TECHNOLOGICAL INFORMATION PILOT SYSTEM (TIPS)

Design for a training programme

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Preface

The following is a report on and for the Technological Information Pilot System (TIPS), on a training programme for the professional personnel of TIPS, according to a contract between DEVNET and the author, of 15 January 1985, Rome, Italy.

The paper is divided into two parts:

I. A Training Programme for TIPS: Some Suggestions

II. Development, Technology and South-South Cooperation

The second part will be of more interest to those concerned with technology transfer in general; the first to those concerned with the making of a training programme. The two parts are interrelated in the sense that the general principles underlying the training programme are explored in the second part.

Working on the paper I have benefited greatly from discussions with two of my colleagues at the Université Nouvelle Transnationale, M. Jean-François Penouilh and M. Igor Rostapovitch. The responsibility for the conclusions, however, is mine alone.

Paris, 28 March 1985
Johan Galtung

The report has been somewhat revised as the result of a very useful brainstorming session on TIPS organized by DEVNET 28-30 April 1985, in Roma, Italy. I am grateful to the partic'-pants for many good suggestions.

Alfaz del Pi, 20 May 1985
Johan Galtung

A second minor revision has been made as a result of the meeting of experts held in Rome, June 7-10, 1985, but in no way reflecting the richness of the discussion (see separate report).
Paris, 21 June 1985

Johan Galtung

I A TRAINING PROGRAMME FOR TIPS: SOME SUGGESTIONS

1. Some general considerations

The Technological Information Pilot System (TIPS) is on the one hand an effort to strengthen South-South cooperation technologically, with an effort to contribute to the satisfaction of basic needs of people in general in the countries of the South. On the other hand, TIPS is a part of the real world in which we live, a world characterised by big governmental bureaucracies, big industrial corporations, and big research intelligentsia complexes. For information about a technology to be transferred from one country to another, a formal status with governmental bureaucracies is indispensable; for the technology to be implemented some measure of economic rationality will be a part of the picture; and for the technology to work at all, research adequacy has to be present. Thus, on the one hand the policy objectives of strengthening South-South cooperation and basic human needs satisfaction; on the other hand, the project has to be operational within the structure we have(which may not be the structure we want).

I think these two points should be used as the basis for deciding what kind of people one would like to participate in the project; what these people should read, know, understand; what should be the content of the obviously international and inter-disciplinary training programme; in other words, what they should do concretely during the six weeks duration of such a programme. More particularly, how should a handbook be constructed so as to meet the requirements of this important project ?

The following are some reflections, very much open to discussion, of those points. I have chosen the form of six dilemmas with which organizers of courses are often confronted, trying to show how the nature of TIPS should lead to a both-and rather than either-or approach. Concrete outlines for course and handbook are then proposed on the background of those general reflections.

For an exploration of the substance, the possible content of the course, see the second part of this report for an analysis of "cultural, economic and social aspects involved in the south-south flow of information of the type that TIPS will promote" (from the contract description).

2. A six weeks training course: Some dilemmas

I would see this training course as very much based on the principle of both-and rather than either-or. It goes without saying that there are limits to how much depth one can obtain during a period of six weeks. On the other hand, however, it is assumed that the participants will be people with some experience in information systems, technology in general and in the countries in the South in particular; in other words people with diverse experiences who should acquire a common language of concerns and communication so that they can more easily interact with each other.

More particularly, I think the following major dimensions for organising the course should be taken into consideration.

(A) Both theory and practice

The course should give general TIPS theory, but should also give some practice. More concretely, there should be exercises with the participants playing roles as receivers and senders in various countries in the South, possibly the countries from which they come themselves, but also changing roles. The participants should have at their disposal the type of (telex) machinery that would be used in practice, the formats for communication, and then enter into the type of dialogue needed in order to establish whether the technology proposed is valid and/or feasible.

(B) Both general theory and case studies

Case studies are indispensable, but so is general theory. The case studies should be presented for discussion. The problems in connection with the cases should be clearly pointed out, the participants should be stimulated into discussing how, and by whom, shortcomings, when and where,could have been avoided or eliminated. Some of the case studies might come out of books, but the best case studies would probably be those that could be found in the field,nearby. In that case the participants should have an occasion to interview, or even dialogue with people in various parts of the economic cycle; those who might be sensitive to depletion aspects of extraction of the necessary raw materials,

those involved in the production itself, those involved in the distribution, and the end consumers - including those who might have something to say about, say, environment aspects connected with production, distribution and consumption. What one should avoid would be information about a case coming from one source only. Having all these different views on these matters, the participants should be trained in seeing a technology from many angles at the same time.

(C) Both elite-oriented and people-oriented approaches

Any technology has its elite aspect: the bureaucracies, corporations and researchers involved one way or the other. And technology has its people aspect: people as producers, working in the distribution networks, and above all people as consumers. Everything becomes much easier if one of these approaches is disregarded. Looking at a technology only from the point of view of state logic, capital logic and (research) logic, totally disregarding the real consequences the technology might have for people in general, is one approach, but a very dangerous one. The same applies to looking at technologies as if there is total freedom to choose, regardless of legal frameworks, as if capital in general, profit and investments in particular do not matter, and as if the necessary innovations have already been made and are sufficiently communicated. It might be useful as a teaching device to take a given technology and look at it from both angles, then having the participants try their hands at putting the two approaches together (another version of what is suggested in the preceding point: to look at the technologies from various sections of the economic cycle).

(D) Both Southern and Northern perspectives

The question might be asked, not only by participants but also by the resource persons: imagine a certain technology is rapidly spreading in a South-South technological information network - what would be the likely action of the North? Eagerly joining to cooperate? Perceiving this as a conflict, trying to impede rather than facilitate the process? Being mainly indifferent, not attributing much importance to the phenomenon? A role-playing approach might be interesting as a part of the training course,

having the participants act out possible international scenarios depending on the technology. Just as under the preceding point they might act out inter-national scenarios to try to understand better the processes by which elites might appropriate a technological resource that has "fallen" into the hands of the South. South cooperation. Again case-studies might be useful, but better still would be some role-playing, for personal involvement.

(E) Both soft and hard technologies

The technologies have been very well selected in the sense that they range from the hard to the soft, in all ten fields there can easily be both hard and soft technologies. I think it is important that all participants should have some acquaintance with either type, with the strength and shortcomings of the two basic types - the words "hard" and "soft" roughly corresponding to industrial/modern and artisanal/traditional. What should be avoided would be the division of participants into "hardies" and "softies", ultimately preferring one to the other rather than being eclectic.

(F) Both technical and social aspects

The course will have to be inter-disciplinary in the sense of giving good check lists of what to watch out for in technical terms. What have been the experiences in the countries where the technology has already been used? At what points, if any, do breakdowns appear? What about spare parts and service? And they have to be fairly conversant with the social aspects, for instance along the line discussed in the second section of this report. Some type of general scheme should be proposed for a "cost-benefit analysis" of any technology, a systematic check list that participants should almost be forced to apply to the technologies used in the case study. Needless to say, the revision of that checking list would itself be an important part of the course, assuming that participants will bring in their own experiences from various corners of the total field of technology and the world.

* * *

Above six both-and dimensions have been indicated. They do not correspond to six weeks since these are principles of course design that should be applied concurrently rather than

subsequently. My experience when it comes to the design of a course over time, is that this is much less important than the organisers of a course usually assume. Any such design is also very vulnerable to availability of resource persons, even to simple delays because of illness, airline delays, etc. Most orders are possible.

The only thing that certainly should be argued is the need to start with some very concrete information about TIPS. In the continental European tradition one would then in all likelihood prefer to continue with general principles in order to proceed to case studies and practical advice. In the Anglo-Saxon/ U.S. tradition one might do it exactly the other way round, or perhaps start with the case studies. My own advice would be to do both: both general principles and case studies from the very beginning and throughout the course, with role-playing exercises - all of it in an inter-disciplinary, international spirit. Doing that, the course should also stand a reasonable chance of becoming a relatively model course in development theory and practice.

3. A six weeks training course: An outline

The TIPS system will obviously have a center producing the technological information (and distributing it), consisting of the TCC and the NBs, and a periphery consuming the information, consisting of the first (governmental), second (industrial), third (research) and fourth (social/people) sectors of users. In the following "TIPS" will stand for the former, and "users" for the latter. A six weeks training course is for TIPS, and should be international in the sense of interregional, not merely regional, since a major purpose of TIPS is to speed up the flow of technological information from South to South regardless of continent, or region. A detailed handbook designed, roughly, along the same lines as the course, will be made for TIPS and might run into 300 pages. If anything of that size were needed for the users the program would be poorly designed indeed; one might and should distill from the TIPS handbook 30pp or so for the users. Similarly, for the users there might be courses or seminars of shorter duration, and then on a regional basis, to learn more about how to make use of TIPS - but then lasting one week rather than being of six weeks duration. It is assumed that handbook and courses for the users will have to come later in the TIPS process and that at the present stage training course and handbook will be for TIPS in the narrow sense, and fully international, involving all ten countries and all ten fields of technology.

Given this, I would see four major components in a course of that duration: development, technology, South-South and TIPS, and in that order. But, in line with the more general principles mentioned in the preceding section, this could be organized in a "Chinese Boxes" kind of way, with the four themes or components tying in with each other, combining theory and practice, general theory and case studies, elite-oriented and people-oriented approaches, Southern and Northern perspectives, soft and hard technologies and both technical and social aspects, with 90% devoted to TIPS proper, but in a context of the more general problématique.

COMPONENTS OF A TIPS SIX WEEKS TRAINING COURSE

1. Development: The Problem

   - statistics on distribution of basic needs satisfaction and other indicators of development between countries and regions (North-South) and within countries and regions (elite-people)

   - historical perspectives, North
     historical perspectives, South - in a different context
     internationally, socially, psycho-politically

   - key development theories and concepts; ideologies

   - on the role of technology in development

   - on the role of South-South cooperation in development

   - first presentation of TIPS philosophy

2. Technology: The Problem

   - a presentation of the ten TIPS industrial sectors/areas

   - detailed analysis of case studies of how technology in these areas works: technically, economically - and socially, politically, culturally

   - explanation of the dimensions selected by TIPS in technical or narrative write-up

3. South-South Cooperation: The Problem

   - a presentation of the ten TIPS countries selected with their factor profiles, technology gap profiles, basic needs and other development factors deficits

   - detailed analysis of case studies of how some technologies have worked in these countries: technically, economically - and socially, politically, culturally

   - explanation of the users (first, second, third, fourth sectors) associated with TIPS

4. TIPS: The Problem

   - a presentation of the organization of TIPS (TCC, UP, etc.)

