

IMPROVED PRODUCTIVITY FROM LIVESTOCK PRODUCTION

IN THE COMMUNAL AREAS OF ZIMBABWE.

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The prognosis for Zimbabwe's agricultural future is not good. At the present time the country is largely self-sufficient in food although shortages of individual commodities are becoming both more common and more frequent. Unless Zimbabwe plans now for major increases in national agricultural productivity, the trend towards declining food self-sufficiency will continue. Because of the importance of agriculture in the national economy, this trend can be expected to be accompanied by balance-of-payment problems and increasing shortages in foreign exchange.

Zimbabwe has made remarkable agricultural progress, particularly in the last 30 years, but the agricultural production base is both fragile and narrow. Today this country relies for the bulk of agricultural foreign exchange earnings, and for urban food supply, upon the productivity of a few thousand farmers. In Table I, commodity production changes between the years 1971 and 1980 are outlined. While the effects of seasonal and relative pricing factors are not isolated in these data, it is apparent firstly there have been major increases in production of several agricultural commodities over this period. Secondly, it is the productivity of arable farming that has improved. Livestock farming has stagnated to a large extent. Production of meat products rose to a peak of some 200 000 tonnes in the mid 1970's and has shown a steady decline from that period. In a country 70% of whose land area is best suited to livestock production and where the farming systems of the majority of the inhabitants are closely linked to livestock, the deterioration of the livestock industries must be of primary concern to policy makers.

Trends in total + per capita productivity for the African continent are not encouraging (see Figure I) and it is not uncommon for Zimbabwe's agricultural prowess to be upheld as a model for other nations on the continent. The data do not support this stand. In Table II are data on both agricultural production and food production in selected countries in sub-Saharan Africa. The indices in this table were calculated using Laspeyres' base-weighted aggregate formula and represent the changes in aggregate production at prices held constant at the 1969-71 level. Zimbabwe's performance, as shown in Table II, is not particularly outstanding, although the effects of war and climate have influenced the results from 1975 - 1980. These data are confirmed from other sources; see, for example, World Bank (1981). Productivity gains have been insufficient to keep up with population growth with the result that the average Zimbabwean is both poorer and hungrier today than he was in 1971. In effect, the very real gains in productivity achieved in the large-scale farming sector have been more than offset by the agricultural decline in the communal areas. Unless this latter deterioration is reversed, the increasing dead weight of poverty and ecological degradation in the communal lands will inevitably and swiftly swamp the small and fragile base which forms the productive sector of the agricultural industries.

Since independence, land reform has dominated agricultural policy. The inhabitants of the communal lands should not, politically or in justice, be denied their demands for resource redistribution in the economy. However, in addressing these demands, it is important to be aware that Zimbabwe no longer has the land problem which dominated policy since soon after European settlement. Majority rule and the ending of land allocation on racial grounds have changed both the form

TABLE 1

ZIMBABWE - COMMODITY PRODUCTION CHANGES
('000 tonnes)

	<u>1971</u>	<u>1980</u>
WHEAT	82	162
MAIZE	1803	1254
MILLET	220	175
SORGHUM	77	94
PULSES	24	26
TOBACCO	65	125
COTTON	49	63
SUGAR	233	334
MEATS	185	175

Source: World Indices of Agricultural and Food Production, (1981),

U.S.D.A. - ERS, Statistical Bulletin 669.

TABLE II

INDICES OF AGRICULTURAL PRODUCTION - 1980
(1969-71 : 100)

	<u>Total Agricultural Production.</u>	<u>Total Food Production</u>	<u>Per capita agricultural production.</u>	<u>Per capita food production.</u>
Angola	55	81	45	66
Kenya	168	164	120	113
Malawi	134	115	98	93
Mozambique	77	79	61	65
South Africa	126	128	97	99
Tanzania	128	141	95	109
Zambia	114	112	82	86
Zimbabwe	115	101	87	72

Source: World Indices of Agricultural and Food Production,
(1981) USDA-ERS Statistical Bulletin 669.

and the dimension of the land problem. Land is still unevenly distributed amongst racial and income groups but government can choose the speed and extent of land redistribution by quite simple legislative measures. A land problem remains in terms of the physical limit to the land area of this country, but that is an entirely different issue. More important but related, both in the immediate future and in the long term, are the agricultural and food production problems, which confront this country. With the inevitable doubling of population before the end of this century, these problems can only intensify. Regardless of land redistribution measures, the year 2000 will still see at least seven million people living in the existing communal lands. Unless urgent and effective action is taken to rehabilitate these areas, the agricultural decline of the past decade will continue and worsen.

