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ABSTRACT

To test the hypothesis that early-stage agricultural innovativeness is positively related to rural literacy, the author set up two investigations in the Chiduku and Seki Tribal Trust Lands of Rhodesia. The results of both studies are reported. Accelerated literacy instruction was introduced and innovativeness was measured in the following farm season. It was indexed by finding out when respondents had adopted nine recently introduced farming practices. Methods used at Chiduku were improved for the later Seki study by weighing the innovations according to their importance and complexity and by gaining some control over extraneous variables. The major constraints to adoption of innovations were lack of labor, oxen, and equipment. The Seki findings indicate that literacy instruction and innovativeness do not appear to be related, nor does there appear to be a delayed effect. The author "cautiously concludes" that illiteracy alone does not appear to be an immediate major obstacle to agricultural development. On the contrary, evidence suggests that economic "take off" in the context of improved opportunity structure precedes the demand for literacy instruction. Implications for rural development programs are described. A 34 item list of references, including the author's preliminary studies, is included. (MS)

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A Report on

LITERACY AND DEVELOPMENT IN THE RHODESIAN TRIBAL TRUST LANDS

SUMMARY OF CONTENTS

INTRODUCTION

This Report brings together the findings of two investigations into rural literacy and its relationship to the development of early-stage agriculture in the Tribal Trust Lands of Rhodesia.

These investigations were in the nature of quasi-experiments where literacy input was carefully controlled and an attempt was made to measure literacy effects later in terms of innovativeness.

A major difficulty at the outset was that there were no existing adult literacy programmes in tribal areas which could be studied, thus a special rural literacy programme had to be

planned and implemented (initially as a pilot scheme). This was undertaken in Chiduku Tribal Trust Land during 1969 and 1970 and has been described by the author. (Smith, 1969 and 1970a).

A more rigorously controlled investigation was subsequently implemented along similar lines in another tribal area - Seki, during 1970 to 1972. This has also been reported in some detail by the author. (Smith, 1970b and 1971).

This Report focuses on the formulation of initial and revised hypotheses and research methodology with particular reference to the Seki findings on innovativeness - material which has not been reported previously. (1).

The formulation of a final hypothesis then leads to a broader consideration of the relationship of literacy to rural development strategy and programmes in Rhodesia.

The transformation of a peasant population from subsistence production to a modern business approach to farming is one of the priority problems faced by the less-developed countries in Africa.

Correlates of rural poverty include ill-health, erosion, over-stocking, migration to urban areas, and - illiteracy. The Chiduku and Seki investigations were stimulated by the question of whether illiteracy, which is widespread amongst the thousands of backward peasant cultivators, is a major obstacle in bringing about the transformation of the subsistence farmer.

The basic question was - would a man who became literate become a better farmer, and if so, how can this be shown? At the commonsense level it seems logical that a progressive peasant farmer needs to be able to read and write in order to comprehend and use such concepts as profit and loss, planning and budgeting.

Two supplementary questions in the Rhodesian context were:-

(i) To what extent should adult illiteracy be considered a priority problem in the early stages of agricultural development?

(ii) What is the best strategy in providing a programme of rural adult literacy and relating it to the development problems of the Rhodesian Tribal Trust Lands?

THE SUBSTANTIVE HYPOTHESES

Three preliminary exercises assisted in clarifying the problem and in the formulation of an hypothesis:-

1. Early in 1969 a small informal survey was undertaken by the author on the potential usefulness of literacy programmes

(1) For further details of the Chiduku and Seki investigations, the reader should consult Smith (1969, 1970a, 1970b, 1971 and 1972).

in the Tribal Trust Lands. Twelve respondents (eight European and four African) took part. These individuals were intimately involved in the organisation of development programmes in the Tribal Trust Lands.
Respondents were asked what benefits they would expect if illiterates in the Tribal Trust Lands became literate. Answers to the survey can be subsumed under two main headings:-

(a) personal changes in the 'new literate' - improved morale/confidence, innovativeness, desire to continue learning, motivation to improve;

(b) access by literates to more information, and therefore greater understanding of scientific causation, economic factors, and reasons for development programmes and policies.

2. A study of the literature on literacy and modernisation/development broadly confirmed these opinions: there is wide agreement that literacy facilitates the modernisation process by improved communication and by changes in the internal state of the new literate.

3. Finally, a review of government development programmes and policies in the Rhodesian Tribal Trust Lands since the 1920's revealed a lack of continuity in policy and approach, and a comparative lack of success in increasing agricultural productivity per capita with improved living standards, despite the expenditures of large sums of money on physical infrastructure and services. (Smith, 1972). This lack of success is associated with a generally disappointing response to development programmes by the tribal people, which to a considerable extent can account for radical swings in government policies for rural development especially between extremes of persuasion and compulsion.

Taken together with Thorpe's (1964) estimate of functional illiteracy in the Tribal Trust Lands (80% of the males and 92% of the females) it seemed reasonable to assume that illiteracy might be a major factor inhibiting development in the Tribal Trust Lands, and that in particular literacy might assist farmers to take advantage of existing opportunities and lead to accelerated adoption of recommended innovations and thereby increase agricultural productivity.

In the early stages of agricultural development it is considered that the relationship between a farmer's ability to read and write and its consequences in terms of improved agriculture can be most clearly established in terms of innovativeness in the adoption of improved practices (c.f. Wood, 1969:13).

Rogers and Svenning (1969: 291-292) describe innovativeness as a key variable in the modernisation process because it offers

a kind of hard data about the extent to which modernisation has occurred.

They conclude that the best single indication of the degree of modernisation is innovativeness - indicating a behavioural rather than a cognitive or attitudinal change.

The problem for investigation in this study was then re-defined in terms of innovativeness, and the initial substantive hypothesis was formulated that individuals who were taught 'simple' literacy at an 'elementary' level would be more innovative than others who did not receive literacy instruction, i.e., innovativeness is positively related to literacy.

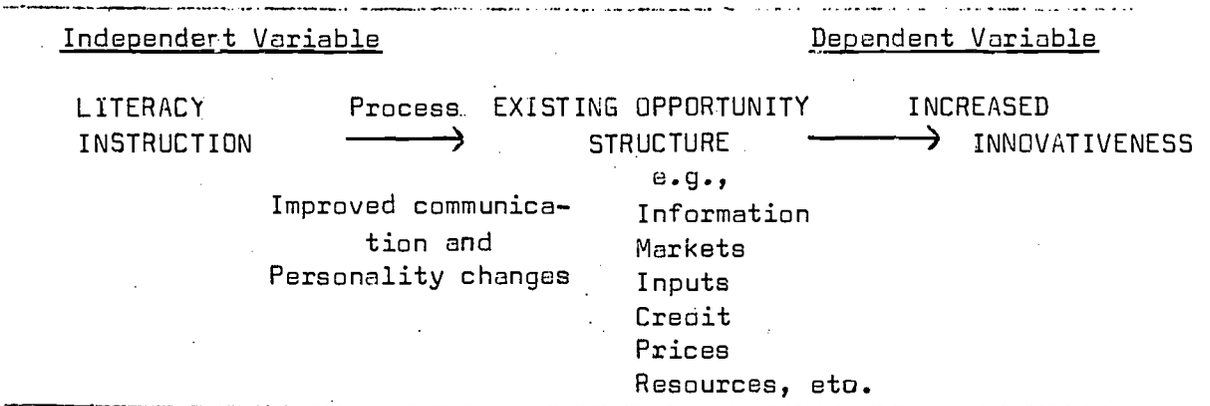
It was assumed that opportunities and incentives were already available or potentially available in the Tribal Trust Lands for the adoption of recommended practices, facilitated by extension services, co-operatives, credit (Agricultural Loan Fund) and guaranteed prices for the main agricultural products.

