

Assessing the Benefits of Extension Work - A Review of the Shell
Co. Experiments and their Implications for Uganda.

MAKERERE

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SOCIAL RESEARCH
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MENT RESEARCH

E.R. Watts

1. INTRODUCTION:

In 1954 Shell Italiana started an experiment in extension in the commune of Borgo a Mozzano in N. Italy. The plan was to study the responses of this community to intensive technical advice. Detailed technical, demographic and economic data has been collected both before and since the extension work started. The results, over a ten year period, are impressive and demonstrate some of the basic needs for the development of similar communities in other parts of the world.

More recently similar experiments have been mounted in Nigeria (Uboma), Portugal, and Thailand. Various people have suggested that a similar project be mounted in Uganda. This paper will attempt to describe the Borgo and Uboma experiments and evaluate their results to date. The implications of these experiments for Uganda (and to some extent other areas of East Africa) will also be studied. The paper is based on the literature cited at the end and a visit made in July 1966 to Borgo a Mozzano.

2. Outline of the Borgo a Mozzano Project:

Borgo was chosen for this experiment because it was thought to be fairly representative of peasant agriculture in the country as a whole. The commune consists of approximately 25 sq. miles of land and includes within it mountain (62%), hill land (27½%) and plain (10½%). Of the population of 8,000 in 1954, 86% of those actively employed were farming. The commune had some 1000 small family farms.

The first step was to employ a young graduate on the collection of data about the area. This survey period lasted 8 to 10 months and involved getting to know the people of the area as well as studying their problems.

Some of the most important characteristics of the commune in 1954 were:-

- (a) Steep hill-sides: About 80% of the area had slopes of more than 1:15
- (b) Communications: a railway and tarmac road passed through the middle of the area but 9 out of the 16 hamlets of the commune could only be reached by mule track,
- (c) Fragmentation: The majority of farms were split into several scattered parcels.
- (d) Perennial crops: Chesnuts, Olives and vines were neglected crops with no systematic pruning, fertilising or disease control.



- (e) Other crops: The average yield of maize and wheat was low an account of inferior seed, inadequate fertilising and insufficient tilling. Other crops include potatoes, lucerne, beans, oats and rye.
- (f) Subsistence production: Of total farm production approximately half was consumed by the farmers family.

The extension work was based on the employment of 1 graduate in agriculture supplemented in 1957 by an instructor in home economics. Care has been taken to restrict assistance to advice and/or training and no loans have been available beyond what are available to farmers in other parts of Italy.

Techniques used in the extension work included:-

- (a) Demonstration plots
- (b) Circulars (aided by almost 100% literacy)
- (c) Group discussions (Borgo farmers were very individualistic)
- (d) Co-operative societies (for marketing, etc.)
- (e) Self-help groups (for road construction)
- (f) Home visits.

3. The Borgo Results

The most publicised results concern the production and income per capita for the commune. It should at once be pointed out that not all of this increase is claimed to be the result of extension activity by the 2 workers. Progress has been made throughout Italy and there has been something of an industrial boom particularly in the North. However the rate of increase of total agricultural production for Borgo over the 10 years is 5.5% per annum compared with 2.5% for the rest of the country.

The following figures were given by Dr. Virone to a symposium at the 1966 British Association Conference:

	<u>Average Annual Increase</u>
Gross saleable production (agriculture only)	5.5
Net farm income	4.5
Total expenditure (including taxes)	11.0
Farm Expenditure	14.5
Net Income per labour unit. (all above based on 1965 prices)	9.5

In bringing about this notable increase in agricultural incomes and production the following changes seem to have been important:-

- (a) Changes of population: The total active population leave agriculture has continued to grow smaller Whereas the higher, inaccessible areas have reduced their population the lower areas have increased. There has also been some emigration to other parts of Italy and abroad (646 between 1954 & 1964)

(b) Changes in work distribution: Today there are very few agricultural labourers and most of the work is done by the farmer and his wife. The other members of the family tend to get work outside agriculture. The proportion of the population depending on the land for their living fell from 80% to 32%.

