COMMUNICATIONS IN FSR TEAM-BUILDING: THE INTERDISCIPLINARY RESEARCH TEAM

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INTRODUCTION

The overall aim of FSR/E projects is to have a lasting effect on the productivity and well-being of people. Constant and effective communication, both external and internal to a project, is necessary to that end. Here, we address the need for more such communication on FSR/E projects in general, and on the interdisciplinary FSR research team, in particular.

FSR/E has evolved out of a need to find better approaches to agricultural development. It is interdisciplinary in nature, and it emphasizes farmer involvement in ways that are new and different from those previously practiced in the United States or other countries. When we aim to analyze and solve problems with an interdisciplinary and farmer-feedback approach, by necessity we commit ourselves to operating in new, interactive ways. The way we work together, share information and outlooks -- in short, communicate with each other -- is critical in bringing multiple disciplines and farmer viewpoints to bear on a problem.

One way to look at the many communication aspects of FSR/E is to build a matrix which will allow project management to focus upon the goals or objectives for which good communication is most critical, and then build new communications strategies into the project design. At this more global level, emphasis should be on external as well as internal communication. The matrix could logically include seven or more goals or objectives.

1. Consider the farm family and the farming operation as a unit. This lies at the heart of FSR/E methodology. Who is the farmer, the tenant on the land, or the landowner who may be making many of the decisions concerning new technology? We frequently hear about how much of the actual farming or livestock rearing is done by women and children -- whether in Africa, Latin America, Asia, or the U.S. The complex interrelationships between production for family consumption and for cash income also must be considered, along with the potential for non-farm income.

2. Know about farmers' exchange of information. We need to know about farmers' organizations, their objectives, and activities. More particularly, we should learn about farmers' sources of information, the kinds of information they seek, and the relative importance and confidence they place on these different sources and types of information.

For example, during a recent field day in Tunisia, farmers said that they like to get certain information from radio or television. What they were talking about was awareness. But they also came to a field day to see experimental techniques and varieties for themselves and to compare notes, as it were, with the farmers who cooperated in the demonstration trials. The value of firsthand verification and of farmer testimony became an important part of our knowledge base about the target audience's information desires.

3. Ensure farmer input into research and extension. With research conducted in farmers' fields, this objective should be the spark of FSR/E. When

agricultural extension was in its infancy in the United States, the resource base was drawn heavily from farmer experience. For example, we have long known the benefits of studying innovators. But how much input into research do farmers really have when we conduct research in their fields? That may depend on the opportunities we have for communication between farmers and the research team. USAID Administrator McPherson once noted that many extension organizations lack the ability to gather information from farmers. Is that also being said about the research organizations in countries in which we work?

4. Develop/strengthen the reporting of research. When we collect base data about farmers, farming practices, farming problems and the like, we also should be gathering information from other sources that provide a characterization of the information system. That knowledge will help us decide how to package information, which media and channels to use, the different audiences to target, and other necessary dissemination issues to address. An inventory of channels and media should include government, private, and commercial agencies and organizations. Researchers are information users as well as information generators; so we should also give close attention to library and documentation services, and to the handling and distribution of in-house materials such as correspondence, memoranda, trip reports, committee reports, and position papers.

5. Collaborate with government agencies, public and non-profit organizations, and the commercial sector. FSR/E projects do not operate in isolation. Government agencies may be working with the same audiences and/or on problems related to those prioritized by the project. Likewise for public or non-profit organizations. And commercial companies that buy and sell among farmers can be valuable information sources and collaborators. Communication with these other agencies and organizations at all levels of operation can greatly facilitate FSR/E work. While we all recognize this fact, how often do we actually actively explore these potential research and extension linkages?

6. Understand communication between research and extension administrations and the FSR/E project teams. This objective refers to how agencies and information flows are organized both vertically and horizontally. The difference between formal and informal modes of communication within this structure also needs to be described. I.e., one must look beyond formal lines of responsibility to study how information is actually developed and delivered.

7. Build in interaction among and between researchers and extensionists. Two-way communication among and between research and extension teams is vital. It must be accomplished even though, as is often the case, two or more different organizations are involved.

It is not enough just to write a set of communication objectives. Although this is a necessary first task which calls for considerable time and energy, in itself it does little to provide the means of communication. To do so, and to complete the matrix, another axis must be constructed. This axis minimally includes three parts.

A. Describe the conditions that must be present to allow the communicative objectives to be met.
B. Determine what activities are necessary to work toward each objective and who has responsibility for bringing about the prescribed conditions and desired activities.

C. Define the standard for success and how progress will be measured.

Leaving aside this larger model of FSR/E communications, this paper deals with only one of the 21 cells in the matrix. We focus on communication problems -- and some solutions for them -- in just one of the many sorts of teams involved in FSR: the interdisciplinary research scientist team.

COMMUNICATIONS ON THE RESEARCH SCIENTIST TEAM

Here, we refer to a team of research scientists -- the kind of group that might include persons from various soil, water, plant, animal, or other biological sciences, agricultural engineering, and social sciences like anthropology, rural sociology, economics, and agricultural economics. The research team may be organized with a team leader, and it typically (though not always) works with the support and direction of an administrator. Rarely does it incorporate a communications expert, however.

Naturally, other types of teams are included in the larger FSR/E effort -- government officials, project administrators/principal investigators, field interviewers, extensionists, and farmer- collaborators. In fact, the research scientist may be a member of some of these other teams as well; there is often an overlap between these groups at adjoining levels. Communications within and between each of these different functional types of teams would provide material for many papers. However, the research scientist team is perhaps especially problematic. Its constituency is often more diverse than that of other FSR units -- in age, sex, race, nationality, professional status, and above all, scientific discipline. When people from several disciplines are expected to interact within and contribute to a team effort, they are particularly liable to run into communication short-circuits and breakdowns that slow or blunt team impact. Our aim here is to look at the practical, everyday communicative activities of this many-headed monster, the research scientist team. We have organized our comments under three headings: (1) communication problems inherent to the research team, (2) where communication can be improved, and (3) how communication can be improved.

