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Executive Summary

WHAT DO WE KNOW ABOUT AFRICAN AGRICULTURAL DEVELOPMENT? THE ROLE OF EXTENSION PERFORMANCE REANALYZED

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Preface

This paper is an up-date after seven years of an earlier attempt to explain why technology transfers have not worked as the solution to Africa's needs for rapid agricultural development. In mid-1976, I observed that for many African nations

> the contemporary rural administration has reached a genuine state of crisis—a point where the ineffectiveness of major public services has become so obvious that it is difficult to justify further public investment in these sectors.[1]

In the years since, the negative trends which were just becoming visible in 1976 have persisted and intensified. Indeed, a whole literature has sprung up among Africanists trying to explain, justify, or perscribe solutions for this evident impasse. The symptoms are clearly economic in nature. They are evidenced by the continent's failure to feed itself and by a continuing decline in per capita agricultural productivity—a trend capably analyzed by Carl Eicher, whose article on this subject is required preliminary reading.[2] Most authors also admit that while the symptoms are economic, their causes are rooted deeply in the managerial, administrative, cultural, and ecologic systems. Some blame the crisis on the system of international dependency, but this does not explain why Africa should have the greatest problems. The larger questions which economic analysis does not fully address concern the managerial implications of this failure. The main issues we shall review in exploring this problem are:

1) Why is the African record as a whole so disappointing?
2) Why haven't the many development institutions and agencies established since independence yielded the expected output?
3) Why hasn't the "green revolution" (HYVs) which seems to be solving Asia's food deficit problem been equally effective in Africa?
4) What potential is there for utilizing Africa's extension services more effectively to transfer technology and stimulate development?
5) What types of interventions should donors consider to forestall further deterioration in Africa's agricultural performance?

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[1] "The Transferability of the Western Management Tradition to the Non-Western Public Service Sectors," Philippine Journal of Public Administration, Vol. 20, no. 4 (1976), pp. 401-427.

[2] "Facing Up to Africa's Food Crisis," Foreign Affairs, Vol. 61, no. 1. (Fall 1982), pp. 151-174.

I. WHAT IS GOING WRONG IN AFRICAN DEVELOPMENT?

1. Current Trends in the Poorer LDCs (pp. 2-7)

It is important to realize that the 1980s present a different situation from the optimistic scenario for rural development which guided technical assistance in the first and second generation efforts of the 1960s and 1970s. A principal change has been that we must now cope with the emergent effects of earlier policies. These include:

1) the increasing capital intensity of modern industry.
2) unforeseen consequences of the lumpiness of economic investments.
3) delayed project output because of weak implementation.
4) the spread of public services in advance of commercialized farming.
5) the bureaucratization of existing rural services.
6) fragmentation of responsibilities for rural development.
7) uncontrolled growth of parastatals.
8) the emergence of an international parallel economy.
9) dangers which accompany the transition into commercialized farming.
10) educationally generated stresses.
11) capital-intensive militarization.

It is argued throughout the paper (and in Appendix I) that these trends have interactive consequences of a mutually reinforcing nature. These interlocked effects should be conceptualized as constraints upon policy choice--in sum total constituting a different environment which makes rural development much harder to design and implement in the 1980s.

2. Influence of Constraints on Policy Choice (pp. 7-12)

A significant aspect of the above trends is that often the ultimate costs to the system are not clearly visible in the proximate contexts where decisions are being taken. It become particularly dangerous when the structure of situations encourages individually rational decisions which nevertheless point in an undesired and unperceived direction. After two decades of development assistance, we can now identify the emergent constraints whose influence must be counterbalanced in future strategies. These include:

1) the growing squeeze between increased needs and declining revenues (p.8).
2) the politicization of technical functions in resource starved systems.
3) decreasing responsiveness to national policy initiatives.
4) emergence of a distinctive LDC managerial style.

3. Why is Africa the Problem Region? (pp. 13-17)

Since the adverse trends we have listed can be found in many LDCs, what reasons might explain why the agricultural performance of black African states has been particularly weak? Here there seem to be several, overlapping considerations:

1) Several of the adverse trends find heightened expression in sub-Saharan Africa. Their impact has become even stronger in the post-1970 decade.

2) In the lowland parts of tropical Africa, environmental constraints have an especially virulent impact on human activities.

3) African nations share a common history of recent liberation from colonial rule in circumstances which accentuated encadrement and which left the leadership with an inflated opinion of the efficacy of political means.

4) Most African states have extremely dualistic economies, which in turn generates short-run policies with adverse long-run effects.

5) Ethnicity (or "tribalism") is a particular problem in Africa, making issues about the participation of minority traders very sensitive.

6) After independence, African nations stressed mass education and the creation of parastatals to take the place of departing minorities; in turn, rapid expansion of higher education generates further pressures for public sector employment and a distinctive managerial style ("personalismo").

7) The main production increases in African agriculture came from expanded acreages and not improved husbandry (which was labor intensive in nature). Now that fresh land is becoming scarce, African farmers are being forced into drier lands where arable farming is risky and there is an urgent need for more effective technology.

