



**IARCS INFORMATION-TRAINING FOR THE NATIONAL
AGRICULTURAL TECHNOLOGY GENERATION AND TRANSFER SYSTEMS.
SCOPE FOR INTER-CENTER COOPERATION**

**A discussion Paper by GERARDO E. HABICH*
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*** Leader Training and Communications Support Program
CIAT, Ap. Aereo 6713, Cali-Colombia**

INTRODUCTION

A major function of the IARC-system is to enhance the technology generation and transfer capacity of national institutions¹ in what concerns the Centers' subject-matter mandate.

Human resources development through training is a principal means to accomplish this purpose, and over more than 20 years thousands of researchers and technology transfer professionals of the national agricultural research and development systems (NARDSs) have benefitted from training carried out by the IARCs.

Information is a fundamental resource for the effective and efficient performance of the NARDSs and expertise is required for its production, handling and utilization. Such expertise, however, is frequently poorly developed or even lacking; and its development and enhancement is therefore an urgent need.

Similarly to the human resources development for research and technology transfer, training is the means for overcoming this constraint.

The possible advantages of the IARCs to also embark on this type of training have, however, been less clear or obvious than has been the case with research and technology transfer. This presentation therefore intends to stimulate the discussion of the NARDSs' information-training demand and of the possibilities of the IARCs -either individually or in cooperation- to meet it.

I shall first develop a very simple frame of reference based on three major information functions -production, intermediation, and utilization of information- for three major components of the NARDSs: the research, the technology transfer, and the education subsystems; and hence I shall discuss the derived training demand and the possibilities -and consequent issues- of the IARCs to meet it.

1 National, in this context, refers to developing nations within the geographic domaine derived from the IARCs' subject-matter mandate. National institutions, on the other hand, does not refer to publicly funded ones only, but to any relevant institution, whether publicly or privately funded.

CONCEPTUAL FRAMEWORK

As stated above, the NARDSs are the IARCs' training clients. For operational purposes this is, however, too high a level of aggregation, and to reduce it to more tractable dimensions three subsystems can be distinguished: the agricultural research system (RS), the agricultural technology transfer system (TS) (itself part of a larger development system), and the agricultural education system (ES)².

In all three subsystems information is an input to their productive activities, and it is also an output of them which, in its turn, may become an input for any of them or for other systems. In other words, the production and utilization of information are key functions in the three subsystems and, therefore, in the NARDSs as a whole.

A third function which I shall call "information intermediation" constitutes the crucial link between the production and the utilization of information: it deals with the systematic collection, storage, retrieval and delivery of information.

The NARDSs' subsystems and the three major information functions (production, intermediation and utilization) conform a simple conceptual model which may serve us as a frame of reference for our discussion of the NARDSs' information training needs and the IARCs' possibilities to meet them. (Figure 1).

FIG. 1 ELEMENTS FOR A FRAMEWORK TO DISCUSS THE IARCs' INFORMATION-TRAINING FOR THE NARDSs

<u>INFORMATION FUNCTIONS</u>	<u>NARDS COMPONENTS</u>		
	RS	TS	ES
PRODUCTION	COMMUNICATION		
INTERMEDIATION	INFORMATION SERVICES		
UTILIZATION	ACCESS TO INFORMATION SERVICES		

2 It can be argued that the ES is external to the NARDS, but it still would have to be taken into consideration; therefore it is simpler -in the present context- to treat it as endogenous rather than exogenous.

The human resources involved in the three major functions related to information in the three subsystems must have knowledge, skills and know-how which vary with function and with subsystem.

The producers of information need, mainly, communication skills (obviously in addition to their specific capacity to generate information) which are quite different between researchers, extensionists³, and educators, who each deal with specific audiences and, consequently, have to communicate their messages in different ways.

The information intermediaries must have the abilities and capacities to serve the different subsystems of the NARDSs by collecting and storing information required by them; by alerting them on new information being produced in the NARDSs themselves and elsewhere; and by obtaining and delivering the demanded information in a timely and efficient manner. Such abilities and capacities are generically common to the NARDSs' three subsystems, but a certain specialization is also necessary to serve the particular information needs of researchers, extensionists or educators.

The users of information, finally, must know how to access effectively and efficiently the various sources of information which may serve the needs of their specific trade.