Nearly 75 percent of the communal lands lie in the Natural Regions IV and V which are ill-suited to dryland cropping. Whitlow (1980a) developed the Natural Region concept of Vincent and Thomas (1961) to include recent data on climate, soils, slope and secondary terrain factors such as waterlogged soils or the occurrence of granite dwala terrain. The agricultural potential map of Zimbabwe produced from this analysis shows that 60 per cent of the communal lands fall into areas of poor to very poor agricultural potential. At low population pressures, even land of low agricultural potential can be managed productively, using existing farming practices. However, as Table III shows, all but a third of the communal lands have human and livestock populations in excess of their current carrying capacity. This population pressure is excessive in some 40 per cent of the communal lands. The existing farming systems currently followed in large areas of Zimbabwe are simply not sustainable at today's population levels and the agricultural challenge of the immediate future is to make the same transformation to the agricultural potential of Regions III, IV and V that has been achieved in the large-scale farming areas of regions I and II since World War II. As livestock are, and are likely to remain, the predominant land use activity in these regions, research into livestock based farming systems of dramatically increased productivity must be a top national priority. In the past, livestock policy in the communal areas of Zimbabwe has been guided by a series of widely held but ill-founded myths. The first of these is that the communal farmer is unresponsive to the economic incentives which have stimulated production in the large-scale farming sector. There is an impressive array of studies to refute this myth (see, for example, Low, 1981, Schultz, 1980, van Onselen, 1975). Where peasant farmers have failed to respond to economic incentives, consistently the reason has been that these incentives are insufficient to compensate for other obstacles to production. Too frequently, agricultural policy in Africa has failed to take into account the realities of production from the perspective of the small farmer. In Kenya, where from the mid-1950's, agricultural policy was aimed specifically at the smallholder, productivity gains were rapid and impressive. Total agricultural productivity grew at 4% annually from 1955-72, hybrid maize production spread more rapidly between Kenyan smallholders in the decade 1964-73 than it had amongst American farmers in the 1930's, and smallholder tea production expanded from a tiny base in the early 60's to one third of total production by the mid 1970's. Smallholders successfully moved into the production of complex agricultural enterprises such as coffee, pyrethrum, dairy products and sugar cane (World Bank, 1981).

The second myth has been referred to as the 'cattle complex'

TABLE III

POPULATION PRESSURE IN RELATION TO CARRYING CAPACITY

<u>Pressure Class</u>	<u>Proportion of Communal Lands (%)</u>
Balanced or none	32,7
2 times - some	29,8
3 times - great	12,9
4 times - extreme	11,7
5 times - desperate	12,9

Source: Whitlow J.R., (1980), "Environmental Constraints and Population Pressures in the Tribal Areas of Zimbabwe", Zimbabwe Agric. J., 77. 4 : 173 - 181.

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(Parsons & Palmer, 1977). In essence, subscribers to this school of thought believe that in the communal lands, cattle are held for sociological rather than economic reasons. In some estimates, as many as 70 per cent of cattle held in the communal areas are involved in functions related to customs such as lobola, spiritual requirements and other functions. That the communal farmer is not responsive to cattle price in the same manner as the commercial farmer, there is no doubt. Figure II shows the percentage offtake, cattle price and herd size in the communal lands over the past decade. The 2-3% offtake from the communal lands is insignificant in comparison with the 15-20% offtake typical in the commercial farming sector. In addition, increases in cattle price have had no apparent effect on offtake. A review of evidence, both in Zimbabwe and from other African nations, indicates that cattle in the communal lands are a capital rather than an income asset. Danckwerts (undated) in the early 1970's estimated from amongst farmers surveyed in Victoria Province that of the value of output from communal cattle production only some 17% came from the sales of cattle. He calculated that 33% of the value of the output was meat and milk for home consumption and 49% from ploughing and manure. He did not attribute values to other significant draught activities such as transport. The data also indicate that the estimated return on investment in cattle by a communal land farmer was in the range of 30%. The rise in price of oil after 1974 can only have increased the capital value of an asset which conveniently supplies both fertilizer and draught power to the farmer. From Figure II it is apparent that communal farmers are responding to the increase in the capital value of their animals in a totally rational manner. The appreciation in the value to the communal farmer from holding cattle far exceeds the appreciation in the value of money he could obtain from selling those cattle. As will be shown later, the extra or marginal cost to the farmer of keeping an additional beast is low although the marginal cost to the community of this decision is significantly higher. Hence the individual communal farmer is, in individual terms, making the best use of the resources available to him by increasing his cattle holdings as opposed to increasing sales from his herd. This behaviour is exactly analogous to that of property developers in the urban areas.