A further assumption was that individuals could increase agricultural productivity from present low levels with their existing labour, livestock and land.

This initial substantive two-variable hypothesis can be illustrated by the simple model outlined in Figure 1.

FIGURE 1

CHIDUKU STUDY : MODEL OF THE INITIAL SUBSTANTIVE HYPOTHESIS

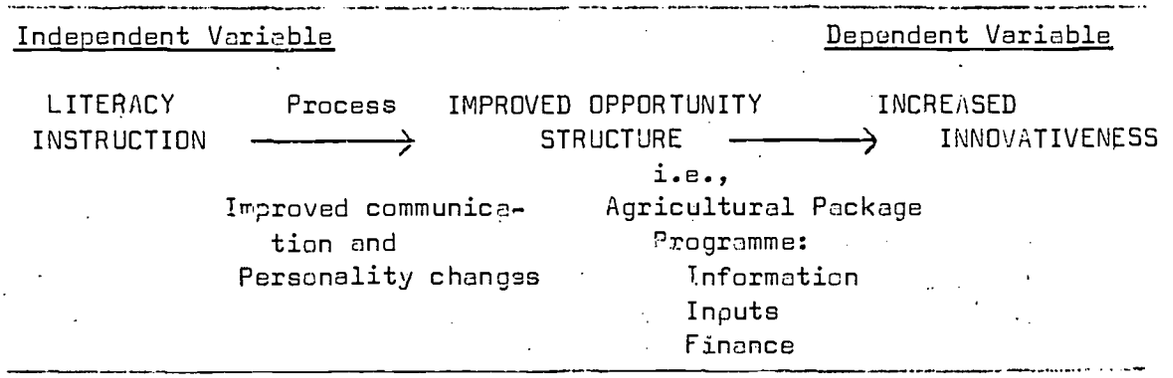


Following the Chiduku study, which was in the nature of a pilot investigation (and to some extent a feasibility study to assess the viability of accelerated literacy instruction) it was apparent that there was a need to control major extraneous variables (i.e., improve the opportunity structure) in order to give participants more equal opportunities for innovativeness. This was achieved by organising an agricultural package programme for the Seki study, and literacy input was at both 'elementary' and more 'advanced' levels.

This can be illustrated by a model of the revised substantive hypothesis which is given in Figure 2.

FIGURE 2

SEKI STUDY : MODEL OF THE REVISED SUBSTANTIVE HYPOTHESIS



RESEARCH DESIGN

To some extent circumstances dictated the choice of quasi-experimental design in this study. An investigation in 1968 showed that there were no literacy programmes functioning in the Tribal Trust Lands, and it was impossible to trace participants who had taker part in a pilot literacy scheme undertaken by the churches and the university in 1965.

There was thus no readily available situation which offered material on literacy gains, nor the possibility of ex post facto correlational research on the effects of literacy instruction in African rural areas. Bennett and Leonard (1970) have suggested the desirability of experimental design rather than survey and other non-experimental designs which dominate rural sociological research at present.

The main advantage of experimental design is that it permits the testing of causal hypotheses compared with hypothetical assumption based on correlational analysis.

Bennett and Leonard (1970) propose that the best form of experimental study is the field experiment undertaken in conjunction with planned change. Random assignment and the probability test can take the place of laboratory control. This reduces the artificiality of the experiment and increases the practical significance of the results. However, they note the paucity of field experimentation reported in the literature of rural sociology and only one study which fully meets the requirements (especially random assignment) of Fisher's (1935) experimental design. Kerlinger (1964: 382-386) also discusses the advantages and weaknesses of field experiments, and points out the suitability of field experiments to test broad hypotheses.

Control Groups

Practical difficulties in setting up experimental and control groups dominated the research design in both investigations and are considered in some detail.

If control groups are to be established in separate areas, there is the problem of finding analagous (matching) areas. There is also the problem to be overcome of subjecting individuals and communities to testing and survey without the benefits of the programme - the people concerned may not only be suspicious, but may also feel deprived at not being given the same opportunities to become literate as the experimental group.

Various suggestions were put forward at the Unesco Evaluation Workshop (Wood,1969: 109) to overcome problems associated with control groups. One of the solutions involves a series of 'experimental' villages and 'control' villages in a study lasting several years. As the programme proceeds people in the control village are promised that the programme will be introduced into their area in the next year, and they thus become the next experimental village.

This was the general technique used to establish control groups at Chiduku and Seki. However, in addition to the difficulty of matching areas, another problem is to ensure that during the experimental period any extraneous factor introduced into the experimental group or the control group is introduced into both of them equally. This is extremely difficult to control, and for this reason, following attempts to match areas in both investigations experimental and control groups were made up of individuals drawn from the same area.

The disadvantage of possible contamination of control groups by the experimental treatment was considered to be less than inclusion of, possibly unknown, variables occurring between different areas which might cause effects greater than could be attributed to the experimental treatment.

The technique of drawing the control group from a "waiting list" of subjects who volunteer for treatment overcomes what Suchman (1967: 348) calls the problem of service orientation - caused by the reluctance of social action agencies to withhold services from randomly selected applicants. However, the problem of self-selection remained.

There was no way to control the flow of persons who wished to enrol in the literacy programme either at Chiduku or Seki, where participation was called for on a voluntary basis.

There is the possibility, therefore, that early volunteers who made up the experimental groups in both investigations, may be more highly motivated and innovative than later volunteers who made up control groups.

A serious limitation associated with self-selected subjects is the non-randomness of samples. In field experiments complete control of a multi-variate situation is impossible and the selection of random samples is theoretically the solution to the control of unknown variables which may be highly relevant to the experiment and distort one or other of the samples.

Ideally the subjects in this study should have been selected at random from the illiterate population of the areas concerned and then divided into experimental and control groups at random.

However, in practice, a compromise with the ideal of random selection is often dictated by practical circumstances. There may be no alternative to non-probability sampling, because in action programmes related to development a 'captive' audience is unlikely. More usually the participants are volunteers. The very fact that they are volunteers means that they do not accurately represent a wider population other than volunteers similar to themselves.

Another problem associated with volunteers in an extended study is the drop-out of subjects which reduces sample size and thus the precision of an experiment.

The longer an experiment runs in a free community setting, the larger is the number of cases lost. (This 'experimental mortality' means that the terminal groups have most probably lost their random character even if randomisation was possible at the outset).

Experimental mortality and small sample size affects generalisability in field experimentation. Very often in an action programme one is working with relatively small groups and the solution of increasing the sample size to make it more representative of a wider heterogeneous population is not possible. This was the case at Chiduku and Seki where the sample size was determined initially by the number of adult volunteers for the literacy course, and at terminal evaluation, by the number of those who could be contacted for interview.

In the absence of randomised samples and the infeasibility of matching individuals, in order to establish some degree of equivalence the groups as a whole were compared on the variables of initial literacy level, and on an initial measure of innovativeness.

The Median Test (Siegel, 1956: 111-112) was used to compare the experimental groups with the control groups on these two variables.

X^2 tests indicated that on initial literacy level and the initial level of innovativeness, the experimental and control groups in both investigations did not differ significantly. This increases confidence that any difference between the groups at terminal evaluation was due to effects of the 'treatment'.

Quasi-Experimental Design : Validity

Quasi-experimental design is resorted to in natural societal settings where the experimenter lacks full control and the random assignment of subjects. The investigator aims to select for study two naturally existing groups which are as similar as possible. (Campbell, 1957).

