RESEARCH NOTE:

EVALUATING BENEFITS FROM SUBSISTENCE PEARL MILLET PRODUCTION IN THE NORTHERN COMMUNAL AREAS OF NAMIBIA

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Using experimental data from the northern Namibia pearl millet based subsistence sector the gross margins (GM) and savings on food expenditure (SFE) were computed and compared. The value to cost ratios from the SFE approach were higher than those from the GM approach implying that investment into the selected technologies would be more attractive under subsistence production than under commercial production. This underlines the importance of change agents not to change the farmers' target for farming. Furthermore, it helps explain why subsistence farmers continue to farm when all GM calculations show that they are always loosing money.

1. INTRODUCTION

The Northern communal areas (NCAs) of Namibia include Omusati, Oshana, Oshikoto, Ohangwena and Kavango regions. The first four regions are also collectively referred to as the North Central Division (NCD). Pearl millet is the major cereal crop in the NCAs (Matanyaire, 1996). It is by and large a no choice crop because of the aridity of the environment (mean annual rainfall of 400-600 mm) and the predominant sandy soils with low inherent fertility (< 5 mg P/kg) and poor water holding capacity. There is no formal market for pearl millet grain. Local traders usually try to buy the pearl millet grain soon after harvest for resale later in the year when most households have exhausted supplies from their own production. However, very few producers are able to sale because the NCAs are generally a food deficit zone (Keyler, 1995). In a survey conducted in the NCAs, less than six percent of households in Kavango and one percent in the NCD reported pearl millet grain sales as a source of household income (Matanyaire, 1998). While grain prices are influenced by the supply and demand circumstances, the relationship between the price offered by traders (producer price) and their selling price is fairly stable as this is largely determined by the trader' fixed target profit margins. Moreover, availability of imported maize meal helps to keep the pearl millet grain prices low and stable irrespective of the

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supply situation.

The orthodox approach for evaluating net benefits to investments in the production of agricultural commodities is the Gross Margin (GM). It is a function of total revenue minus total variable costs. This is based on the assumption that the producer is producing for the market in order to make a profit. Where the production motive is subsistence, the GM approach has serious limitations. In the absence of any marketing under subsistence conditions, the real value of the commodity produced on the farm changes from the producer price to the consumer price. In a subsistence economy all shortfalls in household food requirements have to be acquired at the prevailing grain retail price. Therefore, in monetary terms the own farm production in a subsistence sector is contributing towards reducing expenditure on food. Consequently, a more realistic approach in evaluating pearl millet produced by the household is to calculate its contribution to **savings on food expenditure** (SFE). Some agricultural economists have for sometime been advocating the use of the retail price for evaluating produce from subsistence farmers (Low, 1986: 32). However, this does not seem to be common practice. The purpose of this article is to demonstrate the application of the use of SFE for evaluating produce from the subsistence sector using results from pearl millet *(Pennisetum glaucum)* on-farm research in northern Namibia's subsistence farm sector.

2. MATERIALS AND METHODS

Grain yield data of some selected experimental treatments from the 1995/96 and 1996/97 varieties and fertiliser response evaluation trials conducted in northern Namibia was used to calculate yield gain (YG), incremental costs (IC), the value to cost ratios (VCR), GM and SFE. The selected technology changes used in the computations were those which had the highest grain yield gain and therefore, having the greatest potential to be recommended for farmers' adoption. Variety evaluation involved four test varieties and two controls at eight sites over both seasons. Test varieties SDMV 92040 and SDMV 93032 used in the computation had significantly ($P < 0.05$) higher grain yield than the Farmers' Local (FL) in both seasons. The mean trial grain yield was 1.22 t/ha in 1995/96 (CV of 20%) and 1.52 t/ha in 1996/97 (CV of 25%). Fertiliser response was tested at four sites in a 2 x 4 full factorial trial with two levels of phosphorus (P) and four levels of nitrogen (N) and the combinations producing the highest pearl millet grain yields were selected for the GM and SFE computations.

The following relationships were used in the calculations:
VCR = [YG (t/ha) x Grain Price (N$/t)] / IC (N$);

GM (N$) = [YG (t/ha) x Grain Producer Price (N$/t)] - IC (N$);
SFE (N$) = [{YG (t/ha) x Grain Retail Price (N$/t)} - IC (N$)];

Assuming:

a) a pearl millet grain producer floor price of N$400 per tonne and

b) a retail to producer price ratio of 1.77, established by Keyler (1995: 127) during 1992 and 1993.

Both seed and fertiliser were sold at the agricultural extension centres. The actual seed price of N$3 per kg with a seeding rate estimate of two kg per hectare and an actual fertilizer cost of N$13.3 per kg of P and N$2.6 per kg of N were used in the computations.