The third myth with respect to livestock production in the communal lands is that it is only cattle that are of importance in determining the productivity of these areas. In Table IV data from Matabeleland North province are presented. In all areas where the tsetse fly is not a problem, cattle are the predominant livestock both in terms of absolute numbers and, more importantly, livestock units. Nevertheless there are also large numbers of goats and, particularly in the Sebungwe region, significant wildlife populations. Walton (1981) reports that in a small area of Matabeleland, value of goat sales increased from virtually nothing to \$100 000 in a mere two years with the introduction of a simple marketing system for goats. Reid, (1982) likewise reports a small but significant export trade in goat meat that apparently grew up in the mid 1970's. The Department of National Parks and Wildlife Management with "Operation Windfall" and other related activities has pioneered the profitable cropping of wildlife resources in the communal lands.

The production of the drier areas of Zimbabwe has yet to be realised. At present, land use practices in much of Regions IV and V are causing severe and potentially irreversible ecological degradation. In altering this increasingly disastrous trend it is necessary to start

TABLE IV

AGRICULTURAL AND SOCIAL STATISTICS - MATABELELAND NORTH

(1981)

<u>District.</u>	<u>Area (ha)</u>	<u>Human Population ('000s)</u>	<u>Extension Assistants</u>	<u>Livestock population ('000 head)</u>		
				<u>Cattle</u>	<u>Sheep</u>	<u>Goats</u>
Tjolotjo	736931	111	15	106	5	62
Binga	791900	61	4	18	5	41
Wankie	375202	87	11	37	3	23
Lupane	551700	72	12	98	9	84
Bubi	63368	32	10	18	5	16
Nkai	436200	91	14	111	15	73

Source: Agritex.

wives, young children and old people. Such a family typically lacks the labour resources necessary for successful agricultural production

Some commentators have concluded that the situation is hopeless. Elliot (1981), in his address to the Zimbabwe Society for Animal Protection drew a very pessimistic picture of the chances in communal livestock production. While in no way underestimating the problems which face this country, there are valid reasons for doubting this gloom. This is not Zimbabwe's first agricultural crisis. The British South Africa Company, in the early years of this century, also concluded that agriculture in Zimbabwe was non-economic and, in 1908, commenced a policy of selling off its land holdings. The BSA Company's belief in the agricultural potential of Zimbabwe is illustrated by the land prices of the time. By 1912, land prices had fallen steadily. Arable land was then fetching 3s. 9d. and ranching land 8½d. per acre. If the purchaser made improvements, this price was discounted a further 20-30%. Land in South Africa at the time was priced at between 25s. and 35s. per acre. (Palmer, 1977). Zimbabwe was faced with a major agricultural crisis when the Depression of the early 1930's devastated white agriculture. White farmers were the largest group amongst the white unemployed, a three year moratorium was announced on all instalment payments for farms in 1933 and the Land Bank increased its lending to farmers to one million pounds in 1934. (Palmer, 1977). Further agricultural crises have followed as Muir (1981a, b) has amply documented.

