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ORGANIZATIONAL STRUCTURES FOR
PRODUCTIVITY IN KENYAN AGRICULTURAL
EXTENSION

by

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Discussion Paper No. 154

December, 1972.

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Revised version of I.D.S. Working Paper No. 20

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ABSTRACT

Three aspects of the productivity of Kenya Government agricultural extension services in Western Province are examined: (1) the degree to which farmer contact extension agents are well versed in the technical information they are expected to convey; (2) the extent to which standard national cultural recommendations are being adapted to local ecological conditions; and (3) the amount of effort that junior staff are putting into their basic work of visiting farmers. Personnel policies and organizational strategies which would improve performance in each of these areas are discussed. Along with other lesser reforms, proposals are made for the creation of a mobile, national junior staff retraining service, for a rigorous system of inspecting extension agent work by an increased reliance on group extension methods, and for the removal of inter-cadre promotion bars so as to provide meaningful work incentives. It is suggested that the various reforms taken together might double the productivity of Kenya's agricultural extension workers.

The Kenya Government provides agricultural extension services to farmers in order to improve the productivity and profitability of their farm enterprises.* The availability of agricultural advice and assistance to small farmers has an important function in improving the distribution of wealth in Kenya and in stimulating the economic development of the nation. (See, Working Party on Agricultural Extension Services, 1970:2). The quality of agricultural services found in the rural areas thus has wide interest and importance.

A great many things go into the making of a good agricultural extension programme. Different writers point to various of these aspects: Deryck Belshaw is concerned with the quality and economic sensitivity of the agricultural research which is extended to farmers (e.g., 1969:11-12); David Vail draws attention to the need for a ready supply of agricultural inputs and a reliable market for produce (1970:ii-iii); Hursh, Roling and Kerr concentrate on the methods by which extension agents approach villagers with their innovation packages (1968); Thoden van Velzen is interested in the problem of extension services being directed toward the wealthier farmers (1973; see also Leonard, 1973). All of these perspectives on extension are important.

In this essay, however, we will focus on certain aspects of extension effectiveness internal to the Ministry of Agriculture itself. We propose to discuss the processes by which the Ministry keeps its extension agents informed of its technical advice, by which these agents are prompted to do their work of visiting farmers, and by which general technical recommendations are adapted to meet local circumstances. Though we will be dealing with only three of many aspects of extension productivity, this particular set will enable us to focus on the field organization of the Ministry. We will show how careful attention to organizational problems could lead to a dramatic increase in the effectiveness of Kenya's agricultural extension programmes.

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The author wishes to express his appreciation for the invaluable research assistance of Humphries W'Opindi, Edwin Luchemo, and Jack Tumwa. He also gratefully acknowledges grants from the Institute for Development Studies of the University of Nairobi, which financed the collection of these data, and from the Center for Comparative Study of Political Development of the University of Chicago, which provided the computer time used in the analysis.

I

In 1970-71 we surveyed a 40% sample of the junior extension agents of the Ministry of Agriculture working in the Western Province of Kenya. These 213 junior staff are those agents who are in direct contact with the small farmer. They may be of two basic grades: an Agricultural Assistant (or Animal Health Assistant), who almost always holds a two year certificate in agriculture (or veterinary medicine), or a Junior Agricultural Assistant (or Junior Animal Health Assistant), whose training may consist of one or more week-long courses in a Farmer Training Centre or, in some cases, of courses of six months' to a year's duration. These AAs, AHAs, JAAs, and JAHAs are the last link in the chain which reaches from the agricultural research station to the farmer. The senior staff, who hold diplomas or degrees in agriculture or veterinary medicine, exercise a predominately supervisory function and usually have contact with farmers only through or with the aid of their junior staff. We interviewed all 25 of the senior staff who were working at district and divisional level in the Province.

In the analysis that follows we will concentrate on the data from our 169 interviews with the junior staff concerned with agricultural extension. These extension agents work on all types of crops and on animal husbandry, but they are not involved in the treatment and prevention of animal diseases. The latter function is the province of the AHAs and JAHAs who work in the Veterinary Services Division of the Ministry. We will draw on the 44 interviews which we conducted with the AHAs and JAHAs only when they will help us to demonstrate a major point not illustrated by the AA and JAA data. By and large AAs and JAAs, on the one hand, and AHAs and JAHAs, on the other, react in the same way to similar organizational stimuli.

In order to provide the farmer with technical advice, the Ministry must ensure first that its junior extension agents have command of the advice. Communicating detailed information to others and getting them to retain it is a difficult process. For example, junior extension agents in Western Province were able to give us an average of 13.7 pieces of information out of 19 concerning a fundamental programme on maize fertilizers (Standard Deviation = 3.5). To a much more complex set of questions on a grade cow feeding programme, agents were able to give 8.8 out of 19 points

(S.D. = 4.0). This constitutes a range of 46% to 72% of the technical points which the Ministry is attempting to communicate to farmers.