4. Implications for Policy Implementation (pp. 18-26)

1) A key aspect of the "Africa syndrome" is that while the various problems may seem manageable when dealt with individually, once they begin to reoccur across the entire sector corrective action become impossible.

2) A number of these trends are uni-directional in their impact, and interactive with each other. Once such a causal network becomes established, it becomes impervious to individual managerial interventions, since there will be other trends which continue to cause unwanted effects even if remedial action is taken in individual instances.

3) While it is true we understand the individual mistakes which start the system off in a negative direction, we should not assume that once its components become interlayered it can be reversed by single steps. Most of the stock solutions--devaluation, decentralization, privatization, structural reorganization, better incentives, deregulation--cease to be effective once the system becomes strongly interactive.

4) In retrospect, we can see that "bad management" in Africa has often arisen from well-intended efforts to accelerate development in the short run.

5) Situations where the aggregate and reiterative effects of short-run policy choices counteract or negate the larger aims over the longer run are always difficult to deal with precisely because the link between cause and effect is not readily visible. Examples of such actions would be:

- proliferation of districts to resolve local political conflicts
- "crash" short-term training to fill important new cadres
- attempts to double or triple capacity of successful projects
- expansion of benefits in parastatals to attract good staff
- expansion of higher education to "solve" youth unemployment

Any mode of analysis which focusses on immediate contexts in such a situation will risk making things worse, not better.

6) In place of policy-oriented analysis, what African nations needs is <u>process-oriented analysis</u>. Rather than investigating the immediate and proximate "causes" of particular policy mistakes--which is what most consultants do in Africa currently--we should ask instead why are the same mistakes getting repeated? There are all sorts of typical administrative decisions which with benefit of hindsight we can see trigger off a sequence of further difficulties within the system. For example, as Ollawa points out in regard to Zambia, again and again African presidents promulgate new policies which consist of "dramatic short-run innovations to deal with immediate pressing problems" but which neglect to explore how they will be implemented and the likelihood that they can be made to work (1978:82). Finding the root structural causes which underlie persistent operational weaknesses is, then, the place to start if we wish to understand how and why African development is going wrong.

7) "Process faults" of this nature are not easy to see, and can occur within a diversity of organizational structures which otherwise seem quite normal. The typical weaknesses which we see in Africa include:

- monitoring faults and lack of feedback
- excessive bureaucratic territoriality
- design mistakes
- midirected incentives which encourage counterproductive behavior
- role inhibitions which keep people from acting
- failure of the inter-organizational matrix
- weak follow through
- continued losses or turnover of key staff
- unresolved technical issues which cripple productivity
- failure to disengage from bad decisions and projects
- setting of unrealistic targets
- scheduling breakdowns
- layered blockages upwards and downwards in the organization

Such weaknesses can obviously have a huge impact on organizational productivity, even if they are not readily visible to the outsider on a short visit.

8) This helps explain the paradox that while Africa's administrative systems have much in common with those of the developed nations--a point stressed by Gable and Springer in their review of four national rice programs in Asia--nevertheless when considered as a system of interactions they evidence more problems than we would expect if we looked only at their structures (which seem familiar enough).

9) This suggests that the problems of LDC administration may arise out of reactive strategies being adopted by individual managers which cause outcomes that sabotage organizational productivity. Instead of thinking of black Africa as having bad manager we should realize the "weak" management being evidenced arises when good managers are put again and again into impossible working situations. We could list many such "no-win" situations:

- appointing overeducated young men to supervise undereducated old men.
- inability to fire junior staff because of civil service regulations.
- high rates of annual inflation not allowed for in financial procedures.
- losses of key staff at critical junctures in project development.
- allocation of entire budget to staff salaries.
- inability to adhere to schedules because of fuel shortages, etc.
- equipment downtime of 6-12 months because parts are not available.
- stealing of parts off new vehicles in transit so they cannot be used.
- private builders who take 3-6 years to complete 1-2 year contracts.
- budget requests that are cut arbitrarily and without regard for needs.
- acute local scarcities which trigger off political reallocations.

Any manager with African field experience could expand this listing to run for pages. Such problems are found these days throughout the continent, save perhaps in Botswana and a few Francophone nations. There is nothing particularly Tanzanian or Sudanese about the resulting abberations in administrative performance. In the end, it seems all black African countries are heading into a situation of persistent administrative malfunctioning.

10) Our extended analysis into the causes of low administrative performance in Africa suggests several policy implications:

- For reasons not entirely clear, administrative malfunctioning seems to amplify the worst tendencies within the accompanying development ideology, e.g. in militaristic regimes it increases coercion; in capitalistic regimes, corruption; in top-down systems, bureaucratic rigidity; in socialist regimes, inefficiency.

- Since the causes of malfunctioning are not particular to any given ideological orientation, it is foolish to use this as the criterion for channelling technical assistance. It is also futile to do so.

