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Viewpoint – The Search for Understanding Irrigation - Fifty Years of Learning

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ABSTRACT: For those involved in international irrigation development activities there often are feelings of frustration. This note is an effort to identify underlying sources of the frustrations that come from external limits that are placed on thinking, from fads that often dominate, and from the influence of power that can overwhelm one's best efforts. Problems of ignorance, wilful and otherwise, the existence of unspoken objectives, and the one-size-fits-all approach are addressed from the perspective of personal experience including research, consulting, and grant-making. Basic to many of the problems are the personal motivations of those with decision-making authority. Examples from the Philippines, India and Pakistan illustrate the problems.

KEYWORDS: Irrigation, development, constraints, misfeasance

During the 50+ years of my international water-related career I have been fortunate to have had the freedom to make (and hopefully to learn from) mistakes, to have had the opportunity to work and live extended periods in the Philippines, India, and Venezuela, and to have had a range of work roles – teacher, academic researcher, Program Officer for the Ford Foundation and consultant. With this as a background to permit you to assess the validity of my forthcoming comments, I would like to illustrate some of the problems I had noted in a range of development efforts with anecdotes from my experience.

IT IS NOT EASY TO RECOGNISE IGNORANCE, ESPECIALLY ONE'S OWN!

My first assignment in the development field was in the Philippines, when I was a member of the University of the Philippines/Cornell Program at the Los Baños campus (UPLB). The Governor of Laguna Province offered to provide 50,000 pesos (at the time, about US$12,000) to one of the irrigation systems in the province and asked UPLB to review what the grant was to be used for. I was asked to be one of three faculty members from the college to do the review and I accepted (the first sign of ignorance). We met with the chief engineer and some of his staff to hear their proposal, which was "to line with concrete one of the secondary channels that was leaking badly". We then went to the field with two members of the staff and walked the channel. It was true that the channel was leaking badly, but it was clear that the leaked water was being picked up by small channels dug by farmers adjacent to the main channel. We indicated that using the grant to line the canal was unlikely to have any real positive effect on the farmers, and asked whether other improvements might be a better use of the money. As we walked over the area, the irrigation staff and we identified field outlets that could be improved, delivery channels that could be reshaped and a number of other small improvements. We said "That's great. We'll come back next week and look at your new proposal".

We returned the following week, and the new proposal said: "line the secondary channel with concrete".

We returned to the college dejected, reported to the Governor, who then gave the money to another agricultural enterprise. Upon retrospect, it is clear that we really did not understand the situation. For the Irrigation System staff, lining the channel was a 'positive'. Since it would be done by a contractor, it would take a minimum of their effort; it would reduce the need for maintenance of the channel; there would be an opportunity for some personal 'facilitating' money. The alternative considered was entirely 'negative' by contrast. It meant increased effort on their part; it meant dealing (almost certainly arguing) with many farmers; it would increase the expectations of the farmers about future improvements. Better understanding on our part would have changed the discussion, and perhaps the ultimate result. *And it was my first realisation that Filipinos rarely say no.*

A different form of ignorance is illustrated by experience with USAID's decision to fund the rehabilitation of the Gal Oya irrigation project in Sri Lanka. With the support of USAID, Cornell and the Sri Lankan Agrarian Research and Training Institute (ARTI) were given the responsibility to assist the farmers in their relations with the irrigation bureaucracy. Early in the project we (a few of us from the project) met with the local USAID Director, who proudly announced that she was in discussions with the engineer who had been on the original team that constructed the Gal Oya system, and they were going to *restore* the project to its original condition. We argued that this would result in an almost certain failure of the system. The original system had been constructed 30 years earlier, in an undeveloped area with little knowledge of the local situation available; the first settlers on the project had no irrigation experience; there were three different ethnic groups (Sinhalese, Tamil and Muslim) among those. While reluctant to change the approach to the system rehabilitation, the director did agree to modify it in a way that would utilise the experience gained, by the farmer-irrigators, and by the lower-level irrigation staff. (As with many irrigation departments in South Asia there is a pattern of regular shifting of the senior engineers, usually every three years – ensuring similar experience many times, but not a great deal of depth.) This was a reasonably successful example of substituting understanding for ignorance. However, there are many other examples where ignorance prevailed.

WILFUL IGNORANCE CAN RESULT IN SERIOUS AVOIDABLE PROBLEMS!

