SMINET News

Editorial

It is a great pleasure to feature in this issue of the International Sorghum and Millets Newsletter (ISMN) a number of news items and research notes that first saw the light of day in the first three issues of SMINET News. This new regional newsletter of the Sorghum and Millet Improvement Network (SMINET) is part of Phase IV of the SADC/ICRISAT Sorghum and Millet Improvement Program (SMIP). SMINET News is proposed to be published twice a year to carry information on new technologies (developed in pilot countries and elsewhere) so they can spread rapidly throughout the Southern African Development Community (SADC) region. Our intention here is to bring this information to the global sorghum and millet research community. In future issues of ISMN we plan to include relevant SMINET News news items and research notes among those received from other sources.

An informal network existed during the previous phases of SMIP, but involved mainly scientist-scientist interaction. It became necessary to broaden this participation in order to realize the common vision of improved productivity, food security, and sustainability. Not only scientists, but all stakeholder groups are now involved in SMIP— national and international research institutes, extension, NGOs, farmers' organizations, policymakers, donors, and the private sector (seed, food, and stockfeed industries).

With this broad participation, and pooled resources and expertise SMIP looks forward to a productive partnership. SMINET News will broadcast information as widely, quickly, and cost-effectively as possible and ISMN will share SMIP findings with its readers worldwide.

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Sorghum and Pearl Millet Production in Southern Africa

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Sorghum and pearl millet are SADC's second and third most important cereal grains in terms of production area. Farmers in southern Africa annually sow over 1.9 million ha of sorghum and 0.9 million ha of pearl millet (Table 1). This compares with an aggregate production area of 12 million ha of maize. The area sown to sorghum and pearl millet in SADC has generally been increasing with the growth of smallholder farming populations.

Tanzania is the single most important sorghum producer, accounting for 35% of the total production area in the region. Mozambique, Zimbabwe, South Africa, and Botswana together account for about 48% of SADC's sorghum area. For pearl millet, Namibia and Tanzania each account for about 27% of the SADC acreage, Zimbabwe for almost 20%, and Mozambique for 7%.

Two countries are primarily dependent on sorghum and pearl millet based production systems. These are Botswana, where sorghum accounts for 84% of cereals area; and Namibia, where pearl millet provides a major source of livelihood and accounts for 81 % of cereals area. However, in other SADC countries these crops arc critically important in the drier and drought-prone regions.

Sorghum and pearl millet continue to be primarily grown as food security crops. More than 90% of the region's production is consumed as food in the areas where these crops are produced. The stability of production of these crops reduces the need to distribute food under drought relief programs.

Sorghum production is relatively commercialized only in South Africa and Zimbabwe. In South Africa, some 600 large-scale commercial farmers account for almost all of the commercial production. Roughly 60% of this harvest is used for food—sorghum meal, sorghum malt, and malt-

based food products. Approximately 40% is used for animal feed. South Africa exports approximately 30,000 t of sorghum grain to the milling industry in Botswana.

In Zimbabwe, approximately 20,000 t of sorghum are annually used in the opaque beer brewing industry, and smaller quantities in the animal feed and milling industries. However, rising maize prices have encouraged strong interest in expanded utilization.

Commercial utilization of pearl millet is negligible in both countries. Millers in Namibia have attempted to commercialize the production of pearl millet meal, though quantities remain small. Approximately 300 t of pearl millet is used in the brewing industry in Zimbabwe.

The contributions of sorghum and pearl millet to household food security, and the commercial prospects for these grains, depend on improvements in yield. Sorghum yields across the SADC region averaged only 0.8 t ha^{-1} during the 1995-97 period, compared to 2.1 t ha^{-1} in the more commercialized South African production system. Pearl millet yields average even less than those of sorghum: only 0.6 t ha^{-1} over the 1995-97 period, across the region as a whole.

Despite the release of more than 26 new varieties of sorghum and 15 new varieties of pearl millet over the past 12 years, improvements in average grain yields are negligible. This is partly because the new varieties derived from national breeding programs have not been widely distributed to farmers. Adoption rates (SADC, excluding South Africa) average about 18%. In addition, most small-scale farmers still apply traditional management practices. The use of inorganic fertilizer on sorghum and pearl millet remains rare, except on large-scale farms. Only a minority of small-scale farmers use organic manure. Yet soil quality is declining as farmers mine a shrinking land base.

In order to more directly stimulate productivity gains, the fourth phase of the SMIP project (1999-2003) concentrates greater attention on promoting the adoption of new seed and crop management technologies. The project is encouraging experimentation with alternative seed supply strategies. In addition, attention has been directed toward diagnosing constraints to the commercialization of these crops, and working with industry to resolve these constraints. Higher industrial demand for sorghum and pearl millet will improve incentives both to expand production area and invest in improved crop management.

Sorghum and pearl millet will remain essential food security crops in southern Africa for decades to come. These grains will continue to ensure that few households face starvation, even in years of serious drought. However, the prospects for technological change will largely depend on the competitiveness of these crops in commercial food and feed systems.

