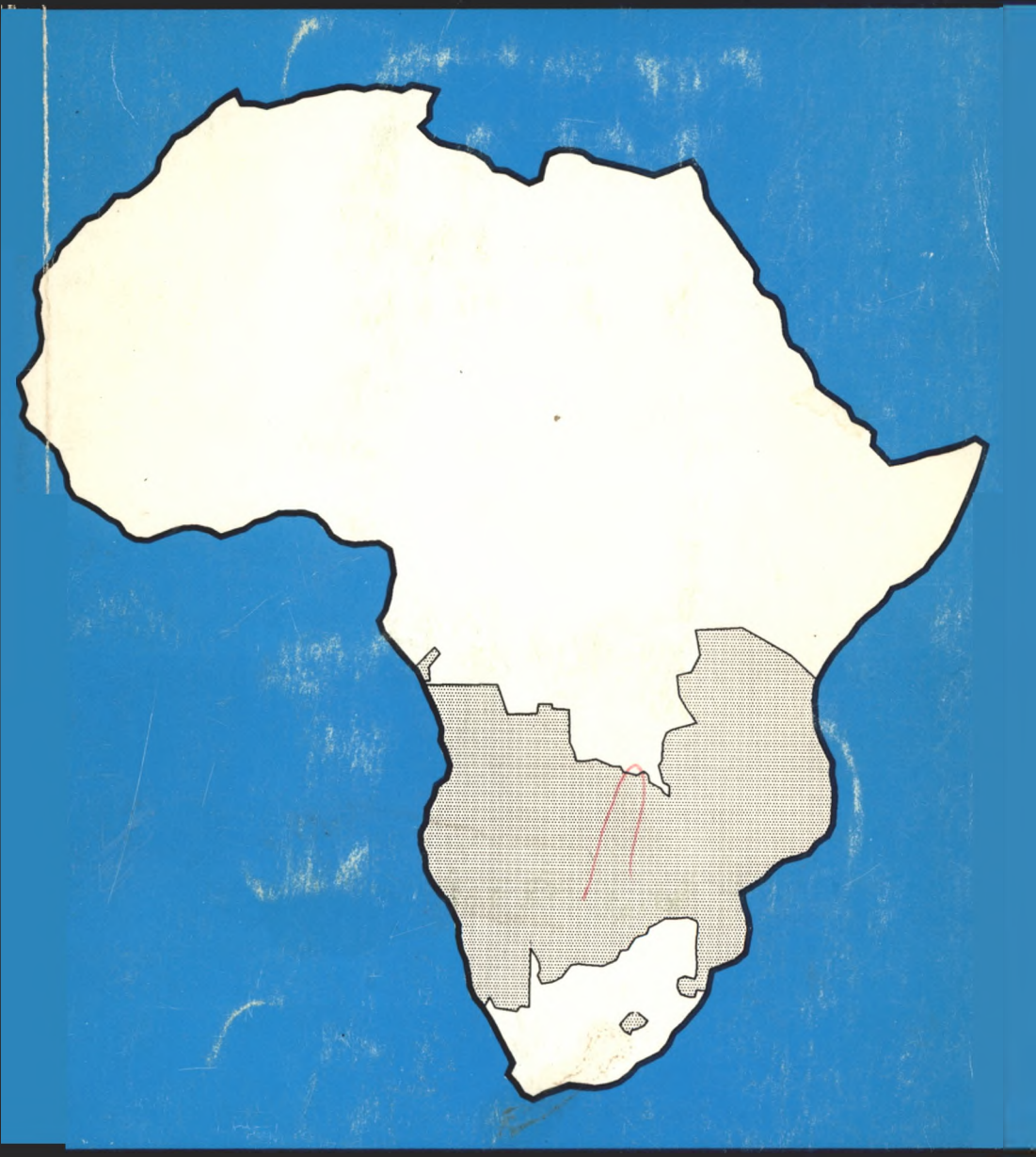
Market Reforms, Research Policies And SADCC Food Security