   - a presentation of the TIPS information cycle - from information source via encoding, transmission and decoding to users in various sectors and further on to end users - ideally with feed-back mechanisms from users even back to the information source - at least to user - UB - TCC/Roma.

   - operational exercises, with software and hardware, role-playing, scenarios for various types of break-downs.

   - relating TIPS to development, technology and South-South.

This may look like a formidable scheme. However, TIPS will have to be based on people with managerial competence, knowledge of the industrial (meaning technical and socio/political) issues involved and with both social awareness and credibility in governmental circles (in general, credibility with all four sectors). The course is designed for such people, to strengthen them and to develop such capabilities further. The participants will be mature people so the term "training course" may actually be a misnomer. It is more an orientation course cum seminar where each participant should know the broad outline in advance and be encouraged to bring and present his/her own material. After all, TIPS is very much in the formative stage, there is not a detailed set of SOPs (standard operating procedures) available so the format should be participatory rather than top-down even when there is a lot of technical information to learn, not just to discuss. Actually, this is the program for an orientation workshop rather than training course.

How should one distribute the four themes on six weeks? I would suggest one week for each of the first three themes and three weeks for the last, with one week on organization and information cycle, and two weeks with operational exercises also relating TIP back again to the more general themes of development, technology for development and South-South cooperation for development. It should be noted that this in no way means that the course is divided in 50% general talk and 50% on TIPS. TIPS is in it from the very beginning; as the TIPS philosophy of development, as a detailed discussion of the TIPS industrial sectors or areas and a detailed discussion of the TIPS countries. Thus, at least half of the first three weeks will be TIPS in a direct way, but in the context of more general theory and case studies. It is assumed, then, that the purpose is not to train narrow bureaucrats or functionaries who know which button to push, but people with broader horizons who know why to push and with what likely consequences. Narrative writing would be a useful exercise for this.

In the first week one might imagine a high level UN system official (McIntyre?) outlining the need for development in a clear and well documented way, followed by discussions of history and theory (Sachs, (Hettne, Abdallah, Kothari?) and then technology (Thailat Patel?) South-South cooperation with analysis of UNTC, UNIDO etc. (Childers, Mennon) and then TCDC philosophy (Agarwala, Savio). This should be a week of inspiration, not hiding the traps and difficulties, but highlighting them in order to solve them.

In the second week and the third week I would draw very much on the participants themselves, demanding of each one of them one technological case study (his own area) and one country case study (his own); possibly with each country really specializing in one area. More studies for each technological area, and each country, will only enliven the debate and make it much more realistic. To what extent one could, in addition, bring in outside specialists in technology and country analysis depends on the resources available. But some guidelines should be made for this purpose. At any rate, it is essential that all participants become conscious of the special opportunities and problems associated with each industrial sector and each country in the TCDC system, not only his/her own. This is essential because they will be assumed to participate not only with a view to what they can get out of the system, but also with a view to what they can put into it ("I remember something I heard in the orientation course about country X having a serious deficit in technology area Y - maybe our experience in Y could be of interest to them" - that would be the mentality to be encouraged.

The fourth, fifth and sixth weeks would evidently be in the hands of the TCDC staff (particularly Agarwala, Savio), with the help of the technical people. But there would also have to be an "animateur" who could tie it all together, also pedagogically - somebody covering both the technical and the socio-political aspects, somebody from the South with a foot in the North, etc. (Parvar?) And somebody with general knowledge of information (Nygaard?).

As to the day-to-day rhythm there are many patterns one could use. My own experience as participant, lecturer, organizer of courses would tend to favor a Monday-Friday schedule something like this:

9-11 Lecture with discussion, 50-50
Break
11-13 Lecture with discussion, 50-50

LUNCH break
Siesta
Reading
Group discussions

17-19 Seminar related to lectures, with lecturer(s)

SUPPER

Evenings for special lectures 2-3 times a week, with case studies or with lecturers that themselves are cases - also to be studied. Weekends for fields excursions, interviews, studies. Leisure time, vacation etc. before and after the course but a long weekend in the middle, which might also be used for travel in case one decides to make the course itinerant, involving two (even three) host countries.

As to venue: there are usually two problems, the place and the region. The sure recipe for disaster is to have course, food and sleep in three different places, with time-consuming and not too well coordinated transportation (including by foot) between the places. At least two, preferably all three, of these functions should take place in the same or adjacent buildings, which would mean some conference hotel/hostel of which there are now enormous numbers, this being a major industry in modern life. Only remember small rooms for group discussions!

The second problem is the type of surrounding. I would argue in favor of away from big cities, in the countryside near small towns so as to offer a wide variety of field studies - and preferably in the South if this can be made effectively use of. The distance to the airport must be manageable. The literature to be made available is so special that it will have to be made available by TWPS anyhow, most universities/high schools would

I would imagine that there would be at least 2 participants from each NP (preferably one from the first three sectors, and one from the fourth sector), meaning a total of minimum 20, and around 5 from TCC (including speakers from the TIPS headquarters) - all together about 25. Great care should be taken so that among the participants the ten technological areas are covered, which might mean including some more participants from some of the countries and/or the headquarters. On the other hand, the number should not exceed 30; 25 itself actually being a good upper limit for seminar discussions and small group dynamics. It should also be noted that there are only 30 days available, and it might be good to give every participant a chance to introduce some topic on more occasions than one, making much use of small workshops.

As to the number of speakers: I think 10 invited speakers from outside TIPS should be the maximum needed, about half of them for the first week, one each for the subsequent weeks. This presupposes that one really can draw upon the TCC and NP participants also for technical knowledge or at least to introduce subjects, and that assumption could be built into the character profiles used for recruiting these people - as already mentioned. Local dignitaries will be drawn upon to open and close the course, and also to use the occasion to make TIPS better known in the host country.

Running throughout the seminar would be an effort by the central staff to make use of the participants to discuss one particular issue: the handbook. I would see that as a permanent point on the seminar agenda for the afternoons, with participants and staff together coming up with proposals - using a big blackboard and a brainstorming technique to get good ideas about the content. Much of this could be written in first draft on the spot, at least as an outline - remember, there will not be that many chances with both authors and readers (sometimes the same person!) present together in a context that should be germane to this kind of work.

3. A Handbook: Some reflections

In general, I would say about a handbook exactly the same as what has been said above concerning the training course. A basic problem to be discussed would be the following: should the handbook be ready before the course, or should there be some trial runs of the course first where the participants also would have the task of pronouncing themselves, during and after the course, on what the handbook should look like?

Personally, I would be inclined to prefer the latter. I think the handbook should be highly flexible, looseleaf system, modular, something to be revised by each subsequent course. There should be no illusion that anything like final guidelines exists in this field.

However, if the position is to have a handbook as quickly as possible, I would propose the following four sections:

(i) What is TIPS - an introduction to the theory of TIPS and how it is supposed to work in practice, including how its daily operations are envisaged, down to technicalities, with information typologies, and so on. Complete structure/process analysis.

(ii) The ten fields of technology, with some basic information written by specialists in the fields about the problems to be expected, and particularly about what is now most needed as new technologies, what are possible breakthroughs in the future.

(iii) The ten countries, some basic information about the technological capacity both as senders and receivers, in connection with the ten fields chosen; as well as some basic information on the more socio-economic conditions, seen from the basic perspectives on development, both actor-oriented and structure-oriented approaches.

(iv) More general considerations, something along the lines of the theoretical part of the present paper.

II. DEVELOPMENT, TECHNOLOGY AND SOUTH-SOUTH COOPERATION

1. Development: the problem

Our world is divided into countries, and in all countries we find elites and people, the former having (much) more and the latter less, of power and privilege. A glance at world history and geography informs us that there are poor countries and rich countries, and inside the countries there are poor people and rich people - a distinction that coincides more or less with the distinction just made between elites and people. The big question is: why are some countries poor and some countries rich? And why are some people poor and some people rich ? And why is it that the poor people in the poor countries are so poor that they end up in misery, dying quickly or slowly, having their life expectancy seriously curtailed? And then the more practical question: what can be done about it?

The global answer is now: development. But there seem to be many types of development projects. Development of the country, making it powerful and rich as a whole with everything modern found inside its borders? Development of the elites, making them rich and powerful as a group and in possession of everything modern? Or development of the people, at least to the point of satisfying their more basic human needs for food, shelter and clothing, health and education, transportation/communication and energy, not to mention a basic level of security (the probability that the basic needs will remain satisfied); and the non-material, but equally basic, human needs for identity (meaning with life) and freedom. In addition to that, there is also another very meaningful distinction between development by the elites or by the people, depending on who actually carries out the task, including setting the goals.

The issues are extremely complex and no simplistic position will stand up well in confrontation with facts in world history and world geography. Nevertheless, some positions may stand up better than others, more in line with the facts. Thus, leaving aside "development of the country" as an abstraction, we are

left with four possibilities; development of the elite versus the people, and development by the elite versus the people. Anyone confronted with the misery in the poorest countries cannot remain content with the first of these combinations, development of, and by, the elite. At the same time, development of and by the people has a tinge of the naive: the motivation may be there but not the capability. After all, technologies exist, and even if they are soft rather than hard the type of training needed to implement them already makes the person a part of the elite rather than of "people" in general. Much more reasonable will be the formula: development of the people, by the people and the elite, in cooperation.

What about the remaining two combinations? In a sense they bring us very close to reality: "development of the people, by the elites" is what development assistance programmes seem to be about at the rhetorical level. And yet, for some reasons to be explored later, the reality easily becomes "development of and by the elite". On the other hand, the last combination, "development of the elite by the people" is not a part of the social rhetoric. Why should the people work hard in order to develop the elite even further? But it is very much a part of social reality, particularly in very exploitative countries. People work hard, their conditions do not improve very much; elites may or may not work hard, but their conditions improve and there is a causal connection between the two. How come?