The experimental design used in both the Chiduku and Seki studies is described by Campbell and Stanley (1966: 47) as the 'non-equivalent control group design' where the experimental and control groups do not have sampling equivalence prior to the experiment. This is the design most commonly used in educational experiments. A major threat to the internal validity of the non-equivalent control group design is the possibility of interactions between selection factors and other factors, which might be mistaken for experimental treatment effect. The main question of control (already discussed) is the similarity between the two groups.

The pre-test is commonly used to measure similarity and the assumption is made that the pre-test has a definite relationship to the dependent variable. However, similar pre-test results for the two groups does not eliminate the possibility of selection factors interacting with other factors. Despite this possibility it is generally accepted (Campbell and Stanley, 1966: 48) that the more similar the experimental and control groups are in their recruitment, and the more this similarity is confirmed on the pre-test, the more effective the control becomes.

In addition, a replicated experiment enables comparisons between experimental treatment groups to check the consistency of any experimental effect.

Although the self-selected version of non-equivalent control group design is much weaker than equivalent control design, Campbell and Stanley (1966: 50) consider that it does provide information which in many instances would rule out the hypothesis that the treatment has an effect. Kerlinger (1964: 314-316) agrees with Campbell and Stanley, and with the procedures used in this study to establish 'equivalence between the groups in the absence of random selection, random assignment or matching'.

External validity is concerned with the generalisability of the results of the experiment to wider populations and to other situations. Generalisability depends upon randomness, and thus the external validity of this type of design is questionable although it may be increased by replication studies.

Before and After Measurement

Initial measurement of innovativeness in both the Chiduku and Seki studies was designed to eliminate the sensitising effects associated with pre-testing.

At Chiduku there was a single administration of the checklist of adoptions at terminal evaluation. This involved simultaneous pre- and post-measures of the dependent variable-innovativeness.

It must be noted that at Chiduku the measurement of innovativeness depended to a considerable extent on the respondents' ability to recall when improved practices were actually adopted.

At Seki an agricultural package programme was initiated - this was planned following a problem study of late crop planting and needed innovations to overcome this problem. The adoption of innovations by participants in the package programme was then recorded.

At both Chiduku and Seki the 'before' treatment measures were limited to the collection of student personal data and literacy pre-tests.

This limitation was thought desirable, because there was little prior indication which illiterates would, in fact, participate. It was also feared that detailed bench-mark information would not be forthcoming at the commencement of the investigations because of the people's suspicions of fact-gathering.

Timing of measurement is a problem in evaluative research (Freeman and Sherwood, 1965; Hyman and Wright, 1967). Very often it is not certain when programme effects can be expected.

At both Chiduku and Seki measurement of innovativeness was undertaken in the farming season following the experimental literacy treatment.

The durability and stability of effect is also questionable. Caro (1971) suggests that the problem may be tackled by continuous or at least repeated measurement. Repeated measurement over two farming seasons was undertaken in the Seki study, but was impractical at Chiduku.

The independent Variable: Literacy input

The independent variable - literacy instruction, was in the form of accelerated literacy courses, which have already been described in some detail, Smith (1969 and 1970b).

The independent variable can be most precisely defined in operational terms on the basis of literacy gain scores at the end of the courses and crude literacy levels derived from these. Although this is not entirely satisfactory because it does not reflect other possible gains from exposure to the course other than just mechanical ability in reading, writing and numeracy.

The dependent variable: innovativeness

The trait innovativeness is usually indexed by asking respondents when they adopted certain recently introduced ideas (Rogers and Svenning, 1969: 86).

The time required for a respondent to adopt these new practices is then compared with other respondents in the same social system, and used as a measure of his innovativeness.

The procedure for measuring innovativeness differed between the Chiduku and Seki investigations, but was concerned with

measuring innovativeness as a dichotomous variable - 'adopted' or 'not adopted' at the time of interview, and involved physical checking as evidence of adopted practices whenever feasible.

A checklist of items was used to measure innovativeness at Chiduku at the end of the farming season. This has already been described, Smith (1970a). For the Seki study a structured interview schedule was designed and administered in stages throughout the farming season.

The dependent variable is defined in operational terms as the innovativeness scores derived from the Chiduku Checklist or the Seki Interview Schedule.

At Chiduku the checklist was used to index the number of innovations (adopted by respondents during the farming season following literacy instruction) from a wide universe of possible improved practices which were considered to be desirable and feasible in an uncontrolled field setting.

At the conclusion of the Chiduku study it was felt that this procedure was not satisfactory as a method of measuring innovativeness.

Firstly, the behaviour domain was too broad, covering crop, livestock and home economics practices in a free setting, and it became obvious that with non-random samples there was a need to narrow the field of behaviour in order to control some of the most important extraneous variables and thus give respondents more equal opportunities to be innovative. Holden (1972) has pointed to the assumption commonly made in innovation studies that the infrastructure for the adoption of innovations, exists, whereas, in fact, failure to adopt may be failure of part or all of the infrastructure.

Secondly, it was felt that the dependence upon recall data from respondents regarding the time of adoption of a new idea was unsatisfactory. ((This is a common weakness of diffusion research: Rogers and Shoemaker, 1971: 78).

In addition, it was apparent that in the early stages of agricultural development there are certain basic improved practices which have much greater priority and relevance for development than others, and that these would be a more specific and appropriate criterion measure than the heterogeneous checklist measure.

For these reasons respondents in the Seki study who made up the experimental and control groups were selected from members of savings clubs who took part in an agricultural package programme - each growing half an acre of maize. This has been described by Smith, 1971 and 1972).

In the package programme there were nine basic operations (improved practices, or combinations of improved practices) as follows:-

Liming		
Manuring	Pest Control	Soil Organic Matter,
Ploughing	Fertiliser Top-dressing	and
Planting	Weeding	Grain Storage.

The recommendations in the programme for each operation were derived from agricultural research findings but were carefully adapted to the local circumstances.

Discussions with the local priest involved in the project and the Fertiliser Company Agronomist (following an informal cropping survey of the area in 1969) established that, for all practical purposes, the level of innovations (based on these recommendations) for potential respondents was zero before the introduction of the package programme.

A structured interview schedule was then constructed with sections for each of the nine operations. The schedule was administered in stages after the completion of each operation, and respondents were questioned on how they had carried out each operation. Most of the practices were then physically checked, or cross-checked with other data - e.g., fertiliser orders.

During the interviews respondents were also tested informally on their knowledge of the main points in each operation. At the conclusion of the farming season yields from the half acre maize plots of respondents were measured.

Innovativeness scores were derived from the Seki Interview Schedules by the author in consultation with the Research Assistant. Any doubtful scores were moderated by the Fertiliser Company Agronomist.

There is a serious problem of obtaining reliable data in the peasant setting (e.g., Castillo, 1969: 135-142). For this reason, a deliberate and continuous effort was made to ensure the accuracy of innovation data. Both of the data collection instruments were constructed following a survey of the particular situation and discussion with programme administrators and other experts on what information was required and which questions were appropriate to yield this data. This was followed by a try-out of the instrument in conditions as similar as possible to those in the real situation.

The Shona research assistant who acted as interviewer in both studies assisted in the construction of the instruments, translation into Shona and pre-testing. He was thus thoroughly familiar with the content, standard procedures and the way he would have to function in the field. He also had a thorough knowledge of the people and their customs.

It has been shown that the personal attributes of the interviewer influence a subject's responses. (Rosenthal, 1963). In order to guard against interviewer bias and other errors in data collection, physical checks of innovations were undertaken by the interviewer and by the author.