- The severity of observed trends is increasing over time, but newly independent nations seem to enjoy an initial decade when rationally-chosen policies have the intended effects. They should thus try to learn from the others and avoid actions which accentuate systemic malfunctioning. So far, such learning has not taken place.

- Once systemic malfunctioning emerges across the entire agricultural sector, particular choices of policy have diminishing influence. In such situations, systemic tendencies must become the overriding concern in policy analysis.

- When systemic malfunctioning becomes entrenched, the main hope for improvement must rest on the identification of "process interventions" which will change how the system works (in contrast to structural interventions which change how it looks).

- Some of the standard bureaucratic reforms such as making individuals more accountable or giving more training to individual cadres may in the overall context simply make the malfunctioning worse.

- Because the problem of low organizational productivity cross-cuts the entire spectrum of national institutions, tactics which do work in one sector are likely to be useful in others as well.

- We should not expect that particular organizational forms--"the T & V system," "KTDA-type agencies," "package programs," etc.--will produce equal results in other national settings. It will be the quality of implementation rather than the program model which influences success.

- This means that the design of new policies and rural development programs requires extraordinary amounts of analytic skill and local sensitivity. When it comes to reforming situationally-generated malfunctioning <u>without</u> changing the situations themselves, there are few easy answers.

- On the international scene, we have neither much expertise nor a base of relevant research knowledge to guide in how "process interventions" can be found and applied. Present expertise is worse than useless; it in fact perpetuates the very problems LDCs need to escape.

5. Extension Implications (pp. 27-30)

1) African governments should not count upon high yielding or "miracle" varieties (HYVs) as an easy answer to boost on-farm productivity. Likely increases will be in the 20-50% range, which means that slight changes in input pricing or comparative attractiveness may alter farmers' choices. Organized extension is more critical when the gains from adoption are modest.

2) African peasant producers have in the past responded quickly to higher prices and other economic opportunities. The absence of an entrenched class structure is an advantage. There are however large and unexplained differences in on-farm productivities, so that the aim of extension work should be to bring all farmers up to levels already achieved by some farmers.

3) A general problem in many African communities is the poor organization of credit, input supplies, storage and marketing. Weaknesses of this type have a large impact upon programs for the transfer of commercial technologies.

4) The worsening terms-of-trade for African farmers who want fertilizers, fuel, machinery and spare parts is making commercialized farming marginal in even those areas where a decade ago it was profitable. In general, we do not encounter economies of scale in African farming. Agricultural research needs to be reoriented away from input-intensive, high cost, high volume farm strategies towards varieties which can be grown without such support.

5) It is clear that African extension staff are working against the grain of current trends: high risk plow farming in semi-arid lands, the "backwash" effects of rapid urbanization, and continued ceilings on food prices. It will take major breakthroughs simply to hold development at present levels.

6) There are new technologies which might have the potential to avert the worst effects of present trends, but they are not the ones receiving high priority and it would take a large investment and a long lead time to develop them to a point where their commercial viability could be demonstrated.

7) Permeating all field activities and all extension agencies is the severity of Africa's administrative malfunctioning. The marked deterioration in service management has especially adverse impacts on agricultural extension.

8) Nevertheless, African governments continue to place the major responsibility for stimulating agricultural production upon their ministries of agriculture and various allied parastatal agencies. While there were some "success" stories in the early 1970s, today even the formerly efficient development agencies are experiencing great difficulty.

II. EXTENSION AND TECHNOLOGY TRANSFER

1. Extension or Technology Transfer? (pp. 31-35)

Agricultural extension is defined as the linking of farmers to producer assistance. It may be either "top-down" or "bottom-up," public or private. As used in the literature, the concept is variously thought of as being information delivery, training, service supply, or farmer organization.

Farmers and farming communities differ in the kinds of assistance they require as the farming system evolves. Thus there is no single "best" or "correct" extension role: as farming changes, so does its extension support.

The main components which enter into agricultural extension include: i) the farming system, ii) degree of client organization, iii) a change agent, iv) extension tasks, v) the service delivery system, vi) the inter-agency matrix, and, vii) community-level infrastructure. Sometimes--but not always--extension work has as its main focus the transfer of technology (viii). The productivity of "extension" depends upon the output of the total system, not just one component. There are diverse organizational solutions for the service delivery aspect, which in turn is heavily affected by economic development. Countries which have a large investment in a particular kind of system are likely to resist switching to alternatives.

While technology transfer may be the main focus of extension efforts in some settings, there are many additional roles which might be expected of the extension agent: input distribution, diagnosis of farm problems, farm planning, the organization of farmers to solve community problems. An emphasis upon the technology transfer aspect makes most sense at the middle stages of rural development, after infrastructure exists and there are technologies to extend.

Americans come out of a setting where mechanization was the key to raising farm productivity. We see extension as being primarily educative. Such a focus was well suited to our historic circumstances, where farmers had access to a moving frontier and were already convinced that technical change was the key to higher profits. Our farmers were the social equals of their advisors and trainers, and were in a position to exert upwards pressure upon the extension services and the agricultural colleges. They enjoyed efficient suppliers and in recent years a variety of subsidies and public assistance.