Communication Problems Inherent to the Research Team

If nothing else, the professional jargon of different disciplines can sometimes close the door to effective communication. This is not surprising, since on occasion we even experience difficulty in communicating within our own disciplines. When we try to work across disciplines, the terminological problem is magnified several times over. Each scientific discipline has its own jargon -- a technical vocabulary that is unique to that field. Moreover, scientists may coin new words, or use old words to mean something quite different from the layman's meaning. The "jargon barrier" is one common and simple example of some of the communications breakdowns that research teams encounter.

Closely related to this problem is the understandable tendency of each discipline to identify, define, and address FSR/E tasks according to its own methods, models, and outlook. A plant breeder, for example, may see a new variety as the ideal solution to a given cropping problem. The hydrologist may instead think that more or more timely delivery of water is the key. The economist may argue that pricing policy alone is sufficient to resolve the matter. And the anthropologist may opine that it is best to do nothing at all! These examples could be multiplied by as many disciplines as one can find in FSR/E. The point is, this diversity of opinion and approach is not bad. Quite

the contrary -- it is the overriding strength of FSR/E. Ideally, it should lead to more culturally and technologically appropriate, ecologically sound, and cost-effective solutions that accord with the real-world complexity of farming systems.

In arriving at these integrative solutions, communication across disciplines is essential. Yet fully trained scientists who have spent years acquiring a profound knowledge of their field are naturally inclined to work within the scope of that expertise. They may be reluctant to venture into the no-man's-land between disciplines. This can be a difficult and confusing experience, as one leaves behind one's tried and true disciplinary paradigms for uncharted research territory.

Furthermore, there is often little to motivate the scientist to embark upon this extradisciplinary journey. Our research reward system generally does not encourage the sort of interdisciplinary interaction that is necessary to FSR/E. Academic positions are usually defined in precise subspecializations. The most prestigious journals are often the most narrow and field-specific. Moreover, scientists on an FSR team often lack the leisure to craft so many scholarly articles as their more academic peers. And although both are burdened with the struggle to keep abreast of information flows in their own discipline, the FSR researcher must absorb a great deal of information from other fields as well.

As noted above, research teams commonly operate under a team leader. The way this role is handled can impact the way the team works and the final results of its research endeavor. A dictatorial leader can easily stifle input from some members. Conversely, one who is too laissez-faire may not provide enough structure for effective team communication and action. One of the most important jobs of a team leader is to stimulate activities that promote the productive flow of information and ideas among the team members.

Cultural differences, too, can affect the way a group works. It is not unusual to find a variety of nationalities on a research team. Their attitudes toward team communication may vary accordingly. Some cultures expect to have a lively exchange of ideas by speaking out, confronting one another with new facts and insights, and even arguing. In contrast, others place a premium on downplaying open conflict, and discourage the frank expression of individual opinion. These two different perspectives (and there are still others) can lead to some uncomfortable moments.

Finally, further cultural and socioeconomic differences can be a hurdle to good communications in some groups. Team members may vary in age, sex, marital status, religious and other organizational affiliations, education, salary, social position, and in status indicators like dress, place of residence, or what-have-you. This disparity can exacerbate disciplinary differences and impair communication flows if no steps are taken to cope with it explicitly.

Where Communication Can Be Improved

In our experience, we have noted several very basic areas where difficulties arise in evolving a shared understanding of team tasks and integration -- and hence where improved communications could be of great benefit. The following three areas hardly exhaust the list, but they appear to be especially common problems on FSR/E projects everywhere.

One of the very first places where communications breakdowns can occur is in team members' view of project objectives. It is all too easy to assume that everyone shares the same perspective on project priorities. Such an assumption is dangerous. At the outset of a project, one of the first communicative chores is to hold a discussion among all team members of the written project objectives. (If they aren't written, this becomes a prior task). This should include a free-ranging exchange about the overall situation and background of the project, to make sure that everyone has the same information and understanding. This is the time to seek clarification from superiors, further explanation, to re-check the outcomes or products expected of the team, and so on. Sometimes even the definition of the subject matter of research can be problematic. What seemed straightforward enough, at least as conceptualized before beginning work in the field, can shift radically when confronted with the reality of local farming systems.

Equally important is reaching a common understanding about team, as well as overall project, objectives. If scientists see the team objective only in terms of their own areas of expertise, something like the reverse polarity of magnets can ensue, and the team will fragment. How each discipline can best contribute to team objectives needs to be negotiated and spelled out as clearly as possible. In the process, team members must also reach a consensus about their respective roles in group action and decision-making. Critical to both these processes is a mutual respect for the various disciplines involved.

Not only must each scientist's contribution to the team effort be delineated; there must also be a plan for integrating these contributions. Yet how often have we heard the complaint that there is no cohesiveness in the research effort because scientists are working only on their individual projects? And that they never collaborate, coordinate, or communicate with the other teams members as they ought? In this regard, it is critical for members to recognize that the team objective takes priority over individual research agendas.