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Zimbabwe's Experiences In Agricultural Research Priority Setting For Communal Area Households

E.M. Shumba[1]

INTRODUCTION

Agricultural research priority setting in Zimbabwe has traditionally been based on the need to ensure national food self sufficiency and to promote export crops. To this end, much has been achieved over the years as evidenced by spectacular increases in crop yields and output in both the large scale commercial and communal farming areas, Table 1. These productivity gains can be directly attributed to the practical application of improved technology resulting from research work conducted in this country (Tattersfield, 1982). For example, over 95 percent of communal area farmers purchase and plant hybrid maize seed each year, thus increasing communal maize production and the proportion of the total crop delivered to official marketing outlets. For example, Table 2 reveals that the contribution of communal farmers to the marketed maize output has increased from eight percent in 1976-80 to 48 percent in 1986-88 while the proportion of cotton produced by communal farmers has increased from 22 percent to 56 percent over the same period. Such advances clearly demonstrate that, given the appropriate technical and institutional support, communal farmers have the capacity and willingness to invest in expanding the country's agricultural production.

However, the above scenario is misleading, especially when one considers that about 80 percent of the maize delivered by the communal sector to the Grain Marketing Board in 1985 came from only 20 percent of the 900 000 communal area households who are located in the high rainfall areas (Natural Regions I and II). The rest of the farmers contribute very little because they live in low rainfall environments (Natural Regions III to V). Many of these farmers experience food shortages (both in terms of quality and quantity) because of low and erratic rainfall and low soil fertility coupled with a lack of cash to buy food, particularly during drought years.

[1]Head, Agronomy Institute, Department of Research and Specialist Services. Ministry of Lands, Agriculture and Rural Resettlement.

Unfortunately crops like sorghum and millets, which are more adapted to such marginal rainfall conditions, have received little or no research attention in the past because of their limited importance and utility at the national level and in export demand. Table 1 shows that little progress has been made in raising yields of sorghum, pearl millet and finger millet compared to maize since 1951-55.

Table 1
Crop production trends in Zimbabwe by agricultural sector: 1951-55 and 1986-90

		Large Scale Commercial Farms		Communal Areas	
Crop	Year	Area (ha)	Yield (kg/ha)	Area (ha)	Yield (kg/ha
Maize	1951-55	145 000	1 421	628 751	342
	1986-90	141 667	5 063	1 172 250	1 056
Sorghum	1951-55	3 017	568	149 673	307
	1986-90	8 054	2 861	158 264	481
Finger millet	1951-55			91 347	605
	1986-90	93	564	110 352	662
Pearl millet	1951-55			97 853	531
	1986-90	124	599	175 615	542
Cotton	1951-55	5 102	256		
	1986-90	59 233	1 920	178 006	885
Burley Tobacco	1951-55	291	1 202		
	1986-90	62 386	1 928	173 205	901

Source: 1951-55 data extracted from Tattersfield, 1982.; 1986-90 data supplied by the Agricultural Marketing Authority and Central Statistics Office.

Table 2
Proportion (%) of total crop delivered to official marketing outlets by sector: 1976-88.

Crop	Year	Large Scale Commercial Farms	Communal Areas [a]
Maize	1976-80	92	8
	1981-85	69	31
	1986-88	52	48
Cotton	1976-80	78	22
	1981-85	61	39
	1986-88	44	56

[a] Includes deliveries from small scale commercial farms and resettlement areas.
Source: Date supplied by the Agricultural Marketing Authority and Central Statistical Office.

This paper discusses the research priority setting mechanism adopted by the Department of Research and Specialist Services (DR&SS) in its attempt to address the problem of lack of food access of many households in marginal rainfall areas. The problems associated with this approach and suggestions for future work are highlighted.

