AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C 20523

BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY

BATCH 79 ARDA

1. SUBJECT CLASSIFICATION

A. PRIMARY
Food production and nutrition — AE10-0000-G176

B. SECONDARY
Agricultural economics--Rhodesia

2. TITLE AND SUBTITLE
Zimbabwe, anticipation of economic and humanitarian needs: The agricultural sector in Rhodesia

3. AUTHOR(S)
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4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1977	~~43p.~~ 44p.	ARC RH330.96891.A217 v.2

7. REFERENCE ORGANIZATION NAME AND ADDRESS
AASC

8. SUPPLEMENTARY NOTES *(Sponsoring Organization, Publishers, Availability)*
(In Transition Problems in a Developing Nation; consultant [occasional] paper no.7)

9. ABSTRACT This occasional paper on Rhodesian agriculture includes sections on land settlement patterns, agricultural production and marketing, effects of sanctions on agriculture, and the effects of transfer of power. The "land settlement patterns" section discusses the land held by Europeans, by Africans, by national parks, in tribal trust, and unreserved. An analysis of European farms by size is included, as well as land distribution by agro-economic regions. There is a brief discussion by agro-economic regions. There is a brief discussion of the transportation system. Under "agricultural production" there are sections on maize, tobacco, cotton, tea, groundnuts, wheat, sorghum and millet, citrus fruit, and livestock products. The discussion includes productivity and exports and the effects of sanctions on agriculture. Section D makes hypothetical assumptions about events after a change of government. The effects of any exodus by European farmers or reduction in extension services on domestic food supplies would obviously depend on the type of farmers who left and the region most heavily affected. Maize, which is the main staple, will probably raise the prices of food in the south. Estimates of the impact of an exodus are measured in terms of the foreign exchange and wages lost. There will likely be a reduction in the level of beef, wheat, and soybean production and an increased production of flue-cured tobacco. Citrus fruit, sugar, and tea are unlikely to be affected. Progress in Rhodesian agriculture will depend on improvement of African productivity and this will involve land reform.

10. CONTROL NUMBER
PN-AAF-244

11. PRICE OF DOCUMENT

12. DESCRIPTORS
Exports
Land settlement
Manpower
Marketing
Production
Rhodesia
Sector analysis
Southern Africa

13. PROJECT NUMBER

14. CONTRACT NUMBER
AID/afr-C-1254 GTS

15. TYPE OF DOCUMENT

AID 590-1 (4-74)

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OCCASIONAL PAPER NO.7

FINAL REPORT

THE AGRICULTURAL SECTOR IN RHODESIA

by

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January 20, 1977
Subcontract AID/afr-C-1254 for African-American Scholars Council, Inc. and the Agency for International Development

A. LAND SETTLEMENT PATTERNS

The nature and character of Rhodesian agriculture has largely been determined by the Land Apportionment Act of 1959 which was amended in 1969. It divided the country into African and European Areas. The former were then subdivided into the Tribal Trust Lands and African Purchase Areas. The initial division of land was as follows

European Area	35,660,900 Acres
Tribal Trust Land	40,127,600 "
African Purchase Areas	4,276,700 "
National Land (Parks, etc.)	10,497,400 "
Unreserved	5,961,900 "

The Act was amended in 1969 and the result was an allocation of approximately 5.5 million of the Unreserved land to Europeans and the rest to African Purchase Areas. Within the European area 6.2 million acres were designated as National Parks and 1.07 million acres in the African Area were so designated. The amendment of the Act in 1969 was therefore not motivated by any equity reasons, nor did it materially change the existing structure. The outlines followed the earlier ad hoc distribution of land which did not take into account the population composition; an insignificant proportion of the population claimed ownership to 40% of the total acreage.

European Agriculture is in the hands of approximately 7,000 farmers settled along the railway line running from the Eastern border at Umtali, through Salisbury to Bulawayo, with branches to Sinoia in Mashonaland and Fort Victoria in the Victoria Province. The major crops are tobacco and maize with livestock and dairy products coming from intensive farming in the north and ranches in the south. An analysis of farm size in 1965 showed a distribution ranging from 50 acres to over 20,000. As

can be seen from the table below, the largest number (55%) ranged in size for 1,000 to 5,000 acres. In contrast the average acreage in 1973 for the 60% of the total population classified as farmers by the Government was slightly over 11 acres.

Table 1

ANALYSIS OF EUROPEAN FARMS BY SIZE, 1965

Size of Farm (Acres)	Number of Farms	% of Total Acreage
Under 51	52	---
51 - 100	151	0.04
101 - 250	318	0.2
251 - 500	317	0.3
501 - 1,000	612	1.45
1,001 - 2,500	1,895	9.73
2,501 - 5,000	1,562	16.03
5,001 - 7,500	518	9.38
7,501 - 10,000	222	5.72
10,000 -	619	57.15

Source: Census of Agricultural Production in Rhodesia 1965. Central Statistical Office, 1966.

AFRICAN LAND OWNERSHIP AND AGRICULTURAL PATTERNS

Land in the 174 Tribal Trust Areas is owned on a communal basis, with disposition powers now vested in the chiefs. Individuals have usufructuary tenure of the arable land with grazing land utilized communally. Because of the government control on chiefs, this has resulted in practically no security for the farmer. The pattern of agriculture is essentially small-holder cultivation and herding, with cattle as the major capital input. The Tribal Trust Lands farmer has no access to commercial

loans since he has no collateral; government loans would require a lien on cattle. Since the official belief is that African grazing areas are overstocked, farmers fear that the Government would use the liens as a way of destocking. This has virtually stopped all government lending.

Extension services are provided by approximately 110 white officers supervising 1,700 African extension personnel. Distrust of government extension personnel runs deep because of conflicts over suitable livestock herds, and their advice is regularly ignored.

The African Purchase Areas were created with the first Land Apportionment Act (1929). By 1973, 8,060 of the potential 10,000 farms had already been occupied. The concept allowed Africans to acquire a registered title to land under freehold tenure. The requirement is that applicants prossess a "master farmer's certificate" acknowledging his ability to rotate crops, make ridges and practice land conservation, together with capital assets equivalent to a least R$500. In addition, he has to carry out specified capital improvements before acquiring title to the land. The units are bigger and usually better located with respect to transport facilities than Tribal Trust Areas, and as a result, over 60% of the total African sales of agricultural products marketed through the statutory come from this group. Average farm size in 1973 was about 300 acres, 9.25% of which was arable. The average value of output sold was R$270, compared to almost nothing for the average Tribal Trust Land plot holder.

LAND DISTRIBUTION BY AGRO-ECONOMIC REGIONS

A survey classified land in Rhodesia into Agro-economic regions on the basis of effective rainfall (total rainfall minus evaporation rates), soil fertility and drainage characteristics as well as the potential for erosion. This classification was closely associated with geographic regions as well.

Region I is located in the Eastern Highlands. Rainfall is heavy, with only a 1.6% variation and none of the area receives less than 42 inches per annum, because of low temperatures most of it is effective. This is a region suitable for intensive dairying since arable land is limited. There are also soft wood plantations and tea, coffee and citrus fruit estates.

Region II covers most of the land with an altitude of between 3,000 and 5,000 feet. The mean annual rainfall is 44 inches but the area drains well because of the high watershed. There are variations in natural soil fertility, however, which make some of the land suitable for intensive grain production in rotation with pasture for beef and dairy cattle (Mashonaland North). Another sub-region responds to fertilizer but can erode easily. The lower fertility allows for the control of nitrogen content, a characteristic favorable to tobacco farming. The soil can also support fodder crops, and irrigation increases productivity. All the land in Mashonaland South and North as well as parts of the Midlands lie in this group. Still another sub-region (around Sinoia) is suitable only for intensive beef production.

Region III lies between 3,000 and 4,000 feet and has a mean annual rainfall of between 22-28 inches. High evaporation rates make only 17 inches of this effective and only these crops that mature early and are drought resistant crops and livestock, but the quality of the soil is such that optimal units have to be between 3,000 and 4,000 units to be viable. The poorer soils in the region (Midlands and Victoria Provinces) either can support crops like millet, cowpeas or small scale (5,000 acres) ranching. Otherwise, most of it is suitable only for forestry (Gokwe Tribal Trust Area).