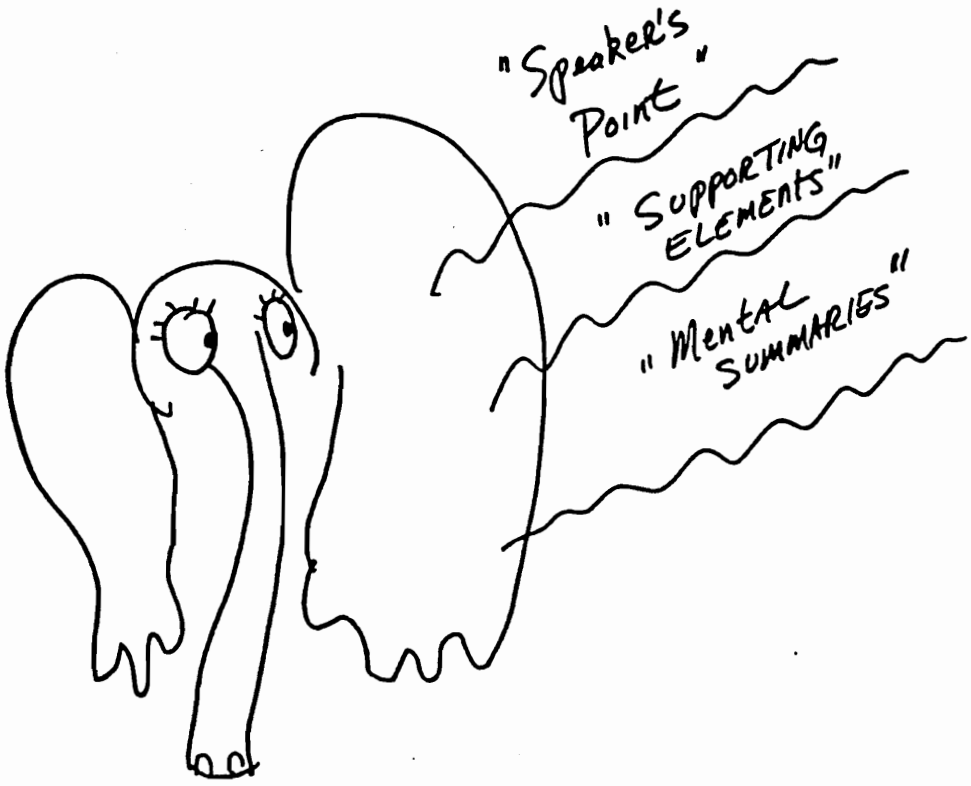
How Communications Can Be Improved

This could be a full curriculum or just a few tips to take home and put to use. We have chosen the latter. Although there is a healthy literature on team-building communications in fields like business management and industrial psychology, it is not always directly relevant to FSR/E. Here, we do not reference that literature; instead, we offer some practical suggestions for improving research team communications that are largely based on personal observation and on examples of real situations we know about. And rather than follow any of the popular communications models -- for example, Berlo's SMCR (source/message/channel/receiver) framework or Schramm's (1961) and Shannon and Weaver's (1964) well-known models -- we group these strategies into four categories phrased in terms of increasing the quality, frequency, intensity, and variety of channels in communicative events.

Quality. There are many qualitative aspects of the communicative process that could be considered here, but we want to point to one that is too often overlooked -- listening skills. As many communications experts have noted, if we would just listen better, this alone would lead to more successful communication. Some authors believe that listening is at once the most used yet least appreciated aspect of daily communication. For example, a frequently cited report (Nichols 1957:6) finds that many of us spend 70% to 80% of our

waking time in some form of communication, of which nearly half (45%) is devoted to listening. (Of the remainder, 30% is spent in speaking, 16% in reading, and 9% in writing.)

According to Nichols, we can improve our listening skills through three simple exercises. (1) Anticipate the speaker's next point; this will let you know whether or not you are understanding the message correctly. (2) Identify the supporting elements of a message, as represented in explanations, emotional pitch, factual illustrations, etc. (3) Make mental summaries periodically as you listen. These exercises make listening an active rather than a passive communicative event. And they will quickly help sort out where your and your teammates' views of an issue diverge or agree. (Figure 1)



1. Listening Skills

Frequency. Simply increasing the number of opportunities for exchange of ideas and information is an obvious starting point for improving team communications. The more communicative events there are, the more likely that messages will be sent, received, and understood. As noted earlier, one function of a team leader is to provide for regular interaction among team members. This interaction can take many forms, as we will see in the dimension of channels. Of course, in designing both the type and frequency of communicative events, time and distance constraints must be taken into account. (Figure 2)

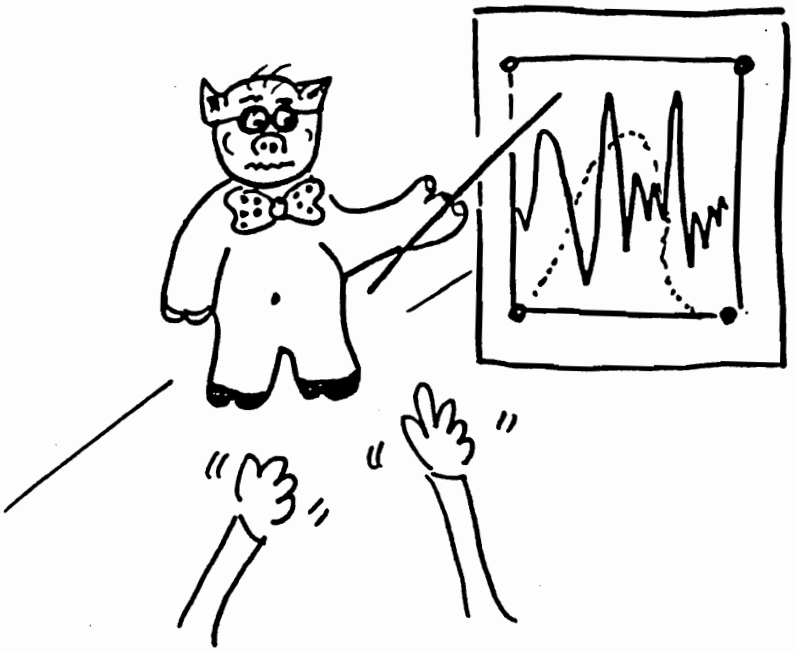
Regular meetings of the full team membership naturally should be a feature of every FSR/E project -- the more often the better. For teams that are far-flung in remote areas, perhaps with transportation shortages as well, the frequency of such meetings will be lower. In such cases, other strategies must

be sought to keep up the frequency of communications. For example, on one project on which the second author worked in West Africa, team members were posted to different regions, as much as 400 km distant from each other. Moreover, they were faced with uncertain transport, and with unreliable or no phone or wire service. To help offset this communications gap, a monthly report was instituted. In it, each team member would describe her/his research accomplishments, problems, insights, immediate plans, logistic or other needs, professional contacts made, suggestions for new project activities and research foci, and so forth. Along with budget and equipment news from the administrative end of the project, this monthly report was compiled in the project office in the capital city and then distributed to team members, and to the project directorship back in the U.S. When the team then reunited for its aperiodic meetings in the capital, these in-house reports served to focus discussions and save time in catching-up on each others' doings since the previous meeting.

