mauritania, Mali, Burkina Faso, Niger, Nigeria, Chad, Sudan, Somalia, Ethiopia, and Eritrea is “one of the poorest and most environmentally damaged places on Earth” (PBS, pbs.org). And all for lack of water.

Unhappily, we can expect then more droughts and deaths to come. “The soils of the Sahel,” Dar says, “are easily eroded, highly leached, have low fertility and high levels of aluminum.” If crops don’t stand a chance of survival, the humans cannot be far behind.

Where lies hope then? If you are a farmer in the Sahel and of course you have a problem with water, what is the solution? There is only one and only one solution: H₂O. That is a given; you cannot do away with it. If you cannot change the climate, what can you change? You can always change your crop, to a variety that is miserly on H₂O. That is a lesson from ICRISAT.

You can ask for seeds from the partnership of ICRISAT and the World Vegetable Center (AVRDC) based in Taiwan, working in the Sahel. There is tomato: ICRI-Xina, the rainy-season tomato developed by ICRISAT-AVRDC for the Sahel. You have the PKM1, the superior Indian variety of moringa – which is the drumstick tree, horseradish tree, the Ilocano marunggay – a survivor in any environment, promising good nutrition for humans, and livestock. There is the Koinni, a short-duration okra, a survivor of high heat, promising a delicious, nutritious fresh salad for the table.

The ICRISAT-AVRDC vegetable partnership started in 2007, with fruitful results. For instance, the ICRI-Xina tomato was planted on 200 ha in Niger in 2009, during the rainy season, providing income to the growers from the plots where no tomato grew before. Planting the PKM1, farmers harvested 7.5 tons per hectare of leaves, 3 times more than the local varieties, not to mention that the PKM1 tasted better. What if some people didn’t like moringa on their menu? Science improves the crop; you have to improve your taste.

Aside from the outstanding crop varieties, a major part of the secret of the success of the ICRISAT-AVRDC partnership in the Sahel is the so-called African Market Garden, which is actually a low-pressure drip-irrigation water-saving system. The precious drops of H₂O are drip-rationed by the AMG within a garden of 500 square meters, say 20 by 25 meters. The partnership has come up with several AMG models that give high profits. ICRISAT reports that up to \$1500 for each garden has been earned. What’s the secret for the success? It’s the water, I say. Better crops, better fertilizers, better farmers are no better without H₂O.

On 29 March 2010, ICRISAT and AVRDC were awarded a joint “Science Award for Outstanding Partnership” by the CGIAR, the mother agency of the two partners. They were cited not only for developing techniques for growing vegetables on the

deserts of West Africa but also for training local West Africans to train the local farmers themselves. The Science Award was presented by CGIAR at the Global Conference on Agricultural Research for Development (GCARD) at Montpellier, France. Scientists become better scientists by becoming better farmers; then they train the farmers to become partners in the transfer of technology to other farmers.

With the assistance of the ICRISAT-AVRDC partnership, it intrigues me that marginalized women in the Sahel have turned infertile soils into fertile wombs of crops, growing native vegetables successfully on barren spots. Dar tells us in June 2006, a group of 120 landless women in the Dosso region of Niger started growing hardy indigenous vegetables on 7 hectares of degraded, abandoned sites. "They used ICRISAT's Bioreclamation of Degraded Lands System," Dar says. Three years later, 70 hectares of vegetable plots have been rehabilitated, are under cultivation, and the expansion of area continues. "Lush greenery," Dar says. The women must know some things the men don't!

"That is how science can change the lives and health of poor women and children in the Sahel," Dar says. "This ICRISAT-AVRDC partnership in West Africa has massively improved the lives of countless West African children and women," Nigel Poole, Board Chair of ICRISAT says. "I am extremely very proud of this outstanding work of my colleagues."



Dar says the region of West and Central Africa is home to about 100 million people, the poorest on Planet Earth. With extreme heat along with low and erratic rainfall, drought results in crops failures in 2 out of every 5 years. Left alone, nutrition of the population is very poor and mass famines are common. When a drought occurs, the poor families starve as they don't have the means to buy food. Today, they don't have to anymore.

In that context, the small garden system made possible by the AMG, as designed by ICRISAT, has provided a model lifesaver for the malnourished and destitute families in Sahelian Africa. Small vegetable plots nourished by the AMG have become reliable greenfields in the face of the unreliable rain. "The AMG has provided a radical alternative," says Dar, "for reducing poverty and improving nutrition in the Sahelian region of Africa." Radical situations call for radical solutions.

Small is beautiful for the small. Plots of 100 to 500 square meters can now grow enough vegetables to nourish starved bodies and line up somewhat the wallets of mothers for other household necessities. At present, some 5,000 women and their families in the countryside have been reaping the just rewards of their labors, just planting a short-duration okra called the Koinni. From this comes the common good.

On one hand, Dar says ICRISAT has long been in the Sahel trying to improve the harvests of pearl millet, sorghum and groundnut for the small farmers. By the late 1990s, ICRISAT realized that more than improved crop varieties, the small farmers needed high-value crops to help increase their incomes and improve the nutrition of their family members. But which ones, and how?

On the other hand, AVRDC had worked closely with small farmers alongside ICRISAT focusing on malnutrition and income. It was AVRDC that introduced the first heat-tolerant tomato lines in West Africa, leading to the release of Xina in Senegal in 1981. From then on, Xina became extremely popular across the region.

In 2001, ICRISAT appointed Dov Pasternak as head of the Institute's high-value crops program in the Sahel, and this included the improvement of irrigation and cropping systems for small farmers. Here would arise the AMG, Pasternak's brainchild. "The program provided the catalyst for many subsequent projects," says Dar, "the foundation for a full-time presence of AVRDC in the region and the development of a very successful partnership."

In 2003, AVRDC and ICRISAT began regional trial plantings of vegetable varieties. In 2007, a scientist started breeding and selection for a locally adapted okra variety for the Sahel. In 2008, AVRDC formed a team of vegetable breeders for Sahel, funded by the Bill & Melinda Gates Foundation. Early this year, the recognition of a Sahelian job well done came from CGIAR. I say, award well-deserved. For bringing those precious crops and precious drops of water to the Sahel.

(Published in the American Chronicle on 31 March 2010)

Isabela principle 1.

In dry, don't look at the water!



ROXAS, ISABELA, Northern Luzon, Philippines – This is a rice countryside; this is also a hot, dry countryside, with rivers not rising because there isn't even enough water to rise to its own level. And with that, if you know how farmers grow rice, there is a looming crisis of irrigation water. How do you solve a problem like rice water?

We are in Burgos, Isabela, talking about the usually uncertain coming of irrigation water (the croplands are very near Magat Dam but the dam has its own problem with water – there’s not enough of it), looking at rivers waiting and wanting more water, and knowing the farmers are worried they wouldn’t be getting enough water for their ricefields in the days to come. June is planting season. The days are hot, very hot; will the clouds drop enough rain for the rice? Nobody knows. I know something else. After days of looking at the ricefields of Isabela and thinking of dry and rain, today I had a flash of insight.

To be successful, a farmer must become an entrepreneur

This requires that the farmer must become a businessman, must innovate, and must turn that innovation into an economic good or service.

As things stand today, the farmer is the production manager not in control of any of his raw materials. Take the case of water. Water is the lifeblood of the farm. The farmer can have access to credit, access to seeds, access to land, access to technology, access to processing, access to handling, access to marketing and distribution. But if he cannot have access to water, he cannot have control over his seeds (they need water to germinate at the right time), his fertilizers (they need water to dissolve at the right time), and his transplants (they need water to grow in stages, produce more tillers at the right time, and manufacture more grains at a later right time).

How do you solve a problem like rice water? If you don’t have control over a factor of production, look for where you have control: seeds? transplants? fertilizers? weeds? pests? watershed?

Don’t look at the water – look at the seeds

In Burgos, a rice farmer told me the other day he had just sowed 2 cavans of paddy for some 8,000 square meters of ricefield. That’s 72 kilos of seeds. Learning from hybrid rice technology, I would say the ideal is 20 kilos per 10,000 square meters (1 hectare); therefore, for 8,000 square meters, the seed need is only 16 kilos. Those 72 kilos are 4.5 times more than necessary! A waste of resources. Those 16 kilos of seeds sown would need 4.5 times less water than those 72 kilos of seeds otherwise sown. You save much on seeds, on labor, on water.

Don’t look at the water – look at the transplants

The subject of seeds brings up the subjects of transplanting, direct-seeding, and rice variety. If you don’t over-transplant, your 16 kilos of seedlings will be enough for your 8,000 square meters. One seedling per hill is enough. But do you really need to transplant the rice? Direct-seeding or direct sowing of the seeds over the field is also recommended, and you can use a seed drill for planting. You save on water for the seedbed, you save on labor for the transplanting.

Now that global warming is here, equally important is the rice variety you plant – it must be stress-resistant. Take a tip from William Dar even if ICRISAT is not into rice:

Plant a climate-change crop, a drought-resistant variety. So you solve the lack of water. If you can't solve a problem, change the problem!

Don't look at the water – look at the fertilizers

This may come as a surprise, but your value-added source of fertility may not be your chemical fertilizer, no matter if it is rich with major (NPK) and minor (such as Ca, Mg, S, Zn) nutrients. And no, it's not organic fertilizer.

The nearest thing to it is trash farming, but I prefer to call it organic farming, because I have a different idea of it, and because the essence of it all is the organic matter involved. The OM is all vegetation on the soil surface, growing or introduced as crop refuse. By rotary tiller, the organic matter (OM) is first shredded in 1 or 2 passes of the tiller, and then on the 3rd pass incorporated shallowly – an inch or so – into the top soil. No deep plowing of any kind. Slowly, the OM is transformed into humus, the richest single source of soil nutrients you can find on Earth, if you will pardon the pun.

The double beauty of it all is that the OM becomes organic fertilizer and at the same time the water reservoir of the soil, because the humus that is formed is both rich in plant nutrients as well as water – it can hold many times more water than its weight.

Don't look at the water – look at the weeds

Rice farmers try to control the weeds by drowning them, and they have never been successful with that. I know; I'm a farmer's son. Then came along the weed killers, and I enjoyed myself spraying poison (2,4-D) on those broadleaves and watching them die. Man's cruelty to Mother Nature.

Are the weeds bad? Not if you know what's good for you. If you poison the weeds, you can't make good use of them. But if you practice organic farming like I briefly describe above, you will find that the OM that covers the soil is the best weed killer of them all – the weeds and their seeds are killed and turned into food for the crops.

Don't look at the water – look at the pests

If you practice organic farming like I point out above, you will find less and less pests in your field because the environment does not encourage the breeding and multiplication of unfriendly insects and other types of enemy organisms. Your crops are healthier too and, therefore, will yield you more.

In other words, the best way to fight lack of water for crops is the best way to fight lack of soil nutrients for crops and the abundance of pests and diseases – organic farming.

Don't look at the water – look at your watershed

Again, learning from ICRISAT's Dar, he can tell you about the Adarsha watershed success story in the village of Kothapally, which is a community effort of scientists and farmers to rebuild the watershed by reducing runoff and soil loss, producing organic

fertilizer, enriching the soil with crop refuse, building dams and catchments to catch the rain and drive the water down to the underground, and revegetating the site to provide land cover and trap the rain in the top layer of the soil. The Adarsha model has been so successful it has been adapted in many other places in India, Thailand and Vietnam.

The Isabela principle

All of the above fits into what I call the Isabela principle, the name coming from the fact that it is where the idea was born.

With control and continuity, you can plan on growing. Access is not enough. You must have control – you must be in command of your resources. You must have continuity – there must be working links, there must be stability, there must be a minimization of interruptions in the business of farming.

Farmers have access to seeds

Farmers have access to fertilizers

Farmers have access to pesticides

Farmers have access to credit

Farmers have access to land

Farmers have access to technology

Farmers have access to processing

Farmers have access to handling

Farmers have access to marketing and distribution.

Farmers have little or no access to water.... etc, they don't have control, and they don't have continuity!

So I'm not surprised the farmers remain poor.

So, what can President Noynoy Aquino do for the millions of poor farmers in the Philippines? Nothing. The farmers must do it for themselves. But Noynoy Aquino can lead the way. He can begin with the rivers and watersheds waiting for the rains to fall.

(Published in the American Chronicle on 10 June 2010)

Isabela principle 2.

In rain, don't look at the water!



ROXAS, ISABELA, Northern Luzon, Philippines – Global warming calls for global thinking and local action. I happen to be in the agriculture sector, a popular science writer and an environmental journalist, and having inherited a handful of hectares of ricefields in far-flung Isabela, so my theory and practice is in farming. My mind refuses to give up on how farmers in the Philippines can go from poor to rich.

This 2nd essay runs parallel and completes the story that began in the previous one – this is the flipside of the same coin. Yesterday, the rains came to Burgos and now the fields are flooded as you can see. When it rains, it pours.

And now the question: Why are the ricefields flooded when it rains? And now the answer: Because the paddies are designed so that they can hold water for as long as the farmers want. Farmers' fields don't have poor drainage – they have none. The drainage is the hole they punch into the lower dike out of which comes the excess water.

As far as I know, the flooding of the ricefields is an idea that came from my alma mater, now known as UP Los Baños. Global warming aside, is the flooding of the ricefield really necessary? Not if you compare traditional rice cultivation with the system of rice intensification (SRI), which is “a methodology for increasing the productivity of irrigated rice cultivation by changing the management of plants, soil, water and nutrients” that results in water savings of 25 to 50% (ciifad.cornell.edu). That to me indicates that farmers are wasting up to 50% of irrigation water because of the wrong notion of flooding the field.

In the Philippines, irrigation water comes mostly from hydroelectric dams. The San Roque Dam located in the towns of San Manuel and San Nicolas in Pangasinan can irrigate year-round some 708 square kilometers of farmlands in Pangasinan, Nueva Ecija and Tarlac (Wikipedia). That's theoretical. In fact, that depends on how much water the reservoir, which is 1.2 kilometers long and 200 meters high, actually has in store. Watershed WYSIWYG: What you store is what you give.

In Isabela, the Magat Dam can provide the irrigation needs of farmers in nearby towns only if the reservoir reaches the standard level for irrigation of 156 meters (Ellalyn B De Vera, 11 May 2010, mb.com.ph). The other major dams in the country have in fact showed decreasing levels of water “due to the impact of the El Niño event,” according to the news report.

De Vera's report is, to say the least, inaccurate. The real reason that those hydroelectric dams have seen decreasing levels of water in their reservoirs over the decades is that their sources of water, which are the forests upstream, have been used and abused and not conserved. Conservation WYSIWYG: What you save is what you get. Without forests, you don't have a watershed; if your watershed is inferior in quality, which means you hardly have any forest at all, you hardly have water to collect in a reservoir for any hydroelectric dam.

Now, the forest and the farm have something in common when it comes to this important liquid: They have to conserve water. The forest conserves water by growing trees that build a rich soil underneath the canopy that acts as both the storage and source of headwater for rivers and streams – and therefore hydroelectric dams. That forest soil is organic matter that transforms into humus, which is the storage and source of plant nutrients and water. Cut down most of the trees of the forest and you cut down on the amount of humus on the forest soil. Hardly any forest humus, hardly

any headwater for any hydroelectric dam. Except for springs, the forest humus is the real source of the water that flows downstream.