Unfortunately, one has to look into the first question raised in order to get any further: why are there poor and rich people, why are there poor and rich countries? There seem to be two schools of thought in the effort to answer this question, or at least two major schools of thought. I shall not refer to them as "liberal/conservative" and "marxist" since these are very special views on these matters, but as the "actor-oriented" and "structure-oriented" approaches respectively.(1) Grosso modo the answers run along the following lines:

Actor-oriented approach:
Countries are actors that can set goals and develop their strategies to pursue them; people are actors who can set goals

and develop their strategies to pursue them.
In order to become rich there are two basic conditions: motivation and capability.[2] The motivation may come from the inside (such as the famous "need for achievement"),[3] or from the outside, as suitable rewards if one does achieve something, maybe also as punishment if one does not. The capability may be inherited as talent, intelligence and/or acquired through schooling and training in general, and hard work. Life is a sorting process of individuals, on the stage provided by society; and of countries, on the stage provided by the global system - with the more motivated and capable drifting up and the less motivated and less capable staying where they are, or declining further. Gamble on the strong, and there will be a trickling down effect with the motivated and capable as force motrice.

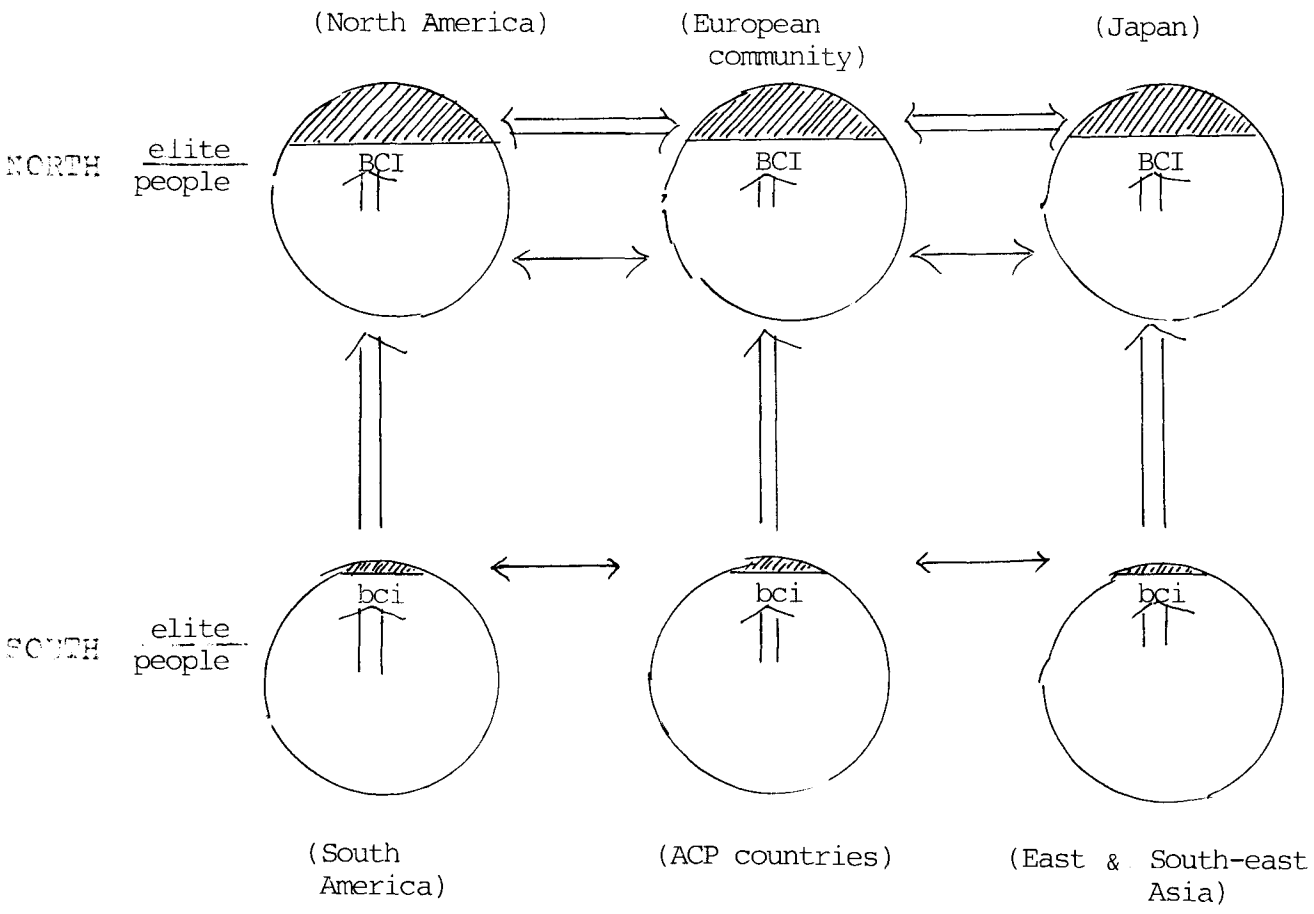
Structure oriented approach :
Countries are embedded in a world structure, individuals in a social structure and in general those structures are strong, single individuals and single countries weak except for the strongest ones that tend to benefit from the structure. The basic characteristics of the structures are two: exploitation and fragmentation. Exploitation is the extent to which the fruits of labour (beyond that which is needed for the reproduction of labour) drifts upward in the social system and the world system; fragmentation is the extent to which weaker countries are kept apart and weaker people are kept apart (not integrated through organisations to protect and promote their interests). Organise the weak so that they become strong, motivated and capable enough to eliminate exploitation.

My own view is that both approaches are valid, that both have to be taken into account in an exploration of why development efforts succeed or fail. If that stand is eclecticism, then the opposite stand, that only one of these views is valid and there is no reason even to know the other one, is dogmatism. The structural approach is more or less valid depending on the distance in a broad sense between the centre and periphery in the world system of countries and the social systems of individuals. In relatively egalitarian, equitable world systems (the Nordic countries?), and social systems (New Zealand and, again, the Nordic countries? Japan?), the actor-oriented approach gives much better predictions as to what

is going to happen. In general one might simply say that when these exploitative and fragmented structures are very pronounced, even highly motivated and capable individuals at the bottom may not be able to "make it"; where these structures are weak the differences between actors become dominant. The problem is only that when actor differences have been working for some time, sorting individuals and countries into high and low, rich/poor, the result may crystallise into a very wicked structure that perpetuates those distinctions, making it very difficult or impossible for the people to rise any further, or to stop sinking still deeper.

At this point one simple figure covering much of the world system and one simple table with some ideas about how the structures operate, may be useful![4]

Figure 1. The structure of the world system: A sketch



In this figure, there is a North and a South with the elites in the north (the powerful and the privileged) constituting a considerably larger proportion of their countries than the elites in the south. Three world sub-systems have been included: the Americas; the European Community with their former colonies and associated territories, in Africa, the Caribbean and the Pacific (ACP); and Japan with its former Great East-Asian Co-prosperity Sphere in East and South-East Asia. They are there mainly for illustration, making the general presentation more concrete. Of the ten TIPS countries, Brazil, Mexico, Colombia, Peru in Latin America; Egypt, Kenya, Zimbabwe in Africa; Thailand and the Philippines in South-East Asia. And then India in South Asia, a more independent part of the Third World. *

The three basic pillars of modern society have been singled out: Bureaucracy (B), Corporations (C) and Intelligentsia (I) - with the lower case letters in the south standing for the same, but also for their dependency on the corresponding elites in the North.(5) International organisations serve as conveyor belts between northern and southern elites, both for information in both directions and "socialization", meaning training southern elites in the attitudes and behaviour of those in the north. Thus, the intelligentsia are tied together through international professional organisations (of physicians, of social scientists, etc); the corporate, industrial, capital-oriented people are tied together in trans-national corporations (TNCs); and the bureaucratic elites are tied together in international governmental organisations, the most important ones being members of the United Nations family. Hence, a considerable amount of homogeneity in world outlook in general, and professional standards in particular, can be assumed, perhaps particularly for the corporate people since they are not only in the same association, but also in the same organisation oriented towards production. They can interact easily with each other, both North-North, South-South and North-South (of the 15 possible relations of that kind between 6 elite groups, I have only drawn 4 in order not to make Figure 1 look too confusing. Of course, there is also interaction among people and between people and elites but more so in the North than in the South, as indicated in the Figure.

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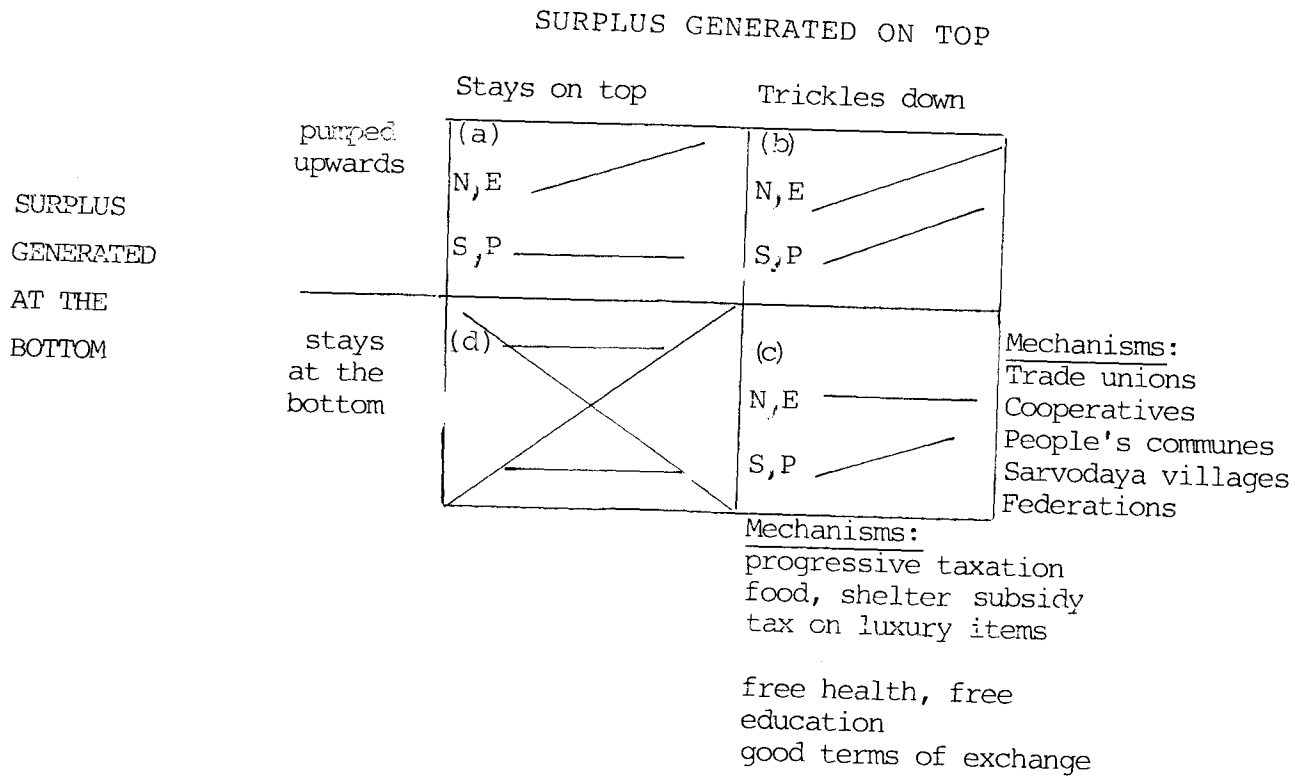
* The list is not definitive. China may also be added.

