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THE KONNI MODEL USER'S GUIDE

by

Peter Ensink and Robert Deuson*

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*M.S. student and Assistant Professor, Department of Agricultural Economics, Purdue University, West Lafayette, Indiana 47907

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INTRODUCTION

The Konni model was constructed by Peter Ensink in 1989 to assess the economic potential of new sorghum cultivars, the amount of risk associated with their use, and to identify farm level constraints to their introduction. The model is a linear programming Target MOTAD (Minimization Of the Total Absolute Deviation) analysis that uses as its data the results from 1984-1988 on-station and on-farm trials in the *arrondissement* of Birni-NKonni. These trials were performed by INRAN (Institut National de Recherches Agronomiques du Niger) in collaboration with INTSORMIL (International Sorghum and Millet Program) and Purdue University. The lack of adequate and sufficient data, however, makes the Konni model oversimplified in its conceptual strategies.

THE KONNI MODEL

The Konni model is a static, representative farm model (see Figure 1 and Tables 1 and 2) whose objective function maximizes expected income subject to limits on the negative deviations from the target income. Because of the complexity and importance of the factor resource endowments, consumption requirements, and agronomic data, an explanation of how these are presented in the model is required.

Modeling the Land Constraint

The land holdings of an average Konni farm equal 2.98 ha, but this is broken down into 2.34 ha of rainfed land and 0.64 ha of irrigation-perimeter land. In the model, the land holdings are grouped into three categories because even though irrigation only occurs in the *contre-saison* (dry season), the land on the irrigated perimeter is used year-round. Thus, a Konni farm

has 2.34 ha of rainfed land which can be planted in the rainy season, 0.64 ha which can also be planted in the rainy season and which may receive supplemental irrigation if rainfall is poor, provided that irrigation water is available. In addition, the 0.64 ha is the only land holding that can be planted in the dry season, and which requires irrigation.

Modeling the Labor Constraint

To model the rainy and dry planting seasons and the availability of labor for each season, a calendar of operations, Table 3, was constructed which divides the production year into twenty-two labor time periods. The calendar categorizes the various labor activities by land type and crop type and specifies the number of man-hour equivalents available for each time period. The base model assumes that each of the 3.73 Konni farm laborers will work twelve 8-hour days per 15-day time period.

The labor availability estimates in Table 3 are for family labor only and do not include the amount of labor that a farm can hire. The model limits the availability of hired labor to 55 man-hours per year (Arnould, 1986), and values hired labor at a rate of 100 FCFA per man-hour (Adesina, et al., 1988). The labor activities that need to be performed on each crop include field preparation, planting, replanting, weeding, harvesting, and possibly fertilizer application and irrigation.

Modeling the Cash and Credit Constraints

Farmers in the Konni perimeter can pay for their fertilizer inputs at the end of the production year, but in the model the fertilizer cost, as well as the costs of seed and hand tools, are treated as cash expenses. Local seed

varieties are priced at their market prices prior to planting, and the 1/2 MSB seed, urea, and super simple phosphate are valued at the official prices charged by the Nigerien Ministry of Agriculture. In the model, Konni farmers can not purchase fertilizer at the lower, market price because of policy of the perimeter's cooperative. The per ha annual cost of hand tools is about 350 FCFA for a four-ha farm (Swinton, 1988).

Farm cash holdings that are earmarked for agricultural purposes are normally minimal amounts. The reason for this is either that the bulk of the cash holdings are held for precautionary measures, which leaves little for agriculture, or that the returns to agriculture are too low for a farmer to invest cash in the purchase of inputs (Jomini, 1989).

In the base model, the amount of cash available for agricultural production is 10,000 FCFA, but the farmer can borrow up to 30,216 FCFA. The initial model assumes an annual interest rate of 40%, but the effective cost of capital is 20% because borrowing usually occurs during the average duration of a six-month production season.

Modeling the Consumption Requirement and Income Dependency

To ensure that enough millet and sorghum grain is available for on-farm consumption, the model requires a production combination of these two food crops that will provide a minimum of 2,475 kg of grain per year, or 225 kg for each of the 11 family members per year. Since millet and sorghum are normal goods, consumption can exceed this minimum if enough grain has been produced or if there is sufficient income to purchase grain at the local market.

Modeling the Agronomic Data

During the rainy season, the model allows for the production of local millet, millet-cowpea intercrop, and sorghum varieties on the land outside the perimeter. Also during the rainy season, but on the irrigated perimeter, local millet, sorghum, improved sorghum and cowpea varieties as well as cotton can be cultivated. In the dry season the model only allows for the cultivation of irrigated sorghums, cotton, and wheat.