(c) Changes in arable cropping pattern: During the 10 years the arable area fell at the rate of 18 hectares a year. Significant increases and decreases are as follows:-

<u>Increased area</u>	<u>Decreased area</u>
Leys 14% to 55%	Green manure crops 36% to 20%
Also flowers, vegetables	Wheat 50% to 25%
	Rye, Hemp, Lupins, Beans - hardly grown now

(d) Changes in perennial crop production: The quantity of vines has remained almost constant while chesnuts have lost their previous importance.

(e) Changes in livestock production: Sheep, pigs, asses and mules have declined although sheep may continue in view of the favourable meat market. Pigs were formerly kept mainly for home consumption. Livestock production now concentrates on poultry for meat and eggs, rabbits and dairy cattle.

(f) Changes in crop yields: The following average yield increases are claimed:-

	1923/28 average	1954	1963/65 average
Wheat (quintals/hectare)	11	15	29.7
Maize (" ")	15	13.3	36
Potatoes (quintals/hectare)	56	61	223

These improved yields are the result of improved seed and techniques including fertilizer.

(g) Changes in enterprises: The following are the principal changes in annual production in Borgo over the 10 years period (1954 figures compared with average for 1963-65)

<u>Product</u>	<u>1954</u> <u>Quintals/annum</u>	<u>1963-65</u> <u>Quintals/annum</u>	<u>Variations</u>
Cereals	7,480	7,099	- 381
Chesnuts	21,930	2,030	-19,900
Wool	15	6	- 7
Wine	10,930	13,562	+ 2,632
Olive oil	297	949	+ 652
Wood	78,310	109,192	+30,882
Meat	2,027	2,701	+ 674
Milk	6,980	13,807	+ 6,827
Butter & cheese	196	211	+ 15
Eggs ('000s)	207	1,832	+ 1,625

The greatest increases are in products like olive oil, milk and eggs. Other notable changes are that the value of vegetable production has increased by nine times while potato and rabbit production has doubled.

- (h) Improvement in quality of products: This was most noticeable in the case of wine. With little change in acreage the value of production rose from 76.5 million lire to 99.4 million lire. In the case of olive oil also production increased due to improved management of trees from 30 million lire to 90 million lire.
- (i) Changes in labour productivity: During the 10 years there was a sharp decline in the labour force from 1900 to 964 S.L.U.* Productivity per S.L.U. is given as follows:

	<u>1954/1965 prices</u>	<u>1963/65 average</u>
	£	£
Gross productivity/S.L.U.	186	520
Net productivity/S.L.U.	176	437

- (j) Improvement in communications: This has mainly consisted of self-help roads built with some government assistance. During the 10 years 31 miles have been built and the road net work increased from 19 to 50 miles
- (k) Co-operative societies: 3 societies have been formed for agricultural supplies, co-operative farming and poultry keeping.
- (l) Mechanisation: Increased from 71 to 2184 H.P. There were 159 machines and engines in 1965 as compared with 3 in 1954.
- (m) Increased expenditure on means of production: The following increases in consumption have been recorded:-

	1954 in tons	1965 in tons
Fertilizer	73.1	503.1
Fungicides and insecticides	13.0	39.6
Seed	15.2	297.0
Feeds	48.3	601.1
Fuel and lubricants	7.2	297.7

4. The Contribution of Extension to the Borgo results:

To quote from Dr. Virone's paper at the British Association "the economic results at Borgo a Mozzano, seen in the context of the dynamic socio-economic conditions in Italy over the same period, are definitely much more intensive and are spread over the entire community. Furthermore, the development process there went at a much faster pace than in the national agriculture although starting from more backward conditions than the average. The reason for this success has been the concentrated advisory activity undertaken by the project in the rural community. The cost of the service, which now runs at around 8 million lire per year, even if considered

* S.L.U. Serpieri Labour Unit -- 1 adult physically fit male.

responsible for only half of the increase of net income achieved at Borgo a Mozzano, represents 7.8% of that increase."

The cost of extension here only covers the cost of the 2 extension workers provided by Shell (including transport, office and other expenses). In comparing this figure with the net increase in production some account should have been taken of the cost of implementing some of the improvements, particularly through government subsidies. Thus while the extension service cost around 8 million lire per annum government subsidies over the 10 year period have averaged 18.9 million lire.