A special effort was made to complete the collection of data as soon as possible from absentees, etc., Interview data was cross-checked with other information from earlier interviews and from other records, e.g., purchases of fertiliser and any apparent inconsistencies were investigated by the author. This gave an

opportunity to cross-check about 5% of the data personally in the field.

Analysis of data

In this study, test of the null hypothesis was limited to the median test. The procedure described by Siegel (1956: 111-112) was followed.

Adoption of innovations in the Chiduku study was measured on a simple adoption scale ranging from 0-105, with a score of one for the adoption of each innovation in the farming season following the literacy course.

However, Rogers and Shoemaker (1971: 136) have drawn attention to the fact that the tendency to regard all innovations as equivalent units is a dangerous over-simplification. At the conclusion of the Chiduku study the author was aware of this weakness - the non-equivalence of innovations, and, therefore, in the Seki study the nine operations making up the interview schedule were analysed and weighted according to their relative importance in crop production and complexity.

The points awarded and method of scoring for each operation were decided in discussion with two judges - the Fertiliser Company Agronomist involved in the package programme, and the research assistant. The final scale agreed upon consisted of 26 points for the nine operations.

THE SEKI INVESTIGATION : LITERACY EFFECTS

Full-time accelerated literacy courses with sixty-five participants were held during June and July, 1970, for members of three savings clubs in the Seki area.

The first objective was to replicate as closely as possible the full-time pattern of literacy teaching developed for the Chiduku study, i.e., Part I of the course consisting of the eighty-five lessons of the A.L.C. Shona primer (subsequently restructured into 106 lessons), and then in Part II teaching those new literates who completed the primer how to keep simple farm and household records.

The second objective was to overcome weaknesses in the Chiduku study by structuring a follow-up programme (half-acre maize 'package programme') which could be more tightly controlled and thus evaluate more carefully the relationship between literacy and innovativeness. In addition to providing participants with more equal opportunities for innovativeness, the author wished to study the effects of controlling some of the major extraneous 'inability' variables and to provide relevant innovation information from credible (trusted) sources.

The experimental and control groups

Both the experimental and control groups were drawn from the same areas during the first demonstration on land preparation in the package programme. Before this first demonstration it was not

known which individuals would participate in the package programme.

Of the seventy-five volunteers there was some wastage due to some individuals who were sick, others were away for a long period over Christmas; several were cultivating relative's land and those who did not have sufficient savings to cover the cost of inputs were not allowed to participate in the 1970/1971 package programme. The final groups consisted of twenty-nine experimentals and twenty-seven controls made up of 'slow' and 'advanced' individuals, as follows:-

FIGURE 3

COMPOSITION OF EXPERIMENTAL AND CONTROL GROUPS : SEKI

75 Initial Volunteers

↓

56 Final respondents.

	Experimental Groups (N=29)		Control Groups (N=27)	
	'Slow'	'Advanced'	'Slow'	'Advanced'
Besa	5	7	6	6
Madamombe	1	6	2	6
Ushewokunze	6	4	4	3
	N=12	N=17	N=12	N=15

The groups were compared on the variables of age and initial literacy level. It was considered that for practical purposes all respondents were at the same zero level for innovativeness in the half-acre maize package programme (for this reason all progressive farmers such as Master Farmers and any previous participants were discarded from the groups).

Initial literacy levels of the control groups were determined firstly by checking the length of previous schooling 'Controls' with two years of previous schooling or less were then given the literacy pre-course tests. The total scores used to compute initial literacy levels were combined with those of the experimental 'slow' group for the median test.

Those 'controls' with more than two years of previous education were combined with the experimental 'advanced' group and ranked on the number of years' previous schooling for the median test. Table 1 gives the results of this comparison and the probability of X^2 based on the median test.

TABLE 1

SEKI EXPERIMENTAL AND CONTROL GROUPS COMPARED

	Median Age	Median Literacy level
Control Group 'Slow'	51,0	2,0
Experimental Group 'Slow'	51,5	1,8
Probability level for X^2	$> ,99$	$> ,99$
Control Group 'Advanced'	40,0	3,5
Experimental Group 'Advanced'	43,0	3,8
Probability level for X^2 (Two-tailed test)	$,02 < P < ,05$	$> ,99$

It can be seen from Table 1 that the difference in initial literacy levels was not statistically significant between the experimental and control groups, suggesting that they were initially similar on the independent variable literacy. The 'advanced' experimental group was significantly older than the 'advanced' control group.

In the Seki study data was collected from the fifty-six respondents on the setting (constraints) within which their actions in the project took place. Following each of the nine operations each respondent was questioned concerning labour availability and other problems limiting the adoption of recommended innovations.

The major limiting factors reported are summarised below:-

36 reported labour problems in varying degrees
34 had no oxen (or trained oxen) of their own for ploughing
42 did not own a functional scotch cart for transport
29 did not own a plough in reasonable repair
42 did not own either a harrow or cultivator for weed control
12 did not own any cattle for making kraal manure.

Respondents' answers were checked physically whenever possible.

These constraints were spread over the four groups as outlined in Table 2.

TABLE 2

CONSTRAINTS LIMITING THE ADOPTION OF INNOVATIONS : SEKI

	Experimental Groups		Control Groups	
	'Slow' (N=12)	'Advanced' (N=17)	'Slow' (N=12)	'Advanced' (N=15)
Labour shortage	7	11	8	10
No oxen	6	8	9	11
No scotchcart	8	13	10	11
No plough	7	9	5	8
No harrow or cultivator	9	12	10	11
No cattle	2	2	5	3

It can be seen that these limitations were spread relatively evenly over the experimental and control groups, except that the control groups were at a disadvantage in the number of available oxen for ploughing and livestock for making manure.

Measurement of innovativeness

The structured interview schedule was used to measure innovativeness for both the experimental and control groups. This was administered by the research assistant. Inconsistent data was cross-checked by the author and,or, the local priest.

There were nine basic operations (innovations or combinations of innovations) in the project. Respondents were asked whether they had attended the relevant demonstration, and how they had carried out the particular operation. It was not possible to check whether a person had actually attended a particular demonstration, but most of the practices were physically checked - e.g., plant spacing, etc., and others were cross-checked with individual fertiliser orders, etc., However, in some cases it was not possible to verify information, e.g., amount of manure applied - this may have been ploughed into the soil, whether fertiliser had been used to top-dress the project half-acre or whether it had been spread over a larger area. Nevertheless, it is considered that the Seki innovation data is as accurate as it is possible to obtain in the peasant setting.

The innovations were scored as follows:-

1. Lime. Recommended amount, correctly applied. (2).
2. Manure. Recommended amount, or all available, or, for non-stock owners - collection from the bush or compost. (2).
3. Ploughing. Land ready to plant before planting rain. (3).
4. Planting correctly carried out:

Time	(1)
Spacing	(1)
Fertiliser	(3)
Seed	(2)

5. Stalkborer control. DDT correctly applied.
   First application (1)
   Second application (1).
6. Fertiliser top-dressing correctly applied.
   First application (2)
   Second application (1).
7. Weeding.
   Before germination (1)
   At least twice after germination (1).
8. Soil Organic Matter - sustained effort to utilise stover and make manure/compost. (2).
9. Grain storage.
   Protection of cobs. (1).
   Protection of grain. (1).
   Improvement of granary. (1).