In the model, fertilizer is only applied to crops grown on the perimeter land, which is fairly consistent with actual practices. In practice, farmers usually apply super simple phosphate during the planting season even though agronomists recommend that it be applied before planting. The model accounts for this process by considering the labor required for the task, and applies super simple phosphate (SSP) during planting. Urea is applied at time of the first weeding and again at the second weeding.

Replanting occurs on 20% of the planted area in the model, and this requires a proportionate amount of extra seed but not, for crops grown on the perimeter, more fertilizer. This replanting requirement is neither too conservative nor too high, though it is recognized that different crops and growing conditions require different amounts of replanting. The first weeding of a crop occurs two weeks after planting and the second weeding four weeks later, which is also consistent with actual practices.

The economic modeling of agronomic data is complex and difficulties do arise. In the model, crop yields are the only data indicative of the yearly rainfall, soil fertility and moisture, cold tolerance for off-season production, and general growing conditions. One way to improve the agronomic content of the model is to assign each state of nature a probability of

occurrence. **Adesina** (1988) calculated the probabilities of very good, good, average, poor, and very poor rainfall years in Niger. Using the technique of **Adesina** (1988), each of the years from 1984 through 1988 is assigned a probability of 0.15, 0.20, 0.30, 0.15 and 0.20, respectively. Other modeling problems occur when yields are reduced to account for planting postponements and bird damage. Planting normally occurs in a high moisture period after a rain of 10 mm or more (Krause, et al., 1987). From the Konni rainfall data for the period 1984-1987, the average number of high moisture periods between June 15 and July 15, when sorghum, millet, and cotton should be planted, and between July 15 and August 15, when cowpea should be planted, were calculated. For both periods there were three high moisture periods per year, which were sufficient to avoid delayed planting. Insufficient data exists to determine the amount of grain lost to bird feedings by crop and by state of nature, so the model assumes that millet, sorghum, cowpea, and wheat are equally susceptible to bird damage.

Table 4 shows in detail parts A, B, C, D, and E from the model's schematic in Figure 1. The formula for the crop activity entries in the objective function is:

- [cost of hand tools] - [average price of 1 kg of SSP * 100 kg[1]] - [average price of 1 kg of Urea * 100 kg[1]] - [average seed requirement (kg/ha) * average price per kg of seed] + [average price for 1 kg of production * average kg of production], with the entire sum divided by 1000.

[1]if applicable

The formula for the crop activity entries in the cash constraint is:

[cost of hand tools] + [average price of 1 kg of SSP * 100 kg^{1}] + [average price of 1 kg of Urea * 100 kg^{1}] + [average seed requirement (kg/ha) * average price per kg of seed], with the entire sum divided by 1000.

The formula for the crop activity entries in each of the five risk constraints is:

- [cost of hand tools] - [price of 1 kg of SSP * 100 kg^{1}] - [price of 1 kg of Urea * 100 kg^{1}] - [seed requirement (kg/ha) * price per kg of seed] + [price for 1 kg of production * kg of production], with the entire sum divided by 1000.

MISCELLANEOUS

Besides the risk averse and risk neutral base models, other versions of the Konni model include (1) reference-priced and budgeted hybrid sorghum seed costs, (2) a six-hour, five-day work week, (3) an effective cost of capital of 50%, (4) the inclusion of wheat as a dietary staple, (5) a larger cash availability for agriculture, (6) a management-on-yield effect that differs by state of nature, and (7) less variability in the prices of outputs. Each of these scenarios is analyzed for a risk averse and risk neutral Konni farm family.

Practical Application

The Konni model is in a LOTUS123 matrix format, but is converted into a format readable by LINDO. To do so, a macro within the 123 model file must be used, as must the conversion program 123LINDO. The macro and conversion program should be used as follows:

1) Use the /RANGE NAME CREATE command [in 123] to name the section of the spreadsheet containing the variable names and parameters "MATRIX".
2) In the upper right-hand corner of the block you just named, enter the number of rows in the block, e.g. 70.
3) Press Alt-W
4) At the prompt, enter a file name. One warning: don't enter a name which conflicts with an existing file or the macro will crash.
5) Take a short break.