The basic aspect of the world system, however, according to the structural approach, are the vertical arrows standing for a type of interaction that makes some countries richer than others, and within all countries some people richer than others. For an exploration of this process, Table 1 may be useful:(6)

Table 1: The structure of exploitation: A sketch - for countries/people



It should be noted that this figure is general: it can be applied to individual actors within social systems, but also to country actors within world systems. The basic idea is very simple: there is a top and a bottom to all systems, high and low, and there is a surplus which in this connection may be identified with "positive balance" or even (although not correctly) with"profit".

The basic structural problem is what happens to the surplus: does it stay where it is generated, is it pumped upwards, or does it trickle down? The top category refers to the type of surplus which is generated at the top (say, fees

from licences and patents deriving from the work of the intelligentsia) or enters at the top (say, a positive balance in international transactions). Clearly, we get four possibilities when we combine these alternatives, for surplus generated at the bottom, and on the top. In case (a) the surplus from the bottom drifts upwards and the surplus on the top stays where it is; obviously a very positive condition for those at the top although it spells stagnation, even decline for those at the bottom. In case (b) surplus is pumped upwards but some trickles down again. The mechanisms behind the trickling down effect are indicated in the Table: Progressive taxation, subsidies for basic needs commodities such as food and shelter; tax on luxury items; free or heavily subsidised health services; free or heavily subsidised education and good terms of exchange between that which is produced at the top (for instance, industrial goods) and that which is produced at the bottom (for instance, agricultural goods). The structure is often known as the welfare state, and the curves for the level of material living over time may be remarkably parallel for elite and people. Needless to say, there is no welfare world(7).

In case (c) this is taken even further, by combining the trickling down effect with strategies to make the surplus generated at the bottom stay at the bottom. This second class of mechanisms can be seen as efforts to overcome the second structural aspect: fragmentation, just as the first class of mechanisms are there to reduce or eliminate exploitation. The opposite of fragmentation is organisation/integration: trade unions; cooperatives; all encompassing forms of cooperatives involving all activities in the village (such as associated with Maoist People's Communes, and Gandhian Sarvodaya villages), possibly in the future even taking the shape of federations of all kinds of "southern" and "people" elements to stand up strongly against the North and the elites, and particularly the Northern elites. Or, more positively: to become self-reliant(8).

In other words, there is nothing particularly strange or new about it all. All of these elements are known from contemporary social life, whether they are seen as "political" (which of course

they are, as political as exploitation and fragmentation, in and by themselves) or not. They are all at the heart of development from the structure-oriented approach point of view: where they are operating, the structures may become less exploitative and less fragmenting, and the result may be a reduction of elite "quality of life" and a lifting up of the people at the bottom, out of their misery. The curves can become parallel, even converging.

But from the actor-oriented approach or point of view it all looks different. All these mechanisms have one thing in common: they hamper the free operation of the market forces giving privileges to the less motivated and/or less capable (and hence "non-deserving") people and hampering, through ties of solidarity in collective organisations, the free action of particularly motivated and capable individuals, the force motrice. Both arguments are, of course, correct and most real systems in the world (as distinct from the clear-cut nature of the systems in the Table), are mixtures depending on the relative force of those upholding the actor-oriented and structure-oriented approaches respectively - often as expressions of their own interests.

But what about case (d)? It has been crossed out from the Table because it does not really represent a society. The surplus generated at the bottom stays down, the surplus generated at the top stays up; there is no real interaction between the two parties. One is reminded of societies everywhere in the world with tribal peoples running their economy and non-tribal peoples running theirs, the two economic cycles not intersecting. The result is not even parallelism but is usually considerable separation between the parties. Within each party, models (a), (b) or (c) may then apply. But "the twain never meet".

Conclusion: Model (a) is the major answer to the question - Why are there poor people and poor countries and very, very poor people in poor countries? And the two sets of mechanisms are the basic answers to the question what to do about it. And for that purpose motivated and capable actors are a necessary condition. There must be something to control, to counteract! - something dynamic. Control alone leads to stagnation; dynamism alone to flagrant inequality

2. Technology: the problem

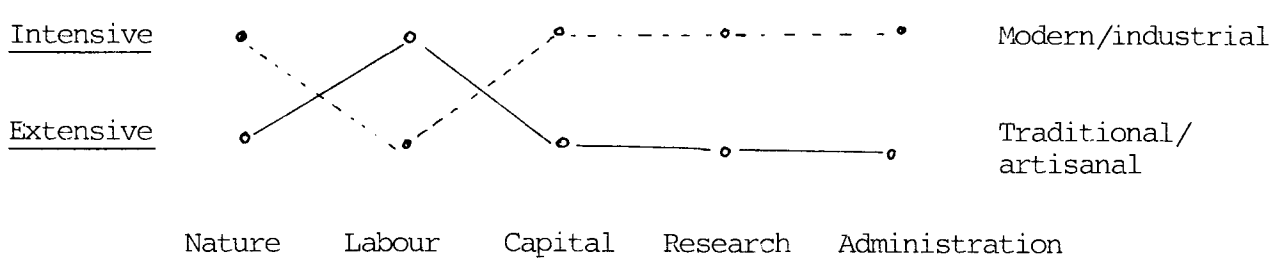
Let us now try to make this analysis considerably more concrete by introducing that on which we all depend for our consumption: production, in turn depending on technology. Of technologies there are many, TIPS being particularly concerned with the technologies in the fields of biomass, solar energy, coal, hydro-power, electronics, extractive metallurgy, agricultural machinery, bio-technology, food processing and pharmaceuticals.* The reflections that follow are, however, of a more general nature, not tied to any particular field or any particular technology although some very concrete examples will be made use of, out of the author's own experience.

The point of departure is production, according to a production function with five variables:

P = P (Nature, Labour, Capital, Research, Administration).

In short, to produce goods and services one needs inputs from nature (air, water, soil, raw materials, energy), labour (skilled and unskilled), capital (liquid and fixed), research (pure and applied), administration (innovative or routinised). If much is required of a given factor, the technology is said to be intensive on that factor, if not it is extensive. And that leads straight to a classification of what is usually referred to as"traditional" and "modern" technologies in terms of their factor profiles as in Figure 2:(9)

Figure 2. Traditional vs modern technologies: Five factor profiles

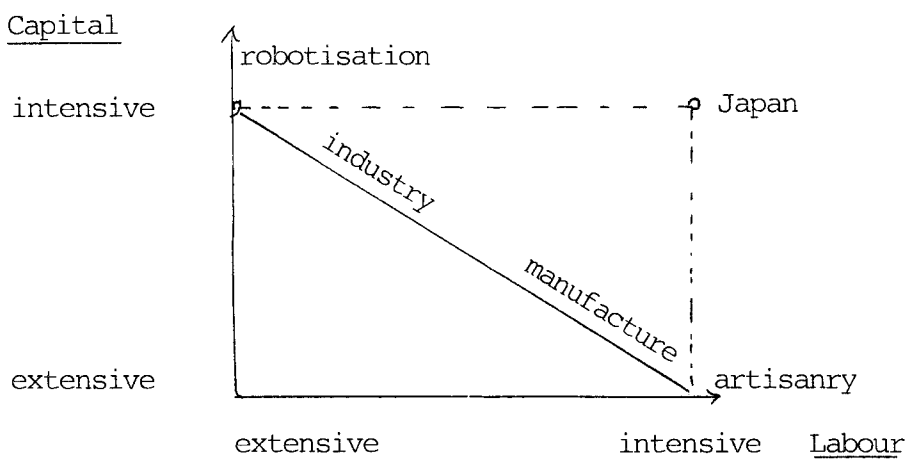


* Possibly adding fisheries and shipping

The two profiles are highly complementary. The traditonal/ artisanal technology is relatively soft on nature (although this may not always be the case, compare slash-and-burn agriculture), highly labour intensive, and requires very little in terms of capital ($100 to equip one artisan, for instance), research (there is a tradition of centuries, millenia to draw upon of accumulated knowledge and skill) and administration (by and large so simple that no separate layer of administrators is necessary). On the other hand, then, modern/industrial technology: hard on nature both in the sense of using much and using it in a deep and penetrating manner, highly capable of saving labour, substituting for labour capital, research and administration.

However, one insight is gained if instead of saying "capital-intensive" one says "capitalist-intensive"; instead of "research-intensive" one says "intelligentsia-intensive" and instead of "administrative-intensive one says "bureaucrat-intensive". Expressed in this way the symbiotic relationship between the rise of modern technology and the rise of the BCI complex becomes very clear: one is the necessary condition for the other. This is lost sight of if technological change is discussed only in terms of a two-factor model, using labour and capital at the exclusion of the other three, as in Figure 3:

Figure 3. Traditional vs modern: A two factor model



In this "model" the point of departure is artisanal production, highly labour intensive and very capital saving, and then the diagonal line where capital is increasingly substituted for labour, leading through phases of Western economic history characterised by manufacture and industry respectively to robotisation/automation. Whatever little is left of labour is put into positions surrounded by enormous amounts of capital (of the magnitude of 10^4 - 10^5 - 10^6 dollars per position, as opposed to 10^1 - 10^2 - 10^3 dollars for artisanry). But hidden in this diagram are all the institutions administering the capital, research and administrative inputs, and the capitalist/corporate people, intelligentsia and bureaucrats in corporations/financial institutes, universities/laboratories and bureaucracies, private or public needed to run the total complex known as modern technology.