The weighting scheme of 26 points was constructed by the judges (the Fertiliser Company Agronomist, and the research assistant with the author) on the basis of the difficulty/complexity of the innovation and its contribution to total crop response, and

was spread as follows:-

Pre-planting operations: 7 points
Planting operations: 7 points
Post-planting operations: 7 points
Supplementary operations
(Organic matter and grain storage): 5 points.

The experimental and control groups were combined and the respondents were ranked according to their raw scores for the median test. Table 3 sets out the total scores, the medians and ranges of scores for the four groups with the probability values of X^2 based on the median test.

TABLE 3

INNOVATION SCORES : SEKI EXPERIMENTAL AND CONTROL GROUPS (1970/1971)

	'Slow' Groups		'Advanced' Groups	
	Experimental (N=12)	Control (N=12)	Experimental (N=17)	Control (N=15)
Maximum possible score:	312	312	442	302
Actual score:	248	217	302	289
Range (Max.=26):	(11-26)	(10-23)	(11-22)	(15-23)
Median:	19.0	18,5	17,5	19,0
Probability level for X^2 (One-tailed test)	$> ,49$		$15 < P < ,25$	

It can be seen from Table 3 that the difference is not statistically significant between either the 'slow' or 'advanced' experimental and control groups. Thus there is insufficient evidence to disprove the null hypothesis that there is no relation between simple literacy instruction and innovation scores. In fact, individuals in the 'advanced' control group appear to be slightly more innovative than the 'advanced' experimental group if their greater constraints are taken into account.

There is thus insufficient evidence to accept the substantive hypothesis that literacy input (i.e., attendance at accelerated literacy courses) and innovativeness are related.

It is interesting to note the literacy gains of students in the 'slow' experimental group. Assessment of post-course attainment showed that:

Four had satisfactorily completed the primer
Five had made some progress
Three had made nil or little progress.

The individual who had the maximum score for innovativeness was in the 'slow' experimental group and had made nil progress at the end of the literacy course, and was still illiterate at the time of retention testing.

During the interviews to ascertain how well practices were carried out, respondents were also tested informally on their knowledge of the main points in the particular operation. There was a total of twenty-seven questions on the nine operations.

The experimental and control groups were combined and the respondents were ranked on their raw test scores for the median test. Table 4 sets out the total scores, the medians and ranges of scores for the four groups with the probability values of X^2 based on the median test.

TABLE 4

KNOWLEDGE OF INNOVATIONS : SEKI EXPERIMENTAL AND CONTROL GROUPS

	'Slow' Groups		'Advanced' Groups	
	Experimental (N=12)	Control (N=12)	Experimental (N=17)	Control (N=15)
Max. possible score:	324	324	459	405
Actual score:	182	168	263	232
Range (Max.=27):	(8-23)	(8-18)	(10-21)	(8-21)
Median:	17,0	16,0	15,5	15,0
Probability level for X^2: (One-tailed test)	,15 < P < ,25		> ,49	

It can be seen from Table 4 that the difference is not statistically significant between either the 'slow' or 'advanced' experimental and control groups. This finding gives support to the previous conclusion that there is insufficient evidence to disprove the null hypothesis, i.e., there is no relation between simple literacy instruction and innovation scores.

Data was also collected on the number of demonstrations (total=5) which each respondent attended. This information was impossible to cross-check. However, many respondents who admitted missing particular demonstrations appear to score badly on innovativeness and knowledge for related items, although some who did not attend a demonstration appear to understand and perform as well as those who attended. Further questioning of these latter individuals indicated that they acquired knowledge of certain innovations from the savings club field-worker, the local priest, the research assistant, from others who attended the demonstration or from printed handouts in Shona which were given to all package programme participants.

An attempt was also made to assess the degree of carryover of innovations from the half-acre maize project field to other maize fields and crops.

However, it soon became apparent that shortage of money (and labour to a lesser extent) was a limiting factor, and that generally only relatively 'cheap' innovations such as stalk borer control, light fertiliser top-dressings and weeding were carried over to other fields.

The mean yield of maize on the half-acre project plots for seventy-one respondents in the package programme (including fifty-six in the experimental and control groups) from whom accurate yield figures were obtained was 10,0 bags of grain per acre - with a range of 0 to 24 bags per acre.

The ranges of yields and median yields for the four groups are given in Table 5.

TABLE 5

MAIZE YIELDS (1970/1971) SEKI EXPERIMENTAL AND CONTROL GROUPS

	200 lb. Bags of Grain per Acre			
	'Slow' Groups		'Advanced' Groups	
	Experimental	Control	Experimental	Control
Range	(4-16)	(5-20)	(5-24)	(1-22)
Median	8	11	10	7½

(Yields were rounded to the nearest bag per acre)

Part of the yield variance is due to local differences in rainfall, soils, weeds (especially the parasitic witchweed) vermin damage and local infestations of stalkborer.

The experimental and control groups were combined to compare innovation scores with crop yields. The Spearman rank difference correlation was calculated. Obtained ρ = ,83 with N=56, significant at the ,01 level (one-tail test).

Innovativeness in the 1971-1972 Package Programme

It was intended that the same fifty-six respondents making up the experimental and control groups would be followed up a year later and measured for innovativeness in the 1971/1972 expanded package programme.

However, there was 'experimental mortality' - three of the respondents were absent from the area and did not take part in the project, data was incomplete for one individual and two of the 'advanced' control group attended literacy continuation classes during 1971/1972. The fifty survivors made up the groups as follows:-

Experimental Groups		Control Groups	
'Slow' (N=11)	'Advanced' (N=14)	'Slow' (N=12)	'Advanced' (N=13)

In addition, it was found that the recommendations for groundnuts and sorghum in the updated package programme were only implemented fully by about twenty-five participants due to a shortage of money to purchase inputs, although recommendations for maize were followed by most participants. For this reason measurement of "innovativeness" was again limited to maize project fields and the same procedure was followed as in 1970/1971. Table 6 sets out the total scores for innovativeness, the medians and ranges of scores for the four groups with the probability values of X^2 based on the median test.

TABLE 6

'INNOVATION' SCORES: SEKI EXPERIMENTAL AND CONTROL GROUPS (1971/1972)

	'Slow' Groups		'Advanced' Groups	
	Experimental (N=11)	Control (N=12)	Experimental (N=14)	Control (N=13)
Max. possible score:	286	312	364	338
Actual score:	242	258	283	279
Range (Max.=26):	(15-26)	(13-24)	(12-23)	(14-26)
Median:	21	20,5	20,0	20,5
Probability level for X^2 (One-tailed test)	> ,49		> ,49	

It can be seen from Table 6 that the difference is not statistically significant between either the 'slow' or the 'advanced' experimental and control groups. However, the overall scores are slightly higher than the 1970/1971 innovation scores (Table 3). This is to be expected in the second year - the scores do not really reflect innovativeness but are a useful confirmation of the previous year's findings that there is insufficient evidence to disprove the null hypothesis, and appear to show no delayed literacy effect in the experimental groups.

Home Economics Innovations

Although the measure of the dependent variable - innovativeness, was limited to crop practices in the agricultural package programme, a supplementary study of the adoption of home economics innovations was undertaken in Seki for comparison with the Chiduku findings (Smith,1970a).

This was in the nature of a follow-up survey of all students who attended classes regularly in the 'Modified Literacy Follow-up Programme' (Smith, 1971) during July to September, 1971. The survey was undertaken partly to collect data for future programme planning.

An interview schedule consisting of personal data for each respondent with questions on clothing, cooking and health (the main subjects in the programme) was constructed and administered by the research assistant who interviewed respondents approximately three months after the conclusion of the 'Modified Literacy Follow-up Programme'. The group consisted of eighty-three women (married and widows) and thirty-six girls (i.e., unmarried women).