These are very special advantages. In those LDCs where similar circumstances were encountered at the local level--as in Mexico's Sonoran wheat farming or India's rich Punjab plain--the US extension model has transferred readily. Elsewhere in different contexts it has not worked well.

sion (at least in theory) of extension outreach. Yet again and again while the effectiveness of extension is assumed when calculating project benefits, at the stage where genuine extension work becomes possible it gets sacrificed to other expediencies and the project loses donor support. In my view, the principal weakness of both USAID and World Bank projects in Africa has been their neglect of sustained support for extension at the critical implementation stage when the actual benefits must be secured.

6) Agricultural extension has the potential of becoming a professional "home" for agricultural management as a specialty. At present those interested in agricultural sector management have no real base within the US academic system, making it difficult to achieve cumulative development in this area of enquiry. Despite the complexity of problems and the high levels of skill needed in agricultural management, the few people available to work in this area are generally employed in relation to other designations.

7) Another reason for strengthening agricultural extension is to take advantage of the tremendous technical potentials offered by new communication and data processing technologies. In today's world, even Peruvian peasants own television sets! We can foresee that in the near future many rural residents will leapfrog the stage of formalized instruction to become a mass television audience. Similarly, young LDC professionals are already returning home with microcomputers whose vast potential will go underutilized because nobody has yet incorporated them into rural development professions. A fresh approach to "extension" might tap this potential to accelerate the diffusion of new agricultural technologies.

8) Finally, if we conceptualize extension work as the "soft" or organizational technology which accompanies "hard" or tool-oriented technology, we can see that while the latter often cannot be transfered directly the former is the key which unlocks how "hard" technology gets adapted successfully. As Mexico's Puebla Project indicates, the intial development of "software" for effective extension can be very demanding of expert time. Once perfected, however, extension routines can often be spread throughout the larger region with only minor adjustments from country to country--as when Colombia's Caqueza Project was able to rapidly and cheaply tap the Puebla experience. Organized extension can thus speed up the diffusion of approaches to field problems, using the experience of one country to benefit all its neighbours.

2. Why Take Extension Seriously? (pp. 36-40)

The case for giving more serious attention to the problem of LDC extension effectiveness rests upon the following eight arguments:

1) In actual fact agricultural extension has sometimes been a key ingredient in stimulating the transfer of technology (cf. the Kenya hybrid maize introductions or the Philippine Masagana 99 program). These show that when the techology works and programs are well organized, extension can be effective.

2) Most LDCs these days have large Ministries of Agriculture, which bear the primary responsibility within their countries for promoting agricultural development. The crops they assist are their nation's principal foreign exchange earners. Even a poor country like Tanzania will have roughly 10,000 salaried extension employees supported by numerous agricultural institutes, research stations, and allied parastatal organizations. Over the short run, this large investment in agricultural extension and training institutions remains a fixed commitment. The choice facing donors is not whether any particular country needs public sector extension services, but rather how existing institutions can be made more effective.

3) A root problem is that in the early stages of development and where farm sizes are extremely small (as they usually are in Africa and Asia), commercial services to farmers are not a paying proposition. The cash flow within many African communities is too small to support secondary services. It also seems that organized extension work can avert the capture of initial benefits by rural elites when HYV programs are introduced. In the longer run it has been countries like Japan or Taiwan where access was evenly spread which have generated the largest continuing gains in output.

4) Research institutions cannot do the entire task of developing, testing, and diffusing new technologies alone. When yield increases are modest, the technologies must be carefully field tested under a diversity of environments and farming conditions. There is also need to report disease outbreaks quickly and to coordinate the supply of inputs. Typically, a research institute does not have either the field staff or the local contacts to perform the technology diffusion tasks adequately.

5) A major component in many technical assistance projects is provi-

3. Extension Agency Performance at Present (pp. 41-61)

The typical LDC extension service differs in many ways from the type of extension organization US trainers understand. The major differences from the US extension model are:

- LDC extension services tend to be strongly hierarchical, "deep" rather than "broad" in terms of institutional structure.
- LDC extension services look upwards for directives rather than downwards for approval. Staff think of themselves as civil servants or, at best, as ministry representatives.
- There are few effective means for disciplining middle and upper level staff, with the consequence that transfers of staff tend to become a general solution for all types of problems and the rate of rotation between assignments remains high.
- Similarly, for bottom-level staff civil service regulations often provide a cushion against lay-offs and make it difficult to exert effective discipline for any but the most flagrant offences.
- The bottom-level, contact cadre equivalent to the US county agents have weak training, poor motivation, and hardly any discretionary resources. In particular, they depend on higher levels for access to transport.
- This situation results in part because virtually all ministry resources go into staff salaries, leaving very little on the margin for vehicles, travel, and equipment.
- Extension agencies are assigned to fairly specific sub-sector functions which cross-cut the necessary sequence of crop related support activities, e.g. irrigation, fertilizer supply, credit, research, land reform, crop husbandry, animal husbandry, etc.
- These bureaucratic boundaries affect two dimensions of technology transfer: 1) internal and inter-organizational communication, and, 2) the acceptance of joint responsibility. Both are problemmatic.
- Members of the extension service generally do not find that effective field service yields recognition and career advancement; to the contrary, many assignments of vital importance for development nevertheless impede the likelihood of the individual's advancement.
- Finally, the general circulation of technical information—new products, disease outbreaks, husbandry innovations, breed performance, etc.--does not occur.