Agricultural Research Priority Setting for Communal Area Households Since 1980

A major factor that accounted for the agricultural research success story in the large scale commercial sector before 1980 was the close linkage that existed between the research and extension departments. This interactive linkage enabled farmers to influence and direct both the research and extension agendas. However, since a parallel setup did not exist for communal areas, farmers could not directly influence the direction of research. This partly explains why research on traditional drought tolerant crops like sorghum and millets, cowpeas and bambaranut was not emphasised prior to 1980.

Following independence in 1980, the mandate of DR&SS was informally broadened to conduct research that "increases agricultural productivity in the communal areas while maintaining production in the large scale commercial sector". With this wider mandate, there was a need for the department to target research to the needs of communal farmers in marginal rainfall areas. But this required a mechanism to enable researchers to identify important problems of communal farmers for inclusion into the department's research agenda. Since there were no formal linkages between DR&SS and the extension department (Department of Agricultural and Extension Services, (AGRITEX), the Committee for On-Farm Research and Extension (COFRE) was formed to develop on-farm research and demonstration priorities for DR&SS and AGRITEX[2]

The Emerging Research Agenda for Farmers in Low Rainfall Communal Areas

To specifically meet the challenges of improving food access to farmers in low rainfall areas, DR&SS has, since 1980, initiated new on-station research programmes and strengthened its on-farm research thrust. Moreover, on-station research programmes on previously neglected traditional food crops have been created and/or strengthened. Examples include the initiation of cowpea and bambaranut breeding and agronomy programmes and the expansion of small grain cereals research to include crops other than sorghum. Also, agricultural economists have been hired and posted at technical research institutes to influence both the on-station and on-farm research agenda through farm level diagnostic surveys and to broaden the technology evaluation criteria by encompassing socio-economic issues.

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[2]COFRE has set up a number of national and regional subcommittees to generate on-farm research and extension priorities (Fenner and Shumba. 1989).

The department currently has two economists attached to two technical institutes. In addition, an intedisciplinary Farming Systems Research Unit (FSRU) was formed to conduct research exclusively in communal areas. The major thrust of the FSRU is conducting diagnostic surveys in specific areas followed by adaptive on-farm trials to address the identified constraints. The unit refers all technical constraints with "no ready" technical solutions to disciplinary institutes for on-station work or further on-farm testing.

Perhaps the greatest achievement of the research and extension dialogue initiated through COFRE has been the marked improvement in priority setting for on-farm projects over the last four years. There has been considerable progress in the prioritisation of enterprises and technical areas addressed in on-farm projects. This is in line with recommendations made at the 1987 COFRE workshop on "Setting research and demonstration priorities for natural regions III to V" (DR&SS and AGRITEX, 1987).

In comparison with maize (the major starch staple and cash crop), there was a shift towards trials on small grain cereals, oilseeds, horticulture and production systems between 1987-88 and 1989-90, Table 3. Trials on small grain cereals are aimed at generating technologies that increase household food security in low rainfall areas. Associated with this has been a renewed interest in the utilisation of vlei areas by initiating on-farm research on the production of wheat and rice on residual moisture. Diversification into horticultural crops is aimed at producing technologies that generate cash and a nutritionally balanced "food basket" at the household level. The thrust on production systems research is in recognition of the role played by improved crop husbandry practices in increasing and sustaining crop productivity in communal areas. However, the number of on-farm projects on livestock has been very small despite the importance of livestock as a potential cash source for communal farmers. This has been largely attributed to budgetary and transport problems and the complexity of conducting on-farm research with livestock.

Table 3
The ratio of maize on-farm trials to other crop enterprises: 1987-90

	1987-88 (n = 63)	1988-89 (n = 65)	1989-90 (n = 58)
Small grains : maize	1.11	1.00	1.34
Oilseeds: maize	1.91	1.39	1.55
Horticulture : maize	0.45	0.27	1.11
Production systems[a] : maize	0.64	0.53	1.00

[a] Includes rotations, crop protection, soil fertility, intercropping, tillage techniques and regenerative agriculture.
Source: Shumba, 1990.