2. Regular, Frequent Meetings

Aside from regular project meetings and written reports, another useful strategy is to establish a series of semi-formal colloquia on research in progress, with team members taking turns at reporting their findings to date. Such colloquia serve as a forum where researchers can react to each others' work in an organized way, provide constructive criticism, and explore the touchpoints between disciplinary investigations through joint analysis of concrete data. Colloquia can also be used to invite special guests who may be passing through the project area or speakers from other projects there, both of whom can often provide fresh perspectives on the team effort. On one project in the second author's experience, such colloquia rotated among all the team

members' homes, with spouses welcome to attend. Preceded by cocktails and followed by dinner, these soirees provided an especially congenial, commensal atmosphere in which to debate research findings. (Figure 3)



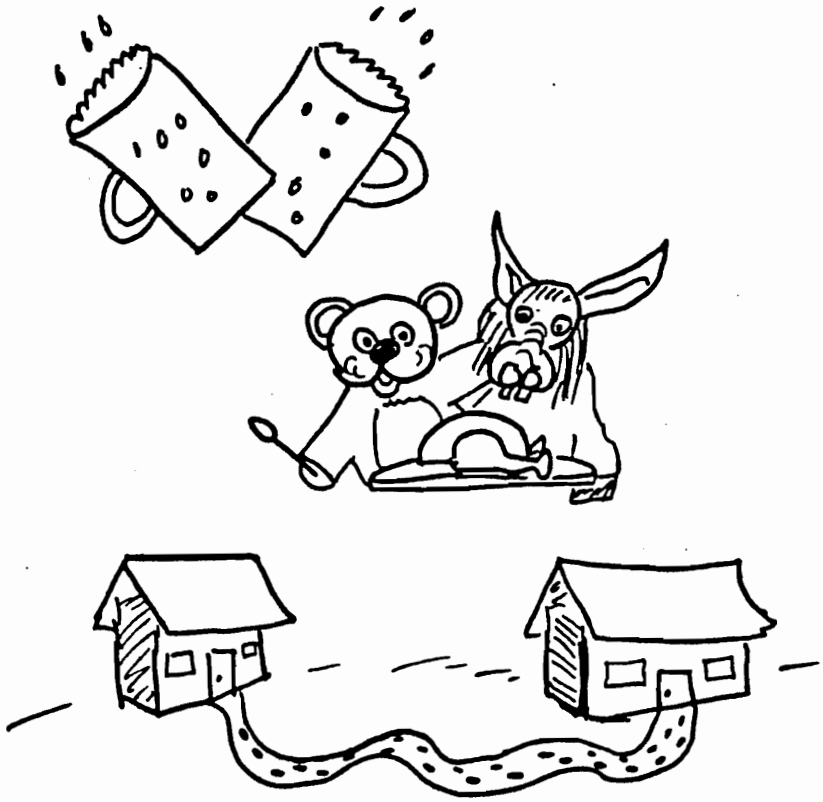
3. Semi-Formal Colloquia

This last example suggests that not all communicative events among the team need to be structured and/or formal. And not only team leaders can initiate interactions. A great deal of successful communication takes place in the equivalent of hall-walking, over meals, at parties, in visiting back and forth between team members' homes, or in situations like having a drink or engaging in games, sports, and exercise events together. Team members and leaders both should contribute to the frequency of such events. Their more casual and social definition often opens up more free-flowing lines of communication that are blocked in formal contexts; and they can do much to overcome cultural and status differences, and build a solid sense of team-ship. (Figure 4)

Intensity. Increasing the intensity of communicative events can reinforce and, especially in long-distance situations, partially substitute for the frequency of communications. By intensity we simply mean events where individuals are in close communicative contact for hours on end across days at a time. This category includes gatherings like workshops, retreats, conferences, team trips, and lengthy special-purpose sessions, e.g., for project planning, evaluation, or review.

One example of the latter is drawn from the first author's experience at the International Rice Research Institute. There, once a year, a week-long, essentially day-and-night internal review of all ongoing research was held. Scientists found this a grueling period, but in the end they agreed that it was necessary to continued project integration and research coordination. A similar example is the annual planning seminar which takes place on the MIAC

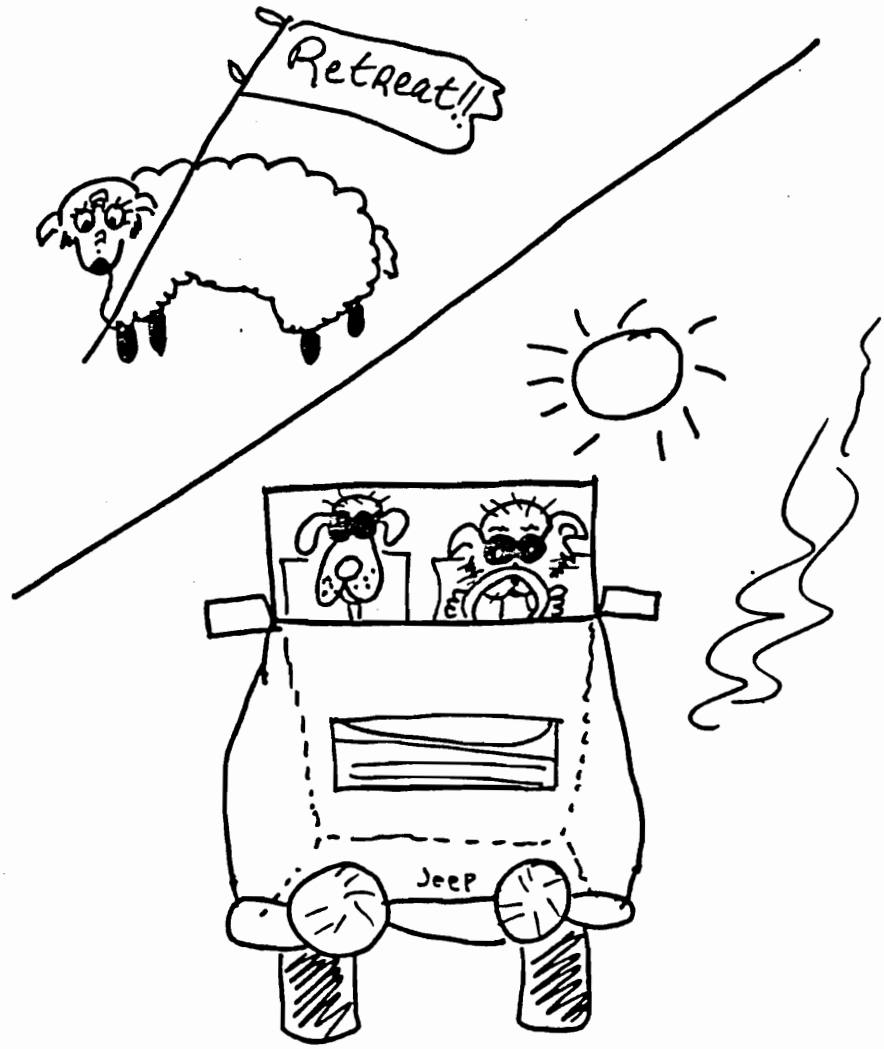
(MidAmerica International Agricultural Consortium) Farming Systems Research Project in Tunisia. Some 30 Tunisian FSR researchers plus their U.S. core consultants gather for several days of frank discussion of the project's achievements and shortcomings across the year past, and to plan accordingly for the future year.