Zimbabwe is a difficult agricultural country and the success of the large-scale farming sector has been the consequence of carefully targetted programmes to assist those farmers. It is clear that the need today is to use the same strategy to rehabilitate production in the communal lands. There are three positive and relatively simple steps which could be taken and which arise from the preceding analysis. First an appropriate labour policy is an essential prerequisite for any successful rural development strategy. Secondly, the livestock marketing system needs revision to cater for the livestock systems of the communal lands. In particular, the design of the system must incorporate the capital nature of the communal cattle market and provision for the marketing of livestock other than cattle. Finally, the problem of allocating the real costs of grazing to the owner of ruminant livestock needs to be solved. Each of these steps will be examined in more detail in the following paragraphs.

Labour policy in Zimbabwe has been consistently, and remains today, biased against the rural poor. Large-scale agriculture employs directly approximately one-third of the national labour force. From Table VI, it is apparent that the absorptive limit of this sector for unskilled workers has been reached and that there is a shift towards employing fewer more skilled workers. This decline in employment during the period 1975 to 1980 was not accompanied by an increase in real wages. If real wages had increased during this period the declining trend would almost certainly have been more marked. The Commission of Inquiry into Incomes, Prices and Conditions of Service (1981) while apparently discounting available empirical evidence on wage employment trends in agriculture observes that a minimum of 50 000 jobs will have to be provided in the communal lands if unemployment is to be avoided. This estimate is based on an optimistic assumption of an annual national growth of 8%. The Commission comments:

"The peasant sector clearly has a crucial role to play at present in absorbing the unemployed and the underemployed.... The Report concurs with the evidence from other sources that the peasant sector constitutes the largest group of poor in the country. In any policies aimed at raising the incomes of the poor, the peasant sector therefore must have a primary place."

TABLE V

YIELD TRENDS OF FOOD CROPS IN ZIMBABWE

(1950 - 100)

		1980
Maize	LS	333
	C	203
Munga	LS	-
	C	73
Sorghum	LS	440
	C	161
Rapoko	LS	-
	C	80
Wheat	LS	356
	C	-
Barley	LS	408
	C	-
Sugar Cane	LS	294
	C	-
Potatoes	LS	218
	C	-
Groundnuts	LS	417
	C	186
Soyabeans	LS	494
	C	-
Edible dry beans	LS	143
	C	97
Sunflowers	LS	126
	C	-
Cotton	LS	668
	C	-

LS = Large Scale Farms
C = Communal Farms.

Source: Mr. J.R. Tattersfield (DR & SS) - Address to Zimbabwe Crop Science Society Symposium, 10th July, 1981.

Yet, of the 293 pages which make up the report, some 12 deal directly with the problems of the self-employed rural poor. Of the 22 chapters in the report, 13 deal with issues of concern to the mainly urban wage earner. The problems of self-employed peasant farmers are only superficially analysed and no clear guidelines as to how employment in this sector can be improved are given. The majority of workers in agriculture are self-employed. As discussed previously, able-bodied labour in the small scale and communal farming areas is a critical scarce resource. Unless the young can be persuaded to stay in communal lands, productivity from these areas will never improve. It is unrealistic to expect these young people to work at a difficult and risky occupation in remote areas without adequate reward. The Commission's report fails to address this major obstacle to rural reconstruction. Government labour policy since the publication of the Commission's report has unfortunately continued the 'urban bias' of previous administrations, albeit with a different emphasis.

The livestock marketing system in the communal lands requires considerable modification. The present system of sale pens is too widely dispersed for the needs of the market and the marketing system is designed for the selling of cattle for income. It does not cater for sales of other livestock, nor does it cater for the trading of cattle as capital assets. Reid, (1982), has observed that sale pens appear to be used to establish a base price for cattle. Once this price is established, cattle are frequently withdrawn from sale. The appearance of cattle at a sale pen and their subsequent withdrawal after auction may be either a decision by the farmer to update his valuation of his holding. Alternatively, the cattle may be sold at some premium over the auction price outside the market place. Only when cash is needed for some specific purpose and no off-market buyers are to hand are cattle actually disposed of through the sale pens. It is also apparent that communal farmers are distrustful of the auction system as currently operated and do not comprehend the reasons behind grading and pricing schedule operated by the Cold Storage Commission.