Likewise, farms that do not build a layer of organic matter on their topsoil are deprived of humus and therefore of stored nutrients and stored water. You can see these farms bare and dusty or cracked and hard in the dry season. These are the soils that require lots and lots of fertilizers. These are the soils that easily get flooded and eroded during the rainy season and easily scorched during the dry season.

Dry season or rainy season, I have to remind the farmers in the Philippines and the rest of Asia about the Adarsha watershed lesson courtesy ICRISAT. The Adarsha villagers rebuilt their watershed from a picture of devastation to a picture of health through revegetation and water impounding structures that also contribute to groundwater replenishment.

The law in the Philippines mandates that each municipality build water reservoirs; these reservoirs will serve as catchments for rainwater. But these are not enough. A whole watershed in each municipality will have to be restored, and the Adarsha lesson is that success depends on the villagers' participation in a huge effort designed for the common good. Government investments are not enough in themselves, neither new and improved technologies from research and/or development agencies. A major part of the Adarsha watershed lesson is that people must empower themselves.

Aside from the Adarsha watershed success story, there is another ICRISAT watershed triumphant story, that in a cluster of villages in the Bundi District in Eastern Rajasthan in India. The villagers worked for free to help build structures to conserve soil and water: 200 staggered trenches, 290 percolation pits, and 6 gully plugs across an area of 45 hectares. The villagers planted grasses and saplings all over. To harvest and store moisture in the same place where vegetation was being restored, the people put up stone bench trenches, contour trenches and catch pits. The water conserved helped turned the grey area into green so much so that even during the drought of 2000 that continued up to 2003, this Bundi watershed turned green. A watershed of unending green is an unending well of water. Good for the cattle, the wildlife, the crops, and the humans.

As I revise this at Burgos, Isabela, the rain has been pouring in buckets since about an hour ago. Coming back from Roxas a few minutes ago, we could see that the rainwater had nowhere to go but stand in those ricefields. Since there is too much water on those ricefields already, this is so much waste of rainwater.

Aside from rebuilding their nearby watershed to replenish the underground water tapped for irrigation and reinvigorate the rivers and streams tapped for both energy and irrigation, our farmers will have to conserve water right there in their own fields. They will have to do some organic farming. They have to build the humus on the top soil by *trash* farming, by green manuring, by introducing and incorporating crop refuse on the top soil. Using a rotary tiller, the organic matter is first shredded in 1 or 2 passes,

then on the 3rd pass incorporated into the top soil. The soil organic matter mechanical mix will transform in a short while into humus, which is the essence of organic farming. When the rains come and your field has that organic mix in the top soil, no soil erosion occurs, no rainwater runs off with the soil nutrients, and there may be overflowing of water but there is no destructive flooding. In such a case, when it rains, you don't have to think of the water!

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InfoDev means business.

ICRISAT means dryland farmers



HYDERABAD – From rags to riches is a pipe dream for many a village in Asia and Africa. Business knowledge becoming practice remains a dream for most of the poor in many dryland communities in many countries. Today from the World Bank comes the knowledge that only with farming treated as business can the small farmers help themselves, and from ICRISAT the information that farmers can be made self-sufficient only if public-private partnerships help them access the knowledge as well as the tools.

There is more of the good news. On 26-28 October, the Community of Practice, CoP for Agri-business is being launched in a kick-off meeting, hosted by ICRISAT. The meeting is designed to share knowledge and expertise in order to shape the global agri-business CoP work program.

The CoP for Agri-business is meant to help innovators incubate their businesses in agriculture. This incubator initiative of infoDev was set up in 2002 with the support of the Government of Japan "to provide financial support, technical assistance and partnership networks for technology incubators and business incubators in developing countries" (infodev.org). This is a push for entrepreneurship in the disadvantaged nations of the world.

The CoP program puts "special emphasis on enabling access to and productive use of technologies that are available locally, in the region, and internationally". This is entrepreneurship in action. The CoP promotes the use of information and communication technologies "to increase information, knowhow and markets, and enhance transaction efficiencies." Knowledge must be used to create products; the products must reach the markets; all exchanges must be value-adding to all.

The global CoP has 80 members from 20 countries (infodev.org). Membership "involves a readiness to share knowledge, active participation in the work program that the CoP undertakes, and a willingness to share good practices and data on agricultural companies incubated" (idisc.net as cited). That is to say, sets of information on good agricultural and business practices become accessible to all; and business data can be studied by everyone interested. This is entrepreneurship brought to a higher level.

In his inaugural address, Director General of ICRISAT William Dar says, "This event aims to bring together practitioners who enable agri-business entrepreneurship in developing countries and to share their lessons and ideas with the purpose of shaping infoDev's Agri-business CoP work program for 2010–2012." At this point in time, the plan for 2010 must be to initiate the CoP program for the next two years.

It may be asked: Why is the World Bank interested in agri-business? It is interested in helping increase the gross domestic product, GDP of countries, especially the disadvantaged, to help the poor. "The World Bank estimates that GDP growth originating in agriculture," Dar says, "is about four times more effective in reducing poverty than GDP growth originating outside the sector." Thus, agriculture is not only the Mother of Industry; it is also the Mother of Entrepreneurship.

Dar cites the example of China's modern rags-to-riches story. "Let us not forget that China's rapid growth in agriculture was initially responsible for the rapid decline in rural poverty, from 53% in 1981 to 8% in 2001." Where before the Chinese numbered 53 out of 100, in 2001 the poor numbered only 8 out of 100.

The CoP for Agri-business wants to focus on food coming from farms. Dar says that by (1) increasing yields, (2) connecting smallholders to markets, and thereby (3) generating jobs also outside of the farm, "the agro-food system is a strong engine

for direct and indirect growth and poverty reduction in developing countries."The economic efficiency will increase while the number of poor will decrease.

Not only to raise yields, and link farmers to markets, the CoP for Agri-business can help "reduce crop risks and vulnerabilities," Dar says, "and enhance environmental sustainability." While the farmers take care of their crops, they also have to take care that they do not reduce the capacity of the environment to sustain itself, to keep the life cycle of death and renewal in flux. The CoP for Agri-business reminds us that Mother Nature cannot be abused with impunity.

In fact, ICRISAT's own Agri-Business Incubator (ABI) already is helping create competitive agri-business enterprises benefiting farmers in the drylands. An ICRISAT program in this regard has set up 10 agri-incubators, Dar says. Under the global CoP for Agri-business, "ICRISAT and infoDev will be cooperating in setting up model centers for Africa and seek respective governments' funding for the same."

This is all very opportune for ICRISAT. "I would like to mention here," Dar says, "that ICRISAT's new strategy to 2020 is strongly anchored on harnessing markets to reduce poverty and hunger. We call this strategy IMOD or inclusive market-oriented development. IMOD fits within the context of the CoP for Agri-business.

Dar is saying that directly linking the farmers to the markets reduces poverty because the farmers become the middlemen and reap the benefits of the transaction themselves, not some go-betweens. Also, this farm-to-market link stimulates the creation of more agri-businesses because of increased demands for a greater diversity of higher-value foodstuff and agri-industrial products. Without the middlemen, food is cheaper, and the consumer wants more not only of the same but of other kinds.

Be that as it may, for more agri-businesses to develop, "there are several challenges as well as opportunities," Dar says. It has to do with knowledge sharing of successful cases. "We need to share successful models that have ... graduated to successful agri-businesses." There is a need "to provide visibility through various media" for these successes. I believe that, among other things, there is an urgent need for the media to be educated about these successful agri-businesses working with the environment and not against it.

Among other things, we are interested, Dar says, about academia-to-industry linkages. The educational institutions should be a fertile breeding ground for innovative ideas for agri-business. These higher schools must not only encourage innovation but must provide initiatives in entrepreneurship in agriculture. Then, Dar says, "we will together be fulfilling the mission of eliminating poverty by improving livelihoods."

So, when do we begin? Dar says, "Now is the time to do it!" Innovation for entrepreneurship for farmers is now!

(Published in the American Chronicle on 27 October 2010)



ICRISAT strat.

Drylands & the economics of the little



MANILA – In Zimbabwe, I learn that ICRISAT is telling a family that 9 kg ha^{-1} of nitrogen applied to corn is most profitable. In the Philippines, I learn that the Open Academy for Philippine Agriculture, is recommending for corn as much as 575 kg ha^{-1} (or 11.5 bags) (openacademy.ph). Both are impossible! Isn't 9 kg a little too little, and 64 times 9 kg a little too much?

Juxtaposed like that, with those numbers we are forced to make a paradigm shift along with country-hopping, not to mention climate change. ICRISAT is talking to poor farmers and OPAPA is talking to rich farmers, or those who can afford to raise at least PhP 10,000 (about \$220) for fertilizer alone for 1 corn cropping. ICRISAT must be talking of micro-dosing, using a bottle cap to measure out the fertilizer; OPAPA must be talking of macrodosing, using unending fistfuls of fertilizer. The ICRISAT technology is tried and tested and new; the OPAPA technology is tried and tested and old.

What's a poor guy to do?

Me, if I were to raise corn I'll follow the farmers in Babati in Tanzania than Mindanao, the Land of Corn Promise, in the Philippines.

With the cheaper Babati corn, I get much learning in what I shall refer to here as the economics of the little. The explanation for the miniscule nitrogen requirement for Babati corn is pigeonpea; corn is either intercropped with the legume or rotated with it; naturally, the legume enriches the soil with nitrogen, so the farmer needs to add just a little bit more nitrogen to the soil. The pigeonpea is an improved variety from ICRISAT. With the bottle cap and legume as symbols, ICRISAT tells me, in effect, that the African Green Revolution is underway.

The photo shows Rose Fratern Muriang of Babati. Ten years ago, her pigeonpea was ravaged by wilt and all she got was firewood. With wilt-resistant pigeonpea from ICRISAT, she is now one of the leading farmers in Babati, and is constructing a new house. Her pigeonpea had been selling for \$1 per 1 kg of grain.

This phenomenal economics has been initiated by ICRISAT-improved pigeonpea varieties. I'm sure that is why the CGIAR has been moved to say, "If we were to name only one legume that assures food security in the semi-arid tropics, it would be pigeonpea" (cgiar.org). Actually, there is more to pigeonpea than just food security, as ICRISAT has demonstrated in Tanzania.

African farmers love the ICRISAT-improved pigeonpea for many reasons:

- It is tolerant to drought
- It is resistant to wilt
- It is a short-duration crop
- It cooks fast and has the taste and aroma favored locally
- It feeds the family with nutritious food, as it is rich in protein
- It is a cash cow
- It feeds the cattle as well.

And the Chinese love the ICRISAT pigeonpeas because they help stabilize farm soils in hilly areas, including roadsides; they don't need much inputs; the tender pods make good substitutes for vegetables as cash crops; the tender branches provide fodder for livestock; and the woody stems when mature provide firewood. This could be the start of something big in huge China.

The 1st part of the African Green Revolution initiated by ICRISAT is the supply of science-generated varieties of pigeonpea that are resistant to the stresses of drought, warm weather, pests and diseases. Director General of ICRISAT William Dar says that 60% of the farmers in Babati are now planting ICRISAT-improved varieties of pigeonpea, and that this crop alone contributes more than 50% of the cash income.

Dar also says: Realizing the huge demand for improved seeds, local agro-dealers contract-trained farmers to grow high-quality seeds with support of the extension system. The produce is marketed through producer marketing groups that allow smallholders to benefit from collective action.

When ICRISAT and the Selian Agricultural Research Institute began collaborating in the mid-1990s, the Babati and Karatu districts in Tanzania were “pretty impoverished” – dirt poor. Their high-yielding Babati White pigeonpea had been devastated by the unforgiving *Fusarium* fungus that causes plants to wilt and die. With ICRISAT-improved pigeonpea varieties, farmers’ incomes have since risen 80% and, what’s more the districts have benefited – that is shown by the fact that they are now electrified, and the roads are paved. “And everywhere,” Dar says, “there are signs of prosperity driven by agricultural commerce.” I believe it.

Did the Tanzanians eat pigeonpea before? Dar says, “Twelve years ago, the idea of consuming the crop was somewhat preposterous.” But with the introduction of good-tasting pigeonpea varieties such as the Mali (meaning wealth in Swahili), this legume has become an important part of the diet of the people. Mali has large seeds; the pea is cream-colored; it cooks fast and has “an appetizing aroma,” Dar says. Improved pigeonpea varieties now cover about 25,000 ha, half of the pigeonpea hectareage in the districts of Arumeru, Babati, Karatu and Kondoa.

That is not all. “There are many examples of how ICRISAT with its partners in the public and private sector,” the Governing Board says, “have vastly improved people’s lives, and how its new strategy will enable them to have much more.”

Dar says, “Tanzania has been one of the countries with which we have had excellent collaboration” on pigeonpea and chickpea. He also mentions and gives thanks for the funding sources for various projects: African Development Bank, DANIDA, Bill & Melinda Gates Foundation, and the International Fund for Agricultural Development.

Dar tells me the new ICRISAT strategy is based on the concept of inclusive market-oriented development. The Governing Board of ICRISAT refers to it thus: “this exciting strategy.” It is exciting; it is also revolutionary. With innovations, IMOD engages the farmers and institutions. The changes sought are not merely with the individual farmer, such as higher productivity for his farm; they are institutional, including hand-holding so that the farmer will soon stand on his own feet and, more importantly, improve his life and that of his family.

In the IMOD context of investments, Dar says three sectors are necessary to make it all work for all: (1) the poorest of the poor are included as raisers of crops, (2) donors are sources of access to assets, inputs and technologies, and (3) the government provides

support in matters of policy. Connect the farm to the market, and you will motivate the poor to grow more crops – the market becomes the motivation to raise food and cash.

If I may say so, IMOD is grey-to-green revolution via science with human faces.

The concept of farm-to-market road is not enough; that is the Economics of the Big, the Trader. In the ideal IMOD, there is no trader for the farmer; nothing is lost in the transaction between farmer and buyer because there is no middleman or, which is the same, the farmer himself is the middleman. He gets all the value added from his produce. This is the poor farmer commercializing his own crop. And so I like to call IMOD the economics of the little.

IMOD must explain this claim by the Governing Board of ICRISAT in their Arusha Declaration:

In seven short years, the lives of many smallholder farmers in the Babati District of Tanzania have prospered beyond imagination. ICRISAT's improved pigeonpea varieties have allowed them to establish a thriving export business to India and invest the profits to replace their houses, buy household appliances and build a new school.

Knowing this Tanzanian breakthrough, will the poor countries of the world have to depend on external aid forever? No, the Governing Board says, "We will never accept this view!" The poor we shall not always have with us.

Assumptions: "The people must determine their own destiny," the Governing Board says; partners in the public and private sectors must actively participate; and IMOD must be their strategy.

IMOD was not part of the Green Revolution that passed us by.

On my part, I can summarize IMOD in 4 Rs:

Reduce the costs - Like produce planting materials through seed systems to assure quality, availability, and affordability. Intercrop pigeonpea with corn, and you can reduce your fertilizer cost by 64 times.