As the downward transmission of information constitutes a problem within the Ministry, we determined to study it. We selected five cycles of questions on maize fertilizers, the feeding of grade cows, the diagnosis of East Coast Fever in cattle, Berry Borer insects in coffee, and spiny bollworm on cotton. These areas were chosen because they were on technical subjects important to the Ministry's current programme in Western Province. Although we asked open-ended questions of the respondents, the answers had already been provided to us by various national experts, and we simply ticked off the correct pieces of information on a pre-coded sheet as the respondent mentioned them. (For details see Leonard, et al., 1971). The maize and cattle questions were asked of all extension agents, but either the coffee or cotton cycle was used depending on which was the more important crop in the respondent's area of work. In addition to these rigidly objective measures of informedness, we asked the agents to explain what each set of recommendations does for yields and exactly why and how it works. These answers were then rated on two three-point scales by the interviewer, providing us with subjective measures for each topic of the agent's persuasiveness and depth of knowledge on yields and the basic technical process. For the purposes of this essay we will call these measures "persuasiveness". Contrary to what might have been expected, the various objective information tests are correlated with one another. (Eight of the nine correlations are statistically significant. The average $r=35$). With the exception of the maize explanation score, the subjective measures of persuasiveness are related to their respective objective information scores quite closely. (Average $r=69$). In general, however, persuasiveness in other ones. Nevertheless, the different technical subjects show very similar determinants of well-informed agents, so we will discuss them together.

The process of developing technically informed extension workers begins at the point that the Ministry selects an applicant for employment or training. The intelligence, motivation, academic preparation, and farm experience of extension agents are the foundation upon which later training must be built. Unfortunately only one of these qualities is easily identified--formal education. This has resulted in the predominance of formal criteria of selection, and the increasing supply of secondary school leavers

in Kenya has led to a clear rise in the educational level of new extension workers. Those entering certificate courses in agriculture will now need a good (secondary) School Certificate, whereas before Independence a good primary school certificate would have sufficed. (See also Watts, 1970:4.) Even those hired directly as untrained Junior Agricultural Assistants seem generally to have a Kenya Junior Secondary Examination pass now. Before Uhuru, most JAAs would have been Standard IV leavers.

Contrary to expectations, this improvement in the formal education of extension workers has not always been a good thing. Among agricultural extension agents, those with upper primary education (Standard V through Certificate of Primary Education) have a clear tendency to know more than those either with secondary education or with only lower primary schooling. This tendency is evident in all technical areas tested, is also present for agent persuasiveness, and persists when we control for other determinants of extension worker informedness. The general pattern is well illustrated in Table 1. This is not an isolated finding, for R.K. Harrison has found precisely the same phenomenon among extension agents in Western Nigeria (1969:228-229). He accounts for it by the fact that the better educated Nigerians tend to come from urban backgrounds and to be less committed to extension work (1969:152-162). Kenya secondary school leavers are unlikely to be from the cities or towns, but their long time in school (almost certainly a boarding one) has probably cut them off from much farming experience. Perhaps more important, secondary education may well allow its graduates to feel that the details of farming are beneath them. In the present African context, special care must be exercised with respect to selection, practicality of training, and motivation if extension workers are to be recruited from among secondary school leavers.

Both our work and Harrison's indicate that better extension productivity will be achieved from less educated recruits if the special problems of those with secondary education cannot be treated adequately. We do not mean by this that education is of no relevance to extension work. Those with only lower primary schooling and those who are not fluent in Swahili are less well informed. Upper primary schooling is positively correlated at a statistically significant level with knowledge in four of the five technical areas we tested, even when one controls for the effect of ten other determinants of informedness through multiple regression. On average, upper primary education plus competence in Swahili is associated with an agent's

TABLE 1. TOTAL INFORMATION SCORES ON HYBRID MAIZE FERTILIZERS
ACCORDING TO THE EDUCATION OF JUNIOR
AGRICULTURAL EXTENSION STAFF

<u>Education</u>	<u>Mean Score</u>	<u>Variance</u>	<u>Number of Cases</u>
Standards I-IV	11.2	17.72	14
Between Std. IV and C.P.E.	14.2	9.64	73
Certificate of Primary Education	14.2	13.75	46
Kenya Junior Secondary Examination	13.1	14.86	16
School Certificate	12.8	11.36	19
F (5/163) = 2.37			
p < .05			

knowing 27% more of the information for which he is responsible and his being 30% more persuasive. (These percentages represent the residual effect after other determinants of informedness and persuasiveness are discounted. They are calculated by dividing the appropriate beta values in the multiple regression equations by the average number of points achieved on that test. Averages of these percentages for all the tests were then computed.)

Furthermore, we have positive evidence that secondary education can be an added asset if the special problems of School Certificate holders are properly handled. Table 2 illustrates Animal Health Assistants with four years of secondary school perform better than those less educated. Part of the reason for this disparity between Agricultural Assistants (AAs) and Animal Health Assistants (AHAs) lies with differences in the character of their

TABLE 2. TOTAL INFORMATION SCORES ON FEEDING GRADE CATTLE
ACCORDING TO THE EDUCATION OF JUNIOR VETERINARY STAFF.

<u>Education</u>	<u>Mean Score</u>	<u>Variance</u>	<u>Number of Cases</u>
Standards I - IV	6.9	10.12	8
Between Std. IV and C.P.E.	7.9	9.78	15
Certificate of Primary Education	9.8	23.30	12
Kenya Junior Secondary Examination	10.5	40.50	2
School Certificate	12.7	13.24	7
F (4/39) = 2.68			
p < .05			

certificate training, as we shall see shortly. But the other cause is a subtle divergence in their promotion expectations. Both AAs and AHAs spontaneously express dissatisfaction with their present status and a great interest in gaining access to the cadre of diploma level Assistant Agricultural Officers and Livestock Officers (Gakuya in Leonard, 1971:66-67). During their training AHAs were led to believe that they could attain such upgrading while AAs were not. Consequently we feel that a good deal of the difference between the two groups is accounted for by despondency on the part of AAs and a lively motive to perform well on the part of the AHAs. AHA expectations of meaningful promotion prospects have not yet been fulfilled, and we would expect their performance to drop to that of AAs if these prospects are not provided in the next year or two.