Table 1. Sorghum and pearl millet production area in SADC, 1995-97 average

	Sorghum			Pearl millet		
	Area ('000 ha)	Yield (t ha^{-1})	Production ('000 t)	Area ('000 ha)	Yield (t ha^{-1})	Production ('000 t)
Angola	82.6	na	37.5	66.1	0.5	30.0
Botswana	150.0	0.2	36.7	9.3	0.3	2.7
Dem. Republic of Congo	80.0	0.6	50.0	42 0	0.6	25.8
Lesotho	17.7	1.0	16.8	0.0	-	0.0
Malawi	74.7	0.7	53.2	13.8	0.6	7.8
Mauritius	0.0	-	0.0	0.0	-	0.0
Mozambique	439.8	0.5	235.5	69.9	0.4	30.4
Namibia	34.6	0.2	7.3	269.8	0.2	66.9
South Africa	172.5	2.1	356.9	21.0	0.6	13.0
Swaziland	2.0	0.7	1.5	0.0	-	0.0
Tanzania	683.2	0.9	648.6	263.3	1.0	255.7
Zambia	44.4	0.5	31.0	30.8	0.3	22.7
Zimbabwe	174.9	0.5	80.7	186.7	0.6	59.4
SADC total	1956.5	0.8	1555.6	906.7	0.6	514.5

na = not available.

Source: FAO Production Yearbook.

Successful commercialization will depend both on the availability of relevant production technology as well as efforts to encourage investment in applying these technologies to increase grain deliveries targeting particular end uses. There is ample evidence that sorghum and pearl millet can compete successfully with maize in the global coarse grains economy. The development of stronger links between technology supply and market development remains the main challenge for commercialization of these crops in southern Africa.

Sorghum and Millets in Zimbabwe—Production, Constraints, and Current Research

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Sorghum, pearl millet, and finger millet are generally grown in semi-arid environments because of their drought tolerance. In Zimbabwe, these crops are staple foods for most rural households in the low-rainfall (450 to 650 mm) agroecological regions III, IV, and V. These regions, which constitute over 70% of Zimbabwe, are drought-prone and characterised by high temperatures and poor soils. Yet smallholder farmers in these regions prefer to grow and eat maize despite its frequent failure due to drought Consequently, frequent food shortages occur, with farmers having to rely on drought relief food.

Yields of sorghum and millets on smallholder farms in Zimbabwe are generally low, barely reaching 500 kg ha^{-1}. This is largely because smallholder farmers continue to grow local landrace varieties characterised by low grain yields, tall plants, lodging, disease susceptibility, and late maturity. Apart from low production and productivity, lack of appropriate storage and processing technologies are additional constraints. Previous agricultural policies encouraged production of maize for export. Crop improvement programs, development of trading and grain processing infrastructure, were all built around maize. This encouraged reliance on maize as a source of food and cash. But if similar efforts had been invested on sorghum and millets, these crops would have remained staples today, ensuring household food security in Zimbabwe's semi-arid areas.

Currently there are four sorghum, three pearl millet, and two finger millet improved open-pollinated varieties available in Zimbabwe (Table 1). The sorghum varieties were all selected and released by the national Sorghum and Millets Research Program of the Department of Research and Specialist Services (DR&SS). The SADC/ICRISAT Sorghum and Millet Improvement Program provided exotic germplasm to the national program, assisting in the development and release of some of these varieties.

Improved varieties can outyield traditional varieties in semi-arid environments, by virtue of being short-statured and early maturing. These varieties are also resistant to major diseases: head blast in finger millet; leaf blight, head smut, and downy mildew in sorghum; and ergot in both sorghum and pearl millet. In Zimbabwe, pearl and finger millets are not affected by pests as much as sorghum is. Major pests include stemborers, armyworm, shootfly, armored cricket, and nematodes. Witchweed *(Striga asiatica)* is also of significant importance in sorghum and finger millet

At the moment, adoption of these improved varieties is poor. There are several reasons for this, including inadequate seed production and delivery systems for small grains, an unpredictable grain market, and lack of appropriate processing technologies like threshers and milling machines. The national program, in partnership with other research organizations, is currently engaged in activities to resolve these problems.

Table 1. Improved varieties released in Zimbabwe

	Variety	Year of release	Characteristics
Sorghum	SV 1	1987	Medium maturity, high yield
	SV 2	1987	Good milling quality, high yield
	SV 3	1998	Medium maturity, tolerant of *Striga*
	SV 4	1998	Late maturity, high yield potential
Pearl millet	FMV 1	1987	Dwarf, high tillering, early maturity
	PMV 2	1992	Intermediate height, dark gray seed, early maturity
	PMV 3	1998	Creamy white bold grain, good for composite flour
Finger millet	FMV 1	1992	Early maturity, high yield
	FMV 2	1992	Late maturity, high yield