Reduce the risks - With disease-resistant varieties, you not only decrease the risk of a crop failure, you also decrease the risk of investment failure – and increase the harvest per hectare.

Run the market - Help the poor farmers form a producers' marketing group so they can market their farm produce by themselves so that they get the middleman's share of the value added – because they are the middleman. Additionally, multiply the produce by processing the peas into products.

Raise the incomes - Doing the 3 Rs above results in pigeonpea net returns increasing more than a hundredfold to a hectare, like it's \$366 for improved practice vs \$76 for farmer's practice, so that gives us an actual increase of 482% (icrisat.org).

In development, faith must go hand-in-hand with science; where you do not know, you have to believe, especially when it is absurd. I have faith in the farmers with IMOD

in place, and so along with the ICRISAT Governing Board and by attribution to the pre-Augustine Christian apologist Tertullian, I say about the economics of the little, about the philosophy of the poor hanging on to both faith and reason bringing about the African Green Revolution:

"Credo quia impossibile est." I believe because it is impossible.

(Published in the American Chronicle on 28 September 2010)

GENDI RURAL COOPERATIVE SOCIETY LTD
P.O. BOX 140 BABATI MANYARA

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ICRISAT IMOD.

AT Magazine encourages India's leaders



NEW DELHI – It reads: Agriculture Leadership Awards. With the eye of a teacher and a journalist, I see that India's Agriculture Today Magazine online, a monthly, is in a class by itself in Asia. I would call it The National Encourager. I'm talking of editorial intent, not content. I'm based in Manila and when I think of our own aggie magazines in the Philippines published online or in print, that doesn't encourage me.

I see that the Agriculture Today Group is now in its 3rd year of sponsorship of the Agriculture Leadership Awards that it itself initiated and created in 2008. The Awards coincide with the annual Indian Agriculture Leadership Summit, now one of India's most prestigious events. I wish we had a similar one in Manila; then we will see how much, or how less important agriculture is in the life of the people; and we will see on national TV how the media digests it all. I know the Manila media loves to pick nits and fights; I have yet to see the media look at any whole as greater than the sum of its parts, like, look at development as greater than the sum of its failures.

And so these awards must be a prestigious one to receive in India; this year, there are 15 leadership awards in these fields (Ahmed Sudan, 25 September, telecentre.org):

- (1) JNL Shrivastava, Policy Leadership
- (2) UP Bhoomi Sudhar Nigam (WB-Aided), Development Leadership
- (3) Escorts Ltd (Farm Machinery Division), Industry Leadership
- (4) International Crops Research Institute for the Semi-Arid Tropics, Research Leadership
- (5) VS Rao (former Agriculture Minister of AP), Farming Leadership
- (6) Monsanto India Ltd, CSR Leadership
- (7) DP Singh (Vice Chancellor of BHU), Environment Leadership
- (8) National Institute of Rural Development and Agriculture Scientists Recruitment Board, Program Leadership
- (9) Coromandal International Ltd, Corporate Leadership
- (10) SN Puri (Vice Chancellor, Central Agriculture University), Academic Leadership
- (11) Vibha Agrotech Ltd, Entrepreneur Leadership
- (12) S Senthilkumaran (Director, MS Swaminathan Research Foundation), Extension Leadership
- (13) State of Himachal Pradesh, State Agriculture Leadership
- (14) State of Andhra Pradesh, State Horticulture Leadership
- (15) MV Rao, Lifetime Achievement.

Agriculture Today says the awards recognize "leadership roles played by individuals and organizations towards the development of Indian agriculture and bringing about rural prosperity." Awards have a way of bringing out the best in individuals, the best in institutions, the best in teams. At his best, the great warrior and leader Napoleon Bonaparte says, "A leader is a dealer in hope." This is not hypothesis; this is practice. Followers do falter, as leaders do, so for management to succeed, you have to encourage the leaders also. That is why I appreciate what AT Magazine is doing. In theory and practice, communication for development is not only about motivating the followers; it is also about motivating the leaders. It is not only about transferring technology to those who don't have it; it is also about conveying responsibility to those who own it.

ICRISAT won the “Agriculture Research Leadership Award” for 2010; Director General William Dar received the award on behalf of ICRISAT at the 3rd Agriculture Leadership Summit in New Delhi on 29 September 2010. I’m not surprised.

Of the leadership awards themselves, I’m newly intrigued; of the research leadership of ICRISAT, I’m already informed. National in scope, these Indian awards encourage excellence in leadership; they also encourage awareness of the people on the importance of leadership. I hope it also reminds them of the complementary importance of followership.

A farmer’s son, I can easily relate to agriculture. A science editor for a good many years, I have looked into its website, agriculturetoday.in, and I can see Agriculture Today is itself a leader in the field I have referred to above as communication for development (ComDev), but not apart from it.

Borrowing from sales techniques, proper communication for development follows 4 stages known by the famous acronym AIDA: Awareness, Interest, Desire, Action (EK Strong, 1925, *Theories of Selling*, cited by changingminds.org). I can see India’s Agriculture Today is into Awareness, in this instance, awareness of the value of leadership, and that is deliberate, in both theory and practice. The magazine should itself be a recipient of a leadership award in communication for development.

Certainly, ICRISAT deserves the research leadership award. It mostly goes back to the year 2000, when William Dar became the Team Captain of ICRISAT. That year, to put it kindly, the institute was a non-active leader in research in its five chosen crops. More importantly, the institute still had the crop focus; in photography, that would be using the macro or zoom lens. Good but not Great, as music hit maker David Foster would say in another context. Over the last 10 years, ICRISAT changed views using a wide-angle lens, viewing more in a single instance, looking not only at the needs for new crops but also the needs of whole villages. Food is good, but not enough. If you focus on subsistence farming, the poor farmers you are helping will always focus on being subsistence farmers.

The photo shows Dar receiving the award from Shivraj Patil, Governor of Punjab, as MS Swaminathan looks on. Swaminathan is this year’s Chair of the Organizing Committee and is a Jury of the National Awards Committee headed by AR Kidwai, former Governor of the States of Bihar and Haryana.

On receiving the award, Dar says in effect that ICRISAT cannot rest on its laurels. He says that in India, the poor farmers and their families constitute about 80% of whole villages, and that’s the size of the problem: Giant. To uplift the poor, he says: The key challenges facing Indian agriculture today are ensuring household food and nutritional security, increasing farm income, alleviating poverty and minimizing production risks due to climate change, in addition to ensuring overall natural resource management and environmental security.

In India, Asia and Africa, the poor need to be assured of their food, secured with their nutrition, uplifted from their poverty, and insured against farming risks brought about

by climate change, not to mention supported in addressing natural resource and environmental concerns as much as they can and should.

Dar says that calls for “innovative policies, appropriate institutional arrangements, and market-driven technologies that can harness untapped opportunities to provide benefits to the farming community.” Produce from the villages must reach the market and come back as value added, not subtracted by the marketing system.

For food security, he says there should be greater emphasis on setting up systems for producing quality seeds, using inputs efficiently, providing financing and insurance to farmers, along with “a paradigm shift in technology transfer mechanisms.” Ah, paradigm shift. The traditional top-to-bottom or scientist-teaches-farmer approach to communication for development needs to be supplanted with a bottom-to-top approach.

In terms of volumes of harvest, Dar says, India could increase farm yields by cultivating new lands, intensifying cropping per unit area, and planting varieties that increase yields from the same soils. “High yields are still possible under climate change,” he says, “if farmers combine improved practices with climate-adapted crop varieties.” The old crop varieties have outgrown their usefulness; the new varieties are just beginning to show theirs. Are you watching?



The citation for the ICRISAT Research Leadership Award 2010 reads in full:

The International Crops Research Institute for the Semi-Arid-Tropics (ICRISAT), with a wide array of partners, has pioneered in the Research and Development arena to improve dryland agriculture in the developing world of Asia and sub-Saharan Africa, home to 644 million poor people. ICRISAT maintains the largest genebank of its mandate crops with 119,000 germplasm accessions of sorghum, pearl millet, chickpea, pigeonpea and groundnut. As of today, more than 600 improved varieties/hybrids with parentage from ICRISAT have been released by partners, and almost 200 of these are released and used in India. World's first CMS-based commercial pigeonpea hybrid ICPH 2671 - Pushkal, and India's first marker-assisted pearl millet hybrid to reach the farms, HHB 67 Improved, which extends the economic life of this popular extra-early hybrid, are two out of many such instances where this non-profit, non-political organization has set a record. ICRISAT is involved in demonstrating crop and water-harnessing practices in 5000 sites of 25 States/UTs of India. ICRISAT and IIT Kanpur, in collaboration with five other partners, created Agropedia, an online, interactive agriculture encyclopedia. ICRISAT's valuable global knowledge base on rural households, collected over the last 30 years, is now an International Public Good, and helps identify constraints and pathways to dryland agricultural development.

That is an enumeration of what ICRISAT has done in terms of research and knowledge innovations and inventions. That's much. Nevertheless, I myself can see that much is not enough. That takes care of quantity for life. ICRISAT has a new strategy up to 2020, Dar says, and this revolves around inclusive market-oriented development. That takes care of quality of life.

IMOD sees the needs of whole villages. In his speech, Dar says IMOD ensures that the farm is productive; farming is stable; there is food security; and farmers have access to resources. They would need, among others, quality seeds and direct connections to markets. That is no less than empowering the poor. This, Dar says, "will check the widening rural-urban disparity," that is to say, the urbanites getting richer, the ruralites getting poorer.

Is ICRISAT targeting only the poor? Not if it wants to be a good leader. "A good objective of leadership is to help those who are doing poorly to do well," business philosopher Jim Rohn says, "and to help those who are doing well to do even better." For ICRISAT, those who are doing poorly are simply the first priority. Smart.

"Those who have less in life," former Philippine President Ramon Magsaysay says, "should have more in law." State policy. Policy initiatives, Dar says, will have to develop skills and knowledge of poor farmers to "increase their income levels and help empower them." And "more importantly, policy changes," he says, "need to be transforming in nature, which calls for inspirational leadership."

What did Microsoft brains and now philanthropist Bill Gates say towards the end of the 20th century about empowerment? "As we look ahead into the next century, leaders will be those who empower others." The same goes with communication campaigns in science – they must empower the people.

And it all goes back to leadership.

(Published in the American Chronicle on 2 October 2010)

Hyderabad Declaration.

Marketing agri-business models



HYDERABAD – With the issuance of the Hyderabad Declaration of Cooperation, it is as if suddenly, marketing is a priority of the World Bank through its infoDev. Actually, no. In fact, there is the World Bank's concept called marketing-oriented enterprise, the same which has inspired ICRISAT's inclusive marketing-oriented development model.

The full title of the newly released document is “Hyderabad Declaration of Cooperation for the Establishment of infoDev’s Global Agri-business Community of Practice”. At this point in time, the Community of Practice is just starting to build the knowledge base for the CoP to be shared by all member countries; for that purpose, the initial 4 priority areas identified are (with my insertions in parentheses):

- (1) Access to finance
- (2) Introduction to new markets
- (3) (Defining & resolving) policy Issues/raising awareness/(sharing) new models
- (4) Capacity building.

The Hyderabad Declaration is a sketch of a plan of action for countries up to the year 2010 regarding the incubation of new agriculture-based businesses. Looking at the list, to incubate new agri-businesses as well as share successful business models, it seems that the CoP of Agri-business countries are telling the World Bank that they will need financing first before they can address each of the issues in all priority areas.

I believe the 4 priority areas listed has everything except that, personally, I will list the priority areas this way and increase the number to 6:

- (1) Access to finance
- (2) Introduction to new markets
- (3) (Defining & resolving) policy issues
- (4) Raising awareness
- (5) (Sharing) new models
- (6) Capacity building.

Financing is a given; new markets are necessary; policy issues must be resolved; investors’ and the public’s awareness must be raised; new models must be shared; and capacities for creating new agri-businesses must be built. And, for sustainability, all the resources must be able to regenerate themselves.

Given all that, the way I see it, the 1st priority for the Hyderabad Community of Practice, CoP for Agri-business is marketing. While incubating business is a relatively new idea, marketing is old and still necessary. I’m looking at marketing in the classic sense of the 4 Ps:

- Pricing
- Packaging
- Positioning
- Promotion.

Whether they like it or not, what the CoP for Agri-business people will be doing essentially and initially is selling the idea of incubating new businesses, that is to say, the products or services they are marketing are actually creating new businesses.

With the full support of the World Bank, financing shouldn’t be a problem.

Marketing will be, I suppose. In my list, “Raising Awareness” is an independent priority area, not lumped with policy and models. In fact, I will put it as #1 priority. This is actually part of “Promotion” in marketing, and if you follow the Hierarchy of Desire in sales & marketing, the world-famous AIDA, raising awareness is not enough; it is only the first stage: Awareness > Interest > Desire > Action (AIDA). You must raise the level of wanting from mere Awareness to Interest leading to Desire, ultimately leading to Action – the consumers buy. In other words, my bias for communication for development, C4D is showing – in your dream of incubating new agri-businesses, you need C4D because you have to market everything, including the very concept of incubating new agri-businesses:

- Pricing – No matter what price you ask, your proposal for incubating a new agri-business must show or indicate that it is economically efficient.
- Packaging – You must package it in such a way that it is a proposal any candidate funding institution or individual cannot refuse.
- Positioning – You must relate it to other proposals, other competing concepts or business models, and show or indicate where it uniquely belongs and why it should see the light of day. The Blue Ocean Strategy of W Chan Kim & Renee Mauborgne comes to mind and is applicable here.
- Promotion – You have to market your business idea starting right away and all the way.

Note that ICRISAT’s hosting of the CoP of Agri-business kick-off meeting is an indirect acknowledgement of outstanding performance in the field. Knowing that under Director General William Dar, ICRISAT has shown leadership and initiative in innovation by rising from the bottom rung to the top of the stairs, and in fact is inventive enough to have had its own Agri-Business Incubator setup on campus before the CoP for Agri-business was born, I’m sure ICRISAT has much to share initially in terms of incubating and marketing new ideas, including new businesses.

In the paper presented by Steve Giddings of the World Bank at the Hyderabad meeting, he used the metaphor of the seed for starting a new business model. It’s a good analogy as far as it goes. The seed is the germ of the idea; you always start with an embryo of an idea.

Embryo, hmmm. I prefer to use the metaphor of the chicken & egg situation: They must be created independently of each other – where the egg is the proposal for a new business and the chicken is the fund source. In this perspective, the mother hen must formally examine and approve of the egg before she consents to brood on it and hatch it!

Without the mother hen as brooder or hatcher, to turn eggs into chickens, you need the incubator, which should give you the right temperature and right chambers; the incubator watch, which is you, needs to reposition the eggs regularly, including to do candling, to determine if the embryo in the egg is still alive or already dead, still continuing to grow or has stopped growing. Without a candler, with an egg grasped

fully by your left hand and your right hand with a flashlight at the bottom of the egg, if you see red in the dark, it's a beautiful sight.

In like manner, in incubating a new business, one needs the right conditions and atmosphere, but most of all the right egg. In poultry husbandry, candling is necessary because not all eggs are fertile. In like manner, not all proposals for new businesses are fertile and must go through a candling process. With the CoP in Agri-business in place, all your eggs of business ideas should be fertile, incubate and hatch nicely.