A man or woman newly admitted to the Ministry may undergo a short training course at a Farmer Training Centre and become a Junior Agricultural Assistant (JAA); or he may enter a two-year institution, obtain a certificate in agriculture, and be employed as an Agricultural Assistant (AA). Certainly the JAA cadre is not as well technically informed as those who have had certificate courses. On average this training is associated with an additional 13% of both an agent's knowledge and his persuasiveness. So the two years of training are valuable. It is important to note, however, that those graduating from the current agricultural certificate institution, Embu, generally are not so well informed as are those who went through the now defunct Siriba College. On the other hand, the veterinary certificate holders from the present Animal Health and Industry Training Institute (A.H.I.T.I.) are more knowledgeable than their Siriba counterparts. (Leonard, *et al.*, 1971: Tables 6.D, 11.D, 21.D, 22.D, 34.D, 39.D) Something more than the difference in the effect of secondary education on the morale of AAs and AHA's at work here, for the disparity persists after we have controlled for education.

We suggest that the relative success or failure of current certificate institutions is to be found in the extent to which they are able to give their students practical experience. This interpretation is supported by several facts. First, those who report having seen a practical demonstration when they first learned about a technical area also know more about it. (This effect is statistically significant or very nearly so in all the technical agricultural areas except maize and is associated with an additional average of 12% of the information and 16% of persuasiveness.) Second, the old Siriba

is known to have been an exceedingly practical institution, in which students spent more time doing farming than studying about it. One of Siriba's graduates has told us that this practicality was so intensive that the Institute used to lose about half its students, something that would be intolerable today. Third, the areas in which Embu's performance is actually inferior to that of Siriba are those in which it has few or no facilities for practicals--animal husbandry and cotton. Fourth, A.H.I.T.I. is generously endowed by a Food and Agricultural Organization grant and so is well provided with training requisites. Embu, on the other hand, is troubled with a shortage of practice oriented staff, budget pressures, and a shortage of land. We conclude that the secondary school student's lack of farming practice can be compensated and sound certificate training provided. But this cannot be achieved without costs. We suspect that Embu's problems stem from a dangerous bureaucratic disease--the tendency to ignore, underfinance, and rob of good staff those programmes in which poor results will not be immediately evident.

Once an agent's basic training has been completed, it is imperative that he continue to be taught and retaught the advice he is to provide to farmers. New agricultural research leads to the modification of technical advice and so requires new teaching. Equally important, the human mind has an extremely great capacity for forgetting and confusing. The author once found himself misreporting a major finding of a paper he had written himself only a year before. Our data suggest that in particular staff tend to improve their persuasiveness with one (but only one) rebriefing every year on each of the important parts of the extension programme in their locale. The marginal impact of annual briefing alone is relatively small, however, and the more costly forms of retraining, such as residential courses, are probably only justified every two or three years. (Rebriefing within the last year is associated with an average increase in information of only 4%.) Training sessions are already general in Western Province, although not necessarily on an annual basis or for all parts of the programme. Over the years these briefings have a cumulative effect on knowledge, for an agent tends to know more the longer he has been in the Ministry. (Each five years of experience in the Ministry is associated with a 5% increase in informedness. The effects on persuasiveness are not statistically significant.)

Briefings are most often handled simply and cheaply through lectures by the Location Agricultural Assistant (LAA) or divisional Assistant Agricultural Officer (AAO) at local outdoor meetings. AAOs commonly address their divisional staff at pay day meetings, but mid-month or even weekly

meetings at the location level are sometimes held. Those agents working in locations in which staff meetings are frequent tend to be better informed, but not more persuasive. (Informedness is increased an average of 7% with each additional junior staff meeting per month. The effects on persuasiveness are not statistically significant.) To be fully effective these briefing sessions need to be conducted by a member of the senior staff. Those extension agents who receive their updating only from LAAs or other certificate holders tend to be less well informed. The use of the divisional AAO for retraining exercises thus seems to be the cheapest effective method in most circumstances. We do have reservations, however, about the use of these officers for all rebriefing, even though our position is only weakly supported by our data. The problem with reliance on local supervisors is that they themselves have to be adequately rebriefed before they can teach their staff. Our interviews with divisional AAOs show that some can be quite poorly informed in critical technical areas and, worse still, be unaware of their ignorance. Every person through whom information is passed causes something to be lost. Transmittal chains need to minimize the number of links.

Our data seem to show that retraining done at a Farmer Training Centre by senior staff provides the extension worker with greater understanding and persuasiveness in his knowledge than does the local meeting. The advantage of the FTC is that it offers a venue free from distractions and an occasion at which all concerned are aware that the information being transmitted is to be taken seriously. Although the larger number of FTC located rebriefings are accompanied by demonstrations, this seems not to be critical. The important thing is to see the point practically when one is first learning it. If this is done, later sessions can serve to refresh that experience without repeating it. On average, a rebriefing conducted by senior staff at an FTC is associated with an increase of 19% in information and 18% in persuasiveness.)