Table 7 gives the median ages, ranges of ages and mean years of previous schooling for these women and girls.

TABLE 7

STUDENT CHARACTERISTICS: MODIFIED FOLLOW-UP PROGRAMME, SEKI

	Women (N=83)	Girls (N=36)
Ages (Range):	(22-60)	(14-23)
Median Age:	37,5	17,8
Mean years of previous schooling:	3,8	6,8

Clothing innovations

Only twenty-four women and seven girls (i.e., about 25% of the group) reported that they made their own (or family's) clothing and none of these reported any innovations in making clothes subsequent to attendance at modified follow-up classes.

Reasons given for not making clothes were as follows:-

(Some multiple responses)

Shortage of money	76
Lack of equipment (only ten respondents own a sewing maching)	66
Unable to use patterns	16
Cannot sew	15
Poor eyesight	8
Not interested	2
Illness	1
Too busy	1
It is slow work	1

(In the literacy classes following the clothing demonstrations students were asked to write a short essay on problems involved in dressmaking. Of 117 essays submitted, 115 students mentioned shortage of money as a major problem, despite the fact that clothes can be made locally for less than half of the cost for which they are sold in the shops).

Cookery innovations (baking)

During the cookery demonstrations in the modified literacy programme it was ascertained that baking (bread, cakes, scones, biscuits) was the most popular subject - selected by 112 from a total of 119 students.

Of the 119 respondents, 72 reported that they had used one or more of the four baking recipes. Frequency of use appears to depend mainly on the availability of ingredients, i.e., money. Of those who had adopted a new baking recipe, sixty-five attributed

the source of innovation to cookery demonstrations and seven to literacy classes in the modified programme.

The forty-seven respondents who had not adopted new baking recipes gave the following reasons for non-adoption:-

Unavailability of certain ingredients (e.g., cooking oil, milk powder, flour, etc., i.e., shortage of money	30
Shortage of pots and pans, etc.,	16
Unsure of recipes	1

Health innovations

Part of the modified literacy follow-up programme consisted of lessons and discussions on typhoid fever and bilharzia - two serious diseases which are endemic in the TTL's.

The following responses were given to questions on the cause and prevention of these diseases:-

"How does a person get typhoid fever?"	106 Satisfactory answers.
"How can you prevent typhoid fever?"	85 Satisfactory answers.
"How does a person get bilharzia?"	102 Satisfactory answers.
"How can you prevent bilharzia?"	77 Satisfactory answers.

No respondent reported boiling drinking water (there is a great shortage of firewood in Seki) or improvement of the water supply (prevention of typhoid) subsequent to the modified follow-up literacy classes.
Reasons given were:-

No firewood to boil water	51
Cost of fencing to keep cattle out of water holes	27
Cost of lining and cover for well	17
Cost of digging/deepening well	16

Only eleven respondents reported that they had a latrine (prevention of typhoid and bilharzia). These were all built before the first literacy courses.

Reasons given for no latrine were:-

No money for a builder or materials	73
Nobody to dig the hole or construct the building	20
Newcomers to the area	7
Latrine collapsed in the rains	4
Planning to build a latrine	3

Discussion: Adoption of Home Economics innovations

It should be noted that the baking recipes are simple innovations which require relatively little money or labour compared with improved clothing, water supply and latrines.

This can explain the high reported number of home economics innovations in the Chiduku study which were also relatively undemanding in money and labour.

The main reasons given for non-adoption of home economics innovations at Seki were 'inability' factors - shortage of labour, equipment and money. This tends to support the findings on innovativeness in the agricultural package programme - that there is insufficient evidence to disprove the null hypothesis - that there is no relation between simple literacy instruction and innovativeness.

CONCLUSIONS

Limitations and weaknesses of the study

There are many problems which confront the researcher in a field setting. In both investigations there were practical problems related to voluntary participation. The consent and co-operation of the participants had to be gained, and there was also the physical difficulty of communicating with individuals - to participate in the project, to attend for testing and for data collection. It is much more time-consuming, costly and difficult to control an investigation with volunteers than with a captive audience. Perhaps the major limitations and weaknesses in this study are due to the fact that for this type of rural social action programme the participants are necessarily volunteers.

This factor dictated the setting up of the experimental and control groups at different times on a voluntary basis, and it also necessitated the pre- and post-measurement of literacy effect (the adoption of innovations) being undertaken together as a combined 'post' measure at Chiduku.

The major weakness in the study is the small size and lack of random samples and random assignment to the experimental and control groups. In the circumstances this was not feasible, and the most that could be done to equate the two groups was to use a similar selection procedure, and to compare the groups on variables considered to be relevant to the independent and dependent variables. This lack of random sampling limits the conclusions to the sub-populations studied and caution must be exercised in generalising to any wider 'hypothetical parent population'. Also, in short-run change studies, changes in dependent variables are likely to be small compared with measurement errors. For instance, respondents may be affected by transient personal factors such as fatigue or lack of time. However, considering the degree of built-in physical checking in both studies, it is felt that this was not a major source of error.

A more serious source of measurement error is possibly interviewee bias and the measurement of innovativeness at Chiduku.

Innovativeness at Chiduku was measured terminally at the end of the farming season, compared with continuous measurement throughout the farming season at Seki. More time was spent interviewing the

experimental group at Chiduku than the control group, who were not so familiar with testing and fact collection, nor were they so well known to the interviewers. Also, because they received relatively more attention than the control group, it is possible that the experimental group at Chiduku had greater expectations (Hawthorne effect) following the treatment compared with the Seki experimental groups. At Seki, experimentals and controls received more equal attention - controls attended demonstrations and participated in the package programme.

The author felt dissatisfaction with the appropriateness of the measure of innovativeness at Chiduku, and in the Seki study the checklist was discarded in favour of examining innovativeness in a much more precise behaviour domain, with more rigorous control of extraneous variables. The Chiduku findings on innovativeness must, therefore, be viewed with considerable reserve.

The advantages of selecting the experimental and control groups from the same area, and the danger of experimental contamination of the control groups have already been discussed.

The possibility of this danger must be considered particularly in relation to the Seki findings where differences in innovation scores were not statistically significant between experimental and control groups.

However, it is considered that the nature of the experimental treatment was such (attendance at literacy classes at the local school, primer and supplementary materials not directly related to the package programme) that contamination of the Seki control groups and any experimental literacy effect on their innovation scores is extremely unlikely.

A comparison of the two investigations

Both investigations were based on substantive hypotheses that literacy instruction is positively related to innovativeness, adoption of innovations being the characteristic selected as evidence of individual modernisation.

The independent variable - literacy instruction was structured in both studies in the form of accelerated, intensive literacy courses, and it may be asked to what extent literacy was achieved. Findings from the post-course tests show that in both studies (particularly in the Seki 'slow' classes) not all the students had sufficiently high literacy gain scores to be considered as having completed the primer satisfactorily (i.e., achievement of 'simple' literacy at an 'elementary' level). Of these students some were illiterate at the beginning of the course and were still illiterate at retention testing some time later after the conclusion of the course.

This means that the instrumental aspect of the treatment (i.e., acquisition of the mechanics of reading, writing and arithmetic) was ineffective with a proportion of students in both investigations.

Despite some variations (e.g., lesson sequence, modifications to tests, etc.,) for all practical purposes the independent variable (literacy input) and measures can be considered to be broadly equivalent at both Chiduku and Seki.