As a result of intense discussions during the meeting, the following priority action areas were selected by CoP members participating in the kick-off meeting:

- 1. Access to finance** -To understand how agri-business incubators currently fund themselves and access finance for their clients through sharing successful business models, client case presentations, webinar training and identification of local, national and global funds.
- 2. Introduction to new markets** -To understand how agri-business incubators help clients access new markets by documenting successful case studies about successful initiatives, providing match-making services through, eg, an online platform and conducting three pilots to test the approach.
- 3. Policy issues/raising awareness/new models** -To understand how agri-business incubators increase awareness of potential among stakeholders, develop appropriate models and impact on policy development by defining the policy impacts on incubation in different countries, sharing models of agri-business incubation, eg, university linkages, gender focus, and setting up an external marketing & communications plan for the Community of Practice.
- 4. Capacity building** -To understand how to best improve the skills of business incubator managers and the sustainability of business incubators by developing training modules according to identified skills gaps, creating broader networks with a view to mentoring and expert visits and exchanges, strengthening existing and developing new toolkits, and piloting an inter-incubator client-sharing project.

(Published in the American Chronicle on 8 November 2010)

Grey-green.

Folk wisdom & science grow grass



MUMBAI - 2010 is the Year of Biodiversity as declared by the United Nations, and I am reading a related report by Sreenath Dixit, JC Tewari, SP Wani, C Vineela, AK Chaurasia and HB Panchal: "Participatory Biodiversity Assessment: Enabling Rural Poor for Better Natural Resource Management." You can't awe me with such language. That can be translated simply into this: "Turning the grey into green". "From dust to grass" is language that the farmer can understand.

Dixit & Co mention that the project was implemented in the Bundi District, which is an “imperative tourist destination” for both Indian and foreign travellers (indianetzone.com). The website makes mention of the district’s “beautiful natural surroundings.” Not yet what we’re looking at right now.

From the scientists’ report, the folks at the Gokulpura, Govardhanpur and Thana cluster of villages in the Bundi District, Eastern Rajasthan in India are now looking at the dividing line between the possible and impossible, between where the land is grey and where the grass is greener. The watershed is grey and green. The green is something the villagers themselves had to put back there. And they could and would do that after they were made to realize that there had been over-grazing, over-cutting of trees and no replanting, no management of the area. It happens all the time all over the world. And droughts had exacerbated the situation.

The good news the Bundi villagers received was that the degraded common grazing land of 95 hectares could be brought back to life for the continued grazing of their cattle. But they had to do something about it. Mother Nature was way beyond repairing the damage at the rate the villagers needed it – and that was yesterday.

That called for the application of science. That explains the project with the technical title “Combating Land Degradation and Increasing Productivity in Madhya Pradesh and Eastern Rajasthan” funded by the Sir Dorabji Tata Trust of Mumbai in India, brought to them by ICRISAT and the Indian Council for Agricultural Research (ICAR), directly through the BAIF Institute of Rural Development (BIRD).



How scientists explain to non-scientists scientific terms always interests me greatly. The report I got from ICRISAT didn't mention how the experts explained to the non-experts the two complex concepts. "Combating land degradation" is stopping soil erosion by replanting the area with vegetation whose roots will hold the soil firmly in place, and "increasing productivity" is growing grass where none grew before, mainly for the cattle. Trees, shrubs and the like are included in the vegetation, to recreate the watershed. If you recreate the watershed, you increase its productivity for grazing, its ability to retain water aboveground and underground, and you increase the habitat for wildlife.

First, the BIRD people discussed with the grazers, herders and farmers in those villages what the problem was and what could be done to solve it. They had to go into the science of it. The project people then suggested that the villagers assign about half (45 ha) of the common grazing ground for rehabilitation, for bringing back the lost vegetation that was forage for their cattle. The villagers agreed. They had no choice.

So they erected a stone fence around half of the common grounds to stop cattle from straying into the area, to allow the grass to grow, and left the other half for common grazing. The cattle needed the grass now. The villagers worked for free to construct the fence; they were doing it for themselves. They also helped to build structures to conserve soil and water: 200 staggered trenches, 290 percolation pits, and 6 gully plugs across the 45-ha conservation area. So far so good.

Then the villagers began planting grasses and saplings all over the area. Not so fast. Remember, they were planting on soil that was severely degraded. They were planting because that was part of the plan. But the land had been so degraded and so dry that it was not surprising that a great many of the plants died. It was very discouraging. And very much expected. You learn also by not being able to do what you thought was easy.

Then the idea came to put up stone bench terraces, contour trenches and catch pits to harvest and store the moisture in the same place. Water for the plants. The report didn't say whose idea, but I know that by those names, folk wisdom saved the day when science was stumped for what to do next: those terraces, benches and pits are age-old techniques of harvesting water from the air, rain or shine.

So, in time the grey turned green and the green turned greener across the 45-ha project area. Despite consecutive droughts from 2000 to 2003, the area just turned lush green while the area alongside remained grey. That was good for the cattle.

That was good for the wildlife too. In the six years or so since the project, the green field with its dense vegetation attracted birds and other animals, increasing the variety of life in those 45 hectares. What started as a grass-for-cattle project improved the fauna and flora of the place. What does that mean? Flora (plants): trees, shrubs, herbs, grasses. Fauna (animals): The wild cows (blue bulls) came back, and so did the rabbits,

hares, jackals, foxes, mongooses, birds and many other creatures you don't want to know but are part of Earth life as you and I are.

The Tata report did not mention what happened to the economic, social and political lives of the villages dependent on the Bundi watershed that was restored to better health. I'm sure those improved too. The vegetation of the Bundi watershed exists for the cattle; the cattle exist for the people – you improve the food of the cattle and you improve the cattle; you improve the cattle and you improve the lives of the people.

The scientists would love to call it “a triumph for biodiversity”. I simply call it “bringing Mother Nature back,” and not only for the cattle herd but more so for the humans. This was of course a partnership that ICRISAT is now known for: donors working with scientists working with villagers working for themselves.

In the language of climate change, the villagers in that Bundi watershed should be awarded carbon credits – if you grow 2 blades of grass where none grew before, you are doubling the amount of polluting carbon dioxide being harvested from the air. When you grow more grass, the place is greener, and the air is cleaner. The scientists can explain it; I can smell it.

(Published in the American Chronicle on 1 May 2010)

Earth Day 2010.

ICRISAT for bracing against a perfect storm



In the year of living biodiversity “ICRISAT joins more than one billion people in 190 countries across the globe in celebrating ‘Earth Day 2010’ on April 22,” Director General William Dar said. “Four decades after the first Earth Day, our world is facing more crises than ever before.” He is thinking of climate change, which is the greatest challenge of our times. “In the center of this crises are the 670 million poorest of the poor people in the semi-arid tropics that ICRISAT has a mandate to serve.”

In an effort to help the disadvantaged peoples brace themselves against what “ICRISAT calls the looming perfect storm – a confluence of crises involving climate change, food insecurity, energy, poverty and population explosion,” Dar said, “ICRISAT works with strategic partners to meet the challenges of semi-arid agriculture, especially in Asia and sub-Saharan Africa.”

So far, ICRISAT scientists have developed farming systems resilient to shocks, buffering crucial resources like water and nutrients, and developing crop varieties adapted to warmer temperatures and resistant to pests. Towards more of those, ICRISAT does further research on a range of farming systems to develop a greater variety of options that poor farmers could adopt or adapt to their advantage.

Stressing the need for resilience on the part of dryland farmers in dealing with global warming, ICRISAT Director General Dar said, “The world is now locked into the inevitable changes of climate patterns, and however uncertain those changes might be, farmers must eventually adapt to them. We must help them.”

ICRISAT has proven innovations in crop, soil and water management that can help farmers better adapt to climate change. For example, the highly productive, low-pressure drip irrigation system called the African Market Garden, designed by ICRISAT and run by women, has provided a radical option both for reducing poverty and improving nutrition in the Sahel region of Africa. ICRISAT recently shared the CGIAR’s outstanding partnership award with the World Vegetable Center, which provided the locally adaptable vegetable varieties grown with the AMG.

Led by ICRISAT, the development of the Kothapally watershed in Medak district of Andhra Pradesh has been receiving worldwide appreciation not only for conservation of scanty rainfall but more so for restoring to life a dead watershed and, in so doing, revived a village. Simeon Ehui, a Senior Staff of the World Bank, reflecting on his recent visit to Kothapally, noted, “There is a lot of learning here that could be used in the World Bank’s rainfed agenda in Asia and Africa.”

ICRISAT’s repository of genes of dryland crops – sorghum, pearl millet, pigeonpea, chickpea and groundnut – are well adapted to changes in climatic regimes. Conservation of wild relatives of mandate crops is a boon to scientists in breeding improved varieties. For instance, the breakthrough pigeonpea hybrid (based on cytoplasmic male sterility) was developed from wild pigeonpeas.

“Conservation is a way of life in ICRISAT,” Dar said. “Earth Day reminds us that the scars left on the earth by unmindful exploitation have to be healed. By working in the most degraded environments of the world, ICRISAT is committed to do what has to be done,” Dar continued.

Scientists predict that the drylands will expand by 11%, and that there will be a spurt in the frequency and severity of droughts across the globe. While helping to fight the spread of deserts, ICRISAT’s integrated genetic and natural resource management approach benefits dryland farmers. With ICRISAT, the nutrient-starved soils of sub-Saharan Africa, 200,000 poor farm families have increased their productivity up to

120% and incomes by 50% with an innovation called microdosing, that is, fertilizer for a hill is measured out in a bottle cap.

A report of the Inter-governmental Panel on Climate Change (IPCC) cites that average global temperatures are currently 0.43°C to 0.54°C higher than the yearly temperatures recorded between 1961 and 1990. All IPCC models concur that temperatures are increasing steadily within the tropics but give divergent predictions on rainfall trends.

Using climate and crop growth models to forecast the impacts of global warming on food production in the semi-arid tropics in several countries in sub-Saharan Africa and India, ICRISAT scientists found that improved use of fertilizer and harnessing rainwater would increase food production even if the climate changes further, notably resulting in drastic increases in temperatures with the same rainfall patterns.

In contrast with low-input farming, ICRISAT found that enhanced fertilizer use, rainwater harvesting and mulching (a protective covering of organic material laid over the soil around plants to prevent erosion, retain moisture, and sometimes enrich the soil) could almost double crop yields, even with a 3°C temperature increase with the quantum of rainfall and its distribution remaining the same.

ICRISAT has a vast arsenal of technical successes – a testament that scientific innovations do make a difference to the lives of poor dryland farmers. With increased and sustained support from donors, policymakers, partners, the CGIAR, and global research and development agencies, ICRISAT will be able to help millions of dryland farmers weather the perfect storm.

(Published in the American Chronicle on 22 April 2010)



Dryland challenge.

Science, folklore, political will



MANILA – With a new Philippine President, do we expect new winds of change blowing across the archipelago? Winds of change of climate, I'm sure. Winds of change of political will? That remains to be seen. Noynoy Aquino won on the promise of change, and he reiterated his promise during his inauguration, but I did not read anything about political will.

As it happens, here is an international call for the exercise of political will on the part of the Noynoy Aquino Administration. On 5 July 2010, Director General William Dar of ICRISAT came out with an open letter to Secretary Proceso Alcala of the Department of Agriculture in the Philippines. Here is the body of the letter:

“On behalf of ICRISAT, allow me to extend our warmest congratulations to you as the new Secretary of Agriculture. We are confident that your leadership will bring in a fresh outlook at the department and renewed confidence among our farmers and fisherfolks.

Throughout the developing world, agriculture plays a pivotal role in reducing poverty and improving the livelihoods of the poor. However, several crises confront global agriculture today, and their confluence, if unabated, will lead to a ‘perfect storm.’ Warming temperatures, droughts, floods, land degradation, loss of biodiversity, rising food and energy prices, and population explosion are creating extreme challenges to feed the world. Being an agricultural country, the Philippines will surely face these daunting challenges. As this happens, the hardest hit will be the rainfed and upland areas where the poorest of the poor live.

In this context, ICRISAT and the CGIAR as a whole are charting new directions to address these challenges. Towards this, ICRISAT advocates an inclusive market-oriented development pathway for the agriculture, involving our partners and farming communities in mobilizing the best of science to attain global food security, reduce poverty and protect the environment. In the Philippines, we are confident that through your stewardship, we can at last attain our long cherished goal of attaining national food security, and prosperity among our farmers and fisherfolks. We believe that the Philippines can be rice self-sufficient and at the same time pursue economic opportunities from high value agriculture. We have the capability to achieve this, propelled by the strong political will of the Aquino administration.

At this juncture, I am pleased to inform you that a bill (HB76752) creating the Philippine Dryland Research Institute (PhilDRI) was filed by Congressman Leonardo Montemayor in the 14th Congress. PhilDRI will be the country’s first line of defense against drought and climate change. It will substantially contribute to improving agricultural productivity, and enhancing the livelihoods of poor communities in the rainfed and upland areas of the country. We ask for your kind support for the establishment of PhilDRI.

Please be assured that ICRISAT, particularly myself, will be your active partner in all your important endeavors at the DA. Again congratulations and we look forward to your successful stint at the DA.”

William Dar in India and Proceso Alcala in the Philippines? Strange bedfellows, if you don’t know the background.

Dar is a Filipino; he was once Secretary of Agriculture of his country. He was also, among others, the Director General of the Philippine Council for Agriculture, Forestry

and Natural Resources Research and Development (PCARRD) and the Director of the Bureau of Agricultural Research of the DA.

The reason Dar is writing an open letter to Alcala is that the creation of PhilDRI was largely Dar's idea. In that open letter, Dar is thus advocating, along with attaining rice self-sufficiency and increasing the livelihood opportunities of poor communities in the drylands, the protection of the environment.

Environment. While there is certainty of rains in many parts of the country, there is also the certainty of drought – and its continuing presence – in the other parts of the Philippines, so the establishment of PhilDRI should be a welcome development.

My own wish list of what PhilDRI should be able to produce includes the following:

- (1) Crops that are drought-resistant, not to mention pest-resistant, those that will grow well and yield well even under limited irrigation or given the lack of rain. I'm in Roxas City in Isabela right now and in some parts they have irrigation water and in some parts they have to wait for the rain. Those who have had to wait for the rains are now late by a month in planting their rice. If you are late, the pests may catch up with your crop.
- (2) Crops that are extremely adaptable to some specific regions, provinces, or towns. I'm not asking for a national wonder of a crop; I'm asking for local wonders – no two places are alike. What is good for the gander may not be good for the goose. Locally specific crops should be easier to create by science than nationally high-performing varieties.
- (3) Partnerships formed between PhilDRI and the private sector, to fund and implement projects for the common good.
- (4) Good Agricultural Practices that ICRISAT has learned so far and can be adopted/ adapted in the Philippines.
- (5) A knowledge bank, a People's Internet that speaks the language of the people in its specific target region: Tagalog, Ilocano, Cebuano, or Muslim or whatever.
- (6) Necessarily, for the People's Internet, scientific knowledge and folklore will be gathered and initially programmed and presented in plain English, as much as possible in the language of high school students and not in the language of experts. I have roamed the Internet and have yet to see a model of this anywhere in the world. The translations to the different languages in the Philippines will follow from there.
- (7) Mass media convinced to be active partners in the development of the drylands of the Philippines. I know. That will be the day!