The periodic market under the control of a locally-based regulated market society offers an alternative to the present system. The costs of setting up a comprehensive set of fixed depots and sale pens to handle the variety of commodities produced by communal farmers is astronomical. Yet, as we have seen, it is exclusion from the market place that has led to the decline of communal agriculture. The depot or sale pen is typically concerned with the trading of a very restricted number of commodities. The trade is typically one-way, with the purchased produce moving out of the area for disposal elsewhere. The overhead costs of running such a market system are high. The marketing agency, therefore, has two choices. Either, as was AMA policy in this country prior to independence, it rejects the possibility of comprehensive marketing in the communal areas as excessively costly. Alternatively, as shown by Malawi's ADMARC, a costly but comprehensive marketing system is set up but the farmer pays for it in drastically lowered producer prices.

The periodic market overcomes these problems. This is a mobile market place moving according to some predetermined schedule around a central point which may be the existing sale pens or depot point. It is a multi-purpose market and requires only a simple infrastructure. This is particularly the case if livestock are the main market activity. If it is organised in conjunction with other institutional services such as visits by the extension, veterinary and health assistants, it can quickly bring structure and purpose into the rural development effort. The market, being within walking distance of the various communities that it serves, encourages internal as well

TABLE VI

EMPLOYMENT TRENDS IN THE LARGE SCALE FARMING SECTOR

Year	Employees ('000)	Average annual earnings (money terms)	Average earnings (real terms, 1975 = 100)
		\$ - C	\$ - C
1975	363,8	93,40	93,40
1976	356,1	103,20	92,90
1977	348,2	112,20	91,60
1978	341,4	120,10	89,40
1979	335,2	137,80	90,70
1980	327,0	149,70	94,10

Source C.S.O.

as external trade. As the market society operates the market place, the farmers can modify its operation to suit their needs. Reynolds (1981) had documented the very substantial economic gains and also increased rural employment opportunities from a well designed periodic market system in Zimbabwe.

Finally, the problem of grazing management needs to be solved before any significant progress can be made in long-term improvements to livestock productivity in the communal lands. The solution to this problem requires both a sense of history and of community. The traditional farming systems of Zimbabwe evolved in an era of land abundance. By long-standing custom, most adult males have the right of access to land; a tradition which is almost universal amongst societies where land is not a limiting factor. Economic development, and the seemingly inevitable concomitant population growth, means an end to land abundance. This is a problem which has been faced by many other nations. But the shift from common access to land to a more restrictive concept has been consistently traumatic for the rural poor.

In Britain, the enclosures of the 17th and 18th centuries led to the first agricultural revolution and a quantum leap in agricultural productivity. It has also led directly to the displacement of large numbers of people from the countryside. The traumas caused by the dislocation of traditional farming patterns were alleviated to a considerable extent by two interrelated factors. Firstly, colonial expansion enabled a significant proportion of the displaced rural population to move to new land. Secondly, the opening of new local and overseas resource bases and markets, agricultural, mineral and industrial, assisted in the creation of industrial employment for the landless urban dwellers in the home society.

Zimbabwe, in the twentieth century and with no new lands to colonize, faces the problem of modifying communal land tenure while maintaining employment in the countryside. Hardin (1968) has succinctly summarised the decisions facing the cattle owner using a communal pasture. The rational herdsman seeks to maximise his own utility. Each additional animal he grazes adds, say, one unit of utility since he gains the cattle revenue from the use of that animal. This same animal, by increasing grazing pressure, also detracts from his utility. But since the extra effect of the overgrazing caused by a single beast is small and overgrazing is shared amongst all the graziers, the disutility effect is small. The net effect, under existing arrangements, is that the only way a herdsman can improve his utility is by increasing his cattle holdings. Combine this fact with the very real gains in capital value associated with owning cattle and it is no wonder that most of Zimbabwe's communal lands are critically overgrazed.

The economic facts facing the farmer and the community are illustrated in Figure IV. The line MR is the marginal or extra revenue associated with owning an additional beast. As the individual farmer is too small to affect market price, marginal revenue is constant and equal to the going price for cattle, P_1 . Each additional beast adds some marginal or extra cost to its owner. The curve PMC is the aggregate of all individual marginal costs of herdsman in the community. The farmers will increase their aggregate holding until PMC is equal to MR at herd size Q. The costs to the community of the overgrazing caused by this herd size are not reflected in the PMC cost structure, at least in the short term. If the social costs of overgrazing are included, we can derive a social marginal cost curve, SMC. Under this cost structure, herd size is notably smaller at Q_2 . The requirement, therefore, is to include, within the cost

structure facing the herdsman, the social as well as the private costs of cattle production.