4. Informal Interaction

Retreats offer another opportunity for intensive communication. At the Missouri campus, we do a lot of "retreating." There are teaching retreats, department chair retreats, deans' retreats, and even Small Ruminant retreats! Sometimes a retreat -- where you physically remove yourself from the usual manifold interruptions -- affords the only opportunity to work past the many communicative barriers, really concentrate upon a given task, and see it through. Team travel provides essentially the same opportunity. During the many hours or days spent hunched on international flights, lurching across rough country roads, or trudging around to farmers' homes, team interaction and communication can reach a zenith. (Figure 5)

Workshops afford another setting for intensive communication. Theme-oriented workshops can be especially useful in tackling specific research and extension problems from an interdisciplinary stance. This was the case, for example, in the ICRISAT/IDRC/SAFGRAD/IRAT workshop on farmers' participation in the development and evaluaiton of technology. This six-day symposium was attended by more than 50 researchers from 20 countries representing all relevant technical and social science disciplines, and it included scholars trained in both French and North American traditions of farming systems research (Matlon et al. 1984). The workshop format was one of formal



5. Intensity of Communication

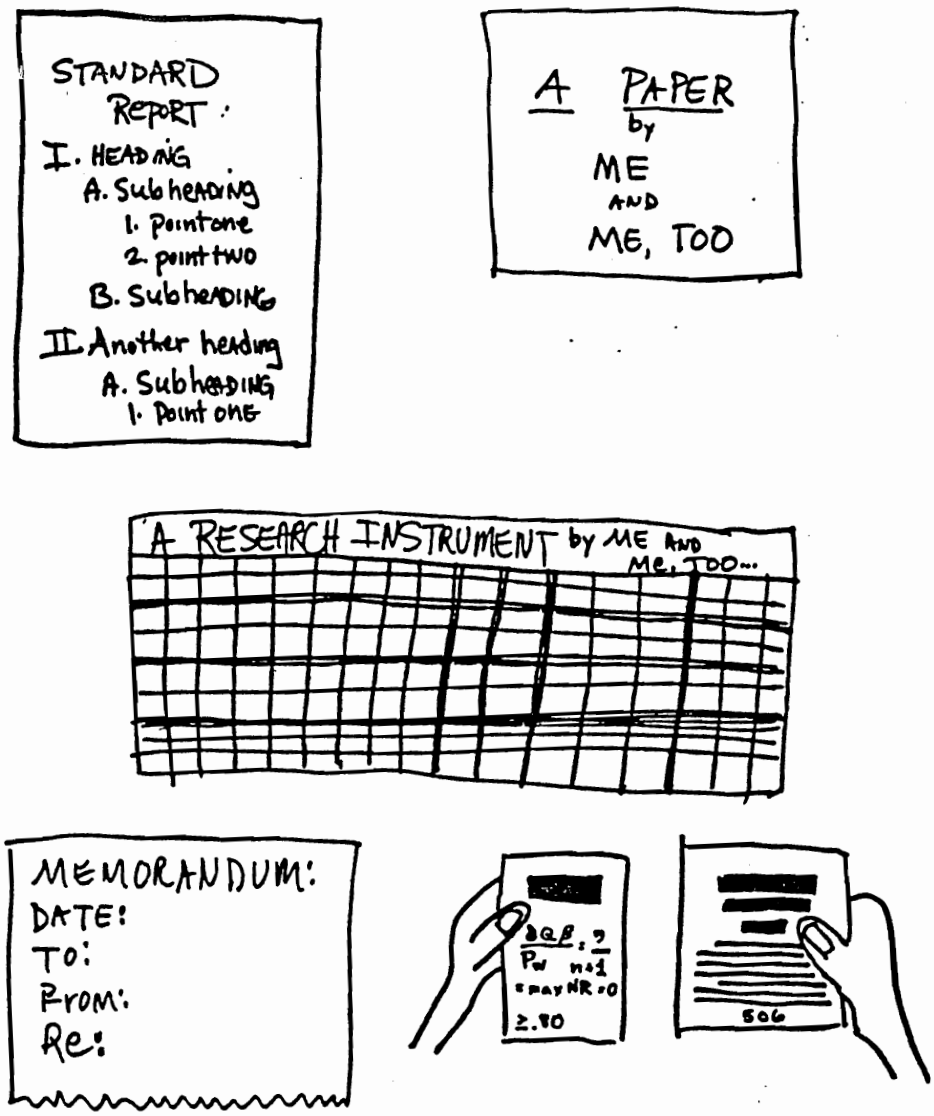
presentations in the morning, followed by afternoon small-group meetings to review, react to, and contextualize the morning discussions. This sort of structure was invaluable for helping individual research teams to discover fresh ways of integrating their own work based on the observations of interdisciplinary FSR/E workers worldwide.

