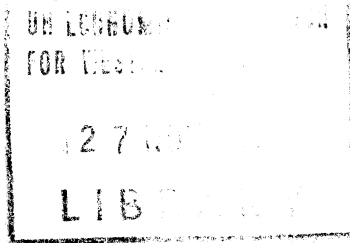




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TECHNOLOGY AND AGRICULTURAL POLICY
IN THE SUDAN

by

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* The opinions expressed in this document are those of the author and do not necessarily reflect the views of the United Nations Economic Commission for Western Asia.

Technology and Agricultural Policy in the Sudan

Introduction:

This paper is not about 'technology' in the broadly accepted sense of mechanisms and knowledge. Rather it is about technology in the precise sense of 'the science of the industrial arts' (COD 1961) - the understanding of the arts of production and the processes of production. In dealing with the question of technology and its relation to agricultural policy in the Sudan, the discussion will go far beyond what might ordinarily be taken into account. It will deal with a major issue: what is agricultural and rural development really about and who is it for? In trying to answer this question, examples will be introduced from and criticism made of the experience of the Democratic Republic of Sudan. The general points are applicable to many other countries.

A clear and unshakeable assumption of this paper is that development is, must and ought to be about the lives of ordinary people. Although we use various aggregate measures for taking of this elusive process, we are in the end concerned with the fate and life-situations of ordinary people, people who labour in their fields, live in communities, experience joy & more frequently for most of the world's poor, sadness. It is about the people who are frequently lost in abstract discussion of rates of return, growth of ENP and combinations of factors of production.

In contrast to the above, the history of rural development policy in the Sudan, and in most of other countries has long ceased to be about welfare, and become a history of control of the rural population and agricultural production for the benefit of the few. The beneficiaries and the controllers are both national elites and the elites of the industrialized capitalist world and the centrally planned economics. If

we examine the history of post-1945 attempts at rural development, we discover a succession of "solutions", each of which has in turn changed from an apparent potential for human liberation to an instrument of state control of the rural sector and of agricultural production.

Various examples can be found to support this view. Each example appears as a "failure" of adaption of a new technology in the reports of governments and international agencies, and in the writing of some academics. Each example can also be seen as one of resistance to control by the rural population. In the period soon after the Second World War, and partly as a hangover from the colonial period, the great thing was "community development" - an idea taken up very strongly in India in particular during the 1950's. Another persistent "solution" to problems of the disorganisations and low productivity of the rural sector has been cooperatives, and a yet more recent "solution" has been the development of large-scale irrigation schemes.

Each and every one of these so-called "solutions" has been a qualified failure. Each and every one has been characterized by a profound paradox and a lie. While the claim has been made that such developments was for the welfare of the rural population, the reality has been in each case that they were means of controlling that population. The forms that the lie has taken are several: transfer of surplus from the countryside to support infant industry; development of export agriculture; balanced growth. Even the much-publicised urban-bias theory of Michael Lipton (1979) which appears to identify so clearly the nature of discrimination against and subordination of the rural sector - fails to analyse the reality of the place of agriculture in most Third World societies.. (Harriss 1980).

The paradox to which I referred in the preceding paragraph is that of the social technology through which all these developments was and are supposed and expected to take place. The construction of communities through programmes of community development fails to recognize why those communities are disorganized, or non-existent, in the first place. The development of cooperatives assumes an ignorance as to cooperatives work in communities where traditions of cooperation have in past times been strong and active. In each case, these initiatives for development have been, and are being resisted by rural people who recognize in their own daily experience that few of these efforts are for their benefit. The very forms that they take are clearly concerned with control rather than care.

The typical form through which agricultural policy is implemented is that of the government department, or in some cases, the multinational company. The typical social technology, the institutional means for achieving the apparent development goal, is the hierarchical organization. Sometimes referred to as a bureaucracy, and analysed as such by Max Weber (1962) in the early part of this century, such institutions are characterized by relative degrees of inflexibility and concentration of power and authority. It is this concentration of power and authority which leads to the central paradox.

If we take the example of community development, particularly as seen in the Indian experience, then the paradox becomes clear. "Community development" appears to be concerned with the development of local authority and the nurturing of grass-roots initiative. However, the reality of such programmes, not only in India, has been quite the opposite. The absence of community and local initiatives is frequently the outcome of historical processes which have effectively sought to destroy local communities. The attempts to nurture such communities through hierarchical

institutions have to be seen as continuations of such destructive and hampering processes. The village-level worker in community development (in the Indian case called the 'gram sevak') is the focus of the paradox. A multi-purpose worker, carrying many responsibilities, he (more rarely she) is caught between the authority of a massive and complex institution and the intransigence and outright resistance of the rural community. The village-level worker has little part, if any, in policy formation, has the lowest skill and pay in the organization, and yet carries (in terms of the formal organization chart) some of the greatest responsibilities. Villagers who have seen many such efforts before, and know historically how little the urban educated policy-makers are really concerned for their welfare, resist the best-efforts of the village-level worker. The programme fails, the village-level worker is blamed, the villagers are "resistant to change", and the officials and institution builders move on to construct similar institutions to introduce another innovation. A cycle of institutional persistence under a succession of apparently welfare-oriented, sometimes radical, labels.