Almost invariably the contracts for design of irrigation projects limit the area of consideration to the project area, constraining a broader geographic view, often with serious consequences. For example, System H of the Mahaweli Project in Sri Lanka was operating with very low water efficiency, and USAID wanted to improve its performance so that there would be water available to permit an additional area to be irrigated. However, it did not take much of a walk around the area to realise that the surplus water draining from System H was in fact the major supply for an existing system downstream. A Canadian consulting firm had been hired to design the improvement effort and I had the opportunity to ask members of the staff in Sri Lanka whether they were aware of the potential problem for the downstream system. They were aware of the probable impact and tried to get the plans modified, but to no avail.

The failure to consider potential problems associated with irrigation development has been widespread. The geographic limitation illustrated above has its corresponding problem when looking 'upstream'. A major World Bank project in Sri Lanka failed to look at the contributing watershed, with its many small tanks. As a result, during a dry period, essentially no water reached the downstream project. Lest it appear that I, and others associated with the Sri Lanka irrigation development efforts, were immune from this type of ignorance, I have to admit that we (the Cornell/ARTI team) failed similarly in our work on the Gal Oya Project. In terms of the stated objectives of the effort, we were very successful. Water was delivered more equitably and to some in the downstream reaches who had not been receiving water at all. Relations between the farmers and the system management improved markedly, as did relations among the different ethnic groups in the system. However, since the water efficiency was relatively low prior to the physical improvements in the system, and since little drainage,

if any, appeared to reach the sea during the dry season, we should have raised the question 'what was happening to the water'? Sri Lankan farmers are not stupid, and over time farms were developed along the drain and the drainage water was used for irrigation. Considering this in retrospect results in the realisation that our very nice benefit/cost calculation may have been *somewhat overestimated.*

There are other types of wilful ignorance. For example, the International Irrigation Management Institute (IIMI) in Pakistan had excellent relations with the water establishment, and invited a number of the irrigation system engineers to a weekend retreat in the Lower Swat Valley (at that time a resort area). At the first evening, as a consultant with IIMI, I chaired an informal session to define the agenda for the next day's sessions. At the start, I said "if we are to accomplish anything during this retreat we have to deal with reality. We understand that some things may be difficult to talk about, but unless we are open in the discussion, there is not much reason to continue. We can relax, enjoy the weekend, and go back to Lahore". There was silence for a few minutes, and then one of the senior engineers said '*okay*'. Then, when IIMI posed a question about the failure to get water to many of the tail enders even though *warabandi* scheduling (where the total flow should have been received by each farmer on a channel in turn) was in force, a number of the engineers responded by saying that often 'powerful people' were at the head end of the channels, and they ignored the warabandi time limitations. This opened the discussion to possible interventions, *without assuming that the powerful people could be changed.* Some were identified that would help (though not solve all of the problems) and would not have been considered had the real source of the problem not been identified. Unfortunately, in many cases, there is a major difficulty in addressing reality. In fact, on the second day of the retreat a senior administrative official joined the session, and was horrified to hear the discussion. The idea that the problems of power were being discussed openly was clearly foreign.

One last illustration of the problem of ignorance. Visualise an international-type meeting hall (plush seats, audio systems, etc) with 500 of the most senior water and power engineers in India in attendance. The meeting is a technical session devoted to Modern Management Methods for Irrigation. (I was invited to attend by a senior engineer I had met during my work with the Ford Foundation.) The first speaker was a member of the Indian Administrative Service (and for those not familiar with India, the IAS is an elite organisation, with excellent staff.) who stood up, faced the assembled group (all men) and started her presentation:

> There are many recent techniques for improving irrigation management. There is Critical Path Programming, Multi-Objective Planning, and a number of others, and they all work, but *they won't work in India.* The reason they won't work in India is that *you lie.* You lie about how much area you irrigate; you lie about how much water you use; you lie about how much construction costs. *Why do you lie?*

There was complete silence. After a short while, a repeat *Why do you lie?* Silence. After another short interval, the Chairman said: "[s]ince there is no discussion, we'll move on to the next presentation".

The point of this story is that in many cases, it is a mistake to completely trust the information provided from institutions that have vested interests related to that information. In many situations it is worse than ignorance. The example shows that admitting to 'modifying' (falsifying) information is not easily done, and it is to be hoped that enlightened administrations will recognise the implications of their incentive/disincentive structures on the validity of the information they use for making important decisions; until this occurs, it is important to both identify which information is likely to be corrupted, and use a variety of sources to verify essential data.