Failure for lack of training of the human resources involved in any of these functions -information production, intermediation, or utilization- will have negative effects on the effectiveness or efficiency of the technology generation and transfer process, thus keeping the growth of agricultural production and productivity below the levels required to adequately feed the worlds growing human population and to bring about economic development; it may also contribute to the improper use of the agricultural resource-base, therefore jeopardizing the future well-being of mankind.

3 Extensionists will be used to design technology transfer professionals in general which include extensionists in the strict sense, technical advisors, agricultural credit supervisors, agricultural input suppliers, etc.

Summarizing then, the individual members of the NARDSs' various major institutional components are the potential clients for information-training by the IARCs. Their demand derives from the need to fulfill the functions of producing, handling and utilizing information, in pursuit of the common goal of agricultural technological development, in order to adequately feed mankind and concurrently bring about economic development with equity and with sustainable use of the natural resource-base.

TRAINING NEEDS OF INFORMATION PRODUCERS, INTERMEDIARIES, AND USERS; AND OPPORTUNITIES TO MEET THEM

I shall now examine the training needs of the human resources involved in the production, intermediation and utilization of information in the NARDSs' major subsystems (RS,TS,ES) in more detail, to discuss issues and possible strategies with regard to which of those needs could and should be met by the IARCs and how this could be accomplished.

INFORMATION PRODUCERS

In the case of researchers, for their product to be of any value at all it must be communicated. This may seem a truism but many potentially valuable data are buried in personal files in the NARDSs because their collectors never got round to communicate them. Also, we are all very much aware of the strong tendency of our research colleagues in the NARDSs to "publish" their results as grey literature, and of all the difficulties and inefficiencies that derive from this fact. We equally know about the difficulties in communication between researchers and extensionists in the NARDSs. This list could be enlarged further, but there is no need for it to conclude that the communication skills of the scientists in the NARDSs are often weak and could be improved substantially through systematic training⁴.

4 This does not imply that insufficient training in communication is exclusively responsible for the insufficient communication of research results or for their publication in grey literature. Many other major deficiencies contribute to it, and training alone is therefore no panacea. But it is, nevertheless, urgently necessary.

Are we in the position to effectively and efficiently do anything about it?

My personal answer is yes. The IARCs have professional communicators although their numbers may be small and their workload already full. But moreover they have their researchers (in much larger numbers) who, as a matter of fact, communicate -firstly and most intensively- with other researchers, but also with extensionists, development officers, policy-makers, and educators. This formidable potential communication-training capacity -the researchers- ought to be tapped and, perhaps under the technical guidance of the professional communicators, put to train not only in the field of their disciplinary subject-matter expertise as most of them very effectively do, but also to transfer basic communication skills.

How could this be done? Certainly by including training in communication skills in the training programs for researchers in those IARCs in which it still isn't.

But the need for this kind of training affects not only the researchers who are trained in the IARCs; it pervades the entire RSs in the NARDSs.

Should the Centers do anything in this respect about NARDSs researchers in general?

This is an issue to be discussed.

The IARCs surely have the capacity to produce training materials on this subject. But so probably have other institutions. Have we a comparative advantage? We may. If we were to prepare materials for our own training, they also would be useful for researchers in general and not only for those that are trained in the IARCs. Also, as this kind of training-needs is clearly not commodity-specific, materials produced by one Center, or by a group of them, could serve the whole IARCs-system and its national partners (language constraints would of course, have to be overcome). Should we embark on this? Who would be prepared to? How would such an endeavor be funded? Is it more urgent than other issues that we also face?

Let us now turn to the extensionists in their role of information producers. What matters in their case is communication with farmers in order to influence their decisions on the use of technology.

This is a kind of communication in which IARC scientists⁵ do not engage and in which they have no particular expertise⁵.

5 IARC scientist do communicate with farmers in carrying out on-farm-research or participatory research with farmers. But this is either to develop methodology for such kind of activities, or to develop technology with farmers participation; not to transfer technology directly to them.

The IARCs' professional communicators, on the other hand, have the necessary basic training required to meet this need, but they are few in numbers vis-a-vis the enormous numbers of extensionists to be trained; more important than this, however, is that they are not active as extensionists or extension-communicators. Therefore they normally lack the expertise to take on such a task, and thus they don't comply with a principle that should guide all our training: to train only in matters in which we are excellent and absolutely up-to-date by the daily exercise of our professional activities.

For all this my opinion is that we should not venture into training extensionists in the skills of communicating with farmers .