Reynolds, (1981) has advocated the use of the share concept to enable communities to manage communal resources such as grazing land. His proposal has the advantage of simplicity and local control. It serves to separate communal interest in the improvement of grazing from the interest of the individual in using that grazing. In simple terms, the concept involves an elected community management group which operates within government sanctions over the use of the land. This community group is established using formal legal procedures and is formed within natural community boundaries. Amongst other functions, it is envisaged that it would set a minimal carrying capacity on grazing land available to the community.

Each member of the community would be allocated a grazing 'share' which would be the right to graze some number of livestock units. The total number of livestock units permitted would equal the locally determined carrying capacity. The individual shareholder has a limited but guaranteed right to access to the grazing. Should he possess insufficient livestock, this right can be sold on an annual basis to another community member. The procedure, therefore, allows those who own few or no livestock to receive compensation for not grazing the common land from those wealthier individuals who hold stock in excess of their share. A price for grazing, which does not exist under traditional arrangements, is thus established and the PMC curve in figure IV is moved closer to the SMC curve.

The carrying capacity of community grazing lands is determined annually by the group. Probably this would take place in the interval after the rains, and before the flush of new births. Regular community business meetings would ensure that the majority interest in land and grazing husbandry is predominant over the minority interest in grazing exploitation. In bad years, the carrying capacity would be revised downwards and thus the price of grazing would rise. Similarly, should the community under- or over-estimate the carrying capacity in any year, this can simply be adjusted in future periods.

The grazing price can be expected to fluctuate with weather and economic conditions. The system guides the community into the efficient use of grazing as well as providing an education to the community in the economic and biological forces affecting cattle production. Under existing conditions, the communal farmer is effectively channelled into environmentally and socially destructive behaviour. The present arrangements discriminate against sustainable husbandry practices and serve to benefit mainly the larger cattle operators who can maintain herds sufficient in size to survive the bad years reasonably intact. Official reaction has been either compulsory culling, which is disruptive and effectively unworkable, or local livestock auctions, which, as have been shown earlier, are largely ineffective in reducing stock numbers in their existing forms.

Reynolds (1981) writes: "In contrast, a price established over grazing, and one which fluctuates over time in reflection of weather and market conditions, acts as a natural incentive to efficient management.... Faced with.....a price for grazing, individual members will calculate not only the number of animals they wish to graze but also herd composition and turnover, as against the remuneration they can expect..... The members can, probably working with government's technical services, review, re-design

and assist in implementing improved technical and marketing services. The interest in such investment and recurrent expenditure should not be limited to those who graze. Greater efficiencies, services and remuneration will play back into higher grazing prices which flow to non-grazers through the sale of grazing rights season by season..... Grazers would benefit from better maintained grassland and from access to better developed market and other services". The proposal goes a considerable way towards addressing directly the very real social, economic and ecological problems of communal livestock production.

In conclusion, there is reason to believe that the livestock economy of the communal lands is not in terminal decline. However, the solution to the real and increasingly critical problems of these areas requires a radically different approach on the part of agricultural researchers. Conventionally, agricultural science in Africa has concentrated upon technical improvements, in the main, to exotic farm enterprises. The farming environment of the small producer and his real needs have been implicitly ignored. Inevitably, given the competence and dedication of the research community, there have been successes in improving the lot of the communal farmer. Such progress has been patchy and, I suspect, somewhat random in its effect. It is now well past the time to review this approach. Large-scale agriculture has flourished because scientists have listened and reacted to the requirements of the farmers. It is a far more complex task to perceive the real problems of the rural poor. It is one which must be systematically and carefully planned and which requires comprehension of the social and economic, as well as the technical parameters, of agriculture. The research service that succeeds in transforming traditional agriculture will be vastly different to that with which we are presently familiar. The issue that faces Zimbabwean agriculture is whether the research establishment in this country will recognise this challenge.

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