That appropriate incentives can encourage accurate answers is illustrated with an early experience I had with the Ford Foundation in India. A previous Programme Officer had given a three-year grant to the Irrigation Department in Bihar, a department with about 10,000 employees. The grant was to establish a training centre that would be used for regular in-service training for the engineers. As the period of the grant was coming to a close, I was given the responsibility to evaluate the results and to write a final report. After visiting the site a few times, I wrote a draft final report and then sat down

with the chief engineer. We discussed the project, and then I asked him if my conclusion that the effort was a *total failure* was correct. After a little hemming and hawing, he agreed. He said it really was not a total failure, since they were able to buy two vehicles that would not have been possible with their regular funding, and a few families had a living for the three years. But, yes, in terms of the objective stated for the grant it was a total failure. For the chief engineer, the admission of the failure of the project had essentially no adverse implications. The two hundred thousand dollars of the grant was very small, in relation to the department budget; there was no malfeasance in the use of the funds; and the likelihood of another grant was very small. He could, not only be honest in our discussion but be frank. I turned in my report to the representative (the Head of the New Delhi office), who made no comment on it, and then to the chief administrative officer for transmission to the main office of the Foundation. He was a little shocked, and asked if I really wanted to send that report to New York (he had never had a 'total failure' report). I said yes, and it went. Sometime later, on a visit to the New York office, I learned that my 'absolute failure' was well known, having generated considerable amusement, but *no criticism.* For the Foundation, risk was not only recognised, but considered by the leadership an important element of its work. If there were no grant failures**,** the Foundation was being too cautious. While the degree of risk appropriate for the Ford Foundation obviously is higher than for major banks, I would argue that those with development goals should allow for more uncertainty in the planning and design processes, and not be too surprised when the results are not exactly as planned.

MAJOR PROJECTS ARE NOT ONLY DIFFERENT FROM OTHERS BUT FACE MULTIPLE UNSPOKEN OBJECTIVES

Before addressing the specific problem of unspoken objectives within large projects it may be informative to think of why there are so many large projects. Several years ago, after presenting a seminar at the World Bank, Walt Coward and I asked the staff of the irrigation group why there was an emphasis on large projects in contrast to smaller ones. Specifically, we asked would not spending one hundred million dollars on one hundred small projects be often a more effective use of the money than the same money spent on one project?[1] The response was: "when we send the proposal for a large project to the governing board of the bank, the questions focus on the ability of the country to pay the loan or whether irrigation is the best area for a loan; there is relatively little discussion of the project itself. If we send a proposal for small projects, there is endless discussion of details. The members of the board think they understand the project and offer suggestions for modification. To lend the one hundred million is much more difficult". For the large, multilateral international lenders there are underlying objectives – to lend the maximum amount as efficiently as possible, and with the fewest problems with their boards. For the major national lenders/donors, political and/or economic considerations may be at the forefront.

In the construction or reconstruction of large irrigation projects there are, in addition to the funder (lender), two major participants (occasionally three) – the irrigation department, and frequently the technical consultant (often foreign), and in relatively rare cases, the farmers. For the irrigation department staff, there is the underlying interest in the potential for salary 'supplement'. For the technical consultant, there is the interest in future employment which implies not raising too many potentially sensitive questions, either about the design or the terms of reference. For the farmers, when they are involved, the interest usually is getting a greater share of the water.

To illustrate these underlying objectives, and the problems in dealing with them, let me go back to the India meeting I described earlier. Prior to opening the formal part of the meeting the Chair (from the Central Board on Water and Power) said : "I want to strongly protest against an article in the

[1] I should say at this time that a subsequent comparison of large and small irrigation projects did not show any significant differences between the two, in terms of time for completion and economic return, but that information was not available at the time of our meeting and the decisions then had the rationale stated.

morning's newspaper which state that the engineers involved in major water and power projects were taking 20% of the project money for themselves. *I strongly protest, because we know that it is only 10%*". There was general approval from the assembled engineers. It is clear that 20% was considered corruption, but 10% was a reasonable supplement to a normally modest salary. Sometime later, this was explicitly corroborated in a discussion I had with a chief engineer of the irrigation department in Maharashtra state. When I raised the question of this type of payment, he responded:

> Look, we have two alternatives – either we supplement our salaries, or we go to the Middle East. [At the time, there was a significant demand for irrigation engineers in the region.] Yes, we ask the farmers for a little extra in response to request for more water, and, thus, it is in our interest to be as efficient as possible so that we can respond to as many requests as possible. The water is used efficiently, the farmers are better served, and we are a little better paid. What is wrong with that?