Another aspect which is neglected is the part played by other extension agencies. Farmers who are literate obtain much of their technical knowledge from farming journals and books. It would be interesting to know how important these factors were in accelerating technical change. With mechanisation expanding rapidly it is also likely that commercial firms contribute towards educating farmers about the merits of the various machines and chemicals available.

Rural Development is such a complex process that any detailed claim for the economic results of extension can be easily criticised. The figure for the cost of the service does not include many costs that would have to be met if the Borgo experiment was repeated nationally. In particular there is no mention of increased use of government agriculturalists in the area or the cost of the surveys undertaken by University personnel. It must also be stated that the experiment was conducted in an area and at a time when expenditure on extension could be expected to produce maximum returns. Nevertheless Borgo does help to make a case for increased expenditure by governments on extension. Its contribution as an intensive case-study in rural development is also particularly valuable.

5. The Uboma Project: Eastern Nigeria

Uboma, a local council area of 25 sq. miles, was selected in 1963 for a project on similar lives to that at Borgo. A graduate from Ibadan was appointed by the local shell company and started an intensive survey with assistance from a Ministry of Agriculture agricultural assistant. The area is situated 14 miles north-east of the town of Umuahia. The country is relatively flat and is in the oil palm area. Shifting cultivation is still practised and the principal crops are cassava, cocoyams and yams. The extension work commenced in 1965 so that the results to date are very limited and undramatic.

The following are the main improvements being emphasised by the extension workers:-

Annual Food Crops: Pest control, fertilizers, better varieties, emphasis on rice, maize, legumes and vegetables.

Cash Tree Crops: Rehabilitation of oil palms.

Perennial Food Crops: Planting of citrus and pineapples

Animal Protein: Fish ponds, poultry and control of pests

Social Organisation: Co-operatives (multi-purpose). Young Farmers Clubs, Health Centre, Water Supply.

Results of the following type are given in the World Land Use Survey study:-

	<u>Increase in Use of Fertilizers</u>			
	<u>1964</u>		<u>1965</u>	
	<u>Uboma Local Council</u>	<u>Rest of Eriti county (estimate)</u>	<u>Uboma Local Council</u>	<u>Rest of Eriti county (estimate)</u>
Compound fertilizers bought (tons)	0.04	0.05	1.35	0.05
Oil Palm fertilizers applied (tons)	1.3	1.1	5.8	1.2
Total of all fertilizers applied	1.34	1.15	7.15	1.25

6. Uboma & Borgo Compared:

While it will be extremely interesting to follow the Uboma experiment the writer considers that the results are likely to be much less dramatic than those at Borgo. The following reasons could be given for this statement:-

- (a) Population changes: The following figures give a sharply contrasting picture of the situation in the two areas.

	<u>Population</u>	
	<u>1951/52</u>	<u>1961/63</u>
Uboma (1952)	20,257 (1952)	34,000 (1963)
Borgo (1951)	8,234 (1951)	7,926 (1961)

Borgo not only has had a net fall in population but has had a considerable movement out of agriculture amongst those that have remained. The sharp rise in Uboma's population indicates that even if production can be substantially increased income per capita may still fall in the future. A reduction in the birth rate, substantial increase in emigration and the development of non-agricultural industries in the area are essential if an increase in income/labour unit is to be achieved.

- (b) Availability of markets: Borgo is situated near the towns of Lucca and Pisa and has good communications with the highly industrialised areas of Northern Italy. Thus the commune has good access to markets for the high price products demanded by industrialised societies.

Products like fresh milk, vegetables, flowers, eggs, meat have all been emphasised in the ten years of development in Borgo. Uboma suffers the disadvantage of having no high-priced market and is in any case concentrating on products which are likely to have low incomes per acre as compared with Borgo. It should be mentioned that particularly rapid industrialisation occurred in Italy between 1955 and 1960 and a further stimulus to agriculture has been the creation of the European Common Market.