In Western Province FTC rebriefings are usually taught by one of the senior staff members in the Province most competent in that area. It seems to be felt that this minimizes the problem of senior staff forgetting aspects of technical advice while also allowing for the adaptation of national recommendations to local conditions. The latter point represents a sound concern but unfortunately we are aware of only one officer in Western Province who has made any significant attempt to develop local technical adaptations. In these circumstances a specialized staff training cadre seems an attractive possibility. Local senior staff are shown by our data generally to be effective in rebriefing, but when we have observed their sessions we have found

that they sometimes leave much to be desired in teaching technique. This is not surprising, for these officers are untutored in teaching methods and their other work does not allow them the time to experiment in the development of training curricula. A specialized staff training cadre could devote full time to this type of activity, however, and could become quite good at it, both in teaching themselves and in organizing others to teach. Furthermore, they could be in frequent contact with the various agricultural research officers and thereby remove one more link in the information transmittal process. Finally, if these training officers were to work with local operational officers before each staff briefing exercise, they could ask about local adaptations. This might lead local officers to do more about developing them, particularly if the questioning were done in a way that suggested possible lines of adaptation. It would be too expensive to provide specialist staffed retraining programmes on all technical areas every year. A programme whereby extension agents attended a one-week, FTC located training course every year and covered all technical areas every three years might be feasible, however.

One obvious further technique for improving the quality of information given the farmer is to develop specialized extension agents. A specialist AA or JAA has a smaller range of topics on which to be well informed, and this means he can better master these areas. Our data do show that specialists are in command of an average of 16.4% more of their technical areas than are generalists. (Leonard, et al., 1971: Tables 6.E, 15.E, 20.E.) But this difference is an uncontrolled one and is largely accounted for by the greater intensity of the rebriefing of specialists in their areas and by the fact that the better staff are often the ones chosen for specialization. When these factors are considered, the edge of the specialists does not seem as great as it should be. Our data also indicate that specialists devote at least 27% of their farm visits to topics outside their expertise and that general extension agents still make visits on the subjects covered by the experts (Leonard, et al., 1971: Tables 30E, 31E, 32E, 33E). The small farmer is a generalist, and he seems to demand wide ranging advice from those extension staff whom he is able to see. Thus both specialists and generalists have to keep themselves broadly informed on the technical aspects of farming in their locales. If it is to be effective, functional specialization in a bureaucracy generally has to accompany specialization in the society it is serving.

Taken together the various factors discussed in this section, exempting specialization, account for an average of 36% of the observed variation in agent informedness and 30% in persuasiveness. We have found that the maintenance

of a well informed field extension service essentially is, or should be, a highly specialized function. Staff are selected and trained nationally. We have seen that even rebriefing appears to be better the higher up it is done in the hierarchy, for there it can be done by specialists. Nonetheless, these highly specialized functions are performed in order to create and maintain a relatively unspecialized agent at the bottom of the hierarchy.

II

Kenya has a very wide range of ecological conditions and soil types. Obviously a wide range of agricultural and animal husbandry practices needs to be varied with local conditions if yields and profits are to be maximized. The appropriate fertilizer mix for maize changes with the soil type; grade cows do not need so much pasture in heavy rainfall areas; and so on. Yet technical advice for Kenyan agriculture is most often given in one or two national packages, and adaptation to local conditions is left to the field extension officer. An important criterion of a productive extension service is therefore the extent to which it is engaged in making intelligent adaptations.

In order to get at this aspect of extension, we not only asked our respondents to give us the standard recommendation for the various technical topics we covered, but also requested that they tell us of any adaptations that they had made to these. The information scores are based on the agents' knowledge of the standard recommendations, but we also kept separate track of those staff who were at all adaptive. Through private communication with the national maize research officer, Alastair Allan, we discovered that their research demonstrates that the standard maize fertilizer recommendations are inappropriate for the Trans-Nzoia slopes of Mount Elgon. The presence of a large amount of volcanic ash in the soil means that hybrid maize responds to nitrogen applications but not to phosphorous ones. A soil map shows Elgon Location of Bungoma District (Western Province) to have the same soil type as the research area in Trans-Nzoia. As these maize research results had had only limited distribution, we had an ideal situation in which to test the adaptive capacities of Kenya extension. We knew that the standard hybrid maize fertilizer recommendations of phosphorous and nitrogen need to be replaced in Elgon by ones calling for nitrogen and a much diminished, if any, application of phosphorous. Our interviews reveal that only two Ministry employees in Bungoma District were aware of the need for this adaptation. One was the District Agricultural Officer, who had heard of the same research we had.

The other was an older Agricultural Assistant who lives in the next location to Elgon, where the same conditions apparently apply, and who had discovered by accident one year that phosphorous applications are unnecessary. The communication structure of the Ministry apparently is such that he had not convincingly communicated his insight to his superiors or colleagues.

Only 13.4% of the junior staff in Western Province reported having made any adaptations to any of the standard recommendations about which we asked. Of these, the bulk favoured the use of farm yard manure over chemical fertilizers for hybrid maize. Our data show that the propensity to be adaptive does not increase with junior staff education, training, experience, or the like. We find only that junior staff who report that they turn first to a senior staff member when they have some technical question are 3 to 4 times more likely to be adaptive than are those who primarily seek advice from their LAA or junior colleagues. AAs and JAAs generally lack either the technical competence or the self-confidence (or both) to make and act on adaptations in official recommendations themselves. They need advice and reinforcement from an AAO or other senior officer. Thus junior staff cannot be expected to be adaptive unless they profit from relatively easy lines of upward communication.