In addition to communicating with farmers, extensionists also communicate with their own peers, and in some cases with policy-makers. Training needs for this kind of communication are akin to researcher-researcher or researcher-policy-maker communication and training materials prepared with researchers' needs in mind could also serve extensionists in these matters.

And what about educators? First of all it is convenient to avoid some confusion which might arise from the fact that some educators are also researchers (and may equally be extensionists). As researchers they truly belong to the research system (RS), and what has been discussed with respect to communication-training of researchers therefore applies to them.

Here we are interested in their communicating information that they produce strictly in their role as educators. Can we train them to improve their communications with fellow educators or with students? It would appear to me that we have no advantage in this field. Their communication-training as researchers -which we would be in the position to address-may, however, have some favourable spill-over effects on their general communication abilities.

6 Training them in diagnostic skills and in production technology is a different subject. In this the IARCs do have a comparative advantage (although it may be only temporarily), but the matter is outside the scope of the present discussion.

Summarizing this section on the information producers, it would appear that researchers, but not extensionists or agricultural educators, have a clear need to be trained in the communication of their information-product that could be addressed advantageously by the IARCs, and that inter-Center cooperation might be convenient for this purpose. Whether to embark on such a venture, and in the case of an affirmative decision, by what ways and means needs to be discussed.

INFORMATION INTERMEDIARIES

The intermediation between scientific/technic information producers and users was performed during centuries by libraries. This intermediation was exerted to some degree within human generations, but more importantly to keep the increasing body of knowledge through the generations.

In the present century things have changed substantially, and particularly so after mid-century; the information-intermediation has become absolutely vital, and library is no longer the best possible name for the "information-banks" into which they have developed, and where information is stored and handled on an ever-increasing variety of media, and from where it is accessed in other information-banks by means that become every day more sophisticated and expedient. Also, other types of information-systems with their own particular intermediation components have arisen in the last decades: e.g. agro-ecological systems, agro-metereological systems, germplasm systems, human resources systems, agricultural commodities comercialization systems, etc.. Many of these tend towards closer and closer articulation or link-up amongst them and with the more "bibliographic" ones to serve a clientele which, itself, is also the subject of information systems on people and institutions.

A symmetrical trend to this institutional evolution has been and continues to be followed by the human resources involved in these systems. Librarians changed to librarian/documentalists; then disciplinary or field-of-service specialization within librarianship became necessary when the variety of know-how required exceeded the capacity of any single professional, and multidisciplinary teams replaced the all-round librarian-documentalist. More recently still, the multidisciplinary teams evolved into multi-professional teams integrated with members from the library-documentation professions and members from the systems engineering fields (computer hardware and software specialists).

In such an information-bank the skills and knowledge required are therefore highly complex and so are, consequently, the training needs of its members, both to satisfy the requirements of the individual professional profiles as those of the team as a whole.

To satisfy their own information needs, IARCs must stay at the cutting edge of this evolutionary -or perhaps revolutionary- trend. So must the NARDSs. But for them it is much more difficult for dearth of physical, financial and well-trained human resources.

The IARCs can contribute to overcome at least some of the difficulties that beset the NARDSs in this respect: They can help them to develop their own capacity, and they can give them access to the services of their own.

For the development of their own capacity training is -once again- the means to overcome their qualitative human resources constraints.

Do we have a comparative advantage for this kind of training? I would say yes, because of being at the cutting edge of the information evolution/revolution: having outstandingly fine information-banks we should be able to train others in how we do things in them. This includes specific training and also the role-model. With regard to the latter a word of caution is, however, necessary. The IARCs' information-banks essentially serve a research function whereas in the NARDSs the extension and education functions

7 The limitations due to lack of physical or financial resources are not to be addressed here, but the IARCs also could contribute to alleviate them by assisting in directing funds for information work to the NARDS (Recommendation 3, CGIAR Documentation and Information Services Meeting, CIP, Lima, 1987).

must also be served. If the NARDSs follow the IARCs model too closely (as they did occasionally in developing their research capacity) they may fail to adequately develop the services for extensionists (which must cover the information on extension methodology and also deal with straight-forward divulgation and extension publications/materials) or for agricultural education (information on education and teaching/educating/training materials).