These structural attributes have a large influence upon how LDC extension agencies perform. Of course, there are internal differences from country to country. Nevertheless in broad brush outline the ex-British and ex-French African countries have similar ministry structures which evidence many of the same weaknesses. Let us therefore examine at each level what the likely performance bottlenecks may be (here drawing heavily upon my field experience in East Africa).

1) How the Research-Extension Linkage Operates (pp. 44-45)

How well does the kind of structure we have outlined perform when involved in technology transfer? Its weaknesses are pronounced in regard to:

- Sharing responsibility for key tasks among several agencies.
- Receiving upward feedback from farmers about their needs and problems.
- Giving sustained support to new programs at the l cal level.
- Maintaining an institutional memory about previous experience.
- Developing decision rules to suit new tasks as they arise.
- Adapting organizational packages to suit local needs.
- Exploiting new opportunities on the farmers' behalf.

Yet, paradoxically, it is these very functions which greatly affect the success of agricultural development projects. If so, we must look more closely at each level in the transmission system to identify what the critical blockages are which jointly cause low extension productivity.

2) Deteriorating Research Institutions (pp. 46-47)

At present, the output from most African research stations is their annual reports, often as not presented with raw experimental results and little interpretation. Recommendations generally have not taken into account farmers' varying managerial skills and resource availabilities. They ultimately arrive on the desk of some hapless recent graduate who must translate them into the vernacular for presentation by sceptical extension agents before a circle of elderly, semi-retired farmers. Little actual communication of positive value occurs.

It is true that at an earlier period some African agricultural research stations produced admirable results. Today experiment stations are much more numerous, thinly staffed, and suffering from many additional handicaps such as scarce inputs and import restrictions. A main difference is that the administrative norms from the larger system now permeate research institutions as well, so that although institutions look physically similar their mode of operations has deteriorated. It is even an open question whether it might not be more cost effective to rely upon "land grant" type tr ning-and-research institutions, which have a greater chance of realizing the minimum conditions for committed professional work.

3) Missing Middle Management (pp. 48-52)

The typical district extension office with its bored typists, idle drivers and broken down vehicles is hardly a prepossessing base for the

urgent and focussed managerial planning that successful agricultural development requires. First, there are usually high rates of senior staff turnover. Second, the inter-organizational matrix cannot be coordinated from the district level. Third, without agreed procedures for spatial planning, the right things get done in the wrong places. Fourth, by attempting to hold the senior person responsible in a situation where services are unreliable one finds that a 'hub-and-wheel' mode of task delegation emerges. This in turn creates many further problems. Fifth, once "personalismo" is recognized as the way to get things done (as it is in many LDCs), the door is opened for various types of subtle and not-so-subtle corruption. And yet as the preparation for these complex and difficult managerial demands, the typical district agricultural officer has been taught mainly technical and scientific subjects.

4) The Contact Staff (pp. 53-55)

In most countries, the "contact cadre" who must ultimately pass on extension messages to farmers constitute "invisible men" whose actual skills, motivation, communication behavior, and opinions are rarely studied. In general, they face an almost impossible task: being expected to service a wide range of crops subject to a host of environmental constraints, held accountable for visiting farmers when they lack transport, and having been given only the rudiments of training and technical materials. Facing such adverse field circumstances, morale is often low--indeed, a number of surveys have found the younger, better educated agents show the worst performance. It is also likely that the situation is deteriorating over time as essentials like fuel and books become scarcer, and the cleavage between the bottom staff and the urban-oriented national elite widens.

5) Nongovernmental Alternatives (pp. 56-61)

If the public sector extension services are so problemmatic, couldn't the nongovernmental alternatives be developed as a substitute? Of 13 "essential requisites" required for effective field programs (Table 3), a majority can be more readily provided by a private firm than by the typical ministry of agriculture. However in practice these theoretical advantages of private sector participation are often not found in African LDCs for a combination of structural and historical reasons. The difficulties are:

- In smallholder agriculture, the market for agricultural services is small, highly seasonal, and tightly constrained. Private firms may be quite reluctant to enter such markets unless they can achieve a de facto monopoly control--thereby undercutting the theoretic advantages.