Region IV has a mean rainfall of 18-24 inches, but it has fairly severe midseason dry spells which make cash cropping inherently difficult without irrigation. The most fertile regions, around the Khami and Umgusa Rivers in Matabeleland, support

ranching on units of 15,000 acres or more.

Region V is in the Sabi (Lowveld), Mazoe, Wankie and Zambezi Valleys at altitudes of between 1,000 and 2,000 feet. Effective rainfall is only 16 inches because of high temperatures. Because of poor water supplies the beef stocking rates are low. Irrigation of land along the Sabi River, however, has allowed the cultivation of crops such as sugar, winter wheat and cotton as well as citrus fruit.

The last area, Region XX, is unsuitable for any agriculture.

The geographical characteristics are such that the less favorable regions have to be more capital intensive (irrigation, fertilizer, range management) if productivity is to be equal to that of the more favored areas in Mashonaland and Manicaland.

The land distribution according to the Land Apportionment Act, however, allocated the more capital intensive areas to the Tribal Trust Lands. The data shows that European lands account for 81% of the total acreage in Region 1, 77% of Region II and 64% of the acreage in Region III. On the other hand, 71% of the total land available to Africans lies in Regions IV and V. A more puzzling aspect is that, of the 4.5 million acres alloted to African Purchase Areas in 1973, 42% lies in Region IV, mostly in the arid areas of the Lowveld. More importantly, however, most of the Tribal Trust Areas which require intensive cultivation by virtue of the population pressure and capital shortage, especially in Mashonaland, have a substantial part of their acreage in Regions III and IV where erosion is a major problem because of the calcium content of the soil. Although this misallocation will not be referred to often, it is largely responsible, along with poor husbandry methods in these areas, for the low productivity of African agriculture. This is especially the case since transportation routes, storage facilities and urban markets have all been located within the European areas.

LAND DISTRIBUTION BY NATURAL ZONE & RACE, 1973

Land Classification	Total Area (Acres)	European Area (Acres)	African Area	of which Purchase Areas	Purchase Area as % of African Areas	Purchase Area as % of Total Area	European Area as % of Total Area
	(1)	(2)	(3)	(4)	(4)÷(3)	(4)÷(1)	(2)÷(1)
I	1,515,000	1,235,000	280,300	15,000	4.63%	0.08	81.52
II	18,144,700	13,987,000	4,157,700	609,122	14.65	3.36	77.09
III	16,683,600	10,790,000	5,893,600	220,844	3.75	1.32	64.67
IV	32,020,200	16,775,000	15,245,200	1,875,461	12.30	5.86	52.39
V	25,805,000	11,417,000	14,388,000	1,757,400	12.21	6.81	44.24
XX	3,015,000	1,030,000	1,985,000	--			34.16

TRANSPORTATION

The major rail and road network follows the main watershed, running from Umtali in the East through Salisbury, Gwelo (Midlands) to Bulawayo. There are spur lines to Sinoia, Shamua in the north and to Fort Victoria in the midlands. Access to the ocean ports is through Beira and Lourenco Marques in the East and South Africa. Paved roads follow the line of rail with branches into the Intensive Conservation Areas (ICA) of the European Areas. Agriculture provides about 9.3% of the Rhodesia Railways revenue. African areas as a rule have poor access to the urban market through roads that are aften impassable during the rainy season. The marketing of maize (dry), ground nuts and cotton is controlled through statutory agencies and they collect output from both Tribal Trust and Purchase Areas, the former from designated collection points, and from the farm in Purchase Areas. African output marketed through the statutory agencies is subject to a uniform transportation charge irrespective of origin, and a levy for the packaging on 1974 transportation and handling charges were R$3.85 a ton, packaging costs $4.40 and the levy $4.13. These marketing costs absorbed 30% of the price of maize, for example, and acted as a deterrent to sales through the marketing boards.

B. AGRICULTURAL PRODUCTION, MARKETING

The agricultural sector in Rhodesia consists of production for commercial production to supply the urban population by both the European and African farmers, and production for own use, largely by African farmers in the Tribal Trust areas. Marketing of the major (controlled) agricultural products is done through state-controlled agencies - the Grain Marketing Board, the Dairy Marketing Board and the Cold Storage Commission (beef). In 1973 there were approximately 6,900 European farmers, 8,686 farms allocated to Africans in the African Purchase Areas with a population of 132,810 who produced for their own use as well as the market, and 2,911,040 people occupying 18,217,000 hectares in the Tribal Trust areas, and producing largely for their own consumption.

Table 1 shows the composition of agricultural production and sales by race for the period 1965-75. The statistics for European production are more accurate since

Table 1

AGRICULTURAL PRODUCTION AND SALES IN RHODESIA, 1965-75
(R$million)

	1965	1966	1967	1968	1969	1970	1971	1972	1973
European:									
Gross Output	148.6	148.9	150.3	144.4	178.3	175.8	215.6	242.0	257.2
Crops	105.5	101.1	103.6	79.7	111.2	103.0	136.4	155.6	154.3
Livestock	28.0	34.2	33.0	36.0	39.0	44.9	55.1	70.6	89.3
Others	6.3	7.2	7.1	7.9	7.2	7.9	7.9	8.3	9.1
Sales:	117.6	112.1	112.8	93.5	123.3	117.9	148.2	185.3	195.2
African:									
Gross Output a/	35.8	50.9	65.3	43.3	64.9	49.9	72.8	85.3	58.5
Own Use	27.6	41.1	53.3	36.6	51.4	39.1	56.5	60.4	36.5
Crop Sales	4.2	5.7	7.9	2.5	7.4	4.2	9.2	17.1	16.2
Livestock	4.0	4.1	3.9	4.3	6.1	6.6	7.1	7.8	10.2
Sales as % of Output	23%	19%	18%	16%	20%	20%	22%	29%	38%

Source: Monthly Digest of Statistics. April 1976. Central Statistical Office.

most of the output is marketed through the official channels and is documented. Estimates of African production for own use are based on per capita needs[1/], and only those sales as are made to state-controlled agencies are included. The assumption is that the population in the tribal trust areas is self sufficient in food requirements, and the value of output retained for own use not only reflects population growth, but is related to quantities sold. The data on sales shows very clearly, however, the dependency of the urban market on European agricultural production. This dependency differs by race and by product, however.

The major agricultural crops are tobacco, maize, groundnuts and cotton, while sugarcane and wheat are grown under irrigation. Other products include citrus fruit, sorghum, tea and millet. Almost all the Virginia flue-cured tobacco, sugarcane and citrus fruit sold commercially or exported are produced on European farms or corporate estates, while African farmers have increased their production of cotton as a cash crop.

MAIZE

Maize is the chief staple of the major part of the African population. Production statistics are not readily available for the period 1966-75. Estimates for the period 1971-74 are given below. The sharp decline in 1973 was due to a severe

Table 2

MAIZE PRODUCTION, 1971-75
(metric tonnes)

	1971	1972	1973	1974	1975
Total Output	1,343,811	1,500,000	635,000	1,600,000	2,000,000[e]
African	900,000	895,000	254,000	N/A	N/A
African Sales	51,344	47,500	10,282	N/A	N/A

Source: United Nations Economic Commission for Africa, Country Summary: Rhodesia

drought during the growing season (November-March). Estimates of African produc-

tion and sales were obtained by using the gross value and producer prices. Only 5% of the total African production was marketed through the Grain Marketing Board, and over 60% of this came from the African Purchase Areas. The major supply of maize to the urban areas therefore came from the European areas, and they also supplied the bulk of the needs for the agricultural labor force and exports. Mashonaland is the major source of maize, supplying over 50% of the national output, followed by the Midlands Province (33%) and Victoria.