A major difficulty for training information-bank professionals for the NARDSs is -to my mind- the small number of trainers (or potential trainers in the IARCs vis-a-vis the rather substantial number of candidates that may require training. In-service training, which from a pedagogic point of view would perhaps be the best way of providing training to colleagues from the NARDSs, may be quantitatively insufficient due to this trainers/trainees disproportion.

Could this limitation be overcome by inter-Center cooperation? I believe it could. Regional training events (for instance, general courses followed by more specific events on a recurrent basis for one and the same audience) could be, surely, organized by groups of Centers.

Difficulties? One that could be serious: the heterogeneity in the organization, structure, and functioning of information-banks between Centers. This however, is also relevant for inter-Center cooperation to serve the IARCs-system itself and therefore surely will be discussed in other sessions of this meeting. For this reason I shall not pursue this matter any further here.

Alternatives? As usual when a disproportionately large number of trainees requires attention, autotutorial materials could be thought of. In this case, however, my personal opinion is not in favor of this type of solution. On one hand because the all-important role-model and daily hands-on experience would be lost; on the other because the trainers/trainees disproportion is due more to the small number of trainers than to an enormous absolute number of candidates to be trained. Thus, the matter is to increase the trainers, and this should be possible through inter-Center cooperation.

A more complex alternative, which goes beyond just developing the human resources of whatever information-arrangement may exist in a given NARDS, is to develop a joint IARCs/NARDSs network and to train the manpower involved in it to serve its needs.

This is the alternative that I myself would prefer. It starts with inter-Center cooperation to accomplish an institution -or system-building/enhancing function of which training is an integral part. In this way training fits into a precise frame of reference, for planning who is to be trained and what are to be the contents and activities, and also for deciding how the results are to be evaluated. If, conversely, the starting point is training (in a way supply-driven, rather than articulating the demand with the supply) planning becomes less purposive and evaluation is difficult or even impossible.

Networking is a much abused word. It covers from networking for the sake of networking -by those who follow what appears to be a fashion, and who by that means capture funds available internationally for such a fashionable activity- to genuine cooperation amongst groups, institutions or organizations within countries, within a region or globally, in order to make the best possible use of scarce resources for the solution of crucial problems of mankind such as the alleviation of hunger and poverty, and the preservation of the resource-base for agricultural production.

I am profoundly convinced that an IARCs/NARDSs information network would correspond to the genuine ones, and that it is feasible.

Various donors, especially noticeable amongst them IDRC, have made considerable contributions towards the development of individual information-banks -as is the case of my own Center's and many of yours-. I feel that now the time has come to systematically link these information-banks up into a global network (or several interconnected regional ones) geared towards proactively, rather than reactively, promoting, enhancing and facilitating the use of information for agricultural technology generation and transfer. The donors which so generously contributed to the development of information-banks might be equally interested in a proposal to make them into a network.

Let me explain in some more detail what I mean by the previous somewhat wordy statement.

I am thinking of a network of major nodes (information-banks) located in the developing world (essentially the Tropics). Each of them would be technically highly developed -as presently are some of the IARC's information-banks and a few of those of the NARDSs-. They would be linked amongst them through modern communications technology, and they would be similarly connected to the relevant information-banks and data-bases in the

industrialized countries (part of this already exists, but it has to be developed and strengthened considerably). This network is of the type in which every single node is linked to all the others. With regard to their operational capacity all nodes would be more or less equivalent, but their contents would be specialized according to the agroecological and linguistic requirements of their more immediate area of influence, or according to their more restricted technical field of specialization as may be the case with information-banks in commodity-oriented research centers.

Every one of these major nodes would, in turn, be the hub of more localized networks -sort of "retail" networks served from a major "wholesale" node-. The nodes of this, if you like, "secondary" network would be in very close contact with their information-user customers, no matter how distant from major urban centers and major information-banks they might be located. Symmetrically they would be very effectively linked to a node of the "primary" network of major nodes by means of modern communications technology. They would hold only a small amount of very strategically selected information in stock, but they would have to have three fundamental strengths: 1. The capacity to directly assess the users' needs. 2. The capacity to effectively and timely serve these needs by drawing on the information stock of the primary network. 3. The ability and the motivation to very actively promote the use of information amongst their clients,⁸ converting a latent into an actual information demand.