- The most successful small ventures at early stages of development usually incorporate reciprocal rather than market-price based exchange. The cost efficiency of minority group "bush" traders is thus based on a large reciprocal (and hence culturally maintained) element which may not be freely transferable into larger scale corporate practice.
- African economies often lack middle-sized businesses of the type most needed in district agricultural development. At the top we find "enclave" trading houses run from the former colonial metropole and oriented to the salaried sector, and at bottom small indigenous or immigrant entrepreurs. Donors may face political difficulty dealing directly with either group.
- The technological capacity of small-sized African firms tends to be extremely weak, duplicating the unreliability of public sector institutions.
- Many of the key extension innovations are of a non-proprietary nature. Since in any case the market for new technologies is small (in all but a few countries like Nigeria), extension assistance is unattractive to the multi-national firm. Even when MNEs do become involved, the kind of staff they can supply to a remote and backward African nation are not particularly skilled or effective.
- Finally, the private sector itself is not impervious to the larger trends in the economy. When foreign exchange dries up, often the private sector gets excluded and must meet its needs through unofficial channels. Once firms embark on such a game, they can no longer serve as channels for aid.

What these observations suggest is that in Africa the private sector shares many of the inefficiencies and problems which also constrain the public sector.

There are other nongovernmental alternatives (Table 4) which do have a comparatively strong record in African rural development. Ford and Rockefeller Foundations once had large field programs in Africa, and maintained regional offices with supporting technical staff. Voluntary agencies have a wide spectrum of small projects, with OXFAM's being of particular merit. It would be interesting to compare the African cases with Latin American programs, such as those described in the Inter-American Foundation's <u>They Know How: An Experiment in Development Assistance</u> (1977). A model of how private support can be mobilized is provided by Coordination Rural A.C. (CRAC) of Mexico City, and also by Shell's pilot projects in Nigeria and Italy.

Probably the most promising area for external nongovernmental aid is in relation to the technical "backstopping" of technology transfer. Here the Francophone African countries have for a number of years purchased extension support through the African Institute for Economic and Social Development (or INADES), which acted as an intermediary broker. Similarly, India has shown how public sector extension support could be used to stimulate media-oriented private firms producing videotapes, radio broadcasts, and extension booklets.

4. Second Generation Approaches to Rural Development (pp. 62-87)

The list of discarded "solutions" which technical assistance has sponsored makes sobering reading: land settlement, mechanization, river basin development, land reform, economic planning, family planning, co-operatives, community development, and (in Asia) irrigation. By the late 1960s, it was clear these initial emphases left still other, basic problems unaddressed. We saw therefore in the 1970s the addition of compensatory "new directions": nonformal education, appropriate technology, cash crop authorities, project appraisal, high yielding varietal development, "package" approaches, integrated rural development, basic needs, women-in-development, regional planning, household water, community medicine, and farming systems' research. In the early 1980s, we now have social forestry, the T & V system, participatory bureaucracy, on-farm water management, and a renewed emphasis upon strengthening institutional capacities.

This listing is by no means exhaustive. It shows that aid emphases are relatively short-lived, and that most approaches are partial in their coverage. Earlier emphases may still be needed (and in fact receive emphasis within host country strategies) long after they have gone out of fashion with the international donors. Let us look at four emphases which are most directly associated with technology transfer and agricultural extension.

1) Transfer of Successful Models (pp. 64-65)

Early technical assistance tried to replicate US institutions in the developing world, e.g. land-grant colleges in India or 4-K Clubs in Kenya. When this "institution building" approach encountered apparent difficulties, the source of institutional models was switched to LDC "successes" such as CIMMYT and IRRI (for international agricultural institutes), Gezira (for irrigation authorities), KTDA (for cash crop authorities), and Comilla (for integrated rural development. The unfortunate truth insofar as Africa is concerned has been that few if any of these model institutions have remained successful over the longer run, with the possible exception of the KTDA.

2) Creation of New Parastatals (pp. 66-70)

Virtually all the new institutions of the 1970s were established as self-governing legal entities, or "parastatals". For crop handling or training agencies, there are many advantages of parastatal status: freedom from restrictive civil service regulations, direct control over finances, staff, and equipment, and the ability to attract better quality professional

staff. While the aggregate demands of the parastatal sector these days may have reached an unsupportable level, the individual reasons favoring the creation of parastatals persist. Even though there are numerous weaknesses which accompany parastatal management, it is predicted that African nations will continue to have a large parastatal sector. The reform measures which we will recommend are especially directed at improving parastatal productivity.

3) Transfer of Technology (pp. 71-79)

A different strategy emphasizing technological content rather than institutional form grew out of the Rockefeller financed plant breeding programs at CIMMYT in Mexico and IRRI in the Philippines. Also known as the high yielding variety (HYV) or "green revolution" strategy, this approach shifted away from resource-intensive measures (land clearing, etc.) towards technology-intensive improvements based on a combination of on-farm water, chemical fertilizers, and dwarf cereal grains which could take maximum advantage of these two inputs without becoming top heavy ("lodging"). By intensive selection and recombination of genetic traits, new varieties were developed which gave yields between 50-300% higher than earlier traditional varieties. It seemed that in India and much of East Asia these varieties could institute a small-farm productivity revolution without requiring massive changes in land tenure and the institutional matrix.[1] For Africa, the two key questions are: i) is the HYV promise a realistic technological possibility, and, ii) what demands do HYVs place upon the accompanying institutional matrix?