Such a process is once again apparent in the case of cooperatives. Widely judged to be failures for a variety of reasons, the experiences of Egypt (), and Jordan (ILO, 1980) and Tunisia (Apthorpe, 1980). in the Arab world all bear witness to the problem of implementing apparently liberating programmes through institutions which are really power-centralising and controlling. This history must make us question just how far the reality is concerned with 'development' of human resources and potential, and how far it is about control. A brief examination of the experience of Sudanese agriculture will be of interest here.

The Sudanese Experience:

Prior to the advent of British colonial rule in the Sudan, agriculture was small-scale, based on minor irrigation works or rainfed dryland production. With the reconquest of the Sudan in 1898-9, and the major crisis faced by the Lancashire Textile industry at the beginning of the twentieth century, this situation underwent radical change. In particular, there was change in the area between the Blue and White Niles south of Khartoum, known as al-Gezira. But change was not restricted to this area, for the development of the Gezira Scheme with its enormous demands for labour, influenced other parts of the Sudan, particularly the West. It even affected areas as far away as what are today Chad and Nigeria.

In the Gezira region, the British civil administration, in cooperation with a British commercial company, the Sudan Plantations Syndicate, established a very large gravity-fed irrigation scheme. The aim behind what is now widely known as the Gezira Scheme, was the production of commercial quantities of fine quality cotton which would provide an assured source of supply to the hard-pressed British textile spinners. It was, additionally, to provide a source of income to the Sudanese exchequer to pay for the administration of the country. By the time of independence in 1956, the Gezira Scheme covered over one million feddans, and has since been expanded under Sudanese administration, to something well over two million feddans.

What concerns us in this paper is the institutional technology, the social technology, which has formed the foundations of the scheme. The scale of the Gezira Scheme is impressive, and so also is the resulting scale and nature of its problems. And yet, recent developments in agricultural policy in the Sudan, such as the Rahad Scheme, the Kenana Scheme, the Khashm al Girba Scheme, and now the Jonglei Scheme in the Southern Province,

all demonstrate an unwillingness on the part of Sudanese policy-makers to consider agricultural development options of a smaller scale. The reason for this is not ignorance or unwillingness to learn from experience. In the Sudan, and in other countries, the reason is that political and social control of the rural population and of agricultural production is of higher priority than the welfare of the agricultural producers themselves.

The British administrators and engineers responsible for the Gezira Scheme perceived themselves as faced with two problems. One was the technical problem of water-management over a very large area all fed from one dam at Sennar. The second was the problem of social technology: how to control the labour of the tenant farmers over this huge area so as to ensure that water-use and the timing of agricultural operations was optimal.

On the face of it, the choice of large-scale gravity irrigation seems to lead inevitably to an institutional structure which imitates the bifurcations of the irrigation system itself. Thus, a hierarchical organization was introduced. With its headquarters at Barakat about 200 kilometres south of Khartoum, the organization followed the pattern on which the land of the scheme was divided. A number of 'groups', each of about 20,000 feddans under the authority of a Group Inspector, and below the group, division into 'blocks', of around 5000 feddans, each controlled by a 'block inspector' assisted by two or three field inspectors. These people were responsible for overseeing the agricultural operations and water use at all points below the level of the minor canal.

Parallel with the organization of field staff described above, although not always working easily with them, was a similar hierarchy, that of the Irrigation Department. At each level of the scheme, the Inspectors would calculate their water needs, using rules of thumb which were not based on experimental work, but on assumptions about water duty in the Nile Valley

in general, and probably derived from Egyptian experience. These requirements would be communicated to the divisional irrigation engineers who would then transmit them up their organizational hierarchy, until a total indent could be calculated by the engineer in charge of the dam. He would then release the total amount of water required.

At this stage, one might justifiably enquire as to the role of the Sudanese tenant farmer in all this. Their responsibility was, and continues to be, to provide the labour input, the government having provided canalization and leased the land from the original owners, and the Sudan Plantations Syndicate to provide the management. Today the arrangement remains much the same, the Sudan Plantations syndicate having been replaced by a parastatal, the Sudan Gezira Board, in 1950. It is germane to our discussion, to wonder as to the terms on which the tenants were to provide the labour input.