Such a structured network is a very ambitious project. Is it over-ambitious? Perhaps. But agricultural researchers and extensionists without an adequate supply of information are surely inefficient, and worse still they may be ineffective. The cost of such inefficiency and ineffectiveness -human suffering and social unrest from hunger and poverty- may be higher than the investment necessary to set up and operate some sort of network of the kind outlined

8 This general model follows a strategy of rather centralized information storage and distribution to the decentralized nodes upon request. Other alternatives are or will become technically feasible, for instance the distribution of massive amounts of information, or of whole information-banks, densely packaged onto media like CD-ROM. Networking in such case, could be quite different and, perhaps become eventually less necessary. Training for the individual highly decentralized information-banks would change accordingly and become very much standardized. The need for highly proactive interaction with the information users would, however, remain.

here. Detailed cost/benefit or cost-effectiveness analyses of alternative network models are, of course, not the subject of my presentation nor within my personal technical capacity, but they may be necessary to develop a formal project-proposal for the donor community.

In any event, my point with regard to training human resources for the information-intermediation function is that a clearly articulated networking project of one sort or another would provide the most precise framework for the necessary human resources development. With it, subject-matter specialists and professional trainers (from IARCs, NARDSs, and from other international agencies) would be in an advantageous position to develop and implement the detailed contents and methods of a conducive training program.

Otherwise, our training will be scattered piecemeal; and at the risk of lacking focus and impact.

INFORMATION USERS

Researchers, extensionists and educators need to use information to perform their specific functions, to continuously up-date their body of knowledge, and to improve their performance through ongoing self-education.

Extensionists must continuously be informed on what technological advances are becoming available to be put into use by farmers; and simultaneously they must know about new methods being developed to further improve their interaction with farmers. Similarly educators must keep up-to-date with both subject-matter content and educational technology to adequately teach and educate their disciples. Finally, all those who create new knowledge and generate information -researchers, extensionists, and educators alike- need the latest information of their field of creativity to be efficient in their endeavor.

To adequately fulfill this information-utilization function, and consequently to effectively and efficiently exert their respective roles in the technology generation and transfer process, all these various agents of the NARDSs must have the habit to seek information and the know-how to obtain it by accessing the various possible resources. Without this prerequisite the best information-bank with the best-trained human resources can result little less than worthless.

Many members of the NARDSs lack the information-seeking habit, sometimes due to lack of training, but others out of frustration after reiterated attempts to document themselves on some specific subject, only to find that what they addressed as information-banks turned out to be "out of cash" or plainly "bankrupt" or perhaps worse still, to find that they could obtain long computer-printed bibliographic lists, but with the exasperating disappointment of not having access to the original documents.

This raises two symmetrical points: the development of information-banks without training the information users -thus turning a latent into an actual information demand- will be inefficient and even ineffective, and frustrating for the information intermediaries; but training of information users without making sure that they will have access to a satisfactory information supply is also inefficient or ineffective, this time leaving the users-to-be frustrated.

But not only is the information-seeking habit to be developed and cultivated; the how-to-see information must also be taught. This is a very wide-spread need as we confirm year after year with our trainees at CIAT. They are almost exclusively postgraduates, yet a very large proportion of them is unable to find their way round in a standard library. This is the result of impoverished universities in which the libraries are almost or literally non-existent, but it is also the result of "educators" who do not develop the information seeking skills and habit amongst their students, often because they themselves lack these attributes. The two facts are, of course, not independent of each other.

In addition to training, there is also a need for re-education to correct habits of improper use of information: It is not unfrequent amongst professionals in the NARDSs, when they write research communications, to insert bibliographic references into them not for the genuine reasons for the use of references, but in a sort of ritualistic way -in the belief that the presence of references, no matter of what kind, is an indicator of good quality-; others -in good faith- include into their writings only references that coincide with their own findings, but leave it to others to find any possibly conflicting evidence in the literature that might cast doubts about their results or that would require additional discussion or work.

Similarly to what was said with reference to the communication skills of the information producers, particularly of the researchers, the list of deficiencies in the search for -and use of- information by the potential

information users could be enlarged further, but there is no need for it to conclude that the information-seeking and utilization habit and skills are often weak amongst the professionals of all three major subsystems of the NARDSs (RS, TS and ES), and that this extremely serious limitation could be corrected by means of training (although an effective information-intermediation function must also be put into place simultaneously).

The similarity of this discussion with what was said with reference to the information producers extends still further: the issues related to what could and should we do about training to overcome the deficiencies in the use of information in the NARDSs, are very much the same as those related to what could and should we do about training to overcome the communication deficiencies of the information producers.