Conferences like the annual Farming Systems Research & Extension Symposium provide another setting for this kind of dynamic exchange. And themes like that of the 1985 conference -- management and methodology -- should particularly help to forge common, cross-disciplinary understandings of FSR/E structures, terms, and techniques.

Variety of Channels. Communication can take place through a variety of channels -- most commonly written, oral, visual, and kinesic/proxemic. In sending and receiving messages, the greater the variety of channels utilized, the more likely the information will get through. We have already mentioned various written and oral strategies in team communications, but here we would like to add a few more, and to suggest some uses for visual and

kinesic/proxemic channels, as well.

With regard, first, to written channels, the need for regular reporting of individual and joint team activities cannot be overemphasized. For some research teams we have encountered, this process is viewed -- even on a quarterly or biannual basis -- as nothing more than a useless bureaucratic nuisance. But regular reports are one way for interdisciplinary teams to communicate the real substance of their differing investigations and to keep track of how well, or if, these investigations are meshing. For teams that find this an especially difficult or onerous task, sometimes it is helpful to draft a standard outline for project reports to aid them in organizing and putting on paper the relevant information. (Figure 6)



6. Written Channels

Another strategy in the written channel is for team members from different disciplines to co-author papers and articles. This is one of the best -- if not the easiest -- ways we know of to promote truly inter- as versus multi-disciplinary farming systems research. To help stimulate this kind of joint communicative endeavor, establishment of a project publication series for co-authored papers is a good motivator.

Relatedly, jointly designing -- and later, jointly applying -- research instruments such as surveys and their code sheets, ranking scales, open-ended questionnaires, and so forth has proved a successful integrative technique on several projects known to us. Not only does this strategy get team members working together on a concrete task, but it also begins to build some knowledge of and respect for their respective expertises. Even better, it helps ensure that data gathered by one discipline will be sensitive to research issues and information needs in other disciplines on the project.

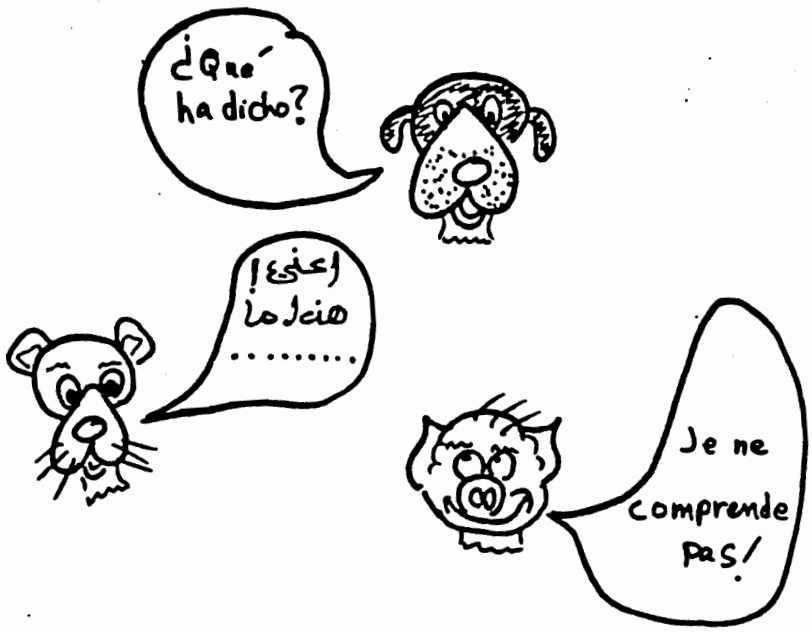
Reading, as well as writing, papers and articles together offers another means of communicating across disciplines. On some teams we have worked with, we have found that exchanging a key article or two can do a lot for the jargon problem. A carefully chosen article or text can elucidate disciplinary-specific concepts or philosophies and their terminological correlates. Whether on a one-to-one basis or in a reading-group format, this kind of exchange is a non-threatening way to introduce colleagues to different scientific perspectives and to build a common vocabulary.

A further team-building reading strategy is systematic sharing of project-related correspondence, memoranda, trip reports, and etc. This can be easily organized in a number of ways. For example, SR-CRSP (Small Ruminant Collaborative Research Support Program) team members at the Missouri campus have established a chronologically-arranged reading file in a central place. Each individual contributes copies of documents sent or received (from any of the ten universities or five country sites involved in SR-CRSP, or from USAID or other sources) by which contain information useful for other members of the in-house team. This information may pertain to any aspect of project functioning -- whether research, administration, logistics, budget, internal or external politics, travel plans, etc. When items are urgent or of time-sensitive news value, they may instead be circulated to the team by routing slip. Particularly critical or informative documents may be copied and distributed to all team members for their individual files. These techniques are real time- and memory-savers. Like regular meetings and reports, they keep people current on project events, assure that they all have access to important information, and save significant person-hours in discussions or in updating team members who have been absent for some period. This team-building communications strategy has the added advantage of keeping things "above board."

One last type of written exchange we would like to mention is the memorandum. This lowly literary form is often overlooked. Recalling the fact of cultural differences in communications, in at least one Asian case we know of, institution of a system of memoranda saved the day. Sensitive to status differences and mindful of oriental politeness, in regular project meetings team members would rarely express their true feelings about issues on the table. A seeming consensus on actions to be taken would be reached in the meeting, only later to encounter silent resistance. However, if subsequently asked to respond to meeting discussions individually and confidentially in a

written memorandum to the team leader, members would then enunciate their real opinions and arguments. Better project planning resulted. At times, this memorandum-response technique is also useful in other cultural contexts insofar as it allows time to mull over issues and then respond in a more thoughtful, less spur-of-the-moment fashion. However, this technique must be applied judiciously. Sometimes a verbal exchange may be more friendly and appropriate. At other times, people may simply be reluctant to commit themselves in writing.