As a result the working class in the secondary sector of economic activity is decreasing, the BCI-complex (in the tertiary sector) increasing - processes that go hand in hand with the substitution of modern technology for traditional technology. The basic point now is simply this: these institutions and these people have to be maintained, they have to be paid by the production. It is very difficult to lay one's hand on concrete figures here, but since the BCI complex consists of people who are usually much better paid than the labour for which they are the substitutes, as concrete human beings with wages/salaries/honorarium, a decrease in their numbers relative to the numbers of workers laid off may be more than compensated for by the total volume of income to pay for their services. In addition there are the infrastructures that have to be paid, the whole institutional network that falls under the headings of BCI : ministries and transportation/ communication and social infrastructure in general, corporations and banking institutions, universities and research organisations. Whether this is paid for by companies charging higher prices from the customers, or by bureaucracies charging higher producer's taxes from the companies or consumer's taxes-to be built into the prices charged from the customers, among other reasons to pay for their own upkeep, and that of the intelligentsia (usually unable to charge

higher prices from anybody)-does not matter. The net result will be increased unit prices to the consumer. That this is so may look strange if the attention is narrowly focussed on the production process of the company itself because it looks so much more efficient after the substitution of labour for capital. There are no longer any workers "hanging around", capital is busily at work, frozen into highly efficient machines. In a more encompassing perspective the reasons for the higher unit prices will become more clear.(10)

In this connection the word "efficiency" or "productivity" also has to be explored. A production function with five factors can give rise to five types of productivity, dividing the volume of production by the input of raw materials, etc., the input of labour (worker hours), the input of capital, the input of research (researcher hours), and the input of administration (administrator hours). In agriculture the first measure is usually considered very important: agricultural output per unit land, for instance. But the focus is usually on the second measure: labour productivity, and on the third measure, capital productivity. It is demanded that labour should become increasingly productive. The motivation is built into the system by tying increases in salaries to increases in productivity, at the same time as substitution of capital for labour goes on so that, unless the production volume should in fact decrease, increased labour productivity is built into the process. Put differently: the working class is invited to work hard for their own abolition, and is rewarded in the process. Similar demands are not put on capitalists, bureaucrats and intelligentsia for the very simple reason that they are in power, they are the subjects, not the objects of demands.(11) (Needless to say, a thorough analysis of this would involve discussions of more than one productivity variable at a time).

The reason why all of this is so important will be more clearly seen from the examples below and shall here only be stated in general terms. The modernisation of a production process, substituting a modern production profile for a traditional one is tantamount to eliminating labour and introducing the BCI complex. Modernisation ="BCI-sation", to express it in the jargon of the

present paper. If this happens quickly the process should give rise to two phenomena easily predicted. First, unemployment for dismissed labour. Second, from the consumer's point of view, substitution of modern products for traditional products - or the introduction of traditional products made the modern way - usually tantamount to higher unit prices when compared with traditional products, at the same time as traditional products may be less available as traditional production starts disappearing.(12) But these processes have to be understood in some detail, and this is where the examples enter.

The first example is the case of the Indo-Norwegian Fisheries Project in Kerala, South India.(13) Traditional/artisanal fishing made use of wooden canoes, oars and sails, simple nets and lines, the produce (prawns, oil sardines, mackerel, etc.) being beached, preserved with salt or ice, and then marketed. Modernisation included motorised vessels, modern fishing gear including trawlers and deep freezing of the catch, launching it into a chain of vans and vessels, distributors and consumers all with refrigeration capacity. It is very easily seen how labour, traditional fish workers, can be dismissed and how big capital, big research and big administration would enter the picture.(14)

The hypotheses surrounding the project when it was launched - as the first major Norwegian effort in development assistance - in 1952-53 was that this would have three major effects: a larger supply of fish products (meaning protein) at prices affordable to the ordinary Indian consumer; an improvement of the material conditions of the fish workers; more harmonious relations in the whole economic cycle - involving the owners of equipment, the fish workers themselves, the fish merchants - through the introduction of cooperatives of various kinds. In other words, through modern social technology in addition to modern production technology.

What happened, however, is as predicted by the theory. Less rather than more fish, and at prices out of reach for the ordinary consumer; no improvement, even deterioration of the conditions of the ordinary fish worker; and - very much related to this - highly disharmonious relations in the whole economic

cycle. In addition, the marine production went down, prawns etc. and fish rapidly diminishing in quantity (possibly also in quality), and the income became vulnerable to international market manipulations.

What had happened? Very simply this: a modern technology drove the prices up, not only because of the way the produce was caught, but also the way it was preserved. Willing sellers would have difficulty finding willing buyers on the traditional markets because of prices and consequently preferred modernisation of markets in addition to modernisation of everything else: Japan and the United States. The step from expert to export proved to be a very short one. Both producers and distributors used the expensive cooling chain they had set up for the products that could fetch the best prices: prawns, lobster and other luxury types of seafood - not the common man's fish. The latter were thrown overboard, hit and hurt in the process. Modern consumers could hitch on to the cooling chain. They had frigidaires - the traditional consumers not.

At the same time, looking at the factor profile again, labour could be dismissed and nature was treated more roughly. Modern technology being highly labour productive, only few fish workers got new jobs, much of the crew being recruited from the family, friends and castes of the owner rather than from the traditional fisherman's community. Suffice it only to add that an export-oriented mono-culture makes the community very vulnerable: the importing country, in casu Japan, needed only cancel the contract for a short period to bring the prices considerably down.[15] Hence, instead of many fishermen exploiting nature softly, with little capital, with centuries/millennia of accumulated experience and simple administration, bringing simple products to ordinary consumers, we get the picture of a handful of fishworkers supported by much capital, fisheries research institutes and an entire fisheries bureaucracy at state and union level, exploiting nature very roughly to the point where renewal no longer took place at a sufficient pace. That some people got extremely rich in the process and could give an impression of glittering affluence belongs to the picture.

The second example is the case of biogas. As is well-known a biogas producer (or biomass converter) is a simple concrete

box filled with organic refuse from the production and consumption of food, placed there for anaerobic "fermentation". An organic compound would usually consist of C, O, H, N, P, K and some other elements. In the "fermentation" process a decomposition will take place whereby methane, CH_4, is released and can be used for heating and cooking. There will also be production of CO_2 and H_2O. As a consequence what is left behind is a mass richer in N, P and K than before the process started since C, H and O have been extracted. In short, what is left is an excellent fertiliser, and organic, not artificial. A very simple process, separating what is essentially considered garbage into two highly useful components. In principle the process can be run on the basis of nature available around the village (stalks from the fields, cow dung, etc.); on inexpensive labour (particularly children who could collect all these things); with very little input of capital; no research needed because the thing simply works; and no administration beyond what particularly an extended family could easily muster. So, what is wrong with it? Is this not a perfect technology, soft on nature, basic needs-oriented?

What is wrong with it is, of course, that it is not modern. There is nothing in it for the BCI-complex: no need for administration, no need for capital that can grow in the process, no need for research. According to the formula "modernisation = BCI-sation", something had to be done about it, and that something can probably best be analysed in the following manner. BCI had to enter, but how?

The point of departure for an attack on this technology, which incidentally is artisanal but not traditional showing clearly that these are not synonymous concepts, would be research. Institutes for biogas technology with PhD. fellowhips and degrees would, inevitably, produce insight into the optimum conditions for biomass conversion, including temperature, composition of the content of the containers, the nature of the container itself. No process exists for which optimal conditions cannot be defined: a typical research task. What is often forgotten is that what to research constitutes optimal conditions constitutes standardised production formulas for the industrialist. He now knows how mass production

can become possible, because he knows what to produce on a large scale: the optimal product. Doing so he is in a position to outcompete the artisanal product, if being more industrial (and hence modern) is a bene per se .

Bureaucracy would probably enter through taxation schemes at the production or consumption end, legitimising the demand for taxes with a need to pay for the research. And thereby the cycle is completed. The BCI complex becomes integrated into what originally was precisely development of the people by the people. It is now transformed, for a short while, into development of the people, by the elites, the BCI-complex.

But that phase is likely to be shortlived for the simple reason that the product becomes too expensive to the end user. The converter prices himself out of the reach of the buying power of the common man, his own artisanal product looks hopelessly old-fashioned and useless in comparison with the factory made product. As a consequence there is production capacity and a willing seller—but few willing buyers around.

The answer to that problem is simple: again the step from expert to export is a short one. The biogas institutes get a new research commission: biogas liquefaction, since biogas can only be transported for export in a more concentrated form. This time, however, the export is probably not for markets abroad, but for domestic markets, possibly the city more than the village, and BCI consumers more than poor people in the cities. It should be noted that what remains local is the use of organic refuse in the countryside, and cheap labour to collect it. In other words, modern technology serves to convert local factors into exportable products leaving behind some cash (that, incidentally, may make women and children somewhat more independent as economic and social actors) for which they may, but usually may not, buy the product that comes out of modern technology.(15)

A third example, solar energy. A solar energy converter, converting radiation energy to heat energy, using water and/or

air as the medium, is a rather simple thing and can be made locally in very many places. My own experience with a solar energy converter in southern Spain is that for a relatively modest investment the converter simply stands there and produces hot water practically speaking all year round given the meteorological conditions in that part of the world, with practically no upkeep expenses at all.[17] As a result the electricity bills go down, the consumption of electric energy based on a typically modern technology, according to the profile analysis above. In short, it is an example of the artisanal model competing with the industrial model. What would be the predictable outcome of that situation?

One could of course make the solar energy converter more expensive by making it more complicated, or solar energy more expensive - if it competes with BCI-intensive technology - through taxation, and/or through safety rules, etc. At this point bureaucracy would be the active agent, making solar energy converters less competitive by taxing them heavily, even, possibly, equipping them with meters measuring the amount of heat energy (quantity of water at what temperature) that is being utilised. And, as indicated, there is the possibility of declaring them unsafe. B might not be immune to pressure from C to bring about this.

Let us then take a fourth example where it is C, the corporate element in the BCI-complex, that might take the initiative to change the social nature of a technology. I am thinking of the so-called social forestry, for instance based on the rapid growth of eucalyptus trees under certain conditions.[18] As is well-known, in many parts of the Third world women and children spend hours everyday collecting twigs and branches and whatnot for the stoves at home, for heating and/or cooking. Merely to liberate them from this time-consuming work could pay off in terms of school attendance for the children and any kind of education, formal or non-formal, for the women to improve their life chances. Fuel wood should simply be more easily available, and one approach would be to plant rapid-growing trees and harvest them, like any other mono-culture.