The reasons the HYV strategy has been only moderately successful in Africa--and some would say not successful--are as follows:

- water supplies are highly seasonal and often do not permit widespread irrigation, thus removing a key support needed by HYVs.
- existing rice varieties are either preferred by consumers or nearly match the IRRI-supplied ones (at least in Eastern Africa).
- maize production actually increases farmers' risk in the large, semi-arid zone, and improved maize varieties have been highly vulnerable to virus diseases and changes in input availability (fertilizer).
- wheat is generally grown under mechanization which involves a high foreign exchange component, and is not feasible in many areas.
- the promising legumes and food crops have been less well studied, and are generally grown on a subsistence basis so that farmers are reluctant to spend large amounts on insecticides (which are often not available).
- when yield increases are achieved, in the lowland tropical zone it seems the disease response is remarkably fast, so that improvements are only temporary and the HYV programs require strong technical backstopping.

- African research services have been slow to take into account farmers' constraints (risk, labor, purchased inputs) when evaluating recommended practices which as a consequence often do not prove profitable.
- The HYV package is especially sensitive to poor institutional performance, since it depends heavily upon good technological screening, available inputs, access to credit, and well-timed watering. In all these areas, African agency performance tends to be very weak. Even if we had sound technologies to recommend (which we do not), it is likely the weakness of the inter-agency matrix would emerge as a key constraint.

In the short run, then, a technology transfer approach is not likely to give the high payoff which the Asian experience suggests might be possible. It would be pleasant to report that the present donor emphasis upon "farming system research" is rectifying these weaknesses, but in actual fact FSR runs the danger of compounding them through creating yet another enclave of dissatisfied professionals who feel they have an "answer" to Africa's needs if only the larger system would pay them more attention (pp. 76-79).

4) The T & V System (pp. 80-84)

In Asia, the success of HYVs in the mid-1960s began to put pressure on national extension services to improve their technology diffusion capacity. An important outgrowth was Daniel Benor's "training and visit" (T & V) system, which was applied under World Bank funding to much of India and now to some 30-40 countries worldwide. Basically, the T & V system consists of a package of administrative reforms designed to simplify downward communication through the typical ministry of agriculture structure. It involves releasing extension agents from most other administrative duties (credit applications, etc.) so that they can work with specified contact farmers and receive intensive training every two weeks (Benor & Harrison, 1977). It insists that extension agents have a reasonable work load, can be adequately supervised, and have a direct link upwards to the research system (which generates the technological materials which the system requires).

As with HYVs, the T & V system does presuppose a number of features which were found in India but may be absent in Africa or Latin America: a tradition of village-level work, agents already on duty in the field, reasonably adequate commercial services for credit and input supply, and--of particular importance--a dramatic, high pay-off technology to extend. Given these requisites, T & V has much to commend it. In Africa, however, the ministry level support it requires (subject matter specialists, etc.) is often weak, commercial services not reliable, and the technological base itself is still under development.

5) Is Management the Missing Ingredient? (pp. 85-87)

Our review of the "second generation" development policies indicates that time after time the constraint which has limited their effectiveness has been the quality of accompanying institutional management. From these and many other examples, qualified observers of the African scene have concluded that poor management is the major reason for the continent's disappointing performance in agricultural development.

This conclusion is both valid and misleading. It is valid in that implementation capacity is probably the single most significant factor limiting the effectiveness of rural development programs. That is why it has been highlighted throughout this paper, even though most writers who deal with extension and technology transfer treat it as only a residual variable.

It is misleading, however, in the implication which suggests that if countries would just bear down upon their existing agencies and if donors would expand the input of "high level" manpower, the problem could be solved. Indeed, as Leonard convincingly argues, senior African officials are likely to respond to the need for tighter administration by increased reliance upon formal authority--the very approach his research shows depressed extension agents' field productivity (1977:90-92). Organizational productivity is not an output which can be stimulated by incremental inputs of higher level manpower. In specific detail, Leonard's excellent study of the Kenya extension service show that "good management" is an emergent property of the total operation of an administrative system.

Our earlier analysis suggests that Africa's "weak management" occurs because when individual managers act rationally in response to proximate contexts, the outcomes do not support "good management" for the organization as a whole. If so, "bad management" in Africa is a consequence of the structure of situations into which operational staff are put. Even more seriously, the tendencies toward "bad management" are gaining momentum because of an overall deterioration of typical working conditions. There is no definitive source for Africa comparable to Gable and Springer's study of Asian rice programs (1979) which documents empirically which of the many adverse trends are the ones most responsible. What we can say, however, is that sources of slippage cross-cut the entire agricultural sector and will probably require a whole battery of remedial measures--possibly a larger commitment than either Africa's current leaders or donors are willing to consider.