Maize is also an export crop. Before the application of sanctions Rhodesia exported maize to Zambia, Zaire, Malawi, and occassionally to Europe. Zambia imported Rhodesian maize during 1970/71 when its own crop failed. Total exports in 1971 and 1972 were 1.22 million and 500,000 tons respectively, and these figures indicate that sanctions had posed a problem for exports until 1971 when markets were found in Japan (770,000 tons), West Germany (175,000 tons), Belgium, Italy and Zambia.

PRODUCTIVITY

Production has increased sharply owing to the increased use of hybrid varieties developed within Rhodesia, most notably the SR52 and R200 strains, as well as the increased application of fertilizer by African farmers. The increase occurred before 1969 and thereafter acreage under hybrid maize in the African Purchase Areas remained constant between 1970 and 1973, at 89% of the total acreage under maize. It is unlikely that a similar increase occurred in the Tribal Trust Areas, although the Government statistics would seem to indicate it. The estimates of production for own use in the Tribal Trust Areas were based on 'per capita needs'. Such needs were computed from surveys of Urban Africans, and the assumption is that the Tribal Trust Areas are self-sufficient in maize requirements. Retentions and sales from the African Purchase Areas and European farms indicate that some maize may be going from these areas into the Tribal Trust Areas, probably as payment for labor during the harvest season. Retentions in 1970

totalled 13,000 tons, then increased sharply to 22,258 tons in 1971, 26,406 tons in 1972 and then fell to 10,172 in 1973. If, as is reasonable to expect, annual per capita requirements were more or less constant, then some of the retained production must have been sold during 1972 and 1973/74 when drought affected Tribal Trust Area output. Sales from the Tribal Trust Areas were more than offset by these inflows, so that net African Sales came from the Purchase Areas.

Table 3 compares productivity on European farms and African Purchase areas for the period 1970-73, for that acreage planted with hybrid varieties. The trial yields were obtained from experimental plantings in the African Purchase Area at

Table 3.

AVERAGE YIELDS PER HECTARE OF HYBRID MAIZE 1970-73
(Kilograms)

	1970	1971	1972	1973	1974	1975
European Farms	3,251	5,100	5,632	2,830	N/A	N/A
African Purchase Areas	633	1,628	2,100	561	N/A	N/A
Trial Yields	6,000	6,636	6,000	0	4,364	-
Gross Producer Price (R$/Metric ton)	39.57	33.11	40.00	38.90	41.33 ~~37.00~~	42.00

Source: R.J. Gallagher, "High Yields and Profits Demonstrated in Zowa African Purchase Area," Rhodesian Agricultural Journal, Vol.73 No.1, March 1976, pp.23-4. Also Survey of African Purchase Areas 1973. Central Statistical Office, Salisbury, 1974.

Zowa, 80 miles from Sinoia. The discrepancy in productivity is obvious. It has been attributed to poorer soils, insufficient land management, including a lower level of fertilizer utilization. The average application of fertilizer was 113 kilograms a hectare, in contrast to about 300 kilograms on European farms. Another important factor is the wider fluctuations caused by the weather in Purchase Areas when compared to European farms. The drought in 1973 for example cut European

farm yields by 50% from the 1972 level, but African yields fell by 75%.

Results at the experimental farm at Zowa would seem to indicate that this is because of the nature of the soil. There, good soil was supplemented with the recommended amount of fertilizer (330 kgms. per hectare), top dressing and the appropriate ridging.[1/] The fertilizer applications were over and above what African farmers apply, and the contouring is also a capital intensive method. The type of soil applied on the experimental land (anthill variety) was well drained, a feature that is rare in Tribal Trust Areas. The results were strikingly different, but the crop failed completely with the drought in 1973, whereas yields on surrounding farms averaged 276 kgms. This suggests that the methods used by African farmers are tailored to ensure a crop in marginal rainfall country (where most of the African Areas are) for subsistence during a bad season.[2/] The results also suggest that yields up to 200% higher can be obtained by increasing the use of fertilizer also by 200%, by employing more labor and capital on suitable land. Such methods would have to be accompanied by an improvement in storage facilities to ensure supplies in times of crop failures.

An incentive would also be necessary to induce African farmers to increase their utilization of fertilizer. Table 3 gives the gross producer price for maize. The European farmer received the full price, but an African farmer selling Grade A maize through the official marketing agency, the Grain Marketing Board, had a levy of 10% deducted from the selling price, as well as a charge for every bag shipped to the railhead. The transportation charge is an average, so that every seller pays the same rate regardless of the distance. Since most African areas are farther from the railway line the result is a higher transportation cost than that paid by most European producers.

The Grain Marketing Board has the sole authority to buy and sell maize in the urban areas. It operates storage facilities in the major producing areas as well as the cities. The grain silos are located along the line of rail (Karoi, Banket,

Salisbury, Gatooma, Gwelo, Bulawayo etc.) and thus are in the European areas.

TOBACCO

Virginia tobacco was the major export crop before the U.N. sanctions in 1966. Almost the entire output comes from European producers in Mashonaland and the Midlands Provinces. Table 4 gives production figures for the period 1970-75. Production since 1966 has been controlled by quotas, and has declined from the 246 million pounds produced in 1965. There were 2,700 tobacco farmers in 1964,

Table 4

PRODUCTION OF VIRGINIA FLUE-CURED TOBACCO IN RHODESIA 1969-75

Year	Output ('000 lbs)	Value (R$ Million)	Producer Price (¢/kgm)
1969	132,000	28.60	45.91
1970	132,000	28.83	46.28
1971	132,000	33.20	50.69
1972	145,000	40.09	55.00
1973	134,000	33.42	60.00
1974	165,000	N/A	82.00
1975	200,000(e)	N/A	85.00

Source: U.N. Economic Commission for For Africa, Summary of Economic Data: Rhodesia. Sixth Year, 1974. Also Economist Intelligence Unit, Quartely Economic Review of Rhodesia, June 1976.

but this number had declined to 1,700, with most of the farmers switching to beef or leaving farming. During this period, farmers sold their output to a state monopoly, the Tobacco Corporation which then stored the output and sold it in secret. There were some problems in finding another market (the U.K. had been the primary buyer of Rhodesian tobacco until 1965), and so a surplus began building up in the warehouses. The 1968/69 budget report valued this stockpile at R$68

million, but devalued it by R$10 million to reflect the market conditions and the difficulty of marketing Rhodesian output.

PRODUCTIVITY

There was little change in output per hectare between 1966-74, with productivity averaging 1,357 kgms. per hectare in 1966 and 1,417 kgms. in 1973. These levels require a high level of capital inputs. In 1965 for example 85,453 hectares under tobacco produced 232.8 million pounds and required the inputs tabulated in Table 5 in addition to utilizing 36% of the labor employed in agriculture and other capital inputs such as ploughs and spraying equipment. These capital requirements, in addition to the soil drainage requirements already referred to make it difficult for African farmers to grow Virginia tobacco. The fertilizer requirements of 121 kilograms per hectare are not significantly different from that applied to maize by African farmers in 1973. Wood would not be expensive to obtain, although plantations would be necessary. However, the coal and oil requirements as well as the labor, barns and other inputs require capital outlays and credit facilities not available to African farmers. Thus they have produced most of the country's output of the cheaper burley and Turkish tobaccos.

Table 5

SOME INPUTS IN TOBACCO FARMING IN RHODESIA, 1965

Input	Quantity
Land (hectares)	85,756
Fertilizer (tons)	69,680
Coal (tons)	50,000
Oil (gals.)	176,000
Wood (cords)	934,000
Barns	38,000

Source: Agricultural Production in Rhodesia 1965. Salisbury, Central Statistical Office 1966.

The average farm size for Virginia tobacco was 91.5 acres. It may be possible to overcome the capital requirements by having African farmers grow tobacco on smaller units of land as long as the soil was suitably drained. Farms in the European areas averaging 20 to 29 acres of arable land under tobacco averaged 788 pounds an acre, whereas larger units (90 to 199 acres) averaged 1,185 pounds.[2/] About 63% of the acreage was in farms with arable land between 80 and 300 acres. This correlation between farm size and productivity may just be a reflection of the fact that the largest tobacco-growing farms were located in the areas most suitable for tobacco. If the most suitable land were divided into smaller units with, say, 20 acres of arable land each, they may be just as productive, given the right combination of inputs.