To do so soil is needed, (very) much water, and seedlings - in other words, there has to be a capital basis. The ecological consequences might be very harmful if water is not abundant and/or humidity is not retained, for instance by having very bushy trees that could retain a very humid atmosphere close to the soil. The latter calls also for the research input that might carry in its wake considerable costs. However, the major social cost borne in this connection would probably be related to the soil: big farmers would go in for social forestry only if it pays off, small farmers might not risk it because priority has to be given to foodstuffs - and fuel wood can still, somehow, be found in the traditional way even if that involves exploitation of women and children. One possibility is that the soil is taken from non-tenured farmers who then become even more landless landworkers, possibly ending up with no work at all, in addition to no land.

However, leaving all this aside: the basic problem is what happens when the eucalyptus trees start growing. They can be used as fuel wood, but can also be used for paper production which immediately would bring higher profits, particularly since rich markets abroad might be involved. The profits would accrue to the owners of the production factors: to the landowners, to the very few workers he needs under the assumptions of relatively industrial arboculture; to the capital owners, the research institutes and the administrators, in the way indicated above. Of course, twigs and branches may be cut off and left for local fuel consumption before the trunks are sped off to the paper mills at home and abroad, or used for construction purposes.

Conclusion: again the same story, Local factors are (ab)-used, as was also the case with traditional technologies. But the end user is no longer found locally, nor the major profiteers. The trees compete with food for soil and water, and erosion may be one result.

I'll let this do as examples of what can go wrong, on purpose making use of what for many people are seen as "progressive" technologies and "progressive" projects. The moral of the story is to expect things to happen this way. These examples are not examples of projects that went wrong, but of programs that were wrong, from the very beginning. They were wrong because the total context

in which these technologies were embedded had not been taken into consideration. It should be remembered, at this point, that the transition from traditional to modern technologies in the First world is the result of a process that has lasted one, even two centuries at the same time as the First world countries also had what today is known as the Third world, to exploit. There was considerable misery due to the gap between buying power and market prices and considerable amounts of unemployment. Yet over time, much time, some equilibrium was obtained between demand and supply for basic needs products, and workers no longer needed because of increased labour productivity found other positions in society, usuallly in the tertiary sector. The improvement of the material conditions for the lower layers of society seems to have been best in the countries where some mechanisms described in the preceding section for retaining surplus at the bottom or having surplus at the top trickle down, or both, were institutionalized.(19)

There is little reason to believe that this does not also apply to Third world countries, perhaps even more so. And the basic key that runs through all the examples mentioned seems to be the organisation of the primary producer, and the common consumer, at the local level, strong enough to prevent the national or international BCI-complexes from penetrating, except on the conditions benefitting people at the local level. This, of course, was exactly what the Chinese hoped to obtain with their people's communes and the Gandhians in India with their sarvodaya villages. Such combattive anti-fragmentation strategies could then be supplemented with the compensatory strategies making surplus trickle down: subsidised goods and services for basic needs satisfaction, particularly free medical services and education, and so on.

In short, the development impact of a technology has to be understood in its social and political context, not in abstract. But the basic problem is that a social and political context equipped with the mechanisms indicated is simply not present in most Third world countries. For that reason any conclusion about the possible development impact of a given technology would necessarily become a social and political conclusion, whether one concludes that certain socio-political measures have to be taken or one prefers to abstain from any such comments, feigning "political neutrality".

This all becomes even more complicated if we include the cultural dimension in the discussion of technology. When we say "modern/industrial" technology what we mean, in general, is "Western." The origin is usually Western even if/when a country like Japan functions as an important link in the transmission chain. It stands to reason that the technology fits at the point of origin, in other words that it is compatible with the basic cultural assumptions of the West. Some of these assumptions can be expressed as follows:(20)

(1) Expansionism with Center in the West
(2) More is better, more ispossible; better is possible
(3) Epistemological atomism, rather than holism
(4) Mastery of nature
(5) Social individualism/verticality leading to competition
(6) Subordination to basic theology/ideology - now materialism

The leading ideology of the West today has been characterized as "materialist individualism"(21) which pretty well summarizes the six pointsabove. It amounts to accumulating material things that can be enjoyed individually, or at most in the family (TV etc., cars); more and more of them; at the expense of nature; using and catering to a limited range of human faculties - and in the process consolidating the position of the West when this cultural push comes. It constitutes a triumph of materialism over spiritualism; of individualism over collectivism, of verticality over horizontality in social affairs (and as a consequence of competition - both as producer and consumer - over cooperation); of bigness over small-ness and centralization over decentralization (and hence of big corporations over the local artisan). But at the same time, and by the same means, this technology also increases individual freedom, to move geographically, socially, psychologically by making choices as to where, when, how and with whom to travel, what social role to play, where to be carried by imagination, phantasies. At least in principle. And at least if the money is available - -.

Since Western man tends to see himself as Universal man, and to be applauded in this narrow ethno-centrism by those from non-West who have been trained by/in the West, this process goes on and on and is seen as some kind of social law rather than as the most massive cultural invasion in human history, leaving the history of the imperial/colonial and missionary traditions behind. Undeniably Western technology has so many pleasures to offer that such socio-cultural factors as those just mentioned often are, conveniently, overlooked. Until the effects have become too clear, too obvious, to be overlooked:

- dependency on the West, or North - if not on the technologies already in existence, they may have been well distributed first North-South and then South-South - on new technologies, on what is most up-to-date
- fatigue with things, more is good up to a certain point but it is difficult to tell in advance where that point is
- a feeling of segmentation, of losing touch with totalities
- environmental degradation
- social degradation, an absence of generosity, egoistic familism or even individualism, joys being less shared, more individualized
- a feeling of emptiness, what is the purpose of all of this?

Many such lists of ills have been produced, many will be and they all have the same shortcoming. They do not explain why, in spite of all of this, there are so few people who really reject "Western technology". The reason is probably simple: the tremendous increase in individual freedom as when the teen-ager gets his first little moped/motoneta and can leave the parents behind, later to get a small used car, escaping with his girl-friend, leaving two sets of parents behind, later getting with his family onto a charter flight, leaving a whole country behind. It all adds up to building a lifestyle characterized by a high level of material comfort and distance from nature, the latter both as producer and as consumer - as well as retreatism into the family - a pattern I have elsewhere described as the Bourgeois Way of Life.[22]

3. South-South Cooperation: the problem

If we now turn back to the sketch in Figure 1, it is easily seen that South-South cooperation in general and in connection with technology in particular, enters in an ambiguous manner. On the one hand there is no doubt that it is one more way of bringing countries in the South closer together, in other words of counteracting fragmentation and dependency on the North. In any given field of technology, a producer in a Latin American country could cooperate with a producer in an African country and a producer in South or East Asia, getting access to their conclusions, their improvements of technology, possibly more compatible with Third world conditions, including the buying power of possible consumers and tropical or sub-tropical climates.

But then, on the other hand, such cooperation would in all probability be in the hands of the bci elites in the South. It would enhance their transnationalisation, admittedly horizontally, but it would still be inter-elite cooperation. What would prevent them from doing to their people with modern fishing technology, biogas technology, solar energy, and social forestry on a South-South cooperative basis what these elites have been perfectly capable of doing when operating alone in their own countries, possibly aided by some BCI-complexes from countries in the North? Would South-South cooperation at the elite level in and by itself change the social structures inside the countries in the South? Hardly, and that is the problem. The structural approach yields two conclusions: North exploits South, and elites exploit people. South-South cooperation may be a partial response to the first problem, but not to the second. It might even make the second problem worse, by transnationalising the elites descending upon very common people, in their local communites, incapable of obtaining an equally high level of transnational cooperation.

The problem, easily stated, is not so easily solved. But let us nevertheless mention a number of possible approaches.

More particularly, I am thinking of a triple track approach, in the eclectic manner that I hope is characteristic of this report, leaving the conclusions "Stick to the traditional

technologies!" and "Modernisation all over!" to the dogmatists. I think a very pluralistic, flexible approach is needed and that those engaged in the practical side of this project should be trained not only in deep knowledge in a range of technologies within their field of specialisation, but also in how this diversity of approaches can be implemented in a symbiotic manner, letting diverse technologies interact with each other positively rather than standing in each other's way.

The first approach would be the introduction of what could be called new artisanal technologies. The technology is then defined by the profile: soft on nature, very labour intensive, requiring very little in terms of capital, research and administration. The basic criterion would be to keep the economic cycle local, where nature, labour, and at least most of the capital are concerned, while at the same time being very open to ideas from the outside and not only outside the local community but outside the country, outside the region, in a South-South context (which, of course, does not exclude inspiration from countries in the North). The outside inputs would essentially be in terms of research and administration with a view to developing local capabilities in both fields. Today technologies are available in the fields of non-conventional energy conversion; not only biomass and solar energy converters, but certainly also windmills and water turbines that could easily satisfy these principles . And the basic point about these principles is that the likelihood that the benefits might actually accrue to those who need them badly for satisfaction of basic human needs should be considerably higher with this kind of technology. Thus, in the case of the fisheries project mentioned, it would probably have been much wiser to bring in new artisanal technologies based on katamarans with sails according to the most modern aerodynamic principles, possibly sticking to conventional fishing gear and using new artisanal methods for the preservation of fish: drying smoking, curing, preservation inside ice cubes, etc.

The second approach would bring in modern technologies, with all that implies for the profiles: hard on nature, labour saving, requiring much in terms of capital, research and

administration. The lesson to draw from the examples given above seems to be rather unambiguous: if this is done in an unreflected, unprotected manner most of the benefits will end up outside the local community and the people who need them most, and most of the costs will be borne by those who can barely afford it seeing their raw material base depleted at the same time as labour remains unskilled in return for a little cash. Of course, this modern technological exchange South-South will go on, and has to go on and may also strengthen the capabilities of southern countries in general, only one should not have any illusion of short term net benefits for those most in need. Technological exchange of modern technologies among negotiating elites in the southern countries would be the easy way out, and for that reason the approach most likely to be taken, hereto be viewed critically.