3. RESULTS AND DISCUSSION

During the wet year of 1996/97 the use of 15 kg P/ha together with 20 kg N/ha resulted in a loss of N$32 using the GM approach. However, using the SFE approach a saving of N$137 was realised (Table 1). During the dry 1995/96 season use of the same fertilizer amount gave a GM of N$90 compared with a SFE of N$353. The fertilizer response was poor during the wet year due to severe leaching of nitrogen in the sandy soils which are known to have very poor buffer capacity (Swindale, 1982). Furthermore, volatilisation losses reduced the magnitude of N benefits during the wet year. On the other hand the relatively higher fertiliser response during the dry year is largely explained by the good P response as reported from similar environments (ICRISAT, 1985). Under conditions of poor soil fertility with low P status as found in the NCAs, P is known to reduce the intensity of drought and increase water use efficiency (ICRISAT, 1985: 42; Shapiro, 1991: 67), making the benefits per unit of P greater during drought years.

The Value to Cost Ratio (VCR) is enhanced when the SFE approach is used (Table 1), theoretically making technologies more attractive. During the wet year benefits from variety change were lower because the short duration varieties used in the computation failed to fully exploit the longer season. Similar observations have been reported by several researchers (Ludlow and Muchow, 1988:185; Shapiro *et al.,* 1991:66).

The SFE computations expose the serious weaknesses of orthodox research and extension in attempting to transform subsistence farmers into cash oriented commercial farmers. Such a shift based on pearl millet in northern Namibia would result in large reductions in VCRs, from VCR_{rp} to VCR_{pp} (Table 1). This is not a change farmers would want to make, especially in an environment where the risk of loosing invested capital due to drought is high. Therefore, for pearl millet production in northern Namibia, change agents must not attempt to change the farmers' target for farming. Policy makers, research and extension must help farmers achieve their target of subsistence by attaining household food self-sufficiency.

Table 1: Some selected examples to illustrate the effect of valuing pearl millet in the subsistence sector at the retail price (rp) instead of using the producer price (pp) at the indicated t ha^{-1} yield gain (YG)

Technology change	YG	IC*	VCR_{pp}	VCR_{rp}	GM	SFE
Dry year 1995/96						
FL to SDMV 92040*	0.57	12	17	30.1	193	351
FL to SDMV 93032	0.57	12	17	30.1	193	351
No fertilizer to 15P20N	0.95	252	1.5	2.7	90	353
No Fertilizer to 15P40N	1.10	304	1.5	2.7	92	397
Wet hear 1996/97						
FL to SDMV 92040*	0.20	12	6.0	10.6	60	115
FL to SDMV 93032	0.23	12	6.7	11.9	71	135
No fertilizer to 15P20N	0.61	252	1.0	1.8	-32	137
No Fertilizer to 15P40N	0.76	304	1.0	1.8	-30	182

IC = incremental costs
FL = farmers' local variety
SDMV = SADC millet variety
P = phosphorus
N = nitrogen

SFE puts the farmers' operational principles into figures. It is one area where research, extension and policy makers should learn from farmers in order to understand the farming and production systems. Encouraging extension staff, researchers, planners, bankers and other development professionals to use the SFE instead of the GM approach would help in promoting the attainment of sustainable pearl millet production and productivity in northern Namibia and similar environments.

The SFE approach provides sound basis for promoting adoption of low cost technologies for productive and sustainable subsistence farming. The high VCRs and added values when subsistence production is evaluated using the SFE approach make the risk of investing in low to medium cost technologies worth taking as options for extensive farming disappear. No wonder North Central Division (NCD) farmers are already investing in intensive technologies such as manure application and more intensive weeding (Matanyaire, 1998). The fact that very few farmers in the NCD are using fertilizer may be due to lack of knowledge about the technology as reported by Matanyaire (1998). Given good guidelines on fertilizer use the chances of its adoption in the NCD are rated high. However, promotion of purchased inputs like fertilizer must not be linked to loans. No loans should be extended for subsistence farming. The fact that it is more costly to rely on food purchases than to invest into food production whatever income is available from other sources e.g. pension and remittances should in itself encourage farmers to invest into purchased inputs.

Using the SFE approach provides a sound explanation why subsistence farmers continue to farm under situations where the GM approach would indicate that they are always loosing money.

It should be noted that once the production from most households exceeds their annual requirement including storage for future drought years, the value of surplus produce drops to the level of the grain producer price. This suggests that a dual approach to farm management economics be taken whenever most farmers start producing surpluses for the market. Under these circumstances, the farmer should be encouraged to view the pearl millet crop on the farm as 'two crops'. The one crop or land block for home consumption should be valued at the retail price which would make capital investments more attractive compared with the 'commercial crop' which has a lower price. This would therefore, promote higher levels of investment into the subsistence crop compared with that directed into the commercial crop resulting in sustainable subsistence farming systems.

4. CONCLUSION

Adoption of the SFE approach for assessing benefits in subsistence farming should be promoted. This would help change agents and planners to better understand the farming system and therefore develop rational strategies for the promotion of sustainable production and productivity of food commodities. Change agents should avoid changing the farmers' target for farming. They should help farmers attain their own targets and not those of the change agent.

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