In terms of technical areas addressed, there were more projects on moisture conservation techniques and soil fertility management compared to crop variety studies in 1989-90 than in 1987-88, Table 4. The increased emphasis on moisture conservation and soil fertility related work is in recognition of the importance of low rainfall and poor soil fertility as major constraints to high crop yields in communal areas.

Table 4
The ratio of crop variety to other technical areas addressed in DR&SS and AGRITEX on-farm projects

	1987-88 (n = 164)	1989-90 (n = 205)
Planting date: crop variety	0.17	0.17
Population: crop variety	0.12	0.17
Moisture conservation: crop variety	0.14	0.64
Crop protection: crop variety	0.16	0.38
Soil fertility: crop variety	0.91	1.88
Other practices: crop variety	0.33	0.62

[a] Rotations, intercropping, regenerative agriculture, castor, bambaranut, etc.
Source: Shumba, (1990).

Limitations of a Technical Problem Oriented Research Agenda for Zimbabwe's Low Rainfall Areas

Despite the highlighted shifts towards a farmer oriented research agenda for marginal rainfall areas, the following contradictions and challenges have emerged:

Conflicts Between Household Priorities and Agroecological Realities.

Despite marginal rainfall conditions experienced in most communal areas, farmers continue to cultivate maize in preference to small grain cereals which are seemingly more adapted to poor conditions (Agronomy Institute Annual Report. 1981). Table 5 shows that there has been an increase in the area planted to maize compared to small grains since 1951-55. Some of the reasons for this trend include preference of maize as a starch and cash source, the ease of preparation of maize flour, the susceptibility of sorghum and millets to bird damage and the lower yield potential of these crops under average rainfall conditions in Natural Regions (NR) IV and V. A cereals comparison trial conducted at Makoholi Experiment Station (NR IV) showed that maize always outyields the small grain cereals. Averaged over a four year period, maize yields were almost double those of pearl millet, the highest yielding small grain cereal, Table 6. In addition to their lower yield potential, small grain cereals do not respond well to improved inputs like nitrogen fertilizer.

Table 5
Changes in the area planted to maize compared to small grains: 1951-55 to 1986-90

	CROP				
	Maize	Sorghum	Finger millet	Pearl millet	Total
1951-55 Area ('000 ha)	629	150	91	98	968
% of Total	0,65	0,16	0,09	0,10	
1986-90 Area ('000 ha)	1 172	158	110	176	1 616
% of Total	0,73	0,10	0,07	0,10	

Table 6
Grain yield (t/ha) comparisons of four cereal crops planted at Makoholi Experiment Station: 1983-88

	Maize	Sorghum	Pearl millet	Finger millet
1983-84	3,72	1,62	2,24	0,49
1984-85	3,39	1,29	1,96	1,06
1985-86	4,33	2,61	1,33	1,65
1987-88	1,39	0,44	1,38	0,75
Mean	3,21	1,49	1,72	0,99
SE±	1,27	0,90	0,45	0,50

The foregoing analysis helps explain the following observations:

- why farmers in marginal rainfall areas largely grow sorghum and millets as a buffer crop in the event of a drought and not as a major starch or cash crop;

- why government pricing and marketing incentives to promote small grain cereal production in the mid 1980s largely benefited farmers located in more favourable Natural Regions II and III who could produce the crops cheaper than their counterparts in drier areas; and,

- why there is uncertainty in the minds of seed producers on the extent to which recently released high yielding sorghum and pearl millet varieties will be adopted by farmers in marginal rainfall areas.

Budgetary Limitations

As indicated earlier DR&SS has, since 1980, expanded both its on-station and on-farm research efforts to address agricultural production problems in communal areas. Unfortunately, this expansion has not been matched by corresponding increases in financial resource allocation to the department. For example, Table 7 shows that, in 1988-89, the department was allocated only 75 percent of its 1980-81 budget in real terms.