(Published in the American Chronicle on 10 July 2010)



Dar speaks.

ICRISAT science with a human face



An interview with Director General William Dar of ICRISAT, which is at the leading edge of science in assisting poor farming communities in the drylands of Asia and Africa. It is multi-awarded, a highly innovative and respected center of the 15 members of the CGIAR.

Please summarize ICRISAT's mission.

Our mission is to reduce poverty, hunger and environmental degradation in the dryland tropics through partnership-based science with a human face.

I'd like to break it down into many parts. First, we are trying to solve the problems of the poor and the hungry. Meaning, we are trying to help improve livelihoods of hundreds of thousands of farmers in Asia and Africa. We are trying to help them become self-sufficient in terms of managing their own farms.

Second, we are trying to solve the problem of the degradation of the environment. We mean by degradation, for instance, the gradual change of fertile soils into deserts over long periods of time. We are studying the influence on infertile soils by using improved agriculture over several years.

Third, we are helping the disadvantaged in the dryland tropics. Covering 6.5 million square kilometers of land in 55 countries, the semi-arid tropics have over 2 billion people, and 644 million of these are some of the poorest in the world. It's a great challenge.

Fourth, we are doing it through science. Educated guesses, well-reasoned experimentations, new or improved systems. Cutting-edge technologies.

Fifth, we are partnering with whom? Governments, private sector, philanthropists, the farmers, the people in their communities. We are thus able to generate projects, funding, and proceed from theory to practice with our partnerships.

Sixth, what do we mean "science with a human face?" One way of looking at "science with a human face" is to always insist that knowledge gathered by scientists must help the poor become food-secure first before they help people become self-reliant. A hungry man cannot think of more important things than food.

Are you telling me your science niche, to borrow from marketing, is improving agriculture in the drylands?

That is correct. ICRISAT is the only international center dedicated to agricultural research in the dryland tropics in Asia and Africa. ICRISAT has been set up to work on five dryland crops – the cereals: pearl millet and sorghum; the pulses: pigeonpea and chickpea; and groundnut (peanut). These crops are important in the countries where we work, both nutritionally and economically.

Our scientists are drawn from all over the globe. They conduct cutting-edge research in areas such as crop improvement, biotechnology, natural resources management, seed systems, socio-economics and policy, and knowledge management and sharing.

By cutting-edge research, I mean high-tech, sophisticated, ground-breaking science. For instance, ICRISAT employs global information systems or GIS, to monitor weather and field conditions, and to study the progress of deserts and the influence of improved agriculture over several years.

In crop improvement, we try to breed location-specific higher-yielding varieties, and drought-resistant crops. That is the science part. We use the modern science of biotechnology to telescope time in improving crop varieties. This is man in aid of nature in creating crops that can withstand any or all kinds of stresses: drought, infertile soil, waterlogging, pests, diseases, and weeds. ICRISAT uses biotechnology to fast-track plant breeding of crops that are resistant to pests and diseases.

Coming to natural resources management, we take care of the soil, natural vegetation, and watershed. At ICRISAT, we have a wonderful experience in terms of watershed management, developing community-wide dryland into a watershed that yields not only water but also rich vegetation, not to mention wildlife. Seed systems have enhanced access by poor farmers to ICRISAT's improved varieties.

Our knowledge management and sharing work consists of helping the farmers gain knowledge and become self-sufficient in terms of managing their own farms by involving them in the research and development process, in which our national partners are also involved.

What's your strategy to encourage better agriculture?

We want prosperous, food-secure and resilient people in the drylands. Towards this, we use a holistic approach that includes good agricultural practices with planting better crops, preventing soil erosion, conserving water, and saving on fertilizer to help reduce methane emission in fields to help combat global warming.



Where is your focus on research? How do you make sure your science with a human face does not compromise your scientific excellence?

The dryland tropics are typified by unpredictable weather, limited and erratic rainfall and degraded soils. Our overarching research strategy is to fulfill the real needs and meet the contemporary challenges of the dryland tropics. That and our partnerships with national agricultural research systems and advanced research institutes in the public and private sectors ensure our continuing scientific excellence. Our relevance is ensured by close collaboration and consultation with a wide array of partners worldwide.

Tell me more about ICRISAT partnerships in doing research.

Our research is done with partners, especially national programs, and often our clients, meaning farmers and farming communities. We are consulting with a wide range of organizations, including many non-government organizations, NGOs at the beginning of projects to ensure that the expected outputs will have the desired impacts at the farmer level.

How vital has the collaborative approach proved to be in the development of ICRISAT research efforts?

Strategic partnerships are the cornerstone of implementing ICRISAT's research. Today, ICRISAT pursues innovative partnerships with more than 200 entities in the private sector, civil society organizations and national and international agricultural research systems. These partnerships are vital, especially in sharing our research results and products to our primary beneficiaries – national programs, farm families, decision-makers and consumers.

For instance, ICRISAT has institutionalized its Agri-Science Park to engage the private sector in commercializing our products to benefit poor farmers. ICRISAT has also partnered with government development authorities and programs - for example, the watershed development and land tenure agencies in India, seed regulatory agencies in Africa, and the UN Conventions on Climate Change, Desertification and Biodiversity.

More specifically, ICRISAT has been instrumental in setting up laboratories in India and sub-Saharan Africa for detecting aflatoxin contamination in food grains, thus assisting consumers and exporters in adhering to food safety standards. Also, ICRISAT uses strategic locations in both sub-Saharan Africa and Asia to develop and evaluate improved germplasm and target locations they are most likely to achieve their yield potential.

What do you think is the critical role of ICRISAT in research?

We fully believe that a critical role that an institute such as ICRISAT must play is to apply the best science to problems faced by poor farmers. For instance, in this era of climate change, ICRISAT is developing "climate-change ready crops," that is, these new varieties are among the most tolerant cultivars to drought and temperature.

ICRISAT has strategic presence in the vast dryland tropics. We are headquartered in Patancheru, Hyderabad, India. We operate two regional hubs in sub-Saharan Africa – in Nairobi, Kenya for Eastern and Southern Africa, and in Niamey, Niger for Western and Central Africa. Additionally, ICRISAT has research stations in Mali, Malawi, Mozambique and Zimbabwe.

We pursue a decentralized management setup. This way we are able to more fully understand and be more responsive to regional and national challenges.

You have a vision and strategy going to 2015. To what extent are you on track on food, nutrition and the environment in the drylands?

We believe we are right on track. ICRISAT and partners have released about 700 improved crop varieties, including hybrids, in 78 countries. That's for improved yields. Our genebank, the world's largest repository of our mandate crops, holds over 119,000 accessions from 144 countries. The genebank is the source of genes and germplasm to develop crops with better yields and that give better nutrition, and are resistant to drought, extreme temperatures, attacks of pests and diseases.

ICRISAT and partners have developed techniques and technologies for land and water management, especially watershed management and corresponding policy influence across countries in Asia. Our simulation models allow the testing and application of solutions across regions.

What techniques and technologies are these?

The fertilizer microdosing promoted by ICRISAT and partners. The African Market Garden, based on low-pressure drip irrigation system is good for diverse vegetable and fruit cultivation requirements. Thousands of farmers in East Africa have benefitted from the early maturing and disease-tolerant pigeonpea that saves them from hunger when no other vegetable grows. Fertilizer microdosing increased yields 120% and incomes 150% in West and Eastern Africa. The downy mildew-resistant pearl millet annually saves US\$ 8 million in crop losses in India. Conservation agriculture maintains soil nutrients, prevents water loss, and doubles yields for more than 300,000 households in Zimbabwe. Superior groundnut varieties have raised farm incomes in China, India and Vietnam.

We need to further enhance our efforts to attract crucial partners and donors to see that more and more farmers benefit from our research successes. We believe that this is possible and are doing all that we can to see that it happens.

Why is community participation a core principle of ICRISAT and how does it relate to the environment?

Community participation ensures the engagement of stakeholders. Once they own a project, they can see the necessity of sustaining the work. Community participation also works this way. For instance, farmers have indigenous, environment-friendly solutions that have worked for ages. Water harvesting for instance. They may not know

the science behind the solution, but they know that it works. ICRISAT scientists then harness such knowledge, discover the scientific explanation, and apply it in similar or even a diversity of situations.

Market is important to farmers.

We will explore market linkages for our mandate crops, including export possibilities. This should orient the poor farmers towards prosperity. Developing diverse uses of crops are important in finding more and new market linkages.

I'm interested in your multi-purpose crops.

Our multi-purpose crops are being explored for food, feed, fodder and biofuel. This is a relatively new dimension to our work, and is highly important in the holistic approach to agricultural improvement.

Do scientists come to you for training?

We have trained thousands of agriculture scientists and scholars from about 100 countries since 1975. We are sure that they in turn have been enriching their own national systems with the knowledge they acquired about innovations they saw at ICRISAT and in the fields.

What have you done to improve the welfare of women in the drylands?

We have found that women in the dryland tropics tend to be less empowered than men, and have less access to production resources. So ICRISAT and partners have been conducting research to understand gender-related risks associated with market-



oriented development. We know also that the welfare of women directly impacts on the children; since childhood malnutrition is widespread in the tropics, that receives our focused attention.

From whom does ICRISAT receive its funding and, realistically, how far does this funding stretch in terms of realizing your institutional goals?

Donors include governments, international development organizations, trusts and foundations. In 2009, ICRISAT received a total support of US\$ 48 million. But the challenges in the dryland tropics are enormous. Poverty and malnutrition continue to prevail in sub-Saharan Africa and South Asia. Much remains to be done, and this can only be addressed with vastly increased funding.

I heard the funding mechanism is going to be revised under the new CGIAR setup.

Yes. New funding mechanisms evolving under the new CGIAR are also presenting challenges to ICRISAT and other centers of the CGIAR. They are planning that funding for the consortium of centers be coordinated by a Fund Council.

In terms of government policies, what do you need?

We will begin to see a change for the better only when a significant number of farmers adopt the wealth of scientific innovations developed to cope with and overcome poverty and the unpredictable weather. Aside from additional funding, this can be achieved through changes in government policies that will encourage and support farming communities, including capacity strengthening within communities.

What about capacity building?

The days of hand-holding are over. Farmers must be empowered with knowledge about solutions, and must have access to those solutions, so that they can become self-sufficient, confident and become contributors to the common good. For instance, ICRISAT has spearheaded the capacity building of farm communities in India and West Africa, through the use of modern information and communication technology, including the use of cell phones and the Internet, which the farmers now use to look up the latest news on the weather, market prices, and to contact scientific experts and consult with them about their agricultural concerns.

Do you see the poor farmers as stuck at being poor, their lives uncertain and hopeless?

We do. As we look to the future, we are proposing an inclusive market-oriented development strategy that focuses on poor farmers to make them food-secure and income-secure. We believe that farmers, even in the drylands, can produce more than enough food to feed their families and still have a surplus to trade for improving their status in life.



I heard something about “Comprehensive Africa.”

That’s the Comprehensive Africa Agriculture Development Programme. We align our research projects with plans of our regional partners and organizations. For example, the concept of market-oriented development aligns well with Comprehensive Africa.

If you have to outline one achievable target for ICRISAT, what would that be?

Not one but many. Cutting-edge scientific solutions to the challenges of a warming world, frequent droughts, and the emergence of new pests and diseases. Improved crops and their corresponding management practices under marginal conditions. These are achievable in the near future. I hope governments and funding partners are listening.

(Published in the American Chronicle on 15 July 2010)

Creative climate science.

What ICRISAT can teach US



Can drought be overmastered in village scale by villagers themselves? The answer is “Adarsha.” That is one of the lessons the world stands to learn from the creative science of ICRISAT based in Patancheru, Andhra Pradesh, in India. Adarsha is Sanskrit for ideal. I say, beautiful. I assure you there’s more where that comes from, Team ICRISAT. But first, let us get our bearings.

Our current predicament is? I say it's a crisis of discernment; to borrow from Solomon, you know, in all your getting, get understanding. They say it's three crises: global finance, development, and environment" (Kevin P Gallagher & Jayati Ghosh, 1 February 2010, TripleCrisis). "The Triple Crises," they say, "actually interact with each other in forceful ways to reflect major structural imbalances between finance and the real economy; between the higher income and developing economies; between the human economic system and the earth's ecosystems." I say, to borrow from the subtitle of Ernest F Schumacher's book *Small Is Beautiful: That is economics as if people didn't matter*.

Since I don't see Gallagher & Ghosh's exploratory pronouncement as within the realm of Bill Gates' extraordinary creative capitalism as I appreciate it, I leave them to their bias. Give me creative capitalism anytime! So, my bias is creative agriculture. It's time to hear of it now.

It's time the capitalists invest in agriculture in creative ways – in parallel, it's time the farmers themselves invest TIME in it: time, initiative, money, and energy more than they have ever done. It's time for farmers to stop being mendicants. It's time the farmers stop complaining about government not doing anything and start doing some things for themselves.

Tiny Taiwan has mastered what the much bigger Philippines has not. In Taiwan, they have come up with a blueprint for the "New Agricultural Movement," four years ago yet (Council of Agriculture, 2006, coa.gov.tw). Minister of the Council of Agriculture Su Jia-Chyuan says the master plan calls for a continuance of current policy" accompanied by a creative flair," a spirit of "creative agriculture, vibrant farmers, charming villages." So nicely put.

Taiwan is into further developing what it has identified as the three "productive directives" (production, life, and ecology), and three "strengths" of agriculture (creative strength, strength to live, and power of charms) – all for sustainable agriculture, to "strengthen agricultural creativity and sales." Compare now the Eastern three productive directives and three strengths with the Western three crises. To borrow from SWOT analysis, the Eastern dwells on the strengths and opportunities, while the Western dwells on the weaknesses and threats. Made to choose, I would pick the Eastern approach. Being negative has been my *métier* but I have finally metered myself out of it.

I understand what is meant by creative agriculture when Director General of ICRISAT William Dar says we must "Put agriculture high on the agenda" . That was 8 December 2009 yet, before the Copenhagen conference. Yet, even if Copenhagen didn't listen, there is good reason why:

(1) We should remember the promise of the G8 countries to "increase the spending on agricultural development by \$20 billion over the next three years." According to Dar, we need at least \$44 billion each year just to solve the problem of malnutrition.

(2) We should campaign for governments of the world to advocate up-to-date technologies not only to boost food production but also to offset the negative effects of climate change. It is the least that we can do for ourselves.

"A clear signal that agriculture urgently needs attention is that India," says Dar, "the second biggest producer and consumer of rice, may have to import 2 million tonnes to shore up 2010 supplies." This will be the first time in more than 20 years that India will import rice just to ensure enough stock for her citizens. The reason is that because of a severe drought, India was expecting a decline in harvest by 18% compared with the other year. This would not be surprising as the monsoon rains in 2009 were 23% below normal, the worst since 28 years ago. After the drought, the floods. If you have doubts about global warming, prepare to shed them now.