- (c) Means of Production: To take but one example farmers in Borgo were already using considerable quantities of fertilizers prior to the experiment. 1954 consumption of fertilizers (73.1 m/tons) for Borgo was 10 times Uboma's consumption for 1965 (7.15 tons). Unless prices are subsidised much fertilizer use is likely to be un-economic on low priced food crops.
- (d) Farmers Education: The fact that Borgo is almost 100% literate has meant that extension methods like circulars, films and lectures have been readily usable. This meant that once confidence had been won it was much easier and cheaper to maintain frequent contact with farmers. Uboma will need to depend much more on direct contact with farmers. Furthermore the intensity of extension personnel is much lower in Uboma than in Borgo. (See 8 c)
- (e) Availability of Credit: It is interesting to note that Uboma has several well-developed credit systems which have been evolved by the people themselves. The most important is the "Isusu" club which distributes in rotation to individual members from a fund which is maintained by regular contributions. However some 56% of this credit is used for items such as school fees, ceremonies, clothes, etc. Borgo had a considerable investment over the 10 year period of £371,400 of which approximately one third consisted of state grants.
- (f) Other Factors: Several other differences between Uboma and Borgo could be demonstrated. However the point that requires emphasis is that returns to extension are maximised at a point where other factors are conducive to quick, effective and economic results. Borgo in 1954 was at a good "take-off" point to make progress. There is a danger that extension will be seen as a sort of magic which will transform agricultural communities in the face of inadequate markets, lack of credit, rapid population growth, etc., etc. Perhaps the most limiting factor in Uboma is the traditional system of land tenure. Fragmentation is still an acute problem in Borgo and as yet no easy solution has been found to this. The other problem for Borgo is the steepness of the hillsides and the general unsuitability of most of the country for 4-wheel tractor mechanisation.

7. The Factors Involved in Agricultural Development

We can for the purpose of this paper dis-regard the argument of those who claim that no real progress can be made with a peasant system of agriculture. The success of the Kenya small-holder tea schemes and the consolidated mixed dairy farm development in Central Province establish that small-holding type farming has a considerable future for many years to come. The success of the Borgo experiment in stabilising agriculture enforces this case.

Assuming therefore that no radical changes in the scale of farming are envisaged what are the main requirements for development? How can governments achieve maximum returns for their investment in agriculture? It is clear from the Borgo results that much can be achieved by extension where other factors are conducive to results. Experience in Africa would lead one to conclude that where other factors are not conducive then expenditure on extension is often wasted. The following would appear to be the main factors involved:-

- (a) Availability of markets (including transport to markets and a fair return to the farmer)
- (b) Availability of agricultural supplies and equipment (including electricity, water and servicing of equipment)
- (c) Availability of credit (including the saving potential of the population),
- (d) Availability of alternative employment to agriculture (to draw-off surplus labour and provide capital for investment in agriculture)
- (e) A Land Tenure System which stimulates long-term investment in agriculture and which allows land to be used as security for loans.
- (f) Motivation for improvement and advancement (related to the educational level of community)
- (g) Availability of technical knowledge on how to improve local agriculture (based on research adapted to local conditions and including economic evaluations)
- (h) An extension service to inform farmers about (a) to (f) and to put across (g) in a form that the farmer can understand and practice with the means at his disposal.
- (i) A high proportion of literate farmers and/or a system of training (farmers in short course institutions or regular evening classes.

It is not suggested that this list is exhaustive. The main point to emphasis is that the factors are interdependant and to concentrate on one to the neglect of others is unlikely to enhance development greatly in the long run. The Borgo project succeeded because (a), (b), (c), (d), (e), (f), (g) and (i) were already reasonably adequately provided. An injection of factor (h) had startling results. Extension could have been said to have been the one factor that was missing. From the information available many of these factors are inadequately provided in Uboma. Further-

more nearly all of the factors will need government organisation and finance if they are to be provided.

8. The Implications for Uganda

(a) Agricultural development without government intervention:-

In assessing the contribution of extension or other forms of government intervention we need to consider what would have happened without any intervention. The fact that £892 worth of coffee was exported from Uganda as early as 1902 (Tothill p. 291) is an indication that there is progress even without an Agricultural Department. Only last year in Kenya an investigation of onion growing showed that in one province there was a considerable export industry which had developed quite rapidly without the Agricultural Department knowing anything about it. These facts need to be borne in mind when assessing the benefits from government intervention.