A good proportion of the senior staff in the Province are considering some small adaptations. But they seldom seem to promulgate any to their subordinates, and they do not appear to be collecting the kind of crop performance information which would show them what sorts of adaptations are desirable. The safe course is felt to be the bureaucratic one--apply the hierarchically approved programmes. At the moment most officers feel that the localization of recommendations must come from the research stations. They limit their role to the occasional intimation of problems to research personnel. But, like most of us with an academic orientation, the research officers are very reluctant to make any recommendations other than those they have scientifically established. For example, we have examined some of the files at the National Agricultural Research Station in Kitale, and we are persuaded that the information exists from which good guesses could be made concerning the appropriate fertilizer requirements for maize in different areas of the country. Scientists are unlikely to make educated guesses, however, unless field officers put considerable pressure on them or start making them themselves. One provincial officer in Western Province has initiated a localization of the recommendations applicable to his speciality, but other officers at all levels need to follow his example. A good guess about a way to increase the profitability of a farmer's operation this season is more valuable to him than a carefully proven recommendation five

years later. Doubtless an officer will want to test his trial recommendation with a few selected farmers before he announces them generally. Officers need to be actively encouraged to take such initiatives, however, and to see them as one of their major responsibilities.

If the possibilities for developing local recommendations are to be fully exploited, AAOs and Agricultural Officers need to open the lines of communication between themselves and their junior subordinates. Only in this way can they find out what is already known in the locality about yield responses to variations on Ministry recommendations. Too often information passes only downward in Kenya Government hierarchies. As we have shown elsewhere, there is a large status gap between senior and junior staff in the Ministry, and this has the consequence of there being relatively little informal contact between these ranks (Leonard, 1973). These status barriers need to be bridged if extension work is going to be molded to local conditions and made fully profitable.

III

The work of the Ministry of Agriculture extension workers consists primarily of visiting individual farmers and providing them with information and services. Junior staff spend an average of 2.9 out of 5 work-days per week on this activity. The other aspects of their work vary considerably with season and the agent's specialization. A coffee specialist will spend part of his time at the cooperative factory grading the coffee crop; the general extension worker may be called to a location baraza (public meeting) or assigned to collect agricultural statistics. It would be extremely difficult to measure how hard the agent is working at these many tasks, but we can determine the amount of effort he is putting into his basic function of seeing farmers. In order to take into account the varying functional mixes of the work of differing extension agents, we have used as our measure of work effort the average number of farmers which an agent visits on a day devoted to that activity. To do this we asked each extension worker to specify for us the days in the previous week which he spent visiting farmers and to name for us the specific farmers he saw. We thus can divide the total number of farmers seen by the number of days used for the activity and achieve a standardized measure of work effort.

The information obtained about the farmers visited was detailed enough to enable us to check the validity of some of the more suspicious entries.

Somewhat less than a quarter of these non-random checks uncovered deception on the part of the extension worker. No deception was discovered for those interviewed by one of our three interviewers, however. Statistical analysis shows that the responses achieved by this interviewer are quite different on this item but not so on other potential problem variables. From this we conclude that his responses for this question are honest, and we have therefore adjusted the responses for the other interviewers downward. Having done so, we conclude that extension agents visit an average of 1.75 farmers on a day that is devoted wholly to that activity and that they see a mean of 20.3 farmers a month. These statistics indicate a low level of work effort on the part of extension staff.

Those junior staff who work the hardest when visiting farmers are those with some upper primary schooling (between Std. IV and C.P.E.) and those who have had a long non-certificate course in agriculture. These two educational experiences probably impart enough understanding of modernity and new agricultural technology for the extension agent to feel committed to his work and to believe he has some potential for promotion. But unlike higher levels of schooling and training, these do not give the junior staff member the feeling that he is working below his station or that he is beyond supervisory discipline. Thus the need for a better selection process in the employment of agents and for better indoctrination into work values during extension training is as evident here as it is in the area of technical knowledge.

Junior staff in the Ministry of Agriculture are acutely dissatisfied with their employment situation. The younger men with secondary education and a certificate in agriculture feel particularly cheated. Their contemporaries with a somewhat better pass in the same School Certificate are given one more year of agricultural training (for a diploma) and then receive twice the salary, as Assistant Agricultural Officers (AAOs). What is more, there is a considerable gap in status and responsibility between the AAOs and the Agricultural Assistants (AAs) which is rather similar to the military distinction between commissioned and non-commissioned officers (see Leonard, 1973). The leap in salary and status between these two cadres is a direct heritage of the colonial period, when AAOs were European and AAs were African. (In Nigeria, where there were fewer Europeans, the salary jump occurs between the AAOs and the Agricultural Officers, again reflecting the racial cutting point (see Kidd, 1968). The persistence of what are clearly "European" and "African" positions in a fully Africanized civil service perpetuates barriers to responsibility and promotion which injure morale.