EXPORTS

Until 1966 most Rhodesian tobacco was exported to Great Britain. Auctions were held publicly at the Tobacco Auction Floors in Salisbury. With the imposition of sanctions a state corporation, the Tobacco Corporation, purchased the entire crop and then disposed of whatever it could. The rest went into storage. Export figures are no longer published, but stocks apparently built up until 1969 when alternative markets became more regular. The production quotas, which had been fixed at 132.0 million pounds for 1969-73 were raised in 1974 with the apparent rundown of the stocks. The producer price was also increased to 60¢ a kilogram in 1973 and 82¢ in 1974 in order to compensate producers for rising costs.

Known exports in 1971 totalled 34 million pounds, 22.4 million pounds of which went to the Netherlands, 7.3 million pounds to Belgium and 3.8 million pounds to West Germany. Exports in 1972 and 1973 totalled 47.7 and 56.1 million pounds respectively, but producer earnings in 1975 were reportedly the lowest ever, some $40 million below expectations.[3/] The diversion of exports away from the port of Beira to South Africa raised transportation costs to approximately $11.4 a ton.[4/]

The higher production costs, principally the cost of oil, together with the labor shortage and the imposition of production quotas forced some farmers to shift to beef production. Tobacco farming is still the most profitable, however, and should conditions return to normal output should recover to pre-sanction levels.

COTTON

Seed cotton has been the fastest growing crop since UDI, with output increasing from 39,000 metric tons in 1967 to 105,000 tons in 1974 (Table 6). Most of the additional output came from the Tribal Tribal Trust Areas, and African producers increased their share of the market from 23% in 1970 to over 50% in 1974. This expansion was due to an increased availability of extension services, sprays and spray equipment and to an improvement in producer prices paid to African farmers. Yields from African areas are 40% those of Europeans, and the latter have increased at a faster pace due to the diversification efforts. Cotton was added to the list of controlled crops and its marketing removed from the Grain Marketing Board to a newly established Cotton Marketing Board.

Table 6

COTTON PRODUCTION IN RHODESIA 1970-73

	1970	1971	1972	1973	1974
Total Output (tons)	62,300	65,500	72,900	55,700	105,000
of which African	14,500	28,200	38,800	28,600	58,000(e)
Producer Price (¢/kg)	15.16	15.23	18.30	26.59	23.00

(e) estimate

Sources: 1973 Census of African Purchase Areas. Central Statistical Office.
National Accounts and Balance of Payments of Rhodesia 1973.
U.N. Economic Commission for Africa, Summaries of Economic Data.

Expansion of cotton production may not go much further since it has to compete with maize and other subsistence crops for land. There are fears that it hastens

erosion and depletion of natural soil fertility. The shift may not be permanent unless land management techniques and extension services help restore land productivity.

OTHER CROPS

Some specialized crops are grown on estates owned by corporations. SUGAR is produced at the Chirundu Sugar Estates on the Rhodesian/Zambian border, the Hippo Valley and Triangle Sugar Estates in the Lowveld. Output of refined sugar in 1967 was estimated at 132,000 tons. By 1970 it had reached 142,000 tons, and 220,000 tons in 1974. Sugar competes with cotton in the irrigated Hippo Valley project, but high prices during 1972-74, coupled with the drive for self-sufficiency in food products seem to have been enough to maintain the upward trend. Marketing of sugar is controlled by the private sector.

Production of groundnuts almost doubled between 1967 and 1974, from 79,000 tons to 130,000 tons, again due to favorable prices. Producer prices increased from $116 a metric ton in 1967 to $188.50 in 1973. African producers supplied about 5% of the total output, most of it for personal consumption. Groundnuts are an important part of the diet, especially for agricultural labor, which received groundnuts and beans as part of their rations. It is also an export crop.

Tea is produced and marketed by the Rhodesian Tea Estates in the Eastern Highlands, and output averaged 2.3 million pounds between 1968 and 1975. There are plans to increase production to 8 million pounds by 1980 at a capital cost of $3.0 million.[5/] Most of the tea is for domestic consumption. Coffee is now being produced on an experimental basis in Manicaland.

Wheat is produced under irrigation as a winter crop in the Lowveld in conjunction with cotton and sugar. Production increased sharply from 18,000 tons in 1967 to 82,000 tons in 1971, and this made up 75% of the country's total requirements.[6/] Because of the favorable prices wheat contributed 3% of the value of agricultural output. In 1965 the producer prices were 23% above import

parity, and Table 7 shows they were considerably higher than U.S. export prices during 1971-72. However, Rhodesian prices did not respond to the 1973-74 world

Table 7

RHODESIAN WHEAT PRODUCER PRICES COMPARED TO THE U.S.

Year	U.S. (Gulf Ports) (R$/ton)	Rhodesia
1971	$43.03	$72.53
1972	46.27	72.53
1973	80.85	72.53
1974	107.90	83.52
1975		110.00

Source: Ian B. Edwards, "Wheat Situation in Rhodesia," op. cit.

price increases, and this, coupled with the increased profitability of sugar and cotton, slowed down the drive toward self-sufficiency.

Production occurs on both European and African farms. The former average 60 to 80 hectares of land under irrigation, with yields of up to 4,000 kgms. a hectare. The Lowveld in the Victoria Province has 60% of the total acreage. Some African farmers grow wheat on a dryland farming basis but the total acreage is only 650 hectares with yields of 550 kgms. per hectare. An experimental irrigation project was established by the Tribal Trust Land Development Corporation (TILCOR) at Chisumbanje in the Lowveld near the Sabi River. There are currently 145 tenant farmers on 2,450 hectares. The wheat is grown and harvested on a co-operative basis, with yields equal to those of European farmers. In 1974 each farmer earned a net profit of between $700 and $1,100 after paying a rental of $165. Costs of production have been low since the water supply was being pumped from the river without any impoundment. As the land under irrigation increases, however, and dams become necessary the cost of irrigation will go up.

Most of the wheat is made into bread, with 70% of the output consumed by the African population. The experimental irrigation project seems to have proved

the viability of African production. That project, however is very capital intensive, with combine harvester and a high level of land management personnel.

Sorghum and millet are two other grains of subsistence and commercial importance. Total production has been stable at 270,000 tons during 1970-75, largely because of an unfavorable price structure, and because they are not an important food crop. Sorghum is a hardy crop produced by both European and African farmers, with the latter retaining most of their output as insurance against drought and for domestic beer brewing purposes.[7] Yields are about 50% those of maize, which is to be expected since both crops are grown on marginal land in Mashonaland, and on a dryfarming basis in the more arid Victoria and Charter areas. Tastes are such that the two crops cannot replace maize as a food crop in spite of their suitability for a large portion of the African Tribal Trust areas. They could be an important export crop, however, if a market could be found.

Citrus fruit is grown under irrigation in the Mazoe Valley (Mashonaland North), Lomagundi, and the Lowveld. The groves are owned by corporations (Mazoe Citrus Estates, British South Africa Company and Hippo Valley Estates respectively). Production is for domestic consumption and export but statistics as to the breakdown are unavailable. Transportation problems seem to have affected exports, however, and Hippo Valley Estates is said to have dumped 16,000 tons of citrus fruit bound for the export market in 1974 because it could not get them to the coast.[8] Some citrus and tropical fruit such as mangoes, guavas and paw paw are grown for own consumption in the African areas, and there are commercial sales in the African urban markets, especially in Manicaland and Mashonaland North. The markets are not very segregated as far as African consumers are concerned, however, so it is difficult to determine where their supplies come from.