Likewise, Dar points out, storms in the Philippines had destroyed 1.3 million tons of rice. Now then, Dar points out, "Just the news that both India and the Philippines could import huge quantities has swollen the price of rice." Bad news comes in twos.

Unrest looms, says Dar. "In 2008, food scarcity set off riots from Haiti to Egypt. Fresh unrest looms large over developing nations if food costs shoot up." According to the Food and Agriculture Organization (FAO), food prices in 31 countries "remain stubbornly high" so that 1 billion people have to go hungry every day. FAO Director-General Jacques Diouf says the hunger crisis affects 1/6 of humanity and "poses a serious risk for world peace and security." Prices remain up today.

Rainfed farmers in the semi-arid tropics, those who depend on heavenly drops to nourish their crops, "are especially vulnerable as rains here are erratic, soil fertility is poor and crop pests abound," says Dar. The magnitude of the problem can be appreciated when one realizes that rainfed farming is practiced on 80% of the world's arable lands and generates 70% of the world's staple foods – and 1.5 billion people depend on such agriculture, with 670 million of them being the poorest of the poor. Ask the Indians who reside in that 65% of India that is semi-arid.

And these are the ones sensitive to slight changes in market forces and climate forces. "Adding to the conundrum," says Dar, "is a progressively warming world." And so, the people in the drylands are among what I would call the climate change-poor – the most vulnerable of the poor, as a small aberration in the climate makes a big aberration in their lives.

Dar is proposing new policies to "push investment into agricultural productivity and increase farmers' access to food markets." I say access is key. New realities require new investments. Dar explains: "Why? First, food self-sufficiency would prevent undue pressure on the international grain trade. It would check wild fluctuations in global prices and avert panic buying in an already thin market." There is a need to improve the linkages between buyers and markets on one hand and crop raisers on the other. I say don't forget the three productive directives: Production, life and ecology.

The new investments must include new science, Dar says. He points out that, for instance, "ICRISAT scientists have developed farming systems resilient to shocks, buffering crucial resources like water and nutrients and adapting crops to warmer temperatures and new pest patterns." This is climate change-ready science. Small farmers must be able to access technology, markets and funding; they must learn to manage their own farms as their own enterprises.

Dar says that more entrepreneurs must be encouraged to tap into the pool of commerciable technologies and develop these into small and micro enterprises, to help farmers gain access to innovative farming systems. Governments can step in with more investments in irrigation systems, farm implements, high-yielding seeds, and markets.

“We have proven innovations in crop, soil and water management that farmers could quickly deploy in these times of crises,” Dar says. From Team ICRISAT innovations: More food from less water. More seeds even from more drought. Good yields from bad soils. More fruits from less fertilizer. More from less.

Finally, that brings us to the Adarsha Model, the Team ICRISAT-engineered system to combat drought in village scale, in Kothapally village in Andhra Pradesh. This is where the drought has largely been conquered, where the raindrops are harvested and made to replenish the underground water table, where the villagers grow high-yielding varieties using different cropping patterns, and where the people improve their skills up to and including manufacturing green manure. “Today, the villagers manage the watershed independently,” reports Dar. On their part and in support, Dar says the scientists use modern science tools such as global information systems, satellite data and remote sensing to assist the villagers to make informed decisions. They use the Internet to train people, to transfer technology, and to help groups explore marketing opportunities.

I note that the watershed in Adarsha is treated and becomes part of the common, and that to me signifies that for a resource to be successfully developed, what is necessary is common access, not private ownership. In addition, it must be emphasized that global warming is no respecter of persons or properties, and this means, among other things, that land ownership is not a prerequisite for farmers to access knowledge and know-hows, to access land, to be able to contribute to the overall affirmative action against climate change. This is another lesson from Adarsha.

Still, science needs more help from government, Dar says. “Developing countries also need to get their house in order. A paradigm shift from (instituting) makeshift measures during droughts and floods to long-term agricultural solutions needs to come about.” Governments must institute more systems, build more roads, build more facilities to help more poor farmers to help themselves more. Government must serve more science.

Science must serve more people. More people must also serve themselves. Just as the environment must be, so farm families must be self-reliant, self-sustaining, self-replenishing. I say, Adarsha!

(Published in the American Chronicle on 5 March 2010)

CMU.

Blue oceans and green harvests



Speech delivered at the Commencement Exercises of the Central Mindanao University, Southern Philippines.

The Board of Regents, President Victor Barroso, officials of the University, distinguished guests, graduating students and their parents, faculty and staff of CMU, friends, ladies and gentlemen, good morning!

First, let me thank Dr Victor Barroso for inviting me to address this very important event at CMU.

I am honored to receive an Honorary Doctorate Degree in International Agricultural Development to be conferred by the university. Today's event is indeed a milestone. It marks one hundred years of CMU's dedicated service to the underprivileged sections of our society. CMU is one of the top performing universities of the country today.

CMU has indeed come a long way since its days as the Mailag Industrial School in 1910. Its excellence in veterinary medicine, engineering, forestry education, agriculture, agricultural education, nutrition and dietetics and teacher education has been manifested by the 67.8% average performance of CMU graduates in the board examinations in these fields. This is a far cry from the 40% national passing percentage! Congratulations CMU for a job well done!

Likewise, your College of Agriculture and College of Forestry are recognized by the Commission on Higher Education as Centers of Excellence in these areas. CMU's excellence takes a deeper meaning as it provides education to students from the "depressed, deprived and disadvantaged sectors" in the region.

Today, the university faces tremendous challenges as well as opportunities for spearheading the growth and development of Mindanao. The economy of Region 10 is the largest in Mindanao. Agriculture is central to the regional economy. But despite its booming growth in agri-based industries, competitive advantage and rich resources, Mindanao has the poorest regions and poorest provinces in the country. This is both a challenge and an opportunity for the university itself and you among the graduates.

Allow me then to offer some advice based on my experience with ICRISAT in India. We work in 55 developing countries of Asia and sub-Saharan Africa. I want you to note that with foresight and determination we were able to harness Team ICRISAT and partners to turn our adversities and challenges into opportunities.

I want to emphasize that, so I will repeat: "turn adversities and challenges into opportunities." Today, ICRISAT is fully transformed and is now a high performing global research institute.

Let me elucidate on a seven-point formula to enable you to do so too. Let us begin with:

(1) Building teams

With its track record of excellence and leadership, CMU can exploit this opportunity to spearhead the sustainable growth and development of this region. I believe it is time for CMU and its graduates to make a paradigm shift from business as usual and shift to a blue ocean strategy. A blue ocean is a marketplace of ideas where the water is clear and peaceful, where there is no bloody competition to make the waters red.

When I came to ICRISAT ten years ago, staff morale was low and uncertainty pervaded the organization. With me as Team Captain, we restored confidence and optimism

at ICRISAT. We turned financial performance around from a deficit to a surplus situation. Through sound leadership and management, we transformed ICRISAT into a strong, robust and stable organization. ICRISAT today is top among 15 international agricultural research centers all over the world.

The first thing that you should do is build a University team – Team CMU, with the CMU President as its Team Captain. Your university officers should work as one group united in purpose. You can also build smaller teams based on your excellence in several areas, which can then work out their own R&D programs under the bigger, proactive and supportive University Team.

(2) Building partnerships

I know funding is a major concern for your projects, even though you may have the best ideas. So after having built a team, you should strengthen partnerships with the private sector, at least in Central Mindanao. You could talk to businessmen in your area of responsibility and explore what common projects you could undertake.

(3) Coordinating with governments

You have to maintain a working relationship with both the national government and local government units in Central Mindanao. Understand how they operate, their limitations, and work within those parameters. Then elevate and strengthen that partnership with teamwork.

Did you know that the Government of India is one of the biggest sources of funding for ICRISAT projects today? It is imperative that you cultivate good relationships with government. From then on the onus of delivering the goods is on you.

(4) Collaborating with outside agencies

Do not forget that there are donors outside the Philippines. In the Philippines, the World Bank and the Asian Development Bank are strong advocates of countryside development, especially for the poor and marginalized. You do not have to be as big as ICRISAT to come up with project proposals for funding. And that reminds me to urge you to invest in building a good think tank for packaging proposals.

(5) Advocating entrepreneurship

While education is your forte, remember that education is preparing people to look for jobs. That is why we are always running out of jobs. The blue ocean strategy here is to create jobs. Given that Region 10 is one of Mindanao's Super regions, with agribusiness as its central theme, CMU can offer courses in entrepreneurship. If you have one, strengthen it and encourage its graduates to become entrepreneurs, thereby creating jobs for themselves and for others.

(6) Encouraging micro-credit

Another blue ocean approach concerns women. Grameen Bank of Bangladesh and our local Ramon Magsaysay Award-winning Center for Agriculture and Rural Development - Mutually Reinforcing Institutions (CARD MRI) based in San Pablo City have shown that women make the best creditors. CMU itself and you graduates can get into micro-credit right away. What you need first are initiative and imagination.

Finally, concentrate on:

(7) Greening your part of Mindanao

There are 'perfect storms' brewing throughout the world. The perfect storm that I have in mind is a confluence of global warming, loss of biodiversity, poverty and population that is threatening to wash away or dry out the little that we have. Right now, many parts of the country are suffering from a severe drought due to El Niño. Mindanao today is experiencing an energy crisis because of lack of water to run our power plants. The whole of Mindanao is now in a state of calamity. PAG-ASA estimates 40 to 60% reduction in rainfall as an effect of El Niño phenomenon. We need to do something for the region. I urge you to green your part of Mindanao. Plant more trees and more drought-resistant crops. More agro-forest farms may be needed. It is in your hands to transform Mindanao into the breadbasket of our country and the springboard for our self-sufficiency in food.

You, the CMU graduates, belong to the youth which comprises almost one-third of the country's population and nearly half of our labor force. The older generation counts on you to help transform our country and become the beacon of hope of our long-suffering people. As you go out of the portals of CMU, you must join the ranks of dedicated professionals who will serve our poor people and help turn the Philippines around.

For your family, for God and country, you must repose more faith and more hope in others, first of all in yourself. You should give the poor people of Mindanao the gift of respect and love. You should share with them the gift of dreams: hopes that they can fulfill, homes where they can stay, jobs to earn a living, food to nourish their bodies, and other things to make a life that they can enjoy. You should share your gift of excellence, dedication and service. You must become the change agents of Mindanao.

When this happens, you, the youth, will have moved CMU to the next level of excellence, leadership and service beyond its first century. With God's help, I am sure that you will all succeed.

Mabuhay po ang CMU! Mabuhay po kayong lahat!

(Published in the American Chronicle on 6 April 2010)

Chickpea on dry.

Science steps in, roots go deeper



BAGUIO CITY - This may not be your cup of pea, but it's mine. The most delicious ice dessert in the Philippines, the halu-halo (stir-mix), I happily tasted twice last week. It's a proprietary concoction called the DJC Halu-Halo; the 2nd one I had gladly had ice cream on top. I was reminded of it reading a Benguet State University (BSU) research report on garbanzo or chickpea growing well where other crops would wither and dry up; never mind the ice cream, but the halu-halo is incomplete without those beans. It must be their "nutlike taste and buttery texture". Sans the DJC halu-halo, I'd love some crispy, roasted chickpea beans.

The welcome science report on chickpea research conducted by the BSU had been funded by ICRISAT and PCARRD, based in Los Baños, Laguna. Based at BSU, Fernando Gonzales is the National Coordinator of the Chickpea Project in the Philippines. PCARRD, headed by Executive Director Patricio Faylon, aside from coordinating national efforts in the fields listed in its name, has long been engaged in science & technology support and promotion. Here, chickpea is their common crop between ICRISAT and PCARRD; the dry soil is the common enemy.

BSU is in La Trinidad in Benguet, which is within the Cordillera mountain range in northern Luzon. Results of its study show that chickpea grows well in the highlands of the Cordilleras where the soil is dry, as well as in the lowlands below where the field is not irrigated. Global warming is here; we are talking of the drylands. We are talking of lack of irrigation water, even of soil water. We need a crop like the ICRISAT chickpea. We need climate change adaptation; we need to adopt a crop that is adapted to the drylands. Even to drought.

The PCARRD report on the same study says three varieties were selected for the highlands, and three others for the lowlands (pcarrd.dost.gov.ph). The selections yielded even higher than the global average yield of 800 kg ha⁻¹. The highland varieties (desi-type, smaller beans, split peas, thicker seed coat) gave up to 1,460 kg ha⁻¹, the lowland varieties (kabuli-type, larger beans, thinner seed coat) up to 1,680 kg ha⁻¹, which is more than twice the global yield. Not only that; given that in India the average yield of chickpea is 800 kg ha⁻¹ (VS Bhatia et al. icrisat.ac.in), the much-higher Philippine yields indicate a much fulfilling crop for the Filipino farmer despite relative lack of water in his field. With the ICRISAT garbanzos, when the water goes, science comes in.

Those tropical Philippine numbers are surprising because, according to ICRISAT itself, chickpea is a temperate crop. Not only considering the phenomenal yield in the Philippines, chickpea is little dependent on the usual farm inputs: nitrogen and phosphorus fertilizers, irrigation water, agro-chemicals, again according to ICRISAT. A climate change-ready crop by ICRISAT standards.

According to the ICRISAT report on the BSU chickpeas, these beans are “widely consumed in the Philippines and the demand is met only through import.” That the Filipino is fond of halu-halo is one explanation. The country imports about 735 tons of chickpea at US\$ 442,000 (PhP 20 million) a year (Danny O Calleja, 3 August 2010, balita.ph). Calleja reports on another study, the field-testing of ICRISAT legume varieties funded by the Philippine Bureau of Agricultural Research, with trial plantings in the Bicol and other regions of the country with longer dry seasons, as according to the Department of Agriculture Regional Executive Director for Bicol Marilyn Santa Catalina. Calleja quotes the ICRISAT Director General as saying about the BAR field plantings:

“We hope that through this project, we were able to identify varieties for peanut, chickpea, and pigeonpea that we can recommend to our farmers in the drier areas of the country to provide stable yield and higher incomes.”

With the ICRISAT legumes, the drier, greyer areas of the Philippines can then turn into green, following ICRISAT's Grey to Green Revolution. If we can't solve the problem with the soil, we can solve the problem with the crop. Chickpeas can be good for stews, curries, salads; they can also be good grounded into flour. You can also have a "sizzling Asian chickpea salad," which is chickpeas fried in garlic and spices on spinach and cilantro leaves. Sprouted garbanzos are good as vegetable or salad; young pods are good for eating too. The seeds can be cooked into a thick soup, or used as feed, or ground into flour and turned into snacks. The starch can be used for textile sizing. Don't forget that the garbanzo is excellent for ice desserts like the Philippine halu-halo.

If you plant chickpea, you're not alone. This crop is the third most important food legume grown in many places in the world (crnindia.com). As a legume, it enriches your soil with nitrogen. If you grow the crop, the beans should enrich your pocket with hard-earned cash. If you cook the beans, garbanzos should enrich your body with lots of nutrients: molybdenum, manganese, folate, dietary fiber, tryptophan, protein, copper, phosphorus, iron and calories.