The junior staff in general complain unanimously about their lack of opportunity for promotion (and hence greater pay). (See also Gakuya in Leonard, 1971:66-67.) After all, it is in the lower civil service, which was already Africanized, where incumbents experienced little of the upward rush in position and salary which came with Independence and Africanization. In good part morale is a function of perceived promotion prospects in the Ministry of Agriculture, and it in turn has an influence on work effort ($r = .19$) (Leonard and Prewitt, 1971:26). The alienation of junior staff seems to have reached the point at which they sometimes are using the informal organization of their work groups to control and reduce the amount of effort they put into their work. There are two symptoms which point to this condition. The first is that increases in the number of staff meetings held in a location -- at which agents can be harangued by the AAO and LAA to work harder--actually lead to a decrease in work effort ($r = -.17$). Apparently the meetings provide the junior staff with an opportunity for seeing one another and developing a counter organization. A second symptom is that the smaller work groups have a lower average level of work effort by their members ($r = .57$; $N = 14$). The smaller groups can be organized informally more easily and pressure put on their members to exert a standard and somewhat lower amount of effort. Thus, the larger the work group the larger the variation in effort among the members of the group ($r = .42$, just short of statistical significance).

The consequences of the informal, counter-organization of junior staff are that effective supervision of their work is extremely difficult. Increases in the number of supervisors tend to result in decreases in the level of work, for more supervisors usually lead to smaller work groups and more staff meetings. Attempts by supervisors to increase the pressure of supervision seem either to have no effect or to provoke an undesirable countermove by junior staff. Thus the priority which LAAs say they give to supervising their subordinates is negatively correlated with the level of work effort. (The correlation coefficient is $-.46$ when we control for group size.)

In such a situation of some agent resistance to increases in their work, major changes in the supervision, incentive and morale systems are in order. We believe that a combined package of fundamental reforms could lead to a doubling in the productivity of the Ministry's agricultural extension services. At present the supervision of junior staff is exceedingly difficult. An LAA will be responsible for as many as 18 juniors and an AAO for up to 50. Each AA or JAA can legitimately be working anywhere within the boundaries of the sub-location or more for which he is responsible. Under existing conditions it is virtually impossible to verify that the junior staffs' basic work of visiting farmers is being done or to judge how well it is being executed.

To the best of our knowledge the only extension organization in East Africa which has made a real attempt to cope with this supervisory problem is the Kenya Tea Development Authority. The K.T.D.A. has registered all tea growers and given each extension agent responsibility for a specific set of these farmers. The agent is required to record each farm visit in a book which is collected biannually and out of which statistics on the number of visits made by each agent are computed. There are two problems with this system. First, the agent's self-recorded work records need to be verified before they can be assumed to be correct. Although in principle this task could be done through supervisory visits to a systematic sample of farms for each agent, effective verification is not actually done. It would be too expensive in its use of the valuable time of the specialist AAO supervisor. As a consequence, these records are in fact a carefully kept fiction (Jeffrey Steeves, private communication). The problem of verification might be overcome through explicit delegation of responsibility for it to an AA or other junior inspector. But the fact that the K.T.D.A., one of the more efficient of Kenya's agricultural organizations, has not done so is not encouraging for the viability of this supervisory technique. The second problem with the K.T.D.A. method of supervising staff would arise if the first were solved. The quantity of extension visits is one aspect of an agent's performance but the quality of advice and services offered is also of vital importance. It is a well established fact of organizational life that when workers are judged on the basis of performance statistics their efforts are directed toward the thing measured and away from that which is not (Blau and Scott, 1962:178). Thus there is a great danger in formalizing and emphasizing visit records such as those of the K.T.D.A.

We feel that a shift to group extension methods would provide the kind of framework within which supervisory control and planning would become feasible and would produce a much more effective extension service. Group methods have been finding increasing favour with agricultural extension services in the developing world (cf., Hursh, et al., 1968:6). Larger numbers of farmers can be reached; method and result demonstrations can be provided more economically; and there is even some evidence that it is easier to persuade people of innovations when they are in groups than when they are encountered as individuals (Etzioni, 1964:36). Although the bulk of Kenyan agricultural extension services is provided through visits to individual farmers, a movement toward group methods, especially with respect to demonstrations, is underway. We would like to see an experiment with virtually complete reliance on group extension conducted in at least one area.

A demonstration represents the culmination of a long period of agent preparation. Result demonstrations have a particularly long gestation period: a farmer must be found to try the crop or innovation; the appropriate materials have to be made available; every stage in the progress of the crop needs to be explained and supervised; input records should be kept; and neighbouring farmers must be persuaded to attend the meeting at which the results are to be assessed and discussed. Method demonstrations and lectures are less onerous but still involve a significant amount of preparation. An agent probably needs to pay quick visits to a hundred or more farms in order to generate reasonable attendance at any kind of meeting, particularly in the early stages of his organizational work in a community. A good demonstration will often generate demands for follow-up visits or assistance in obtaining supplies that will also put work on the agent. Although we do not have the information necessary for a sound judgement, an agent probably cannot average more than two meaningful demonstrations per week of work.

From the supervisory point of view the advantage of demonstrations is that they represent an inspectable, relatively infrequent, final product of a considerable amount of extension work and the observation of them is likely to tell one almost everything one would like to know about one's junior's performance. All kinds of things can be ascertained from one hour at the demonstration of a subordinate. Technical competence is evident in the presentation and demonstration of information; preparatory publicity work can be gauged by the attendance; the extent to which the agent is concentrating on the right farmers can be learned by asking farmers quick questions about themselves; the amount of effort going into follow-up work and supplies provision is easily estimated by asking those present about their past receipt of these services. In fact, the demonstration is a sufficiently comprehensive activity that its various aspects could be used as the statistical basis for evaluating agent performance without creating an unfavourable bias in his work effort. The use of demonstrations for agent ranking is facilitated by the fact that they are given at fixed places and times, known well in advance, so they can be visited unannounced by a supervisor. Thus an LAA who had a motorbike and spent only half of his time on supervision could easily inspect a quarter of the demonstrations given by ten subordinates. A divisional AAO who spent only a quarter of his time in field inspections could see four demonstrations a year for each of a staff of 40 subordinates. Reliance on the group meeting and demonstration therefore makes extension agent work truly visible and renders possible for the first time the meaningful evaluation and reward of worker effort.