III. INTERVENTIONS TO REGAIN PRODUCTIVITY

A. 'Process' Improvements (pp. 88-94)

1. Stop taking actions which only make the situation worse.
2. Identify the key performance sectors that need close watching.
3. Rectify for missing signals in the economic and administrative system.
4. Modulate incentives to get desired organizational behavior.
5. Make planned use of improved budgetary procedures.
6. Let the market determine prices and input supplies.
7. Devise methods of transfer pricing for internal operations.
8. Give special attention to the low productivity institutions.
9. Make routine administration less energy-intensive.
10. Get people excited about what can be done.

B. Extension Reform Measures (pp. 95-114)

1. Introduce an agricultural policy focus into Ministry decision-making.
2. Review staff incentives to reward field performance.
3. Strengthen in-country adaptive research to generate new technologies.
4. Redirect M.S. training towards case analyses of field problems.
5. Prepare organized support for introducing the T & V system.
6. Cluster district extension functions into three domains.
7. Structure organized feedback from the district to the national level.
8. Develop a middle-management package for agricultural staff.
9. Reform the budgetary process to emphasize completion of current projects.
10. Initiate extension staff retraining as a continuous learning function.
11. Organize networks of contact farmers.
12. Make field agents more downwardly accountable.

C. Donor Assistance (pp. 115-119)

1. International consolidation of program experience.
2. Technology screening by donors.
3. Drought aid leverage.
4. Sustained emphasis upon project completion.
5. Facilitate between country exchanges of technical materials.
6. Create US based extension expertise.
7. Improve participant training in the USA.
8. Identify a recipient 'land-grant' type institution in each country.
9. Make better use of the international agricultural institutes.
10. Media/software assistance in technical fields.

Conclusion

Our review of actual and potential agricultural extension performance has highlighted the complex interlinkages between agency characteristics, the faulty technological base, the larger bureaucratic environment, and the constraints imposed by the increasingly negative "development" trends (see Appendix 1). No doubt a more hopeful analysis would have emerged had we dealt with the Asian situation, where both the emergent trends and organizational performance appear more promising, and where irrigated high yield varieties are transforming farm productivity. But this paper has dealt with Africa as it is today, and with the present (rather than potential) technologies.

What we have argued throughout is that the above components are in Africa strongly interrelated. A focus on any one component--say on food production or generating new technologies--is unlikely to be effective over the longer run. The measures we have recommended (part III) cross-cut all stages in the technology generation-and-diffusion process (see Table 6 overleaf). A promising start has been made by the donors in funding a vastly increased amount of "farming system research" (FSR). However this should be viewed as only the first step. To use FSR results effectively, African agricultural agencies need to develop greatly their extremely limited capacity for handling technical information (creating what we termed 'T and V' support institutions). They also require a clearer idea about how to manage field extension activities in ways that meet farmers' needs. Simultaneously the larger bureaucratic environment must be changed to encourage the kinds of managerial behavior that will assist rather than retard effective field activities. We have insisted that the root pathology at present is that administrators within the system have rational reasons for acting in ways that sabotage organizational goals

The principal operational difficulties to overcome are twofold: i) these changes require multiple interventions at several levels, something difficult to accomplish in any operational bureaucracy; and, ii) current trends in Africa are strongly adverse to improving agency productivity. This report tries to pinpoint <u>what</u> needs to be done to regain control; it does not give an easy recipe describing <u>how</u> to get these reforms adopted in actual practice.

Table 6. Location of Interventions in the System

Institution:	Type of Intervention Recommended:
International Agricultural Institutes	Greater focus on extension aspects Get African ones working effectively Rotate US scientists through them Use as 'mother' institutes for national ones
Host country Research Institutes	Consolidate into a manageable number Give clearer objectives Add FSR and feasibility testing units Improve espirit-des-corps
Agric. information packaging unit	Combine with subject specialists for T & V Establish one per country, recognize as skilled service needing resources
Agric. policy planning unit	Make sure it exists Get best people appointed, use them to monitor sector, spot bottlenecks, set goals
Mainline Ministry of Agriculture	Review staff incentives to encourage change Institute performance management Improve budgeting system Institute staff retraining on continuous basis Create T & V support institutions Implement T & V for extension system
Linkage to field units	Improve communication vital (radiocall, CB, etc.) Structured upwards communication Open up to commercial participation on inputs Improved incentives for field postings
District-level agricultural offices	Allow them to deal directly with research Implement middle-level agricultural management Structural reorganization of tasks into three domains: i) information, ii) inputs & economics, and, iii) training & groupwork
Linkage to field agents	Insure overlap of reporting Fewer agents but more transport/equipment Realistic supervisory spans Use monthly salary trips for T & V training Promotions based on field results
Contact Agents	Explore possibilities for part-time, volunteers Backstop with national media campaigns Retrain on regular basis to upgrade Make sure has realistic assignment
Contact agents to farmers	Combine individual/groupwork Develop basis for selecting contact farmers Insure technology is relevant to farmers Make agents downwardly accountable Research system to have direct access Tap existing co-operatives, voluntary agencies

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