LIVESTOCK PRODUCTS

Table 8 indicates the substantial growth of the national herd of livestock

Table 8

RHODESIAN LIVESTOCK STATISTICS 1965-75
('000)

	1965	1968	1971	1973	1974	1975
Cattle	3,475	4,253	5,495	5,610	5,700	6,098
Sheep	472	634	765	745	748	754
Goats	634	1,043	1,770	1,964	2,008	1,747
Pigs	132	174	187	200	192	207

Source: Monthly Digest of Statistics April 1976.

since UDI. The number of cattle almost doubled, largely due to an increase in the European-owned beef cattle from 1.52 million to 2.65 million. The number of dairy cattle was almost constant at just over 120,000, all of them owned by European farmers. The increase in the number of sheep was entirely due to a larger African flock, and Africans in the Tribal Trust Areas owned almost all of the goats.

The size of the herds does not give an accurate picture of the meat industry however. Cattle are the primary capital input in African agriculture, with oxen used as draught animals. A 'team' of four oxen per farmer is a minimum requirement in the Tribal Trust Areas, more in the Purchase Areas, and there has to be a stock of young animals at various ages to ensure a constant supply. This limits the offtake from the African herd usually to animals past their usefulness as capital. Beef fattening, a procedure where culled animals are fed roughage from the fields before being sold, is a relatively new development in both Tribal Trust and Purchase Areas. Estimated slaughter from this source for the period 1970-74 is given in the table below, but the this number could be increased to 60,000 animals if the losses due to late culling were reduced, and if the levy of 10% of the value at slaughter were removed.[9/] Most of the goats are kept for own

Table 9

SLAUGHTER OF LIVESTOCK FROM AFRICAN AREAS

	1970	1971	1972	1973	1974
Fattened Cattle	3,633	5,580	5,208	13,695	15,314
Goats	48,189	38,413	48,988	65,777	N/A

Source: J. Danckwerts, "African Agriculture," in G.M.E. Leistner (ed.), Rhodesia: Economic Structure and Change (Cape Town: Africa Institute of S.A. 1976), Chap.7.

consumption, and attempts to increase sales to the Cold Storage Commission or through the District Commissioner-sponsored sales have proved unsuccessful. African sales of other livestock products to the urban market have also been insignificant, at least through official channels.

The result is that sales of beef to the urban area have come from European-owned ranches. The offtake ratio from ranches and farmswith mixed agriculture was estimated at 24% during 1964-74, so that approximately 635,000 herd of cattle were slaughtered in 1972 and 660,000 in 1975, compared to 369,000 in 1965. Over 50% of the beef production is exported to other African countries and Europe. The increase in production was due to a switch to beef by farmers in mixed farming areas of Mashonaland. The imposition of quotas on tobacco has to be the major reason, because increases in production continued even after producer prices stabilized in 1967. From 1967 to 1971 prices averaged $332 a metric ton dressed weight. The Cold Storage Commission raised prices by 15% in 1972 and 11% in 1973, to $422.5 a ton. The poor grazing conditions in 1973 caused by the drought resulted in an even sharper increase in slaughterings as farmers tried to minimize their losses, so that rate of production is only temporary.[10/]

Europeans sell their beef directly to the Cold Storage Commission, the state monopoly. Africans either sell their cattle to European farmers (who pen-feed the cattle before selling to the CSC), or directly to the market through the Cold Storage Commission or at District Commissioner sponsored auctions. The

Cold Storage Commission operates abattoirs at Salisbury, Marandellas and Sinoia (Mashonaland North), Umtali (Manicaland), Gatooma and Gwelo (Midlands), Fort Victoria and Bulawayo. Most of the large ranches are in the south and Victoria but increases in production have also occured in Mashonaland and the Midlands, and the latter now supplies 23.4% of the nation's output. 11/

Statistics on the volume of exports are unavailable, but apparently they were affected by the EEC embargo on imports. Rhodesian beef has been reportedly sold to Japan, Malawi, Zambia, Ivory Coast and other Eastern European countries.

Sales of milk, butter, and cheese to the urban market are dominated by European farmers, primarily because the productivity of African cattle is low and transport facilities for such perishables as milk are poor. Total production of milk in 1965 was 22.6 million gallons, 55% of which was consumed as fresh or powdered milk, 32% as butter, and the rest as cheese. Rhodesia is self-sufficient in milk production.

C. EFFECTS OF SANCTIONS ON AGRICULTURE

Sanctions resulted in the slowdown and diversion of agricultural exports, in increased state intervention in the marketing process and state leadership in diversification of agricultural output; and in an increase in production costs accompanied by a shortage of agricultural labor

EXPORTS

Tobacco exports were the most visibly affected. The Government of Rhodesia responded by creating a purchasing monopoly, the Tobacco Corporation, imposing production quotas and paying producers prices that either forced them out of agriculture or into the production of other crops. The process of finding a new market other than the United Kingdom resulted in stockpiles already referred to. These stocks apparently built up between 1967 and 1973. The value of the stock was estimated at $68 million by 1968/69, and the market realities forced a devaluation of some $10 million to $58 million in 1970. The stockpile reportedly

all but disappeared in 1974 when producer prices as well as quotas were raised. The increase in output projected for 1975/76 indicates that the shifts toward other crops is not irreversible and that it is relatively easy to bring fallow acreage back into tobacco production.

Exports of maize do not seem to have been significantly affected by sanctions. Failure of the Zambian crop already alluded to provided an outlet for the 1969 and 1970 crops. Markets later opened up in Japan and Europe. However, transportation costs had gone up by almost $12.00 a ton due to closure of the export outlet at Beira and re-routing through the much longer South African route. Although beef exports were hampered by the EEC embargo Rhodesian output has been sold under various disguises to Zambia, Zaire, and through South Africa to Japan and Europe. Exports to Malawi continued at the same pace as before sanctions.

STATE INTERVENTION AND SUBSIDIES

Prior to 1965 only 35% of the total agricultural sales went through the statutory bodies. After 1965 the figure rose to over 70%. The major reason was the drive initiated by government to induce diversification into import substituting crops to compensate for foreign exchange losses inflicted by sanctions. Another reason of course was to use state resources to defeat sanctions by creating marketing monopolies that could seek out markets wherever possible without risk of international reprisals. Table 10 gives gross producer prices for major crops for the period 1967-74. Tobacco and cattle could be considered substitutes, whereas cotton and wheat are complementary crops in the Lowveld. The price of tobacco fell 25% relative to that of beef between 1965 and 1968. The productivity per acre of land under tobacco remained relatively constant while beef productivity, measured as the percentage herd mortality, increased by 50%. Government expenditures on research and extension services increased at 6% per annum, in real terms, over the same period.[12/] Thus, cattle farming returns per unit of land increased

Table 10

COMMODITY PRODUCER PRICES IN RHODESIA 1967-75

Crop	1967	1968	1969	1970	1971	1972	1973	1974	1975
Tobacco (¢/kg.)	51.42	51.42	45.91	46.28	50.69	55.00	60.00	82.00	85.00
Maize ($/M. ton)	33.07	35.93	41.17	39.57	33.11	40.00	38.90	41.33	42.00
Cotton (¢/kg.)	15.60	15.60	14.70	15.16	15.23	18.30	26.59	26.59	23.00
Groundnuts ($/ton)	116.36	134.73	134.73	134.73	134.73	158.54	188.54	N/A	N/A
Tea (¢/kg)	95.50	80.82	76.46	97.90	92.19	93.64	85.31	N/A	N/A
Wheat ($/ton)	-	-	-	-	72.53	72.53	72.53	83.52	110.00
Cattle (¢/kg.)	33.21	33.17	33.41	33.17	34.79	38.07	42.25	N/A	N/A

Sources: Economist Intelligence Unit, Quarterly Economic Review of Rhodesia March 1976. Also U.N. Economic Commission for Africa, Summaries of Economic Data: Rhodesia. Sixth Year, 1974.

relative to those of tobacco. Tobacco remained an attractive crop, however, so the Government had to impose quotas to force those in areas with a mixed farming potential to diversify. Expansion of extension services and increased availabilty of chemical inputs, coupled with a more attractive price relative to that of maize resulted in a higher output of seed cotton from African areas.