Group methods offer an additional managerial advantage in that they make overall extension programme planning more feasible. As the actual use by junior staff of their work time is very nebulous at the moment, it is quite easy for an AAO to plan extension campaigns that will actually conflict with one another in their use of personnel without his being aware that he has reached this point of competition. If an AAO is dealing with fixed units of work that have known and easily blocked time demands, programme planning becomes a meaningful act of choice for him. For example, if a comprehensive campaign involves conducting demonstrations in the area of each headman, agents are responsible for five such "villages" each, and they can do two meaningful demonstrations a week, it is clearly impossible to conduct comprehensive campaigns for both maize and groundnut planting in the four weeks of March. One or the other campaign will need to be slightly postponed or dropped or they will have to be conducted for different areas. Under the system of planning with demonstration units, the conflicts are readily identified and the exact time and nature of the staff training and supplies needed for programmes are evident.

The management of agricultural extension through the use of group methods permits a very substantial expansion in the amount and effectiveness of the authority exercised in the Ministry. Unless care is taken, however, an increase in authority is generally accompanied by a decrease in staff morale and initiative (Blau and Scott, 1962: 150-153). As we noted earlier, staff morale is associated with work effort in the Ministry of Agriculture and there is evidence that junior staff are already informally organizing to restrict the amount of their work. A major increase in supervisory control might lead only to more effective production restriction agreements in these circumstances, unless it is accompanied by a morale boosting improvement in incentives. A fundamental reform in the occupational structure of the Ministry could provide the needed incentives.

The Ministry has a large number of promotion bars that are based on training at the point of entry. To get from the Junior Agricultural Assistant cadre to that of Agricultural Assistant, one must already have an agricultural certificate; the entry qualification of Assistant Agricultural Officers is the diploma; Agricultural Officers must have a degree. These training requirements may not be bad in themselves, but when an employee is denied the opportunity to obtain them once he has begun service, they place him in a narrow cadre, with very limited promotion possibilities and little incentive for effort.

These barriers between ranks are not immutable. At Independence and for a short time after, promising young men of one cadre were selected for entry into the appropriate training courses and thereby upgraded. We have been told, however, that the Kenya Treasury objects to this procedure. Its position is that training should be provided to a man when he is young so the training investment can be amortized over a full civil service career. A man who is already in the Ministry at one rank violates the financial logic both by being in mid-career and by getting the "luxury" of two sets of training. This reasoning **alleged to the Treasury** seems to us to be specious, for it fails to take account of the effects of stagnation on the quality and quantity of a man's work. Such logic is more concerned with the short-term savings of shillings than with the long run maximizing of benefits from investments.

We would propose that the promotion and incentive problem be dealt with by the following five reforms:

(1) Permitting no one to enter directly one cadre who would not be capable of eventual upgrading to the next. If, for example, a grasp of science is essential to the performance of an AAO's duties, those who get the agricultural certificate and become AAs should either have that competence when they enter or get it at the training institution.

(2) Selecting each year a substantial portion of those with 10 to 15 years service in one cadre for upgrading to the next. The object would be to offer each man entering the Ministry a 25% or better chance of being upgraded to the next cadre midway in his career. This would offer him a significant incentive, the effect of which would be felt throughout the 10 or so years in which he was striving to qualify. If the 25% formula were followed, half of each cadre would be made up of upgraded men and the other half of upgradable ones.

(3) Basing promotions and upgrading overwhelmingly on job performance and not on potential, formal qualifications, or seniority. Point 1 would guarantee that all members of a cadre had the minimum potential for going up a rank. Further distinctions on the basis of potential would undercut the object of the restructuring, which is to increase job performance. Included in the concept of job performance, however, could be scores on agricultural information tests which members of a cadre took regularly throughout their careers in order to prod them to keep informed. Nonetheless, the greater part of performance would be judged from their superior's periodic objective evaluations of their field work (for AAs and JAAs of their demonstrations).

(4) Leaving some promotion opportunities within each cadre for attainment after the 15 years of service mark. In this way men who are passed over for upgrading would still have some incentives for working.

(5) Providing training courses for the men being upgraded to a cadre that are shorter than, somewhat different from, and largely separate from those provided for new entrants to a cadre. The current practice is to put those few men selected for upgrading through the same programme as young men fresh from secondary school. We agree with the Treasury that this is wasteful. The staff members being upgraded already have some training in agriculture and have considerable field experience. Further, they are likely to have their greatest difficulty in the more academic areas. Trainees fresh from secondary school, however, will be at ease in the bookish courses and will need a thorough introduction to the practicalities of farming and extension work. When staff in for upgrading are thrown in with new recruits, their time is largely wasted in the practicals and they are over their heads in the academic portions. (A similar conclusion is suggested for Western Nigeria. See Harrison, 1969.) Courses for experienced men need to take their background as a starting point, avoid repeating it, and give extra attention to the theoretical courses, where they will have problems. Even though the training programmes for new recruits and upgraded staff need to be largely different, there are areas of overlap which would justify keeping them in the same institution. Furthermore, the older staff may be able to indoctrinate informally the new recruits into the realities of extension work.