(b) The case for concentrated development:

The expense of providing adequately for all the factors listed under 7 over a whole country is considerable and there is therefore a strong case for concentrating on certain areas. The Borgo experiment demonstrates the advantage of a decentralised extension service with considerable local autonomy. As far as possible any Borgo-type project should be established with local executive powers.

The main objection to the idea of concentrated development is the political one that neglected areas will become dissatisfied. Ideally therefore in selecting areas preference should be given to progressive areas with a considerable evidence of self-help schemes in the area. The selection of development areas would then act as an incentive and could progressively envelop the entire country.

Ruthenberg has shown for three districts in Kenya that returns to government expenditure can be very different in different areas:-

	Nyeri £	Elgeyo Marakwet £	Central Nyanza £
Expenditure for Ag. & Vet. Services /holding/annum.	1.1	2.4	0.4
Additional £ marketed produce for each £ local expenditure over period 1960-64	4	3.5	0.5

Figures like this based on just three districts can be misleading. However from a general survey of development in Kenya one could say that ~~intensive~~ extension based on land reform, provision of markets, etc. has yielded much better results than the old-type "soil conservation and compost extension". Thus areas like Central Nyanza, which admittedly has climatic as well as land tenure problems, have made very little progress.

One of the factors in the Borgo project has been the concentration of highly trained extension personnel in a relatively small area. 2 graduate extension workers in an area of 16,700 acres is a highly intensive extension service. The following comparative figures demonstrate the problem:-

<u>Place</u>	<u>Intensity of Extension Personnel</u>	
Borgo, Italy	1 graduate : 500 farms	
Embu District, Kenya	1 graduate : 30,000 farms	
	1 diplomate : 7,500 farms	
	1 certificate trained : 1,200 farms	
	1 junior agric. asst. (untrained) : 550 farms	
Uboma	1 graduate +	
	1 agric. asst. +	} 5,000 farms
	1 home econ. asst.)	
National average:		
Farms/Extension	Kenya 450	
workers (all grades)	Uganda 2,000	

These figures strengthen the case for concentrated development. A graduate who is working with 30,000 farms must inevitably spend most of his time administering his Junior Staff. There is a case for more concentrated use of some of the highly trained extension staff (diplomates and graduates). One possibility already being tried is "the Community Saturation Project" centred on District Farm Institutes in Uganda.

(c) Staff Training etc.

The tables above show a remarkable difference in staffing levels between Kenya and Uganda. This is largely due to the presence in Kenya of large numbers of relatively untrained staff. For many routine jobs like farm planning these have proved reasonably adequate. Since about 10 of these staff can be employed for the cost of one AAC they enable a much more frequent contact with farmers to be obtained at low cost. Whereas in Kenya the certificate level staff are emphasised in Uganda the diploma-level staff are being expanded at the expense of those with certificate training.

(d) The Campaign Approach:

An alternative to the Borgo approach to extension is to conduct a series of campaigns on various crops, practices, etc. This has the advantage that staff can be quickly trained for a limited number of practices which they are to push. The factors listed in 7 should all be provided for but since only 1 crop is involved at a time the expense and effort involved is limited. Such an approach has some of the advantages of the intensive Borgo approach while lessening the drawbacks of staffing and financial requirements.

(e) Expenditure on Extension :

It has been said that "the greater the degree of apparent precision the easier it is for a project to get finance ". The fact that extension is so hard to evaluate is one reason why it tends to be neglected. This explains why so much external aid is given for capital intensive projects like immigration schemes. For Kenya it has been worked out that the cost of extension services works out at 23% per holding or approximately 1.8% of the average value of output of peasant holdings. Further research on the costs of extension services in relation to increased returns to Government may be necessary to convince the treasury of the need for further expenditure. In particular the common practice of finding the funds for salaries by cutting back on travel is likely to have an extremely deleterious effect on extension services.

(f) Extension Methods:

One interesting point about the methods used in Uboma is the extent to which local leaders were mobilised. In particular priests and headmasters were used to publicise events and meetings. School gardens were used as vegetable nurseries to supply farmers with seedlings. This use of existing organisations could well be copied in East Africa where there is far too much rigid departmentalism.