If the purpose is to alleviate the conditions of misery of those most in need, this approach has to be combined with appropriate socio-political measures. A major measure has been mentioned: a strong cooperative arrangement for common producers and consumers alike, guaranteeing that the control over the economic cycle is in their hands. As for the first approach mentioned above, this does not imply that the products, the goods and services, will only be consumed locally; they may become the objects of even long distance exchange. The problem is who decides what to do with the products, and within a cooperative setting the first priority might still be given to local consumers. The positive Indian experience with dairy cooperatives protecting the common producer while at the same time making it possible to modernise the technologies is encouraging here.(23)

The third approach would be more subtle: combining the first and the second. One could imagine a system of modules, some of them with artisanal and some of them with industrial technology profiles, interrelated in a very diverse and symbiotic production system. Actually, one is reminded here of the Japanese mode of production (see Fig. 2) which in my view is characterised by a very subtle combination of the two approaches. First, there

is an artisanal style production of parts in a very high number of very small, to some extent family run, enterprises producing elements of very high quality because of the artisanal style. Second, there is a robotised assembly of all these parts, in a highly industrial, high technology manner. Thirdly, there is the finishing touch, the artisanal processing of what in other countries might appear as the final products, coming off the assembly line, taking them apart again, putting them together, grinding and polishing, exchanging parts until one is entirely satisfied with the finished product.(24)

This third approach calls for a different general attitude to the whole project. Instead of thinking in terms of one technology within a given field, one would think in terms of a set of technologies, in plural, of different types, spread out in the geographical and social spaces in complex, interacting networks. What should be counteracted would be the obvious tendency to put the artisanal constituents of this network in local villages and the industrial components in the cities, together with capital, research, and administration. This would only reinforce the existing structure, a structure already visible in most cases simply by looking at a road map, the railroad and airline networks, and so on. Artisanal producers would be fragmented. And if they organised to arrive at a bargain they might simply be told that they are expendable, that what they produce can also be produced by more "modern" methods. Somehow the total network of interacting technologies should be under some kind of popular control, not only in the hands of bci's. How to do this without losing too much efficiency, I'm not sure that we know; possibly another case where even simple social engineering is lagging far behind technical engineering, and overshadowed by simplistic ideology.

Let me try to think aloud in two fields so far not touched upon in the examples: agricultural machinery and pharmaceuticals. The strong motivation for agricultural machinery, not to eliminate labour but to eliminate unnecessarily heavy, dirty and degrading work, is obvious. The local capability to set up a large-scale factory may be absent. But what about small-scale factories, based

on the technology still available as the skills built into the local village smith? Could not a number of village smiths be mobilised to make parts, using local foundries, casting the parts, assembling them in a small-scale factory somewhere at the centre of a network of villages? What kind of technologies would be needed in the fields of energy and extractive metallurgy to make this scheme feasible? Would there, in fact, be economies of small scale, not large, cutting down expenses of transportation/communication both for factory inputs and products if the system is operating close to raw materials, and the end users are local small farmers? Building on this example, hailing back to the fisheries example: where is that little engine that can be used inboard, or even outboard, to propel a small fishing vessel, easily detached from the boat when the boat is beached, put on a little van, three-wheeler or something similar that could even be used to market the produce; detached from the van and then put into some little artisanal workshop as an energy source, running a conveyor belt? Could that engine be made locally? Possibly not - it already sounds like a typical job for an imaginative Japanese firm already trained in making products for multiple purposes (radios equipped with watches, watches equipped with computers, computers equipped with organs, and what not).

Or, to take another example, very much needed all over the Third world would be some kind of contraption for the collection and storage of solar energy, some box roughly 1 x 1 x 1 metre on four wheels that can be rolled out of even a very modest hut in the morning, placed in the sunshine for twelve hours, rolled in at night well heated, the energy being tapped for cooking purposes and heating in the cold season. What material would be needed, and be suitable, to enjoy the daytime sun, inside the house, at night?

As to pharmaceuticals: there is a strong trend today of scepticsm directed against synthetic, artificial medicaments, in favour of organic, natural medication. Again a more reasonable position could be eclectic, both-and rather than either-or. There are medicinal herbs to be collected all other the world, and they grow in the countryside rather than in cities, thus favouring local communities. Technologies for their processing without destroying them, keeping their curing potentials without

introducing too many dangerous secondary effects should not be too complicated, but entirely within the first approach mentioned. Preservation, bottling, labelling, etc. could also easily be done on an artisanal basis, with some modern machinery. Those who market the final product know what they are up against: appearance may be more important than content, the pills coming out of high technology oriented, transnational pharmaceutical firms have attractive colours (probably dangerous, though). They look chic and à la mode, not homespun and primitive. I mention this just to make another simple point. The basic problem for first approach technologies might be neither in the quality nor in the price - the products may in fact be of very high quality for very low price, making the Q/P ratio highly attractive - but in the marketing.

Obviously, the third more eclectic approach would be most appropriate in connection with pharmaceuticals because there has to be a top notch research laboratory present as a module somewhere in the technological network. Again that laboratory should be in contact with common people and their demands as well as with popular medicine, not only with elite researchers and their knowledge and skills and "scientific" medicine. Again this brings up some of the deeper nature of the problem: where do the carriers of technology choose to live, with whom do they choose to associate? If they only live in capital cities and only associate with the BCI complex, they will use the inputs provided by them in order to satisfy their demands. In the case of pharmaceuticals this will clearly mean the following: the Ministries of Health, the local branches of transnational pharmaceuticals and the medical faculty at the national university. The point is not to rule out this type of contact - which is going to take place anyhow. Nor is it to point out the obvious: the products will be at the disposal of the new elites, well within the reach of their buying power but of nobody else's and geared to their diseases, not to the common man's diseases.[25] In other words, it would be development <u>of</u> the elite, <u>by</u> the elite. A part of the total package of development, but never to be permitted to be the only one. As quite often happens.

4. TIPS: The Problem and some proposals

In conclusion, let me pull these general theories somewhat closer to the TIPS project. Obviously TIPS will have to operate through the B, bureaucracy system, to a large extent. Not only is TIPS an outcome of the UN system, a system of inter-governmental organisation (IGOs). But the bureaucracies are also organising the system of patents crucial in connection with any transfer or exchange, or even information, about technology. What is said for B also applies to some extent to C and I: there is no way of escaping the BCI system in the modern world. Moreover, BCI is not only bad, and "people" are not only good, to put it in simplistic, and moralistic, and nevertheless very truthful terms. It is true that the interest of B may be taxation, of C may be profit and of I may be personal prestige and career. But it is also true that the BCI-complex produces and distributes an enormous amount of goods and services at the disposal of at least large portions of the citizenry, well into the middle classes, and below.

Given the analysis above and these simple points, one may arrive at the conclusion that the basic task would be to reach a fourth type of user, in addition to the bci in the South that obviously will be interested in a system for exchange of technological information. The fourth type of user should be a collective actor, well-organised, relatively strong, with solid links to common people and understanding and compassion for their needs, not only the basic needs rhetoric found all over the system today. The famous Consumers' Association of Penang, Malaysia, may serve as a good example.[26] In fact, there is a general lesson to be learned here: make information about technologies for production not only accessible to the producers but also accessible to the consumers, encouraging them - from the consumers' point of view - to start production.

This fourth category user should be created if it doesn't already exist. But all over the South, such groups have come into existence, and much information on them can be found in the IFDA Dossier, that very useful bulletin made by the International Fund for Development Alternatives in Nyon, Switzerland.[27] Networks of such fourth category users could be created. Gradually they could carry more and more of the burden of consumer-oriented technology transfer.

There is an obvious danger involved in this: a gap may be created between well-organised consumers, strong and capable, and

those left behind, the truly marginalised. Just as there is a theory of the labour aristocracy on the producer side, we may also need a theory of the consumer aristocracy. But such worries are mainly for the future, only that one should be aware of the matter. And the idea of using an international non-government organisation (INGO) such as the International Consumers' Association as a vehicle for TIPS would be entirely in line with what is probably the best approach: building a third, eclectic approach, using an IGO/INGO mix for this purpose, knowing very well that ultimately the corporations, local/national and/or transnational will come strongly into the picture. But they will have a tendency to prefer secret information, not publicly available, to open sources in order to be competitive. And that approach is, of course, incompatible with the goals of TIPS.(28)

A final question to be looked into: how will the North react to this? After all, this is a very potent way of organising a fragmented South, by strengthening their capacity to produce, on an autonomous basis, through technological cooperation. Two obvious reactions are to be expected. First, the North will try to intensify North-South cooperation in order to counter this effort. In market language this will be done by pointing to shortcomings of the products that come out of South-South cooperation, referring to them as unchic, homespun, second-rate and by underlining the superiority of their own products. Although more expensive, the difference in quality might more than compensate for the difference in price.... I mention this because it seems obvious that South-South cooperation cannot stand up against such arguments except by means of some kind of moral commitment, some sense of community, some sense of "interdependence" as being preferable to "dependence", some vision of an alternative development based on more self-reliance at the level of the region ("South"), at the level of the individual country, and at the level of the community where the fourth category users are found (or may be created).

The second point to be expected is that the North will try to tap the knowledge circulating in the South-South system. As the information is publicly available that may be rather easy. But will the South be correspondingly able to tap the North-North information system, highly professional, highly secretive and highly

protected by bureaucratic laws and rules? Of course, just as the North might be less interested in the more simplistic low technologies of the South, the high technologies of the North might be out of reach for the South, being meaningless for lack of infrastructure. But the problem still remains and will have to be explored.

Maybe one could summarize the problems of TIPS using a little bit of administration theory. Good administration presupposes that systems have cycles rather than "tress" as systems with no cycles are called in graph theory - meaning that they are linear, but possibly with branches. A "tree" structure for TIPS would mean messages originating from ICC to the NBs, and then only to the first, second and third sectors as users, with the latter functioning as "dark holes", absorbing information, emitting nothing. A "cycle" structure would have much interaction among the NBs and among the users of all four categories, if not internationally, at least intra-regionally. The outcome of the interaction would come to ICC from the NBs or directly and yield an excellent basis for improving the performance of TIPS. There will be misunderstandings and there will be more or less justified criticism presented more or less constructively, in other words the raw material out of which improvement can be made.

Since the end users are people and the fourth sector at least presumably are closer to people it is essential that the fourth/social/people sector should be well represented in TIPS. That should not cause any particular difficulty, and Listing no. 1 on the next page is a way of spelling out how it could be done. That way some feedback from people beyond market figures (which do not tell what people might have bought had it existed) will be available. But there also has to be more systematic feedback about the technologies as such, some kind of evaluation, and Listing no. 2 offers an approach in that connection.