Myanmar is ahead in planting ICRISAT chickpea cultivars. In 2006 yet, already Myanmar chickpea was 82% ICRISAT varieties and "emerged as an important exporter of chickpea" (icrisat.org). Will the Philippines be able to catch up?

So much for the crop comparison. Let's talk about climate change adaptation and the plant itself. Note that the successful trial plantings in the Philippines are in the drylands. Dry, non-irrigated. How do you explain the high yields? I asked if BSU fertilized the trial plantings, and William Dar said they added very minimal fertilizer. Considering the long roots and massy root system of the chickpea, I say the answer lies in the water that you don't see on the soil surface. I say those roots help the chickpea capture whatever moisture there is beneath the soil surface.

But how? Water seeking roots, roots seeking water. In the soil, only capillary water is available to plants. I know that there is capillary water in any cultivated soil in the tropics; when there is no irrigation, when there is no rain, when that soil surface is dry, where is the water coming from or, where do the long roots of the chickpea get their water? It must be ultimately none other than from the water table below. By capillary action, that water defies gravity and seeks its own level, higher up. If the soil surface is cultivated too much, the capillary action is broken – but once the chickpea plant establishes itself, its roots will seek those precious drops waiting below the dry soil surface, so you have full roots feeding a plant laden with fruits despite a soil surface lacking in moisture. I would call it a "climate change adaptation-ready crop." That chickpea knows where to find water even if this farmer doesn't.

(Published in the American Chronicle on 16 August 2010)



Adarsha revisited.

Impacts of CGIAR research



MANILA – Investors in agriculture research must be exulting with the report of Mitch Renkow and Derek Byerlee that the efforts of CGIAR centers have “yielded strongly positive impacts relative to investment” (2010, “The impacts of CGIAR research: A review of recent evidence,” Food Policy, in press). Investors need to be reassured that “research investments represent money well spent.” Science is not a commodity thing that bean counters can count on the palm of their hands.

Renkow & Byerlee single out crop genetic improvement (CGI) research as “having had the most profound documented positive impacts.” I can easily understand where it’s coming from. CGI refers to higher yields, higher resistances to pests, diseases, and stresses like waterlogging and drought. An increase in yield is instantly palpable to the researcher who would likely publish it as soon as possible, if he can. It is also immediately tangible to the farmer anywhere, without him having to understand that such an increase may have been due to the new variety’s resistance to pest or disease, or resistance to drought. The poor farmer will not be bothered about such technical considerations as plant morphology and marker-assisted selection and breeding.

I note that the Renkow & Byerlee report focuses on four program thrusts of the CGIAR system: crop genetic improvement, pest management, natural resources management, and policy research. As the authors state, they do not include knowledge production and dissemination, germplasm collection, and capacity building for lack of published papers from 2000 to 2009, as I understand. I don’t think that’s systems approach.

As raw materials for their economic analysis of the outputs of the CGIAR system, Renkow & Byerlee make use of technical reports on research impacts that have appeared in peer-reviewed publications after 2000. I have two problems with that: One, there is a limited number of researchers authoring, much less getting published in technical journals. Two, getting past your peers who review your paper is like the camel passing through the eye of the needle a great deal of the time.

The quality of papers is strained, but there are too few of them that pass the straining test. I should know. I used to be based in Los Baños as Editor in Chief of the Philippine Journal of Crop Science (PJCS) published by the Crop Science Society of the Philippines, fearfully late in coming out with its scholarly issues. I know for a fact that journals within the UP Los Baños campus always have a hell of a time producing an issue 3 or 4 times a year. If it happens to The State University, it happens to all the others.

The point I’m driving at is that, speaking as an Editor, I know published papers are hard to come by, whatever they are. To produce an issue of a journal, in practical terms, you have to have contributors with papers that come up to editorial standards, that is, they must be clear, concise, coherent, and comprehensive, the 4 Cs. Obstacle #1. Then you have to have those papers reviewed competently and fast. Obstacle #2. Then you have to edit, including look for missing images or errors in tables. Obstacle #3. Then you have to have those manuscripts desktop-published. Obstacle #4. Then you have to copyread many, many times if you want it perfect. Obstacle #5. Then you have to watch the printing.

In short, a quality published paper is like rain in an El Niño year – you thank Heaven when it comes.

The original manuscript was received by the journal (Food Policy, published by Elsevier) on 23 July 2009; it was reviewed by peers, sent back to the authors, and the

revised paper was received back on 10 March 2010, or 8 months later, and it took the journal to accept it for publication an additional 40 days, 20 April 2010 – a total of more than 9 months. Additionally, note that above all the entries on that pdf, it says “Article in Press” – they have yet to come out with the actual paper issue. In other words, the pdf is a conversion of online camera-ready pages. And by experience, I know that that was fast.

You couldn’t blame me if I expected that Renkow & Byerlee also solicited for the more numerous unpublished but officially submitted reports of impact manuscripts from CGIAR centers. To screen the unpublished papers fast, they could just have applied the Rule of the 4 Cs. If you use published papers only, you are using only The Rule of the Peers.

I also expected Renkow & Byerlee to present a list of criteria for measuring impact that are specific, measurable, achievable, realistic, and time-bound. That would have been SMART. Finally, I expected the authors to attempt a systems approach in understanding the impacts of the CGIAR system, specifically, to additionally attempt to synthesize the impact of crop genetic improvement along with the following – pest management, natural resources management, policy research, knowledge production and dissemination, germplasm collection and capacity building. Taken separately, the parts are always less than the whole.

Since I’m more than familiar with this CGIAR center, I am going to give you my favorite example of Alexandre Dumas’ Three Musketeer’s motto, “All For One, One For All” – the ICRISAT story of the Kothapally watershed in India.

The impact of Adarsha has been on a community (Kothapally), then a country (India), then other countries (Thailand and Vietnam). A World Bank team visited Adarsha on 18 April 2010, and the team was astounded: “This is a very prosperous village. Are we sure that we are in Kothapally? This village stands out from our normal imagination of a village in Asia or Africa,” was their verdict. The team also said, “There are a lot of lessons we can apply in our rainfed and watershed programs in Rwanda, Malawi, and Nigeria in Africa as well as in different countries in Asia.” This is investors’ money certainly well spent on science.

Let’s have more Adarsha-like impact stories, please!

(Published in the American Chronicle on 20 August 2010)



An African revolution.

IMOD power to the women!



ADDIS ABABA – This one is about small farmers thinking big, big donors thinking women, Africa thinking of a really big revolution. Africa needs a different kind of Green Revolution, USAID Mission Director Thomas Staal said (ethiopia.usembassy.gov). In fact, the African farmers were left behind by the Green Revolution that Borlaug wrought.

Staal was speaking to the delegates to the by-invitation-only Borlaug Symposium 2010 in July. He was calling for a "Grassroots Green Revolution." By the term "grassroots," he referred to the small farmers, and he said they needed to become businessmen. Tillers thinking trade? That would require a continental paradigm shift. On second thought, perhaps it would require rather a tectonic shift.

He was dreaming for the poor African farmers. Staal said the farmers must connect directly to the market, and when they do, this will spur growth in the small towns as well as "create economic opportunities for the landless and for the youth." That is to say, all things being equal, if the farmers grow and sell their own produce themselves, they can reap not only the fruits of their crops but also the fruits of their labors.

Staal said if the poor growers become their own sellers, they can get their fair share of the social value added by their produce and not give it away to middlemen. Not only that. This farmers' market will have a multiplier effect directly in the villages, as it effectively shifts marketing power from the city to the village. The villages will be able to enrich themselves from their honest labors. A historical shift.

Question: But, can you teach old dogs new tricks?

Answer: You have to.

And yes, Staal said, the impossible has been done:

- (1) In cotton, Francophone West Africa is now the world's 3rd largest cotton grower, behind the US and countries of the USSR, 14% of exports from nothing in 1960. This was done by "a combination of public sector promotion and private sector investment."
- (2) In dairy, there has been a tripling of milk production in Kenya, after this country "abandoned its public marketing controls on dairy products." There are now more than 600,000 milk producers in Kenya. The raw milk sales now equal 85% of national consumption.

In his concept of the Grassroots Green Revolution, Staal said women farmers' needs will have to be met more fully. After all, women produce 60 to 80% of the world's food. The women must have access to assets, inputs and technologies (AAIT). The private sector must invest in AAIT, and the public sector must advocate for them and support them.

(I note that Staal says "access" and not "ownership" – access, not ownership, is a requirement for management of resources, whether by the poor or the rich. In his downloadable speech titled "Africa: The Donor View on Development," Staal used the word "access" six times. I note access especially because in the Philippines where I am based, the mass media noise is for land ownership.)

Staal was speaking at the symposium held 13-14 July in honor of Nobel Prize winner Norman Borlaug, Father of the Green Revolution that forgot Africa. In the same occasion, former US President Jimmy Carter said, "He never let any of us – or leaders in the United States and abroad – forget the moral imperative we have to feed the hungry. Better yet, he taught them to feed themselves."

In the same symposium, a paper was presented, authored by William Dar, Mark Winslow, Said Silim, Tsedeke Abate & Mary Mgonja of ICRISAT. The ICRISAT authors concurred with the idea of an African Green Revolution, but differed on strategy. The paper said that “the notion of a single, ideal balance point between food (and) cash crops may be too simplistic.”

ICRISAT Director General William Dar said there need not be conflict between growing a food crop and a cash crop, one for body sustenance and the other for other human needs. For instance, ICRISAT has been working in Ethiopia on chickpea, a single crop that is used to both grow grains and increase incomes, to raise both food and cash.

Dar said that the question is not to end hunger first but to end hunger and at the same time end poverty. The poor cannot have access to food if they cannot have access to cash. While he is feeding his family, the farmer must be able to raise cash to meet other necessities, and he can do that only if he becomes market-oriented.

This has in fact been discovered through a World Bank study, Dar said: The World Bank ... identified a common thread underlying the development of agricultural economies worldwide and over modern history. That common thread was a transition from a rural subsistence enterprise to an inclusive market-oriented enterprise responding to demand from urban centers. Importantly, they note that poverty and hunger decline as this transition proceeds. In a sense, rural areas use agriculture to capture a share of the growing wealth of cities.

We concur, Dar said. The insight of ICRISAT based on data gathered under the Institute’s long-term Village Level Studies initiative “concur with the World Bank’s analysis,” he said, based on ICRISAT’s 30-year observations regarding the drylands of Africa and Asia. Where the number of poor was going down, the farm-to-market connections were going up.

Upscaling the World Bank’s concept of inclusive market-oriented enterprise, ICRISAT has come up with the concept of inclusive market-oriented development (IMOD), inclusive of the poorest of the poor. The position of ICRISAT is that there need not be any food crop and cash crop dichotomy. Even for the poorest of the farmers, whatever the crop is, if brought to urban areas, it becomes a cash crop because city dwellers pay for the produce in cash. The IMOD lesson there is that if you are able to direct more of the poor farmers to produce more, and for the market, those farmers can rise above their low status in life. ICRISAT has since made IMOD a conceptual model for its Strategic Plan to 2020.

In the IMOD context of investments, Dar said three sectors are necessary to make it all work for all: (1) the poorest of the poor are included as raisers of crops, (2) donors are sources of access to assets, inputs and technologies, and (3) the government provides support in matters of policy. Connect the farm to the market, and you will motivate the poor to grow more crops – the market becomes the motivation to raise food and cash.

Dar said because hunger and malnutrition cannot be postponed, the raising of more staple foods such as the major grain crops should be the first step within the pathway

of IMOD, and the food surpluses brought to the markets. The choice of food grains as the first crops to raise is made because they are less perishable, more easily stored as food reserves, cheaper to grow with microdosing of fertilizers, more easily transported over bad roads and from remote areas. If you are hungry, food is first; only after that will you want to meet other and higher human needs, following Maslow's Hierarchy of Needs.

If farmers are worried about their stomachs, high-value crops have no value for them. Governments and donor agencies must worry first about the food for the extreme poor, because amid hunger and malnutrition, there cannot be social stability or economic growth, Dar said. When the stomach grows, a beast may come out.

Once the IMOD process is triggered by the growing of staple food crops, and input & output channels have been established, then farmers can and will be willing to grow high-value cash crops. Farmer cooperatives can then add new crops to the mix and provide the proper training and inputs; the coops themselves can leverage their connections to push to market the new cash crops created by research and grown under new technologies "to increase returns-on-investment, ensure equity and sustainability, and remain competitive in the marketplace."

With inputs, access to markets, infrastructure and credit, as Borlaug had dreamed for African agriculture, IMOD should help bring about the African Green Revolution.

I think that in fact, that African version of the Green Revolution may have already started, at least about seven years ago. Dar said that planted in Ethiopia, the total harvest of ICRISAT chickpea varieties jumped from 168,000 metric tons in 2003-2005 to 312,000 metric tons in 2008, resulting in skyrocketing exports earnings from \$1 million in 2004 to \$26 million in 2008. Similar impacts had been reached in Tanzania with pigeonpea, now grown for both food and export, as well as in the African region with disease-resistant sorghum varieties. ICRISAT helped the National Smallholder Farmers' Association of Malawi screen out groundnuts for aflatoxin content (using another ICRISAT innovation) in order to meet export safety requirements, and in linking to fair trade imports; success has resulted in higher incomes received by farmers of Malawi. This IMOD approach is now expanding into Mozambique, Tanzania and Kenya.

Dar said: "The important question for development agencies should be, "How can we foster a sustainable, equitable transition for the poor along the inclusive market-oriented development pathway?" A change in the balance of food (and) cash crops will be a logical outcome of this underlying transition. For each farmer, the balance will be different depending on their stage in the transition, particularly their food security status, their access to markets, and their capacities (assets, skills, capital).

So IMOD is good. What about the risks: Drought? Wildly fluctuating market prices? Exploitation of the environment? Climate change? They all have to be taken into consideration. They have to be addressed soon enough after food and poverty.

Now then, a final question: To whom do we give more IMOD support: male farmers or female? In Africa, it must be the female, because women grow 80% of the food

consumed in that region. In Kenya, I think the ICRISAT experience shows that the women are the brainier sex. In Africa and Asia, the women traditionally grow the food crop while the men grow the cash crop or leave home to find work in the city (Megan Rowling, 26 December 2008, reuters.com). So, the women need more help than the men. Kofi Annan, former UN Secretary General, said (Rowling as cited):

Today the African (female) farmer is the only farmer who takes all the risks herself: no capital, no insurance, no price supports, and little help – if any – from governments. These women are tough and daring and resilient, but they need help.

The scientists need help too, in fact. In the same symposium, former President of Mozambique Joachim Chissano spoke about the man they were honoring. He said Borlaug was worried not only about the farmers but also the scientists (Borlaug Symposium 2010):

He remained concerned that still too many agricultural scientists and officials remained too detached from smallholder farmers and their problems. It was as if the harsh realities of poverty, hunger and suffering didn't exist. Too many, he feared, were more comfortable in their laboratories, experiment stations and offices, than in going to the fields to see the harsh realities their farmers were facing.

Borlaug died at 95 on 12 September 2009. We are told that his last words were, "Take it to the farmer" (Roger Thurow, Borlaug Symposium 2010). Which farmer? You have to sell the idea of markets to the farmers before they can turn themselves into businessmen. And, according to ICRISAT experience, the best businessmen farmers are, well, women.