The full impact of the diversification efforts can be observed if one looks at the number of tobacco farmers as well as acreage under tobacco before and after the imposition of sanctions. The total number of European farm owners, occupiers or lessees decreased from 7,717 in 1965 to 5,773 in 1969, and then increased again to 6,418 in 1973 in response to recruitment efforts overseas. The number of tobacco growing farms decreased however, from 2,700 in 1964 to 1,700 in 1971.[12/] Total acreage under tobacco apparently declined by 59%, from 103,630 hectares in 1964 to 42,984 hectares. Similarly, acreage under maize declined after an initial increase in 1965, from 150,875 hectares in 1964 to 134,630 hectares in 1975.

INCREASED ACREAGE UNDER CROPS

The shifting from one crop to another occured even while total acreage under cultivation increased by 41% between 1964 and 1974. European acreage increased from 430,332 hectares to 605,361 hectares. Acreage in the African Purchase Areas remained relatively constant, while statistics are unavailable for the Tribal Trust Areas. Most of this additional acreage went to crops such as cotton, wheat, sugar, soybeans and citrus fruit. There was a similar increase in acreage under irrigation. One can conclude that the substantial increase in the value of all agricultural output was due to higher prices and more land under cultivation rather than to overall increases in productivity. This is to be expected, since in some cases land was being planted with crops it was only marginally suited for.

Sanctions therefore resulted in higher agricultural producer prices for the preferred crops, higher productivity in those crops, and lower imports. Tobacco so dominated European agriculture, however, that although the volume index (1964=100) rose to 167.8 in 1972 the weighted unit value index reflected the decline in tobacco prices (from 57¢ in 1964), and dropped to 99.1. The system of subsidies also did not result in unusually high consumer prices. The price index for urban African families (1964=100) rose at an annual compound rate of 2.33% between 1965 and 1972, 4.26%, 7.00% and 12.48% in 1973, 1974 and 1975 respectively. There was some delayed response, but the average rate of increase has to be considered low for that period when compared to other countries. This is because products which had substantial price increases do not play an important part in the urban African's budget. Maize meal constitutes the largest item in the budget, and the price of maize remained almost constant for a substantial part of the period. European prices did not increase substantially either, suggesting that subsidies of most of the products were financed by taxes rather than by consumer prices. Normalization of trade relationships may bring hard times for Rhodesian European agriculture unless curbs on imports (through tarrifs) and price subsidies continue.

If they do not then the current production pattern is unlikely to continue, and it is conceivable that beef production could decline while tobacco exports would once again assume a dominant position.

EMPLOYMENT OF AGRICULTURAL LABOR

Table 11 summarizes the African labor situation in the agricultural sector during 1965-75. The initial effect of UDI and sanctions was to reduce the size

Table 11

AFRICAN AGRICULTURAL LABOR STATISTICS 1965-75

	1965	1967	1970	1971	1972	1973	1974	1975
Employment ('000)	289.0	271.0	290.5	303.4	334.3	348.2	357.7	355.0
Average Wage ($/Annum)	123.5	122.5	126.7	131.2	133.1	142.2	156.8	178.6
Earnings ($mill)	35.7	33.2	36.8	39.8	44.5	49.5	56.1	63.4
As % of Total African Earnings	22%	19%	16%	16%	16%	16%	16%	15%
Net Migration ('000)	-3.4	-4.7	-9.2	-9.8	-7.6	+4.0	+0.5	-6.8

Source: Monthly Digest of Statistics June 1976

of the agricultural labor force. This reduction was largely absorbed by emigration of labor to Malawi, Zambia and Mozambique. Citizens of those countries have traditionally constituted the largest source of agricultural labor in Rhodesia. The largest net emigration (16,200) occured in 1966, the same year the agricultural labor force declined by 17,000. Employment in agriculture increased between 1967 and 1969 when wage rates increased slightly, but then decreased when the weather adversely affected crops in 1973. The decline in agricultural employment was in contrast to increases in other sectors of the economy where the African labor force increased from 367,000 in 1965 to 477,000 in 1972. The result was a decline in the percentage of the total labor force employed in agriculture, from 44% to 38%. The

contribution of agricultural earnings to the total wage bill also declined from 22% to 16% in 1970, and then remained constant as wage rates and employment in the sector started increasing again. The effect on the economy was probably mitigated by a decline in savings repatriated by migrant labor from the three neighbouring countries.

Agricultural wages did not keep pace with those in the other sectors of the economy during the whole period. The reason lay in the decline of the tobacco sector which usually pays higher wages, but also in the antagonistic attitude toward migrant labor. This resulted in a lack of desire by farmers to improve social conditions or the wage rate. The result was a shortage of agricultural labor, which by 1974 was estimated at 50,000 or 14% of the total agricultural labor force.[14/] Rhodesia had previously relied on the recruitment of contract labor from Malawi at fixed wage rates, a situation that kept costs down but also discouraged the improvement of employment conditions or the development of local labor supplies. Malawi has since stopped the recruitment of contract labor, while the Government of Rhodesia has made it more difficult for a free flow of foreign labor in an effort to create employment opportunities for Rhodesians. The feeling has been that population growth in the Tribal Trust Areas would force per capita income there down to a level where agricultural employment at the going wage rate would be a viable alternative.[15/] This has not happened, primarily because of the poor social conditions, and the shortage has been keenly felt in the Mashonaland North and South, and Charter Provinces, areas that previously obtained both temporary and permanent labor from Malawi and Mozambique respectively.

Employment of Europeans in agriculture increased from 4,360 in 1964 to 4,850 in 1974, a rate equal to that in other sectors of the economy. This was because the average wage increased 56%, a rate also equal to the national average for Europeans.[16/] Europeans are usually employed as technical and supervisory labor

and for this reason it may be interesting to measure the change in the ratio of skilled to unskilled labor during the period 1965-75 by using the number of Africans per European employee. In 1965 there were 65 Africans for every European employee. This had declined to 63 by 1970, but then increased to 73 in 1975. The actual ratio is much lower since some farms are run sorely by owners who are not classified as farm labor. Productivity on tobacco farms, the most unskilled labor intensive crop, was probably adversely affected by the callup of European males into military service.

DECLINE IN EUROPEAN FARMERS

The imposition of sanctions on tobacco apparently forced some farmers out of agriculture. The number of European farm owners, occupies or lessees decreased from 7,717 in 1965 to 5,773 in 1969 and then increased to 6,418 in 1973 in response to immigration recruitment drives overseas. The number of tobacco growing farms numbered 2,700 in 1964. By 1970 they had declined to 1,700. Acreage under tobacco apparently declined by 59%, from 103630 hectares in 1964 to 42984 hectares. Similarly acreage under maize also declined after an initial increase in 1965. Yet total European acreage under crops and fruit trees increase during the UDI period, from 430,332 hectares to 605,361 lectares, a 41% increase. Most of the acreage increases were in all the other crops, including cottom, wheat, fodder, sugar, tea, soya beans and citrus fruit. The shift was actively supported by the Government through changes in relative prices, extension services and agricultural loans. There are no comparative acreage statistics for African agriculture but the shift between cottom and maize should be less pronounced than the shift away from tobacco in European agriculture because of the position of maize as a subsistence crop.

CONCLUSION

The agricultural sector has maintained the same characteristics after 11 years of UDI that it had before 1965. There has been an expansion of marketed output, but the expansion came mostly from the already commercialized European agriculture. Although some crops experienced an increase in productivity, the expansion in output was largely the result of a 45% increase in acreage under crops. The The price of the most important crop for African farmers in terms of subsistence declined, but the price of other crops were subsidized. African sales remained an insignificant share of the total value of marketed output.

Virginia flue-cured tobacco declined in importance but still remained the most profitable agricultural crop. Productivity per acre remained almost constant but the price levels insured a higher rate of return per acre than most crops which had a higher transportation cost relative to their value. It is likely therefore that when normal trade relationships are restored production of certain crops like fodder, cottom and beef may decline and tobacco and maize resume their relative importance.