It was hard to argue with that logic, other than to recognise that it tended to disadvantage those farmers who could not afford the special payment.

That not all 'supplemental payments' are as benign as the Indians implied is evident in an example from Pakistan. With the support and encouragement from the chief engineer in one of the major irrigation systems in Pakistan, IWMI undertook the rehabilitation of a sub-lateral to demonstrate how water flows could be improved to better supply the tail-end farmers. In the process they documented the reshaping and lining of the canal. (Subsequent flow measurements validated the IWMI recommendations.) As a matter of interest, IWMI calculated the costs of the improvements, using the local norms for earth moving, canal lining, etc. In comparing the nominal costs, which would have been taken from the project funds, with the payments to the contractor it became apparent that the 'skim' was approximately 40%. The result was clear some months later, when we observed that the channel lining was seriously degraded – crumbling at a touch – and that flows to the tail end were impeded. It was made clear to IWMI staff involved in the project that no mention should be made of the non-hydraulic findings.

ONE SIZE FITS ALL

I think that anyone who has looked at, or experienced the history of irrigation after World War II, will note a pattern of successive enthusiasms for different types of management structures, and the translation of these to situations far removed from their origins. I think I can summarise the results by paraphrasing the observation made by the Indian IAS officer as she described modern management methods – *They all work, but they don't work here.* There was early enthusiasm for the Taiwan model of management, with Taiwan as a 'third country training centre', but it didn't 'take', to the more recent emphasis on farmer management, with a variety of styles in between. The different styles have been 'pushed' by the lending institutions, frequently without adequate consideration of local differences. This type of approach has occurred with the physical infrastructure as well. For example, an enlightened U.S. Bureau of Reclamation team in Thailand hired an anthropologist to survey farmers in a system that was to be improved. He came back and said that the farmers wanted rectangular openings in the division boxes, sized in proportion to the area to be irrigated, and constructed of concrete (obviously they did not want either their neighbours, or the irrigation staff to be able to interfere in the water delivery). The response from the USBR staff was – that is very interesting, but *we do not do it that way anymore*, and proceeded to design the project with variable gates. A similar situation occurred more recently in Pakistan. In a project that was being upgraded IWMI staff talked to the farmers about their needs. Surprisingly, they said that the most helpful improvement would be to have On/Off capability. At the time, it was very difficult to stop the water from coming. Carlos Garces, from IWMI, and I met with the design group from a major US firm, and indicated this to them, and suggested that it might be appropriate to consider a staged improvement, progressing over a number of years. The response was that their mandate was to design and have constructed a 'modern' system, which they did,

characterised by Tainter gates on the main canals, rising stem gates on the inlets to the farms, etc. To my knowledge, the Tainter gates were never moved from their up position, and most of the rising stem gates were non-functional, with the stems bent.

It is clear that the ability to design and construct appropriate irrigation systems requires not only an openness to new ideas and information, but also a willingness and freedom to think 'out of the box' – a box of unnecessary restraints and preconceived ideas. It is also necessary to recognise the real, if unstated and often unrecognised objective of the effort. This is illustrated in an irrigation system built for poor, landless families in Venezuela. The system was constructed with every modern element – lined, elevated channels, measuring weirs, adjustable gates, etc. However, the productivity from the system was very low. When I asked the chief engineer about this his response was – "[t]he system is perfect but the people are lousy"! It so happened, that over a period of time, Cornell University graduate students in Agricultural Economics studied the system over a ten-year period. It was true that from production and financial perspectives the system was a failure. However, the research revealed that as a transition stage, the project was extremely effective in providing the opportunity for the development of a wide range of non-agricultural skills useful in the developing economy of the region. The *campesinos* would stay with the system for a few years and then leave for more rewarding employment, to be replaced by others. A broader view of the project 'products' would have shown a greater contribution to the economy of the country than suggested by the agricultural production, and it could have been accomplished with a simpler, less expensive irrigation system.

In closing, I am reminded of an old Dutch proverb: 'we grow too soon old and too late smart' – but there still is time to learn.

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