(Published in the American Chronicle on 21 September 2010)



Adarsha alliance.

William Dar as ICRISAT manager



HYDERABAD – There was a National Dialogue on Building Leadership in Agricultural Research Management: Concerns and Future Strategy held in Hyderabad, India, 27-28 August. On Day One, Director General William Dar of ICRISAT, spoke on the subject of “Servant Leadership: A People-Centered Paradigm of Research Management” in the public sector. The subject fit the man and the institute to a T – the quite impressive team of ICRISAT.

William Dar as servant leader. Let me tell you what I know, and how I've come to know. I've met him several times. He's an agriculturist, and so am I; he was a teacher, and so was I. I have been writing about the man and the institute quite extensively, even intensively, since February 2007, popularizing their science as they applied their theory along with their partners in the public and private sectors, and with the knowing participation of the village peoples in the semi-arid tropical fields of India, Asia and Africa.

Among other things, I have learned that ICRISAT invented, initiated, or institutionalized the following – please note that my list is selective and at random:

- Microdosing of fertilizer
- African Market Garden
- Virtual Academy for the Semi-Arid Tropics
- Climate change crops
- Market assistance
- Cultural revival
- Empowerment.

Adarsha was first a science-driven scheme that became a village-driven success story of how a village revived its ravaged watershed. With their watershed revived, the villagers thrived. "Earlier, the approach to work in these villages had been very top-down, with an emphasis on soil and water conservation and little people's participation," Piara Singh of ICRISAT said. When it became down-up, with equal emphasis on the poor villagers' inputs, the case took a turn for the best.

Three crucial points I believe have made Adarsha a success story in a direct sense a people power triumph:

- (1) Common eye.** As I see it, Adarsha is the triumph of people commonly at work for a goal after they finally commonly have seen it as one for all. I know quite a few short-lived success stories of people empowerment projects in the Philippines. They all mean well, but good intentions are not good enough; where they have failed is that they are project-driven until project funds run out on all of them. In basketball, you can be a great team, but if you can't see the goal, you can only shoot wildly until you can't shoot anymore.
- (2) Collective mission.** The mission is to help the poor help themselves. A basic rule, not to be ignored. The villagers of any Adarsha candidate in any place in the world will need to learn to walk the talk of people power, real people power. The end is the same: self-reliance. You want it done, right? Do it yourself!
- (3) Collaboration of 3.** The triad is the scientists, villagers and their partners in grime. They all have to learn to work the dirt together. Now, that's not an enumeration by hierarchy, the more important people listed first; it is merely a listing by chronology, because it is usually the scientists who travel for troubles, looking for people's problems. Part of people power should be to arouse people's initiative from inside and among themselves. In the ICRISAT experience, the collaborators are the Indian government, other science institutions, private sector, and donors

such as the World Bank and Bill Gates, knowingly sharing for the poor people working to enrich themselves.

That describes what I shall now call The Adarsha Team, the ideal group at work. This I believe is one of the biggest contributions of ICRISAT to the universe of science in the service of the poorest of the poor. My list of three characterizes the team:

(4) Committed servant leader. It's also something most people of any group of any age forget. Actually, this is where the exceptional contemporary story of ICRISAT starts. In 1999, ICRISAT was plainly suffering from years of money problems, morale difficulties, and unhealthy turnover of staff in management. The next year, mild-mannered William Dar became Director General of ICRISAT, and he introduced servant leadership, that which he himself pointed out in his speech, which he had been practicing in his various headship roles in the Philippines. If you serve the people well, you are the leader they love.

In ICRISAT, he built up the morale of the staff, and their spirit soared. He built up the managers of the institute, and the institute worked harder and better. And these twin accomplishments began to be noticed and they built up the funds. Today, of the 15 centers of the CGIAR, I dare say ICRISAT is an outstanding CGIAR member. In terms of impact? Worldwide. ICRISAT Team Captain Dar is more modest: Today, ICRISAT is a fully transformed and a high-performing institution. Servant leadership is the driving force in this transformation. In his speech, he quoted the creator of the philosophy of servant leadership, Robert Greenleaf as saying that "begins with the natural feeling that one wants to serve, to serve first. Then conscious choice brings one to aspire to lead." Dar listed these 10 principles of servant leadership he borrowed from servant leadership advocates:

1. Vision & foresight; 2. Conceptualization; 3. Stewardship; 4. Self-awareness;
5. Listening; 6. Empathy; 7. Persuasion; 8. Healing; 9. Community building
10. Commitment to people.

He also said that in this age of globalization, genetic revolution, informatization, and climate change, we really need to rethink and reshape our paradigm and strategies in managing research. He did not prescribe a tenet with which to rethink and reshape agriculture research, but it is easy for me to offer the ICRISAT way that I have just described to you in 4 Cs: (1) Common eye, (2) Collective mission, (3) Collaboration of 3 and (4) Committed servant leader.

Jonathan Swift said, through a character in his book of social satire *Gulliver's Travels*, "Whoever could make two ears of corn, or two blades of grass, to grow upon a spot of ground where only one grew before, would deserve better of mankind, and do more essential service to his country, than the whole race of politicians put together." Perhaps, but this one I'm writing about has done much more than that and deserves much more credit: The Adarsha Alliance has been able to grow a watershed where none grew before.

(Published in the American Chronicle on 11 September 2010)



Tanzania & Mali for Mbaazi. 25

The black revolution in Africa



ARUSHA - A revolution is not a dinner party? This revolution is a party. A dinner party. A breakfast party. They also do lunch! And snacks. Well, revolutions today are waged via art with science (embracing technology), and even if your science is better, some are faster with their art. Graphics, graphic mostly.

Mind your theory; practice matters. The ancient truths remain: Practice makes perfect; form follows function, and practice follows theory. Note that in these times when people can communicate their theory at the speed of light, it's better if you get your practice at the speed of bright.

We are in Tanzania; let me remind you this is Africa. Black. Now, if you would call The Arusha Declaration of 2010 the Little Black Book, then we have in our hands The Black Revolution. And the vanguards of the revolution? Black women. And I quote the last sentence of the Declaration "I believe it because it is impossible."

And you thought The Next Revolution was going to be the 2nd Green Revolution (to correct the errors of the ways of the 1st), or even the Golden Revolution (with Golden Rice).

Women again! I for one have no quarrel with women, as long as they know where they belong, as long as they do what they are supposed to do, and well. And in Tanzania, they are beating the men at their age-old game: Women are better at hitting pay dirt.

Dirt is what Felista Mateo soils her hands with, but she is able to make it pay her back well for her efforts where her male farmer neighbors have failed (ANN, author not named, cimmyt.org). She is a single mother of four, an independent farmer, no more than 5 feet in height, but now she stands tall among her neighbors: Her intercroops of corn and pigeonpea (Mbaazi) have yielded enough to feed her children (maize) as well as to sell for export (pigeonpea). She is in the right place, as Tanzania is #6 in the world in the production of pigeonpea, following India, Myanmar, Malawi, Uganda and Kenya.

It was Frank Swai of the Ministry of Agriculture who convinced Felista to plant those two crops together. Frank works with the Selian Agricultural Research Institute; the SARI works with the Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT), as well as ICRISAT. The high-yielding maize was from CIMMYT, the high-yielding pigeonpea from ICRISAT. The intercropped CIMMYT maize and ICRISAT pigeonpea were new varieties that thrived amidst patent lack of soil moisture and with little or no chemical fertilizer.

And all that is only part of the Black Revolution of Africa.

To get on with the story: Felista knows that pigeonpea is being exported to India – by middlemen, who dictate the farm gate price, what she gets for her labors. She thinks about it. She defers selling and stores her harvest in her granary, to sell when the price is right. That's good decision. Contrast the poor rice farmers in Isabela in the Philippines - their harvests cannot be stored to wait for better prices because the farmers are heavily in debt with input suppliers. I know, for some of them are our tenants.

Arusha growers of pigeon pea like Felista have benefitted much from the export demand, and have built better houses, bought livestock, vehicles and machinery for more efficient and more profitable farming (Edward Selasini, 16 October 2010, Arusha Times). Out of this pea, peasants also have been able to pay medical bills and meet

school expenses. Not the peasants in my country. In the first place, Philippine rice is not for export. A lesson from Arusha: What Filipino rice farmers should be doing is look for crops that are exportable. In the meantime, in the rural villages in the Philippines, if a poor rice farmer consults a doctor for a non-life threatening illness and pays, the doctor will have a heart attack! The poor farmers have the willingness but not the ability to pay.

In Kenya, Priscilla Mutie has a 4-hectare farm planted to ICRISAT pigeonpea that is selling like hot cakes. Priscilla says: "I am able to feed myself and my family. The surplus I sell to my neighbors and that income has helped me purchase cattle, build myself a home, purchase decent clothing, and most importantly purchase a mobile phone that has helped me look for markets."

A phone, a phone, a market for a phone! Priscilla can get her market at the speed of bright.

In Babati, Director General William Dar says, ten years ago, Rose Fratern Muriang's fields were devastated by the deadly *Fusarium* wilt bacteria, and from her pigeonpea "all she got was firewood." Today, with new and improved varieties from ICRISAT, she is one of the leading pigeonpea farmers, with 50 acres planted. She is building a new house, and she has been elected a councilor of her town. Rose's stature has risen in her village; she has become a woman of influence. I've heard of a princess and a pea that gave her a sleepless night, but I've never heard of a pea that gave a princess prestige!

ICRISAT's pigeonpea is quite revolutionary in itself in that it is the world's first commercial hybrid. Not only that, it is high in protein, as any worthwhile pigeonpea should be; the hybrid matures in five months while old varieties take twice that long to bear fruit and, therefore, with the hybrid, farmers can have two harvests within a year. Double the work, double the compensation.

William Dar says that when ICRISAT and SARI started collaborating in the districts of Babati and Karatu in Tanzania in the mid-1990s, the farmers had been impoverished by the infestation of their pigeonpea crops by *Fusarium* wilt. Today, the farmers' incomes have risen 80%; there is electricity in town and other "signs of prosperity driven by agricultural commerce." Driven mostly by the new pigeonpea varieties.

All that has inspired ICRISAT to come up with its revolutionary Strategic Plan to 2020 that employs what it calls the inclusive market-oriented development (IMOD) pathway, essentially linking poor farmers to the market, especially the export market, so that they as producers can enjoy the added rewards long denied them by input suppliers and middlemen: added security in food and extra safety in cash.

"Tanzania is the heartland of pigeonpea in Africa," William Dar says. If so, Tanzania is the heartland of the Black Revolution in Africa. Even so, in Kenya, Priscilla says people like the new varieties. "They say that the ICRISAT peas are fairly large and tasty. They have a lovely color that is consistent."

Also, the hybrid is drought-tolerant – it grows well even where the soil is dry, where alone maize fails. And, since pigeonpea is a legume, it enriches the soil with nitrogen; with that, if you grow maize next to pigeonpea, the yield of maize will improve, ICRISAT scientist Said Silim says.

Before the arrival of the ICRISAT pigeonpea variety called “Mali” (Wealth), the Babati White was decimated by wilt disease, and the peasants began totally abandoning the crop (ANN, Arusha Times, 16 September 2006). Now “Mali” has displaced Babati White as the pea of preference.

And how does maize withstand the drought when intercropped with pigeonpea? With its deep roots, the pigeonpea brings up capillary water rising from the underground water table, and that helps moisten the soil around those roots initially, and that helps moisten the rest of the soil in that field eventually.

And how does the new, improved pigeonpea compare with the traditional Babati White? The grains cook faster and taste much better, Mama Fatuma Dodo says. A farmer in Babati, she says the ICRISAT varieties are high-yielding, giving 6-8 bags per acre (1 bag = 120 kg).

Tatu Habib, a peasant and mother in Babati, says that the old variety, Babati White, had some unpleasant taste and the ICRISAT varieties are more tasty (ANN, Arusha Times, cited in firstglobalselect.com). Her husband, Juma Ismail, says that since the ICRISAT “Mali” variety is wilt-resistant, they get bumper harvests; however, he believes that Babati farmers are being cheated by some hit-and-run middlemen: they buy at dirt price from the farmers, carry off the harvest and sell at luxurious prices elsewhere.

Back in Kenya, pigeonpea raiser Carol Maringa says, “I have not had to add manure or fertilizer like I would have for maize” (ANN, 05 August 2009, irinnews.org). She plans to plant more of the pea next time. Advice: Carol should save not only on fertilizer but also save herself from unfair market practices.

That brings us back to Felista Mateo in Tanzania and the farmers in the Philippines: Poor farmers all have to be protected not only from unscrupulous middlemen but also input suppliers.

Proactive, the Tanzanian pigeonpea farmers have taken matters into their own hands – they have organized themselves into producer marketing groups to help each other reduce costs and as one voice demand better prices for their produce. William Dar says ICRISAT and partners have come up with coordinated production and marketing system to help the producer marketing groups “increase market participation and bargaining power by expanding production and marketing” of the new pigeonpeas. You have to help the farmers help themselves.

Partners. Which reminds me of the need to emphasize that the Black Revolution in Africa being wrought by the new pigeonpeas is not being waged by ICRISAT alone but with a party, the list of public and private partners, among others, including the governments of India, Tanzania, Kenya, Malawi, Uganda, and Mozambique as well

as their respective National Agriculture Research Systems, Egerton University, Kenya Agricultural Research Institute, African Development Bank, DANIDA, IFAD, the World Bank, and the Bill & Melinda Gates Foundation.

You don't wage a revolution alone - you wage a revolution with a party!

ICRISAT Governing Board's Arusha Declaration

The Governing Board has approved ICRISAT's strategy for the next decade. Responsive to the rapidly changing world, this exciting strategy (and how it will be implemented) will be unveiled during the next few months.

Anchored on the principle that people must determine their own destiny, the new strategy challenges the widespread pessimistic belief that the drylands of the developing countries will constantly depend on external aid for economic growth.

We will never accept this view!

There are many examples of how ICRISAT with its partners in the public and private sector have vastly improved people's lives, and how its new strategy will enable them to have much more.

For instance, in seven short years, the lives of many smallholder farmers in the Babati District of Tanzania have prospered beyond imagination. ICRISAT's improved pigeonpea varieties have allowed them to establish a thriving export business to India and invest the profits to replace their houses, buy household appliances and build a new school.

Towards this, the Board would like to express our belief in our ICRISAT colleagues as reflected in the motto "Credo quia impossibile est" (I believe it because it is impossible).

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About ICRISAT



The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a non-profit, non-political organization that conducts agricultural research for development in Asia and sub-Saharan Africa with a wide array of partners throughout the world. Covering 6.5 million square kilometers of land in 55 countries, the semi-arid tropics have over 2 billion people, and 644 million of these are the poorest of the poor. ICRISAT and its partners help empower these poor people to overcome poverty, hunger, malnutrition and a degraded environment through better and more resilient agriculture.

ICRISAT is headquartered in Hyderabad, Andhra Pradesh, India, with two regional hubs and four country offices in sub-Saharan Africa. It belongs to the Consortium of Centers supported by the Consultative Group on International Agricultural Research (CGIAR).

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