It has already been noted that the dependent variable - innovativeness, was measured differently in the two studies. Following the Chiduku study it was felt that, in view of the small non-random samples involved, particular attention must be paid to the control of important extraneous variables. In analysing the reported adoption of innovations at Chiduku it was also felt that there was a need to improve the appropriateness of the dependent variable measure.

The author considers that this was successfully achieved in the Seki investigation by studying innovativeness within a carefully planned agricultural package programme based on savings clubs, and selecting the experimental and control groups from participants.

The Chiduku study was valuable because it gave an opportunity to test the accelerated literacy approach and measurement instruments, and later improve on these.

With regard to replication of the studies it should be noted that the two areas are not equivalent ecologically - Seki has a more reliable rainfall. Seki is also served by a better public transportation system, and is close to the capital city, Salisbury. In addition, the source of innovation information (associated with fertiliser company/priest/church/ savings clubs) was more reliable and trusted than at Chiduku. It is felt, however, that the differences in measured literacy effect (innovativeness) between the two studies can best be explained in terms of better experimental control at Seki. In addition, because of relatively easier access and the fact that the Research Assistant lived semi-permanently in the area, measurement of innovativeness was supplemented by more detailed physical checking than at Chiduku. For example, many participants could not measure a half-acre plot and needed assistance, particularly with odd-shaped fields or land with rocky outcrops.

Experience gained in the two studies underlines the importance in the peasant setting of checking each response physically whenever possible if accurate data is to be obtained.

Reconsideration of the substantive hypotheses

The conclusion reached from the available evidence at the end of the Chiduku investigation was that literacy instruction and the adoption of improved crop and home economics innovations appear to be positively related. (However, there were serious misgivings concerning the influence of extraneous variables on the obtained measures of innovativeness).

The findings in the Seki investigation indicated that literacy instruction and innovativeness do not appear to be related

(in the context of the agricultural package programme - at both the 'slow' and 'advanced' class levels of education) and there appeared to be no delayed literacy effect on innovativeness in the second year of the investigation.

Weighing the evidence in these two investigations, and particularly taking into account the more rigorous experimental control and criterion measurement at Seki, there is insufficient evidence to refute the null hypothesis that there is no relation between simple literacy instruction and innovativeness.

From these findings, taken together with supplementary evidence from both studies on extraneous variables (constraints on innovativeness), it may be cautiously concluded that 'simple' illiteracy does not appear to be an immediate major obstacle to agricultural development in the Tribal Trust Lands.

However, this conclusion must be limited to particular situations involving the adoption of relatively simple innovations which can be demonstrated in a very practical manner in an agricultural package type of programme designed for the early stages of agricultural development. As a development project becomes more complex and involves the management of a large number of factors - integration of crops and livestock, cash cropping and such factors as forward planning and budgeting - literacy may well be an important correlate of innovativeness and thus individual modernisation and agricultural development.

This conclusion should also be limited to the Rhodesian Tribal Trust Lands, where the largest group of adults has already received several years of primary schooling, and where there is thus a proportion of literates at various levels of attainment who make possible the functioning of 'enabling' organisations for local development such as savings clubs. (Smith, 1971).

The evidence from both studies also supports the proposition that even if it is shown that literacy is positively related to the adoption of more complex innovations at later stages of agricultural development it would be more effective in terms of cost/benefits to concentrate instruction on the semi-literates (i.e., 'advanced' classes).

The conclusion that simple literacy instruction and innovativeness are not related in early-stage agriculture is supported by Hsieh (1969) who has argued that literacy is not an obstacle in teaching farmers the new technology - varieties and production methods, involved in the 'green revolution'. For example, illiterates have improved their production through communication other than the written word, e.g., demonstrations and explanations by extension workers and personal contact between farmers.

A similar conclusion was reached by Fliegel (1966: 15-28, and 1967: 89-99) who, in a comparative study of Indian and Brazilian farmers, explored the impact of literacy on agricultural

development and whether literacy opens up the individual to modernising influences via radio, film, contact with extension workers and printed material. He concluded that illiteracy is not a barrier to the flow of instrumental information.

Further support for this conclusion is given by Brown (1970: 725-734) who has shown for Chilean low-income farmers that illiteracy, lack of education and so-called traditional attitudes did not constitute an impenetrable barrier to the flow of information. He suggests two ways in which technical information should be made available:-

1. It must be tailored to the farmer's situation, or,
2. It must be embedded in a package of new practices and services which push up the situational ceiling.

He describes the distance between the individual farmer's knowledge ceiling, and his situational ceiling as an 'information-persuasion' gap; and considers that situational factors may be more important than receiver personal characteristics in innovativeness.

There is also increasing awareness that the impact of improved agricultural production on the surrounding economic and social environment creates what are known as 'second generation problems' - increased production has to be transported and stored, etc. (Phillips, 1970: 47) notes that this next stage of development makes new demands on the educational resources of the community. He concludes that although literacy can change the whole work procedure and psychology of the farmer in the use of new techniques, innovations, savings, use of credit, etc., literacy usually only comes into operation when the other factors which play a key role in development are there, e.g., credit institutions, land reform, availability of seed, etc.

Innovation opportunities and literacy

Evidence from the Seki study suggests that economic 'take off' precedes the demand for literacy instruction and not vice versa. As Goodell (1972: 36) suggests, peasants do not learn to read in anticipation of the advent of fertilisers and threshing machines. The presence of these 'modern' techniques and demands often make literacy economically worthwhile or even imperative.

It seems that an 'improved opportunity structure' (i.e., package programme in this case) leads to the adoption of innovations which can lead to a need (motive) for relevant literacy instruction. This can be expressed as a final substantive hypothesis which is outlined in Figure 4.

FIGURE 4

FINAL SUBSTANTIVE HYPOTHESIS
LITERACY AND INNOVATIVENESS

IMPROVED OPPORTUNITY STRUCTURE	→	ADOPTION OF INNOVATIONS	motivation → RELEVANT LITERACY
e.g., Package Programme			need for

The formulation of this hypothesis - of the relationship between innovativeness and literacy in the context of early-stage agriculture - is based on evidence from this study which suggests it might hold good. However, the hypothesis would need to be tested, possibly in a series of replication studies in the TTL's.

Such an hypothesis supports the view of some proponents of functional, work-oriented literacy who, in discussing the motivations of illiterates, consider that they will not make the effort to become permanently literate unless they can see some use for literacy which changes their lives for the better.

Some recent evidence which also supports this view is provided by Galjart (1971) and Grunig (1971). Galjart suggests there may have been a certain neglect by rural sociologists of the structural factors affecting development. He suggests classifying the variables influencing farmers' innovativeness under the headings of ignorance, inability, and unwillingness.

He reviews relevant literature and refers to his own work in Brazil and Chile with particular regard to the 'inability' factor - the farmer knows what he could do but is unable to do it for financial or other reasons. He concludes that in many if not in most cases, the most important impediments to agricultural development will fall under the heading of inability. It is only after these have been removed by structural measures that the lack of knowledge and the traditional values and attitudes which are detrimental to further development come to play an important role.

Grunig states that because of insufficient attention to structural factors, most studies of communication and peasant modernisation have tended to over-simplify and over-estimate the role and effect of communication.

Using data from a study of Colombian small farm operators he argues that communication is a complementary factor to modernisation and development - that it can have little effect unless structural changes come first to initiate the development process.

He reverses the order of causality to state that structural change is the essence of development and communication a complement - after structural change has taken place - and not that development is a communication process complemented by structural change.

Grunig thus adopts an essentially operant conditioning point of view when he states that unless the situational structure is favourable for development (i.e., opportunities are available) communication can be of little use in the development process and the social-psychological attributes of modern people will never come into existence among the peasantry.