To some extent Uboma has departed from the Borgo principle that the extension worker only supplies technical information. At Uboma fish for ponds were issued free and in the case of oil palm a subsidy is given in addition to seedlings and fertilizers. For a government expenditure of £18 per acre it is hoped that the farmers will earn £36 per acre per annum more from the improved plants. Another welcome emphasis has been the use of duplicated material produced locally. Despite the fact that every District office has a duplicating machine you very rarely see locally produced materials being used in extension. In Uboma the use of this material is of course limited by illiteracy but in many areas of East Africa such duplicated posters and publications could be used effectively.

9. A Borgo-type project for Uganda:-

(a) The desirability of a Borgo-type project:-

The following are considered to be the main reasons for suggesting that funds should be sought for a Borgo-type project in Uganda:-

- (i) Such a project, as a pilot study in accelerated rural development, could provide some extremely valuable results,
- (ii) One of the main contributions of the Borgo project is in the valuable training material it provides for teaching extension organisation and methods. A similar contribution could be expected from a project in Uganda particularly through association with Makerere University College and the Department of Agriculture, Entebbe.

(iii) The project should serve as a focus for the needs of rural development.

In particular it is hoped that it might focus attention on the need for land reform,

(iv) It is hoped that a project on these lines might provide a testing ground for some of the materials produced at the Agricultural Information Centre, Entebbe.

(b) The Situation of the Project:-

In order that (a)(ii) can be met it is suggested that the project should be sited within Buganda and preferably near to Kabanyolo. A second factor supporting this site is the fact that a large amount of background data is already available based on the work of the Kasangati Health Centre. This is being supplemented by the Buganda Farm Management Survey and an Agro-Medical Survey to be conducted during the coming long vacation.

The Kasangati data covers an area of 6 villages with roughly 50 homes per village. A somewhat wider area might be necessary for the Borgo-type experiment. The data would still be extremely valuable.

This particular site would have the following additional advantages:-

- (i) Nearness to Makerere - from whence most of those connected with the survey would have to travel.
- (ii) Proximity to markets for anticipated products of the area - e.g. milk, vegetables, poultry
- (iii) Ease of consultation with specialist staff at Kabanyolo
- (iv) Availability of agricultural supplies and electricity
- (v) Availability of planting material.

If an area of more extensive agriculture was thought to be desirable then consideration would be given to having 2 areas with say 300 farms in each area. The second area could then be sited 10-20 miles from Kabanyolo. One graduate extension worker could then be expected to cover both areas with 1 agricultural assistant in each area.

(c) The Survey

Using the Uboma example a survey could be started of the selected area covering:-

- (i) Physical Environment: (Climate, soil, vegetation, land capability, hydrology).
- (ii) Demography:
- (iii) Social Organisation, etc.
- (iv) Land Tenure and Settlement Pattern
- (v) Nutrition and Health.
- (vi) Land usage, crops and Farm Surveys,
- (vii) Livestock and their management
- (viii) Agricultural practices - fertilizer usage, etc.
- (ix) Processing and marketing
- (x) Farm Family Incomes.
- (xi) Agricultural Production (yields, estimates of total production, etc.)

For the purpose of this survey appropriate University College staff should be invited to act as advisers to the Extension Worker who should be primarily responsible for the field work. The advisers would be responsible for writing up the work for the reports. Consideration should be given to choosing a nearby "control" area where similar information would be collected.

(d) The Extension Worker

Ideally a local agricultural graduate with experience is required to take charge of the project. However the most important qualifications are enthusiasm, dedication and tact and in looking for academic attainments these should not be overlooked. The success of the Borgo experiment must very largely have depended on the personality of the agronomist, Dr. Volpi. This aspect of personality is more important in an extension worker than in a teacher - where in most cases there is a captive audience.

(e) Other Staff

It is suggested that the Extension Worker should be assisted by 1 or 2 Agricultural Assistants. The appointment of the assistants might be staggered and if 2 acres were selected one would be posted to each area. In this case the surveys might also be staggered to enable the Extension Worker to get to know one area in depth. For the recruitment of the staff for this project it is hoped that Agric. Dept. staff might be released or seconded for the period of the project.

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