The foregoing example leads us back to the oral channel. Here we will comment on just one factor -- the choice of language used. On teams with an international composition, this can be a critical consideration. Members who are less fluent in the lingua franca of the project may feel left out or at a distinct disadvantage in expressing their ideas and arguments. This can indirectly exacerbate disciplinary or other differences. In such cases, the team as a whole should take care to see that -- whether by translating or by shifting languages -- messages are getting through to their membership. (Figure 7)

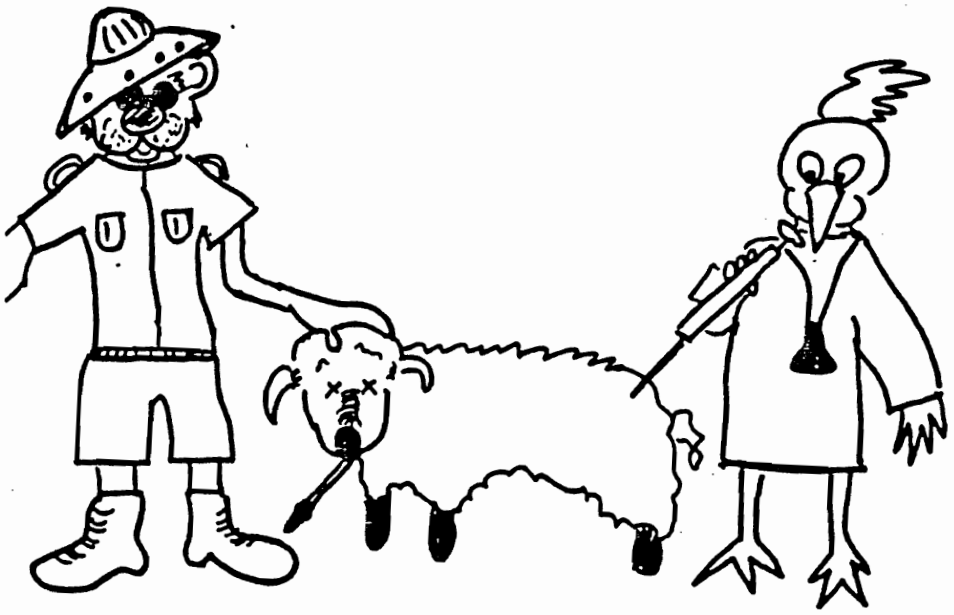


7. Oral Channels — Choice of Code

For example, at a meeting of an international FSR team at CATIE in Costa Rica, one Spanish-speaker felt he could not fully formulate his explanations on a complicated subject in an alien tongue. So he asked a bilingual North American teammate to serve as an extempore translator for the English monolinguals. While, as we all know, translation takes time, on occasion it can be time well spent in that it allows team members to make their best input to the communicative exchange. Similarly, language shifts provide more room to express subtle meanings and implications, to explore how profoundly team members' perceptions diverge or converge, and to bridge both communicative and conceptual gaps. Moreover, occasional code shifts avoid the negative cultural

and psychological ramifications of using always and only one of a team's shared languages.

Joint hands-on activities are an immensely important communicative resource in team building. They simultaneously incorporate oral, visual, kinesic, and sometimes also written channels. In FSR, one of the most common settings for these sorts of events is the farmer's field or pasture. The research problems and goals of different disciplines become much more comprehensible if scientists can see, handle, and remark upon their real-world correlates together. While this is a truism in FSR, perhaps it bears repeating. To give just one brief example, as the second author recently noted in her SR-CRSP research in Peru with a Colorado State University veterinarian, inspecting and handling diseased animals in stockowners' corrals while listening (remember listening?) to her veterinary teammate's running commentary brought home the multiple variables involved in the animal health issues they were addressing. And the veterinarian's stay in the Andean village with the social scientist in turn sensitized him to some of the complex socioeconomic and cultural considerations impinging upon their joint research design. Doubtless all of us could multiply this example many times over. (Figure 8)



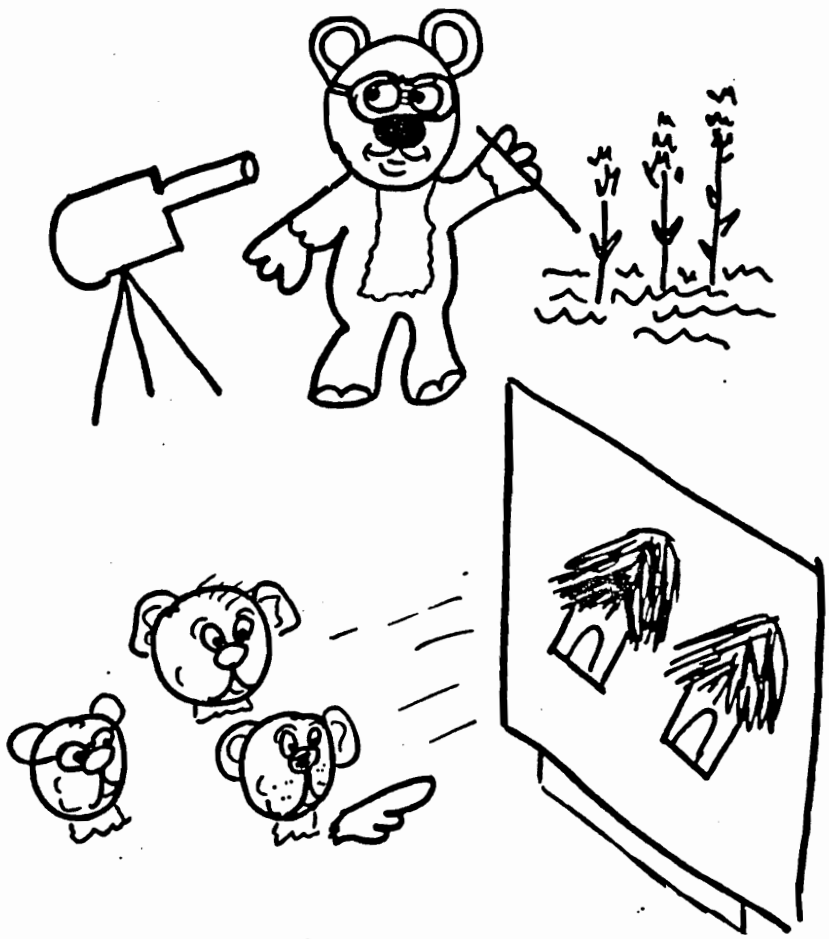
8. Joint Hands-on Activities In The Field