The semi-nomadic population of the Gezira regions was compared unfavourably by the British administrators with their brothers and sisters further to the north, the Egyptian fellahin. These latter were considered to be experienced irrigation farmers, used to careful husbanding of water and to its application on a twenty-four hour basis. In contrast, the Sudanese farmers were considered to be in need of very close supervision and not able to manage a twenty-four hour system. Thus, a closely supervised night-storage system was introduced.

Elsewhere, and in considerable detail (Barnett 1975; 1977; 1980; 1981) I have examined the wide-ranging implications of this decision. Whether or not the Sudanese farmers were capable of managing a twenty-four hour system at this early stage is not clear. What is now clear is that over the fifty years or more since the Scheme was established in 1925, they have learned many things about irrigation, including twenty-four hour watering

techniques. They have, in addition, in many cases, developed a system of water use which is both water and labour economising (Barnett, 1980). While they have done their best, have learned and adapted, even though it has not greatly improved their level of life (Barnett 1977; 1981), the Social Technology of the Gezira Scheme has changed hardly at all. This has created problems for the farmers, and these problems are indications of deeper problems in the Gezira Scheme as a whole, and in Sudanese thinking about agricultural policy and its institutions more generally.

The hierarchical administrative structure of the early days of the Gezira Scheme was apparently adequate for the task of organising and controlling the work of an assumed ignorant and technically unskilled "native labour" force in the colonial period. It may also be added here, that it was also effective as a means of control and maintaining order in a population which had recently experienced a colonial conquest, in a colony in which colonial government was not entirely secure until the 1920's. The institutional technology has shown itself adequate to the task of transmitting policy decisions and order from the headquarters level to the point of production at the field-level. What this institutional technology has not been adequate for is in responding to changes in agricultural practice and social change at the local level. Resistance by the farmers has taken a variety of forms, ranging from major strikes, the most recent in 1979, to conscious lack of care for the cotton crop. This latter phenomena is explained by the farmers as resulting from their perception that the cotton crop does not belong to them, whereas in contrast the subsidiary millet crop does, and is therefore more deserving of their attention, efforts and water. Cultivation of cotton, (and now wheat and rice) is the condition of their continued access to their land,

but it is a cultivation which is performed reluctantly and, for the majority of tenants, hopelessly.

The result of this state of affairs has been ever falling or static low yields of cotton. In addition, there has been a growing remoteness between what the Gezira Board administrators believe or claim that the tenants ought to be doing, and what the tenants themselves wish to do. Mechanisms for consultation are not well-developed, and are in any case overshadowed by a social gulf between the educated, predominantly urban management and the farmers. This relationship which divides the Scheme, is constantly acted out in the continuing drama of the Scheme's administrative technology, a technology of control which could almost be designed so that the tenants can be blamed for what goes wrong, and so that things that do go wrong constantly reinforce in the minds of the administrators the assumed ignorance and incompetence of the tenants. In particular, it is worth noting that the rules of the Scheme actually forbid the tenants to use their water and labour economizing innovations, and exact penalties for so doing.

What has happened in the Gezira Scheme can be seen as the outcome of an inappropriate social technology, a hangover from the colonial period. In part, this is the case. But it would be wrong to cease our analysis at this point. Rather, we can hazard some hypotheses as to why such disfunctional social technology continues to exist.

The administrative institutions of the Gezira Scheme do not stand in isolation from the remainder of Sudanese society. Rather they are a part of the broader structure of that society, and reflect a fundamental conflict of interests between dominant classes, mostly urban but also some rural, and the majority of the rural population. The overall

dependence of the Sudanese economy on the production of cotton is well-known. Stated in an unsubtle form, but a form which is essentially true, the standard of living and level of income, of the dominant classes, depends from year to year on adequate exports of cotton. It is therefore vital both economically and at the level of ideology and belief, that the social technology of irrigated cotton production should remain unchanged. It ensures the constant transfer of value from the producer to the consumers of urban services and imported goods, and it assures the dominant classes that they are dealing with a predominantly ignorant and technically unsophisticated peasantry.

At these two levels, then, it is important for the Gezira Board and the Sudanese government to retain what is an inappropriate social technology - inappropriate that is for the broader, more humanistic goals of a development policy. The production of cotton in the Gezira Scheme continues because the population has nowhere else to go and because their participation gives them access to their annual millet crop, as well as some cash income. The majority of tenant farmers find cotton production to be arduous and uneconomic, registering their protest through low productivity, misuse (or rather own use) of water and are then penalized for introducing their innovations. The administration's response to the farmers' violation of the organization's rules is the classic one described by A. W. Gouldner (1965), which is to call for a reinforcement of the rules and increased supervision and discipline. This leads to a low-level confrontation, and a "vicious circle" (Crozier 1966) in which the administration retains control because ultimately behind it lies the power of the state.