D. EFFECTS OF TRANSFER OF POWER

The following section makes hypothetical assumptions about events after a change of government. It assumes that European farmers reflect the behavior of the rest of the population, i.e., if 50% of the white population decides conditions under majority rule are untenable and leaves after 2 years, then 50% of the farmers will also leave. This is an unrealistic simplification in that farmers have traditionally been the most intransigent in terms of race relations and a larger percentage of them could migrate than in other sectors of the economy. However, we would like to limit the number of possibilities. Specifically, in this section the discussion centers on immediate food supplies, foreign exchange earnings from the export of agricultural products, employment and the provision of extension services to the African agricultural sector, i.e., effects on supply and productivity, without any of the income districation problems. Those are left to the following discussion on long term possibilities.

The area most affected by the departure of farmers will also determine the crop to be affected. If most of the farmers left from Manicaland then dairy products would be most heavily affected. If the departures were concentrated around Mashonaland North and South then tobacco, maize, and beef are most likely to be affected in that order. Abandonment of land in Matabeleland and Victoria Provinces would affect beer supplies.

The effect on food availability also depends on the race of the urban population. Since the African population currently obtains 75% of its caloric intake from carbohydrates and its vegatables from own production, a departure of mostly beef farmers would not seriously affect short term requirements. The following discussion will be on a crop by crop basis, but the underlying conditions discussed above will be paramount in determining the full impact of any emigration of European farmers.

The discussion in Section C has shown the nature of Rhodesian, the transformation that was the result of sauctions and the increased government participation. It is clear that Rhodeaia was self sufficient in the supply of maize, beef, ground nuts, citrus fruit, dairy products, and sugar before an during sanctions. Self sufficiency increased in the supply of wheat due to a favorable price structure. Similarly, exports of tobacco and maize were adversely affected by sanctions but seem to have recovered in 1974 and 1975, while exports of beef were not as heavily reduced. The effects of any exodus by European farmers or reduction in extension services on domestic food supplies would obsiously depend on the type of farmers who left and the region most heavily affected.

SHORT RUN DOMESTIC FOOD SUPPLIES

Maize:

The main staple will probably be least affected by emigration of European farmers. Exports would probably decline on the long run, but if prices go up it has been demonstrated that African farmers can produce and sell the total urban requirements.[12/] Without time to resettle farmers in what are now European areas, however, supplies would become more vulnerable to weather fluctuations, a result that was observed in Zambia during 1970/72. This would be largely the result of the soil conditions.

Supplies may become tight if a decline in European agriculture releases the agricultural labor force onto the urban market, and they have to be fed from African production.

If up to 50% of the maize producing European farms stopped operating there would be no food supply problems, but exports would be eliminated; if more farms cease operations, food prices would go up.

TOBACCO

Since this crop is produced exclusively on European farms any departure by

white farmers would affect export earnings to the same level. It is possible to substitute European farmers with Africans who have had experience growing barley tobacco, but this would require resettlement and training, let alone an injection of capital. Since most tobacco producers also grow other crops as well as cattle, these crops would also be adversely affected. The tobacco manufacturing industry in Rhodesia itself would also be adversely affected.

A gradual departure of European farmers accompanied by a resettlement of African farmers and provision of capital would minimize the decline in output, but it would take a substantial learning period before farmers recognized the qualities necessary for a prime quality leaf.

EMPLOYMENT EFFECT

Since tobacco normally employs 36% of the agricultural labor force, a 50% decline in output would cause the unemployment of 18% of the labor force. A substantial proportion of agricultural labor is still immigrant labor which could conceivably to repatriated to Mozambique, Malawi and Zambia; but this would cut the agricultural wage bill, reduce temporary employment opportunities for neighboring Tribal Trust Area residents.

FOREIGN EXCHANGE EARNINGS:

These would be affected by declines in exports of beef and increased imports of wheat.

Livestock Products as described, beef cattle are raised all over Rhodesia, either on ranches as in Victoria and Matabeleland, or on mixed farms in Mashonaland. Should a sudden departure of European farmers of up to 50% occur mainly from Manicaland and Mashonaland, then dairy products for the more densely populated Mashonaland and midlands areas would be adversely affected. However, first there would be a decline in exports and foreign exchange earnings from beef, and supplies

from the rest of the country would be adequate for domestic needs, especially since such an exodus would also cut the urban market for meat products. If the adversely affected area is Matabeleland or Charter Districts, then exports of beef would disappear, while supplies of milk and dairy products would be adequate, while higher domestic beef prices would probably occur.

Wheat-the African population consumes 75% of the total wheat supplies while producing 2% of the domestic output. Imports supply 25% of the total requirements. Rhodesian prices have since come into line with foreign prices, so domestic supplies would be replaced by imports in the short run, thus draining foreign exchange reserves. Domestic supplies could be increased from irrigation projects in the Lo eld provided extension services and water supplies were adequate, but projects such as the one by TILCOR take at least 3 years to develop and may be unsuitable because of their capital intensive nature.

TRANSPORTATION AND DISTRIBUTION

As discussed earlier, most of the rail transportation is located in the European areas and their output supplied the major share of the $7.14 million in railway revenues in 1975.[18/] This figure constituted 9.33% of the total transportation revenues. The important aspect of any departure is that railways would probably operate at less than full capacity, than raising transportation costs. Food prices in the southern part of the country would probably rise much faster.

EXTENSION SERVICES

Extension services have been provided to the African and European areas by the Department of Conservation and Extension. European areas were divided into over 100 Intensive Conservation Areas served by agronomists, extension and other research personnel. The Africanas are served by European officers usually supervising teams of African extension personnel trained in Rhodesia. Research in

Rhodesia has developed the hybrid varieties responsible for higher yields. The experience gained in the process obviously would be lost if the personnel left. The effect would be more serious for those products like Virginia tobacco and cattle where African farmers have little experience. The current yields can be maintained without research however, and so short-run effects of a lack of research personnel would be minimal. There are currently around 110 European and 1,200 African extension officers prividing services to African farmers, with the farmer acting mostly as upervisory and technical advisors to the African officers who supply the basic services through a community development format. Distrust of the officials have made their contributions marginal at best, and so a reduction of the services would have little impact.

SOME ESTIMATES OF IMPACT

The costs of an exodus can therefore be measured in the short run (1 to 5 years) in terms of the foreign exchange and wages lost. The former takes into account imports that replace domestic production. If 50% of the farmers in Region 11 (mixed farming area) then 50% of the tobacco ... as well as some of the maize and beef exports would be lost, at a foreign exchange cost of around U.S.$150.0 million. This does not include a reduction in beef exports under the assumption that the decline in supply would be absorbed by a decline in domestic consumption as the European population declined. Since 30% of the African labor force is employed in tobacco farming this would reduce the wage bill by at least R$20 million, with the ensuing impact on the demand for manufactured goods. The impact on food supplies would be cushioned by emmigration. If the farmers who left were primarily tobacco farmers then the effect on foreign exchange earnings would be higher, depending on world prices.

A departure of farmers from the ranching areas (Matabeleland and Victoria) would affect exports of meat, but would have little influence on agricultural employment. Departures from Regions 1 and 11A (dairy farming) would seriously affect the availability of dairy products, with a resultant foreign exchange cost.

CONCLUSION

It is likely that the new Government would not support the current level of agricultural subsidies, nor would it be economically desirable to do so, because they have not proved to be efficient nor have they substantially improved the position of the African farmer. Under those circumstances the current production pattern would not last and some crops that flourished under subsidized prices would become uneconomic to produce. There would most likely to a reduction in the level of beef, wheat and soybeans production, and most likely increased production of flue-cured tobacco by those farmers remaining on tobacco land. Urban areas could face an uncertain supply of maize because production from soils in African areas is more vulnerable to fluctuations in the rainfall. If maize producer prices were allowed to increase the shortfall would not necessarily be crucial, but there would be a substantial, if not complete, decline in exports, not only of maize but of beef as well. Since citrus fruit, sugar and tea are produced on corporate estates it is unlikely that they will be affected.