Table 7
Trends in the government's financial allocation to DR&SS

Year	Total Allocation[a] (Z$'000)	Consumer Price Index (CPI)	1980 $ Value	Index
1980-81	8 074	100,0	8 074	100
1981-82	7 731	111,5	6 933	86
1982-83	8 154	122,7	6 645	83
1983-84	8 978	149,4	6 009	75
1984-85	11 375	180,0	6 319	78
1985-86	12 513	196,2	6 377	79
1986-87	15 040	224,9	6 687	83
1987-88	16 993	257,2	6 589	82
1988-89	16 940	280,3	6 043	75
1989-90	19 554	-	-	-

[a] Excludes government grants and contributions from farmer organisations.
Source: Data extracted from Government of Zimbabwe Blue Book and DR&SS Final Accounts
Central Statistical Office - Quarterly Statistics

The proportion of the department's total budget devoted to salaries has increased from 50 percent to just over 70 percent during the same period (Fenner, 1990). This has obviously adversely affected the availability of operating funds and the department's productivity. In 1989-90 government increased its contribution to DR&SS by 15 percent, Table 7, but with inflation averaging 15 percent and vehicle hire charges increasing by 62 percent, the financial situation has been very tight.

These financial realities and transport problems have forced the department to cut some of its programmes. Given that on-farm trials are expensive, these have been the first to go. Table 8 shows that the number of on-farm trials was reduced by 51 percent between 1987-88 and 1990-91. The number of trial sites planted fell by more than 60 percent over the same period.

Table 8
Distribution of on-farm trials and sites by DR&SS Institute or station: 1987-91

	TRIAL (NUMBER)			
	1987-88	1988-89	1989-90	1990-91
Agronomy Institute	12	15	15	8
Crop Breeding Institute	5	4	4	1
Chemistry and Soils	8	7	7	3
Cotton Research Institute	7	6	6	4
Coffee Research Station	1	0	5	0
Farming Systems Research Unit	10	9	0	-
Lowveld Research Stations	5	5	5	2
Plant Protection	12	15	15	10
Livestock and Pastures	3	4	2	2
Total DR&SS	63	65	59	31

Source: Sumba. 1990.

CONCLUSIONS

Zimbabwe's experience with agricultural research priority setting for households in low rainfall areas has revealed several realities. First, financial limitations within national research programmes can constrain well-intentioned efforts to increase on-farm research in communal areas. The budget constraint requires DR&SS to develop a more focused research agenda and strategy.

In the light of the reduction in the number of on-farm trials, DR&SS should consider designing part of its on-station research programme with a communal area farmer problem focus and then invite groups of farmers to visit such trials. This has already been initiated by a few institutes in the department. However, the success of the approach depends heavily on the ability of extension staff to identify problems at the farm level and communicate them to researchers. To this end, diagnostic survey skills are being imparted to extension personnel through COFRE.

Second, the observed conflict between farmer objectives, environmental limitations and financial realities implies that DR&SS should focus on research and extension programmes that reduce the risk associated with the production of maize (the preferred crop). Such work has already begun with emphasis on moisture conservation techniques, fertilizer application rates and breeding earlier maturing and drought tolerant varieties. However in the long term improved technological packages for the efficient production and utilisation of traditional food crops like sorghum and millets and grain legumes will have to be found. Given the annual budget constraints in most national research programmes, this type of research lends

itself to joint research projects with international research centres in the SADCC region. Third, the observed cash oriented production of communal households suggest that cash crops such as sunflower (which is comparatively early maturing and drought tolerant) might improve household food security by increasing farm incomes and economic access to food in the market.

Notwithstanding the financial difficulties of national agricultural research programmes, technology development is a more viable long term food security strategy than "fire fighting" approaches such as child supplementary feeding schemes and drought relief programmes.

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