LISTING 1. Some proposals for strengthening social sector in TIPS

(1) The fourth/social/people sector should be identified from the very beginning so that they can participate equally with the first (governmental), second (industrial) and third (research, university) sector. Participation has to be by them, not only for them. I am thinking, then, of organizations such as DAP (Malaysia, Penang), ASTRA (India, Bangalore), ENDA (Senegal, Dakar), INTAL (Chile, Valparaiso), ITAG/GRIT (France, Paris) - each one of them with continental coverage and transnational networks.

(2) One might consider differential rates of subscription so as to avoid the two extremes of standard rates regardless of economic capacity and gratuities that may lead to status as second class network member.

(3) On the National Bureaus (NBs) there might be representatives of all four sectors as users of TIPS, and - perhaps - also of the endusers, of consumers who could articulate what is needed better than the carriers of technology, the four sectors. At any rate, it is important that the fourth sector is present.

(4) There should be direct interaction between the NBs, not only via TCC, to exchange experiences directly.

(5) There should be direct interaction between the fourth sector users, not only indirectly via NBs and TCC - at least by mail.

(6) The users should be visible to each other and to others. Lists of subscribers of various categories should be drawn up and circulated and up-dated. As users in the first, second and third sectors have so many other chances to meet and exchange information this is particularly important for the fourth sector. Such lists would form the basis for sector conferences within TIPS, and would greatly enliven the organization.

(7) Great care should be taken so that the language used does not alienate some of the users. Too technical language would tend to exclude people who do not have this type of work as a full time occupation. Thus, the descriptors should preferably be in natural language, in some easily understood abbreviated form. The same, of course, applies to the cases of technologies transferred: they should cover a sufficient range to be of interest to all users.

(8) The issue of technology evaluation should be present from the beginning, not only technology transfer evaluation, which is tantamount to evaluation of the efficiency of TIPS. If a technology is seen as a way of bringing together nature, labor, capital, research and administration to produce goods/services that can enter an economic cycle one approach would be to discuss the impact of the technology in five "spaces":

NATURE: to what extent does the technology deplete/pollute?
HUMAN: to what extent does it enhance producers/consumers?
SOCIAL: what kind of social structure is the outcome?
GLOBAL: what kind of world structure is the outcome?
CULTURE: what culture is favored/disfavored by the tehcnology?

The reader will find on the next page a more elaborate list, using the same five spaces, but giving more details as to questions that might be asked. It is to be hoped that TIPS will continue asking those questions.

ECONOMIC

(1) BASIC NEEDS SATISFACTION

- does it directly or indirectly (over short time) contribute to the satisfaction of such basic needs as food, clothes, shelter, health, education, transportation/communication?
- does it produce goods and/or services accessible to those most in need;

(2) FACTOR DEVELOPMENT

- does it use local factors optimally over time?

generating employment;

developing medium and high level skills and engineering and R and D capabilities and using them for the purposes of further technological development;

saving/generating capital;

saving/generating raw materials including energy;

generating more appropriate technologies;

- does it increase the capacity to produce on a sustained, cumulative basis over time?

SOCIAL

(3) STRUCTURAL DEVELOPMENT

- does it reduce dependence and promote self-reliance (autonomy combined with selective exchange on an equitable and solidary basis and with mass participation) at the local/national/regional levels, enabling the society to follow its own path of development?
- does it reduce inequalities?

between occupational, ethnic, sex and age groups;

between rural and urban communities, and

between (groups of) countries, especially in the field of scientific and technological capabilities;

(4) CULTURAL COMPATIBILITY

- does it make use of and build on endogenous technical traditions?
- does it blend with/enhance valuable elements and patterns in the local/national/regional culture?

(5) HUMAN ENRICHMENT

- does it lead to creative involvement on a mass basis by being accessible, comprehensible and flexible?
- does it liberate human beings from boring, degrading, excessively heavy or dirty work?

ENVIRONMENTAL

(6) ECOLOGICAL BALANCE BUILDING

- does it minimize depletion and pollution by using renewable resources, through built-in waste minimization, recycling and or reuse and blending better with existing eco-cycles?
- does it improve material and man-made environment by providing for a higher level of complexity or diversity of the eco-system, achieving balance and reducing the vulnerability of ecological systems?

Of course, TIPS could not possibly give information about all of these factors, this is merely a checking list. Nor is it for TIPS to engage in pre-evaluation, eliminating in advance what is considered harmful technologies. That is for the user to decide. But TIPS could give information, particularly on such items as factor requirements for nature (including energy), labour, capital, research and administration, and factor availability, meaning from where the factor has to be fetched (locally, nationally, regionally, outside the region). With that information, energy and labour vs. capital intensity can be easily calculated, as well as dependency on factors from the outside. If to that one could add some information on the environmental factor, particularly in terms of depletion and pollution, there would already be a rich basis on which to draw conclusions. It should also be noted that this is an information basis, not a question of imposing a particular ideology on the TIPS system. Not to make such information available would, however, be a highly ideological stance.

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It is impossible to single out for special attention any issue or article as almost everything in these rich collections (that will also be a treasure mine for historians later on) is relevant to development, technology and South-South relations

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N O T E S

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(1) For an explorations of this, see Galtung, J., The True Worlds, MacMillan, New York, 1980, ch. 2.4.

(2) The strength and the weakness of the liberal approach: the faith in the individual if only the inner will and the strength are present combined with blindness when it comes to the creation of social structures in shaping motivation and capability.

(3) David McClealland, The Achieving Society.

(4) Galtung, J., "A Structural Theory of Imperialism", Essays in Peace Research, Vol. IV, ch. 13, Ejlers, Copenhagen, 1980. The dominance system operated by the Soviet Union is not included because their structural violence does not produce misery, but repression - by and large.

(5) This is explored in detail in Galtung, J., Development: Goals, Concepts and Theories (forthcoming, 1980)

(6) See Galtung, J., "Poor Countries vs Rich; Poor People vs Rich- Whom Will the NIEO benefit?" - Part II in Toward Self-Reliance and Global Interdependence, SIDA, Ottawa, 1978.

(7) If there had been one the world picture would have looked more like case (b).

(8) For an exploration of self-reliance see Galtung, O'Brien, Preiswerk, eds., Self-Reliance, A Strategy for Development, Bogle-L'Ouverture, 1980, or Galtung, J., Self-Reliance. Beiträge zu einer alternativen Entwicklungsstrategie, Minerva, München, 1983 (edited by Mir A. Ferdowsi).

(9) See Galtung, J., Development, Environment and Technology, United Nations, New York, 1979, p.18.

(10) But the tradition in economics as a discipline is still narrow, reflecting its origins in the book-keeping of firms. What is rational for the firm when externalities are not accounted may be irrational at the social not to mention the global levels where externalities are "internalities".

(11) I see this as a basic point in the Chinese structural ("cultural" being a misnomer) revolution 1967-1976: the "higher" echelons should also be accountable. This was not done, however, by calculating output per time unit ratios (the Chinese at that time considered this morally wrong), but by rotating people between various positions in the production structure making them more equal. Then, they were given working points for performance, which seems to me to be a productivity measure. But it is interesting to compare with the uproar that comes from universities when it is suggested that professors should undergo some kind of productivity evaluation after (not only before) they are appointed - often from the same people that take it for granted that they may make time studies of how workers perform.

(12) If the process is slow and takes place at the top of the

world society there may be time for adjustment, and yet history after the industrial revolution is the story of unlimited misery by the working classes. To argue that today's "developing" countries have to take the same trajectory and can do it is naive and merciless. Naive, because the international context is different (they are, many of them, at the bottom, not at the top); the social context is different (progressive movements are fighting not only their own elites but those elites backed by the rich countries) and the psycho-political context is different (the slow option is out because of the demonstration effect from elites and rich countries). Merciless, because even under positive circumstances imitation of the North will entail enormous suffering - as it already does.

(13) Galtung, J., Development Assistance: Its Rise and Fall, Ejlers, Copenhagen, 1985 (forthcoming).

(14) Thus, the capital cost of each job on fishing vessels is $ 100-1000 in the artisinal sector and $ 10.000-100.000 in the industrial sector, giving a ratio of 100:1 when it comes to employment. With about 450.000 in the industrial sector 24 million tons are caught for human consumption; with about 8 million in the artisanal sector 20 million tons are caught (in addition the industrial sector catches 19 million tons for other uses). There is no doubt about the labor productivity, nor about the threat to the artisanal sector.

(15) This actually happened, see "Shrimp Industry, Dangerous Dependence", India Today, December 15 1983, p. 109.

(16) This"development" was foreseen in the publication quotedin (9) above; see chapter II, "Technological Transfer as a Process"

(17) Galtung, J., "Renewable Energy: Not only a Question of When, but of How", Paper prepared for the NGO Forum on New and Renewable Sources of Energy", Nairobi, Kenya, 9-16 August 1981.

(18) See Patel, V.J., A New Strategy for Agro-forestry, Gujarat 1983

(19) By and large there seem to be three clusters of countries where such conditions are satisfied, at least to some extent: Buddhist countries, socialist countries and social democratic countries. More or less, and then the question is: at what costs, at whose expense?

(20) See the publication quoted in (9) above, ch. III, "Technological transfer and cultural factors", pp. 27-9.

(21) Terminology current in the debate in Britain about Mrs Thatcher and her politics.

(22) Probably the most successful ideology the world has so far seen. It takes distance to nature (and mastery) as a producer and expresses it as "nonmaterial job" and as a consumer, expressed as "material comfort" (taking anything out of nature). It takes individualism and expresses it as family retreatism. Then these three points are solidified through an element of security, the probability that this will last.

(23) The person mainly responsible for this, Mr Kurien, must have been fighting an uphill fight against those who wanted milk for distribution for their own profit and those who wanted to retain all.

(24) Not to be confused with "statistical quality control".

(25) And those diseases are best approached through preventive medicine which is neither capital, nor research intensive, hence not very "modern".

(26) See their excellent Utusan Konsumer, published from 15 Pitt street, Penang.

(27) Particularly responsible for the dossier is Dawne Fletcher Preiswerk.

(28) It is hard to imagine that daughter companies of TNCs, in the South, will not prefer approaching the mother company for any matter concerning technology, and use TIPS as a way of being up-t-date with what competitors might be doing.