LONG-TERM AGRICULTURAL PROSPECTS

Progress in Rhodesian agriculture will depend on improvement of African productivity. Everyone agrees this will have to involve some form of land reform but so far the alternatives have not been considered. Some of the possibilities that present themselves evolve from the present agricultural system in Rhodesia. The two to be considered here are:

(a) Assume that it is far more efficient to move the African population from the marginal Tribal Trust Areas into the current European Areas, which then are subdivided into smaller units.

(b) Assume (a) is too expensive, but opt for an improvement of productivity in the current Tribal Trust Areas while at the same time opening up the European Areas to settlement by those who can finance large-scale agriculture (including Government finance).

(c) Some combination of (a) and (b).

RESETTLEMENT INTO EUROPEAN AREAS

The assumption under such a program would be that moving and resettlement costs are less than trying to improve productivity through combining the right inputs. Thus, the residents of some or all of the 174 Tribal Trust Areas would be moved into the current European Areas. Only in those cases where such a transfer would settle them in a better agro-economic region. As noted, there are about 14.0 million acreas of land in Region II, the area most suitable for mixed farming which are currently occupied by Europeans. All of the land is in Mashonaland. The criteria for subdivision would be to provide a certain percentage of arable land. If 50% or more of the white population left from this area, or if there was a re-organization of land owhership patterns with the cessation of the Land Appointment Act, then some 7.0 million of which are arable would be available for resettlement. If units with about 20 acres of arable land were allowed then 100,000 farmers could settle in this area. Region I which in in Manicaland and is most suitable for intensive dairying, has a total of 1.25 million acres, 180,000 of which are arable.

Such a resettlement program would involve a re-organization of extension Service and production methods. The optimum farm sizes under current production methods in Region II call for units with from 300 to 400 acres of arable land for intensive mixed farming and 600 acres for dairying in Lomagundi. Some areas in Region II (around Enkeldoorn, Macheke, etc.) have recommended farm sizes of up to 1,000 acres with 250-300 breeding cows for dairy and beef cattle. Such operations require a level of capital probably unsuitable for African farmers.

It is clear, however, that units with 20 acres of arable land would leave a large percentage of the Tribal Trust Land's population still settled in Region III, most of which is suitable only for ranching to production of hardwoods. The population density would be lower, thus allowing for larger units, but investment

in productivity enhancement would have to be made.

The current emphasis on Growth points, which is very similar to the Zambian "Intensive Development Zones" provide some learning experience for such units, since the average size of units at Sanyati is only 11 acres of arable land per farmer, but all of it under irrigation, and at Chisembanje only 8.0 acres under irrigation. Most of the land in Region II would not be under irrigation, however, and so the proper experience may come from the current African Purchase Areas. They average 200 acres, 25% of which is arable. As has been shown, productivity, though less than European areas, is higher than in Tribal Trust Lands. The capital costs of such a project would be considerable and would include moving and surveying expenses, agricultural loams and the training of extension people. Under the current price system for maize and tobacco the gross earnings per acre of arable land would be from $34 to $50, a considerable increase from current levels.

Similar projects have been started in the Central Privince of Zambia where loans from the World Bank and other organizations were used to purchase expatriate farms.[19/] These were then divided into sub-units of 200-240 acres each in such a way that each unit had arable land in it. The size of the unit depended on the amount of capital (farming equipment, draught animals) the farmer could muster, as well as his technical knowledge. Commercial banks then made loans for any additional improvements on the land. The projects were started in 1972 and it is still too early to judge whether they have been successful in raising productivity.

Production of beef need not involve exotic European cattle breeds which Africans are most familiar with. Research stations at Zowa and Makwiro African Purchase Areas and some European farmers in the Lomagundi District, Mashonaland North, have been breeding local "shona" bulls which are resistant to tick-carried diseases and are more productive in terms of meat and other livestock products. Any improvement in productivity in the Tribal Trust Lands would have to include

better transport facilities, especially in areas around the Lowveld, Midlands and Matebeleland, which are off the main railway lines. These would include expansion of the freight capacity of the railways, which apparently has been inadequate, paving roads into the Tribal Trust Areas, all of which are currently impassable during the rainy season, and probably building of spur lines from Umtali to the south, Salisbury-Shamva to the North and from Que Que to the Tribal Trust Areas to the Northwest.

IMPROVED PRODUCTIVITY IN THE TRIBAL TRUST LANDS

This would be a long term solution if the capital investment involved was less than in (a), for similar rates of return. The plan would consist of giving loans on a selective basis to a group of farmers with enough know-how to operate units in the current European area. Since this would be a very gradual policy, it would have to be accompanied by attempts to improve productivity in Tribal Trust Areas, through a combination of lant tenure and provision of biological inputs where necessary. This would probably be a recognition of the possibility that productivity is low in TTL's not only because of soil conditions, but also because of lack of know-how, poor extension services, weather variability and lack of proper economic incentives. The Zambian experience of 1969/71 showed that a mismanaged price policy can produce just as poor results as low productivity.

Some Tribal Trust Areas, notably those in Mashonaland North, are so densely populated that increases in productivity may be impossible without some resettlement to reduce the pressure on land. So a plan combining both (a) and (b) may be in order.

CO-OPERATIVE FARMING

Land reform could take some form of co-operatives. The advantage would be that each unit would not necessarily have to have arable land in order to produce subsistence or fodder crops. Zambiz experimented with co-operatives, and initially a large number of them failed due to a lack of managerial direction. Some have been successful.[20/] Tanzania has had trouble with productivity. The African

Purchase Areas in Rhodesia have operated farmers buying and selling co-operatives in order to take advantage of volume purchases. They have not been as successful as their European counterparts because they have had to compete with the Grain Marketing Board as sales agents, and they could not. The corporations supplying inputs to agriculture would also not give them enough of a discount to make them competitive with their own sales agents, so again they lost customers. The only experiment with production co-operatives has been at the wheat project at Chisumbanje. The capital-intensive methods applied there could turn out to be the only way to increase productivity on poor soils that may require extensive fertilizer applications and irrigation.

NOTES

1. R. J. Gallagher, "High Yields and Profits Demonstrated in Zowa African Purchase Area," Rhodesian Agricultural Journal, Vol. 73, No. 1, (March, 1976) pp. 23-24.

2. Agricultural Production in Rhodesia, 1965. Central Statistical Office, 1966, Table 6.

3. Economist Intelligence Unit, Quarterly Economic Review of Rhodesia, Supplement 1975, p. 5.

4. Ibid.

5. U.N. Economic Commission for Africa. Summaries of Economic Data: Rhodesia. Sixth Year No. 6.

6. A. F. Hunt, "European Agriculture," in G.M.E. Leistner (ed.), Rhodesia: Economic Structure and Change (Cape Town: Africa Institute of S.A., 1976), Chapter 6.

7. Traditional brews are an input into the agricultural production process; it is a refreshment served to communal labor.

8. Economist Intelligence Unit, op. cit., Sept. 1976.

9. J. Danckwerts, "Afrecan Agriculture," in G.M.E. Leistner, op. cit., Chapter 7.

10. A. F. Hunt, op. cit., p. 80.

11. Rhodesia, Agro-Economic Survey of Central Midlands, 1973. Agricultural Development Authority, (March, 1974) p. 135.

12. T. J. Bembridge and J.D.G. Steenkamp, "Beef Production Potential with Special Reference to the Matabeleland and Midland Provinces, "Rhodesian Agricultural Journal, Vol. 72, (June, 1976) pp. 143-147.

13. A. F. Hunt, "European Agriculture," op. cit.

14. E. D. Ely, "A Background to the Present Labor Shortage," Rhodesian Agricultural Journal, Vol. 72 (6), 1976, pp. 137-141.

15. Ibid., p. 140.

16. Monthly Digest of Statistics, June, 1976.

17. Total African Sales were 94,000 tons in 1961, enough to supply domestic needs, compared to 10,000 tons in 1973.

18. Monthly Digest of Statistics, June, 1976.

19. Zambia, Supplement to the Second National Development Plan, 1972-1976.

20. C. Stephen Lombard, "The Growth of Co-operatives in Zambia." The University of Zambia, Institute for African Studies, Zambian Paper, No. 6.