The complementary function of communication is thus to provide situationally relevant information needed by the individual to understand and adapt to new conditions resulting from a modernising situation.

IMPLICATIONS FOR RURAL DEVELOPMENT PROGRAMMES

Bearing in mind the fact that both studies were quasi-experiments with small groups in two relatively small tribal areas, the conclusions from this study must be considered tentative. Possible weaknesses in measurement instruments have already been acknowledged.

However, the findings and conclusions which are drawn are supported by evidence from both investigations and by the continued demand for savings clubs, package programmes and functional printed materials (which were developed as a result of this study) in many diverse areas of Rhodesia. It is felt, therefore, that there are cautious generalisations which can be made concerning rural literacy programmes and the early stages of agricultural development which are relevant throughout the Rhodesian Tribal Trust Lands.

These are considered under three headings:-

Strategy
Literacy
Agricultural development.

Strategy for development

The sequence of phases in an extended development programme for the majority of poor, unimproved cultivators based on the Seki study is suggested as follows:

1. Establishment of Savings Clubs.
2. Package programme - subsistence production.
3. Package programme - cash cropping.
4. Improved homestead.

It is now relatively easy to establish savings clubs as the first development priority due to a rapid increase in the number of these organisations during the past two years. There are now 'model' clubs functioning in most Tribal Trust Lands.

A savings club is the basis for the accumulation of capital, purchase of inputs, organisation of a package programme, and inter-personal support for adoption of innovations.

The second phase is to develop an agricultural package programme adapted to local conditions to ensure subsistence for the participants. If savings accumulate rapidly enough this programme could be mounted in the same year as the savings club is established. For example, Methodist savings clubs in Seki undertook a maize package programme in their first year of operations, although this was something of a strain on committee members who had to cope with a wide range of unfamiliar tasks.

The third phase extends the package programme to include cash cropping. In some cases surplus subsistence crops can be sold or used for fattening livestock, in other cases special cash crops can be grown, e.g., cotton or tobacco. In some of the more favoured areas where subsistence is already assured a cash crop package programme might be organised as soon as there are sufficient savings to purchase inputs. This phase involves special attention to marketing of produce.

The fourth phase, which is now being initiated at Seki, is to utilise increasing cash surpluses for individual home improvement. At present this involves the construction of rain water collection tanks and a secure vegetable garden/small livestock unit. (This unit is based on work undertaken by Rodel and Hopley (1973) at the Henderson Research Station during the 1960's). This phase is aimed at ensuring clean drinking water and water for vegetables, rabbits, chickens, etc., in order to improve existing levels of nutrition.

Literacy programmes

Findings from both investigations suggest that the wisest use of strictly limited literacy resources (in terms of the feasibility and costs of making rural adults literate) is the provision of programmes for 'advanced' students, i.e., 'functional' or 'fundamental' adult education for semi-literates.

It is suggested that for the immediate future the subject-matter content of this instruction should be based on and parallel with or consequent to the development phases outlined above.

This functional material could be taught in short full-time courses or as weekly classes to fit in with the seasonal round of rural life. The modified literacy follow-up programme described by Smith, 1971, provides a suitable pattern, and the possibility of linking such classes to various weekly radio programmes which are already broadcast in the vernacular on agriculture and home economics etc., should be investigated.

An important corollary to this proposal is that the rural African child should receive a minimum of three (preferably four) years of primary education if he wishes to maintain a useful level of literacy in the vernacular later in life.

It is considered that absolute illiterates will be most effectively catered for (innovation information and opportunities)

by membership of savings clubs and attendance at demonstrations organised as part of package programmes.

Suggestions for tribal agricultural development

Implications for the development of peasant agriculture in the TTL's discussed below are drawn from the findings of this study, and particularly the author's experience with the Seki package programme during the past three years.

1. Savings Clubs are useful organisations for the mobilisation of small-scale local savings which would otherwise be dissipated. In a study of farmer co-operatives in developing countries (Committee on Overseas Co-operative Development - no date) it is noted that traditional agricultural credit programmes are often regarded as a kind of 'poor relief' because governments and aid agencies seem to believe that small farmers are too poor to save money. However, there is ample evidence following the introduction of savings clubs that although individual financial resources are meagre they do exist, and can be mobilised into sizable sums for local group participation in and financial support for a package programme.

Developments at Seki during 1972 and 1973 have indicated that it is possible to train savings club members in the simplified and standardised procedures necessary to manage all local aspects of a package programme - such as the bulking of individual orders, with a minimum of outside help.

2. Amongst the majority of ordinary tribal cultivators there is a great lack of information concerning relatively simple improved agricultural practices. Greater emphasis must be placed on agricultural extension aspects of development by Government agencies.

3. An implication of major practical importance arising from this study which is directly relevant for the improvement of early-stage agriculture in the Tribal Trust Lands is the realisation of the critical need for the combination of information and inputs leading to timely and careful organisation of local package programmes in order to take advantage of the relatively short rainy season. Experience at Seki suggests that the dry season must be utilised to the maximum for training and organisation so that appropriate knowledge and means are available locally when the agricultural season starts. Ideally, there should be a carefully constructed training and work programme for each month of the year in which the majority of the rural population should be involved. Good timing of demonstrations, supply of inputs and farming operations is extremely important for success.

A feature of a package programme is that less obvious limiting factors rapidly become apparent together with an urgent need for solutions if the package programme is to remain viable.

Recommended innovations must be made feasible in the local situation; this means that field-workers and administrators must function in more than just an 'advisory' capacity, they must work more comprehensively with farmers in a complete programme.

4. The 'image' or credibility of the promotional agent/agency is a key factor in determining the effectiveness of communication, and participation. It is important that agencies should not be suspected of having other than 'helping' motives. A comprehensive development programme based on savings clubs/credit unions provides an ideal church action programme implied in the 'Theology of Development' (Paul VI: 1967).

Major factors which will increasingly involve the churches in this type of development programme include the growth of the ecumenical movement and the search for meaningful co-operation at the action level; the unique rapport and trust which exists between the churches and their 'disadvantaged' members which is in contrast to many government agencies which tend to operate in an impersonal bureaucratic manner. Finally, the churches have large numbers of pastors, priests, lay workers and leaders who increasingly understand development as the growth of the 'whole man'.

The Rhodesian churches have recently shown a new interest in their potential role in rural development (Smith and Jolson, 1973). Furthermore, with a widely scattered rural population, i.e., no real village centres, there are real problems of communication. The church or school is a focal point for meetings and transmission of information. Church organisations at the grass roots level could be involved in rural development as a practical method of 'social action' to a much greater extent than at present.

5. Commerce (fertiliser companies and the like) should become increasingly involved in the development of what is potentially its largest market in Rhodesia. An 'extension education' approach, e.g., demonstrations, provision of technical advice, etc., rather than 'hard sell' advertising has been shown at Seki to bring greater commercial sales - particularly in the long term. The involvement of commerce will ensure that flexibility which is often lacking in bureaucratic organisations and which is necessary for the contained viability of package programmes.

6. It is now necessary that guidelines for district liaison should be agreed upon between sponsors of savings clubs (e.g., missions), any commercial bodies involved in providing inputs and demonstrations and government agencies, in order that savings clubs 'package programmes' can be implemented most effectively on a wide scale.

7. Finally, this study indicates that ordinary tribal cultivators appear to make rational decisions to adopt relevant innovations if the means are available and if there are tangible benefits to be gained. This gives cause for renewed optimism that there are immediate possibilities for the widespread improvement of peasant agriculture in Rhodesia.

G.A. Smith.

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