Even when such shared, hands-on events are somewhat less than successful, they can dramatically point up to team members where and why better communication is required. This was illustrated in a field day in Tunisia attended by the second author. Project researchers in the soil and water sciences, plant genetics and pathology, agricultural engineering, and socioeconomics participated in the event, in addition to farmers. Its stated aim was to explain to farmers the rationale and results of the on-going field trials. In the process, it became embarrassingly obvious that too little team communication had been taking place. For example, when farmers raised a point about the salty soil type of one field, the plant pathologist began to contest

it, until the soil scientists mentioned that they had already taken samples and that, indeed, the farmers were correct. But no one had reported the findings of the soil analyses either to the farmer who owned the field or to the rest of the team! An agricultural engineer later complained that one field had been plowed down the slope, without his knowledge. The input from socioeconomists into the selection of the farmer/collaborators was not at all clear. Finally, it was also evident that technical scientists could have benefitted from some tips from social scientists on how to conduct farmer-researcher dialogues in a more organized and egalitarian fashion. At the conclusion of this field day, nearly every researcher present left with a sense of the real need for increased team communication.

Turning now to visual aids, this seems to be a relatively less explored resource in team communications. Of course, we are all accustomed to the use of slides, graphs, charts, chalk boards, overhead transparencies, and so forth in our classrooms and in our professional presentations. These can also be profitably utilized in team contexts. But here we would like to comment on the rich potentials for increased use of film and videotaping. (Figure 9)

Videotaping could be particularly apropos where team members are working across widely dispersed sites and have little opportunity to visit them all.

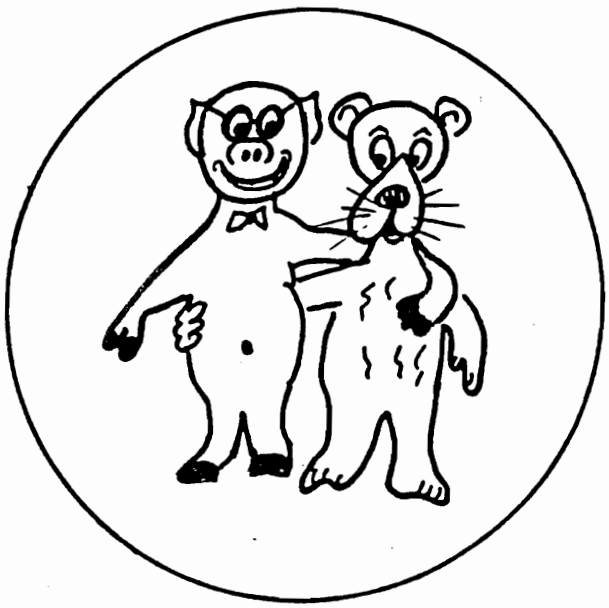


9. Visual Aids

Videotapes of scientists doing and/or explaining their field research in situ illustrating their research problems and methodologies, with other colleagues and farmers contributing their commentary -- this is the next best thing to the entire team's being there. If "one picture is worth a thousand words," then the value of videotape is incalculable. This graphic and dynamic communications resource could conceivably do more for understanding different disciplinary thrusts as they evolve "on the ground" and for identifying touchpoints with the other project disciplines than any other technique short of being there. Moreover, these visual documents will be sure to come in handy for all kinds of team-external communication needs as well.

Ethnographic films -- where these exist for the farming group under study or a closely related group -- can also promote interdisciplinary understanding. Of course, they constitute an excellent pre-fieldwork information and sensitization resource for team members unfamiliar with the culture in which they will be working. But more relevant here, judicious selections from this well-established film tradition could help technical scientists to understand some of the sociostructural, cultural, ideological, and economic realities with which their social science teammates will be grappling, and which will ultimately confront the design and delivery of appropriate technology. (For a complete, annotated listing of 1,575 such films and their distributors, see Heider 1983.)

Lastly, we will just mention one further communicative channel -- kinesics, or as it is more popularly known, body language. This is a somewhat "touchy" and very culture-specific channel. But it is one in which we are all, everywhere, constantly sending out messages -- usually unconsciously. This is not the place to review the fascinating cross-cultural literature on kinesics



10. Body Language

and the related field of proxemics -- the study of the cultural meaning and communicative use of space (cf. Hall 1959, 1966). Here we will simply note that culturally-appropriate eye contact, non-threatening body postures, a "pat on the back," a touch on the arm, a special handshake, an egalitarian and interactive arrangement of chairs in a meeting room: these can do much, in both formal and informal communicative contexts, to put across the message you are sending and/or to defuse interpersonal tensions. (Figure 10)

CONCLUSION

To conclude, we would like to emphasize along with Shaner et al. (1982:184) that "the key ingredient for true interdisciplinarity is interaction." One of the four critical components in their model of interdisciplinary synthesis and synergism in farming systems research and extension is "frequent and open communications." To this we would like to add that communication should also be of high quality, occasionally intense, should utilize as many channels as possible, and should take place in informal as much as (or perhaps even more than) formal contexts. Exploiting this full range of communicative options will improve any FSR team's functioning. Or as one of our colleagues at Missouri has succinctly put it, for successful interdisciplinary team-building you must "communicate, communicate, communicate -- and then communicate some more" (Nolan 1985).

Admittedly, this is a slow, time-consuming, and sometimes painful process, but it is an imperative one. And beyond the level of internal communication within a single functional type of FSR/E team, it also becomes a very complex process involving both internal and external communication networks among government offices (often of two or more nations), the farmer-public, multiple extension and outreach organizations, the media, universities, and other institutions. This complexity may seem a daunting challenge to the non-specialist in communications. In this regard, we offer one further conclusion: FSR/E projects need to include a communications expert on their team.

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