The effects of such a set of reforms would be several. First, the promotion prospects for all staff would be considerably enhanced, and this would provide them with significant incentives over at least the first half of their civil service careers. Second, the social barriers between ranks would be lessened, for each cadre would contain former members of the next lower one and future recruits to the higher one. Third, a lowering of the status differences between ranks would facilitate the upward flow of communication and encourage more informal interaction between cadres. This was seen to be a need in our discussion of the adaptive function. Finally, even the lower positions occupied by each cadre would have some men of experience in them, for many of them would be filled by recently upgraded men.

IV

We have reviewed three distinct areas of extension performance and have found somewhat different personnel and organizational requirements for each. Those who work hardest at visiting farmers have only middle primary education and extended non-certificate agricultural training. The best informed staff are those with upper primary schooling and a certificate course in agriculture. Extension workers with the secondary School Certificate and a diploma in agriculture are the ones who at least are thinking about and encouraging adaptations in standard recommendations. These differing optima need not be incompatible and a common set of personnel policies can be drawn out of them.

First of all, it seems that secondary education is not essential to the performance of AA duties. As a consequence there should be no hesitation about selecting the best performing JAAs for the certificate of agriculture course and upgrading to AA level. This holds even if the JAA has only the Certificate of Primary Education. Such an upgrading policy should apply as an incentive as long as the Ministry finds that it is necessary to employ JAAs to meet its staffing requirements. Nonetheless our data suggest that an untrained cadre is generally sub-optimal and should be phased out eventually.

Second, the selection procedures for AAs, their training programme, and their career opportunities need to be drastically revised. Our data indicate that at the moment higher qualifications are leading to lower performance. We do not accept that secondary education and certificates in agriculture are undesirable in their own right. Rather the certificate training course is often failing to meet the greater need that secondary school leavers have for practical work and indoctrination into the values of rural extension. The Ministry has also ignored the fact that post-Independence secondary school graduates demand far more in the way of promotion prospects than did their colonially dominated, primary school educated predecessors. Our judgement is that if these deficiencies can be overcome, secondary schooling will be an asset rather than a liability to good performance in a junior extension worker. In fact, if the problem of poor promotion prospects is to be eliminated by making possible the eventual upgrading of AAs to AAOs, secondary education will be essential to direct entry into the AA cadre. Even though our data suggest that secondary schooling is currently of doubtful value to the performance of AAs, it is almost certainly

necessary to AAOs, and it is important that all direct entry AAs hold the minimum qualification for AAO if promotion incentives are to be meaningful.

These personnel policies would probably provide optima in the areas of junior staff informedness and work effort, but they leave unmet the need for technical adaptiveness. We feel that this must primarily be a senior staff duty for the present and that the involvement of junior staff in this function is an organizational rather than a personal problem.

The organizational optima for the three functions under examination are also different. Keeping extension workers informed of the Ministry's technical recommendations involves communication down the hierarchy. We have indicated that this function is done better when more highly trained and specialized officers undertake it. We have also suggested that it is best done when the officer has direct contact with the research officers who are originating the information he is disseminating. With respect to adaptations in standard recommendations, we have argued that the divisional and district AAOs and AOs have the best potential, for they possess good agricultural training and could be close to the local intelligence needed for the task. Our position has been that they need more encouragement to be adaptive and to improve two-way informal communication with their junior staff if they are to perform the function. Finally, in the area of work effort we have stressed the need for the creation of a system of meaningful incentives tied to an objective and rigorous method of monitoring junior staff performance. Such a major reform may be able to dissuade junior staff groups engaged in work restriction and at least should succeed in securing the allegiance of LAAs to Ministry goals. We have argued that meaningful promotion prospects must exist from the AA to the AAO cadre if the status and communications gap between the senior and junior cadres is to be lessened and if the LAAs are to fulfill a linking function effectively.

For the different functions of the agricultural extension system we have advocated distinct types of organizational strategies: more specialization and a higher place in the hierarchy for those working in the information sub-system; focus on control techniques and a lower place in the hierarchy to meet the problems of work effort; greater informality between superiors and subordinates in order to provide for increased adaptiveness. Thus we are arguing for three sets of strategies that seem logically incompatible: more functional specialization and concentration to the centre, greater deconcentration and increased supervisory pressure, a relaxation in the authority system.

These opposing strategies are actually complementary for they all focus on relieving the divisional AAO of some of his current work pressures and redefining his functions to include greater effort in another area. We would like to see the AAO be more of a technical advisor to his staff and his division's farmers and less of a lecturer and overseer. To do this we have proposed pushing his instructional tasks upward to specialists and placing more inspection responsibilities on the cadre of LAAs beneath him. This will not divest the AAO of his image as a distant authority figure, but it may diminish it. To the average JAA and AA he may become less threatening if direct hierarchical pressure comes not from him but from the supervisory AAs. With a bit of openness and effort the AAO may also be able to get the LAAs to identify with him as a fellow supervisor. Through this strategy we would hope that both more pressure would be applied to the junior staff and more openness for upward communication would result. Thus "contradictory" organizational strategies may be complimentary and necessary to the achievement of optimal performance.

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