At the second level, that of ideology it must be recognized that

organizations and institutions carry messages about the correct and appropriate place of groups and individuals in society. Thus, in the examples above of community development and cooperatives, the paradox is one of how an organization which carries a message of hierarchy and bureaucratic authority can be the instrument for the nurture of independence and initiative. Among the many and often confused messages which are carried by hierarchical and rigidly structured organizations, are those which suggest that there is an immutable gradation of ability, right to level of life, human value, in a whole society. There is also the message that society is relatively changeless and that the institutions set up in 1925 are appropriate today - despite decolonization in 1956 and a revolution in 1969.

However, development is about change. It is about change in the level of life and potential for action of the majority of the population. It is also about new and more humane ways of relating to each other in the processes of production and consumption. The social technology which has been introduced in the Gezira Scheme clearly does not permit these changes to occur, rather it maintains a system of economic and social relationships which have their roots in the colonial era. Such a social technology cannot lead to development - although it may sometimes lead to growth - but is only able to maintain a static situation which benefits the few at the expense of the many.

The significance of this brief excursion into the historical and contemporary features of the Gezira Scheme is that such large-scale, conservative institutional thinking has come to dominate the entire modern agricultural sector of the Sudan. Whether or not new crops are grown, or mechanized farming of that country's extensive rainlands is introduced, almost all major agricultural policy is dominated by what might be described as a "scheme mentality". The Rahad, Kenana and Khashm al

Girba Schemes have all adopted as a matter of course social technology which is similar to that developed in the Gezira Scheme. Ultimately, the new Jonglei Scheme will doubtless take a similar form.

A rather different sector of Sudanese agriculture which has seen technical innovation in the last thirty years is that of mechanized farming in the central rainlands. This has been well described in the work of I. G. and M. G. Simpson (1978). In this case the problem has been one of scale and inappropriate mechanical technology. Large-scale grain production using tractors combined with some hand labour has been attempted through state and private developments by means of a parastatal, the Mechanized Farming Corporation. This organisation has been supposed to provide inputs and support services to attempts at large-scale grain production. In the judgement of the Simpsons, it has failed. They conclude that:

"The present situation in the Central Rainlands is in many ways an alarming one. Mechanized crop production which has been the principal means of exploiting the potential of the region over the past thirty years, now appears to be non-viable given present crop yields and price relativities between inputs and outputs. Without major changes further significant expansion is unlikely - rather production may fall as existing machinery wears out and crop yields decline." (Simpson & Simpson: 1978: p.90).

In the case of mechanized farming, the Mechanized Farming Corporation has had the responsibility to provide support to both the private and state sectors. It has failed to fulfil this responsibility effectively as a result of lack of personnel and finance. The result has been a kind of mechanized shifting cultivation, which has been characterized by low productivity, financial failure for some private investors (although not

all) and encroachment on the land of nomads and traditional bildat farmers. Thus, large-scale mechanized farming has not only been unprofitable, it has also been positively destructive of existing forms of husbandry which in addition to providing some security for the rural people, also safeguard the land against soil erosion and desert creep.

Although apparently so different from the concerns which occupied the earlier part of this paper, the experience of mechanized farming does draw us back to the central issue: who is agricultural "development" for? Massive solutions as envisaged by the originators of mechanized farming schemes do not, by-and-large, seem to have benefitted the majority of rural people. Nomads have lost their traditional grazing areas and small farmers have lost their land, or seen it affected by desert encroachment. In contrast, the manufactureres of agricultural machinery have sold machinery to the Sudan, and the officials of the Mechanized Farming Corporation have received salaries, while the World Bank loans (admittedly mainly IDA "soft" loans) have accrued interest. All this has happened while "Even with regard to value added per worker, the large farms do not have an advantage" and the small farms add more value per worker, while the large farms had no advantage in respect of value added in spite of much higher capitalization (Simpson & Simpson: 1978: p95).

The Simpsons go on to argue for a strategy based on complementary development of large-scale mechanized production alongside the support and development of small-scale, labour-intensive farming.

The possibilities for this to occur, even if it is feasible seem remote. The Sudan is set on a path of large-scale agricultural development, partly for historical reasons as with the Geriza but also for more contemporary reasons. Foreign investment in Sudanese agriculture by governments and multi-national companies has reached major proportions during the last ten years. Investors are interested in returns for their investments, and

large investments require large schemes in order to recoup that investment. This trend leaves no room for the careful development of stable small-scale systems of agricultural production over which the producers can maintain their control in return for their husbandry. Large developments may be in the interests of the dominant classes in Sudanese society, and of those who see the Sudan as a grain-bowl for the Arab world. They are not in the interests of the majority of Sudanese farmers who will either cease to be farmers at all, becoming instead landless migrants, or labourers in various giant schemes subject to a social technology designed for their control rather than for their development.

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