To whether we could do anything to meet the training needs in the use of information, my reply is an unqualified yes with respect to the research-trainees who are trained at the IARCs. If there are any IARCs that at present do not systematically include this kind of training in their human resources development programs, I would think that a recommendation for them to do so could be reasonably made by this meeting.

But with regard to whether we could or should provide the same training for other researchers, for extensionists and for educators, we face the same issues to be discussed as in the previous sections.

The training in information-seeking and utilization is sufficiently common, however, to all the potential clients, that I feel that the development of training materials for them would be warranted. At first sight the IARCs may not have a clear comparative advantage for this. They, however, have a particularly precise knowledge of the audiences to be served -of their strengths and weaknesses- to be in an advantageous position to meet their needs. Inter-Center cooperation, once again, could be particularly suited to overcome the disproportion in the trainers/trainees ratio which in this case is the result of small numbers of trainers and large numbers of candidates to be trained, both of them in absolute numbers. Complementarities between Centers (for instance in knowledge of certain audiences, and in language capacity) could also be conveniently exploited in cooperative ventures.

These are issues for discussion: whether there is a consensus about action to be taken at all, and if there were agreement on an affirmative response, what would be the specific activities and by whom?

The possibility of joint training events amongst Centers is not to be discarded completely either. The large size of the audience and its dispersion, however, -in my view- make it much more amenable to be effectively reached through indirect training methods than through a direct training approach.

Half-way, however, between the direct and indirect approaches to training, is the alternative to train directly but seeking a multiplier effect. At CIAT, for instance, we train researchers of the RSs directly because their numbers are relatively small and because we can meet practically all their needs through personal tuition. For the training of extensionists, by contrast, we choose to train trainers because the absolute numbers of the extensionists to be trained by far exceed our training capacity, and only through an efficient multiplier effect can we expect to have a real impact on this kind of audience. This model can undoubtedly be applied also for the development and enhancement of the information-seeking and utilization skills and habits of extensionists. Ways of inter-Center cooperation in the training of trainers -no doubt- deserve to be explored, in general and for the particular purpose with which we are concerned here.

Coming back to the proposal of a major information network made in the section on information-intermediation, its members would have to become active in this kind of training, particularly so those in the "secondary" decentralized network.

Summarizing this section on information-users -which has so much in common with the one on information-producers-, it seems to me that there is an obvious need to train researchers, extensionists, and educators in the habit of seeking and using relevant and timely information; that the IARCs could address this need, particularly through the training of trainers and through the production of training materials; and that for both inter-Center cooperation would seem to be indicated.

CONCLUDING REMARKS

To finalize, I would like to briefly stress -once more- the major points of my presentation:

IARCs training is to enhance the technology generation and transfer capacity of the NARDSs (normally restricted to what concerns specifically the IARCs mandate). It therefore has an institution -or systems- building/enhancement purpose.

Information-training is part of this and should address the whole information production, intermediation and utilization system, which is part of the continuously ongoing agricultural technology generation and transfer process.

Amongst the three information functions put forward in the present model -production, intermediation, and utilization- intermediation is perhaps the most complex, and certainly technically the most dynamically evolving one. Training for it should not be simply supply-driven; rather it should articulate the training supply with the training demand, preferably within the framework of some kind of information-systems development project, such as an IARCs/NARDSs information network.

In contrast with the IARCs' training of researchers, in which the Centers have their most obvious comparative advantage -because there are many trainers for a relatively small number of professionals to be trained, and because the training-subject is to teach, simply, what the trainers do daily as their specific job-, in the case of information-training there are, by and large, few trainers (or potential trainers) in the IARCs vis-a-vis a very large population of candidates to be trained.

Moreover, the training demand for research, although not exclusively commodity -or IARC-mandate-specific, can be kept within such limits without too much difficulty. The information-training, by contrast, is not commodity -or IARCS-mandate-specific and therefore raises a whole host of issues such as:

Should the IARCs embark on information-training at all? Do they have a comparative advantage to do so? If they have some, what would be the audience (or audiences) to be addressed? With what kind of training?: Courses, in-service, or through auto-tutorial training materials? Does inter-Center cooperation have any advantages for an affirmative answer to these questions?

My personal answer to all these questions is a strong, or occasionally qualified, yes. But it is to you my colleagues to say if they are the right questions in the first place, and if they were not utterly wrong, what the answers should be.