When you've created all the files you'll need, exit LOTUS, move to the directory containing your work files and invoke 123LINDO (type 123LINDO <return>). Press "C" at the main menu to create a LINDO-readable file from the ASCII file you just created. A file selection window will open: you can now select up to 99 files (in the same subdirectory) for conversion to LINDO files from a "bounce-bar" window which opens from the bottom of the screen. Move the highlight to the first file and press "S" to select a file. The highlight will move automatically to the next file, so if you move the highlight past any subdirectories and hold the "S" key down, you can quickly select all the files in a subdirectory. Move the cursor back to a file and press "S" again to

deselect it. By the way, if you use "*.*" as your file specification, directories will be listed in addition to files. Move the highlight to a subdirectory name and press "S" to move into that subdirectory (Note: in so doing you lose any file selections you made in the old subdirectory). Alternatively, press "P" to change the path, file specification, or both.

Once everything looks OK, press "G" to go on to execution. Pressing "Q" aborts the file selection process; you'll be prompted for a file name and given the opportunity to override the default settings for margins and output file (pressing "G" without making any file selections has the same effect). You won't be prompted for margin settings and output file names if you select files from the window. By default, the output file will have the same name as the input file, but with the extension "INP". The resulting file can be read into LINDO using the TAKE command (Sharp, 1988).

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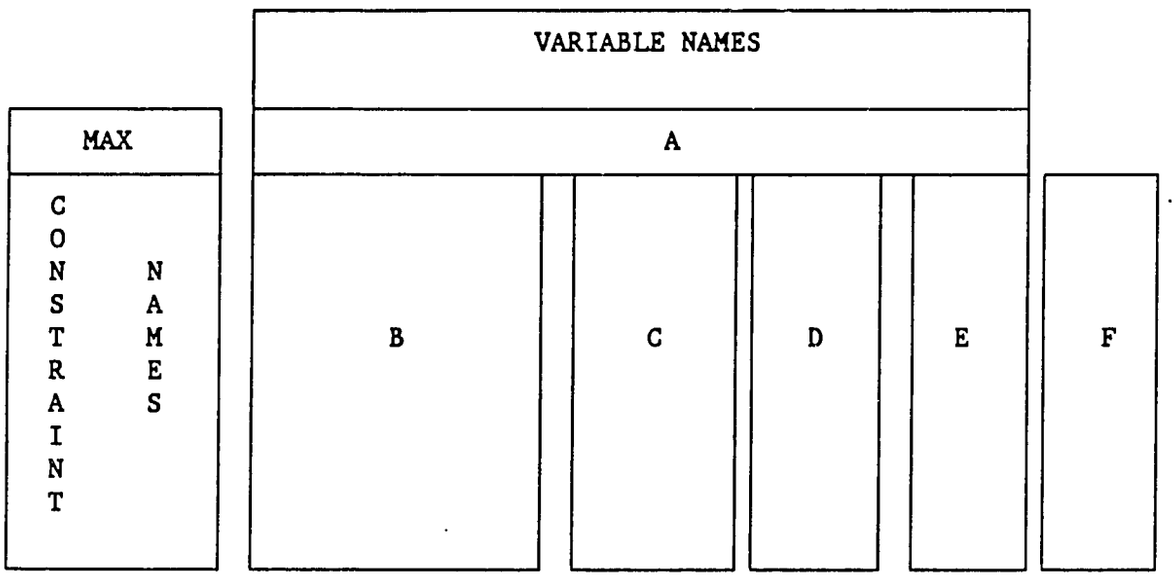
Figure 1. Schematic of the Konni model.



A = objective function
B = crop activities
C = hired labor activities
D = risk columns
E = minimum grain consumption columns
F = resource endowment column

Table 1. Interpretation of variable names.

Variable	Interpretation
	Area planted to:
HRM	humid season, rainfed millet
HRMC	humid season, rainfed millet-cowpea intercrop
HRSNK	humid season, rainfed local sorghum variety
HIM4(5)	humid season, irrigated perimeter millet planted in period 4(5)
HIK4(5)	humid season, irrigated perimeter cotton planted in period 4(5)
HISNK4(5)	humid season, irrigated perimeter local sorghum planted in period 4(5)
HISMSB4(5)	humid season, irrigated perimeter 1/2 MSB sorghum planted in period 4(5)
HISTAM4(5)	humid season, irrigated perimeter TAMU TA1 hybrid sorghum planted in period 4(5)
HISHD4(5)	humid season, irrigated perimeter Hageen Dura 1 hybrid sorghum planted in period 4(5)
HIC6(7)	humid season, irrigated perimeter cowpea planted in period 6(7)
SIK15(16)	dry season, irrigated cotton planted in period 15(16)
SIW15(16)	dry season, irrigated wheat planted in period 15(16)
SISNK15(16)	dry season, irrigated local sorghum planted in period 15(16)
SISMSB15(16)	dry season, irrigated 1/2 MSB sorghum planted in period 15(16)
SISTAM15(16)	dry season, irrigated TAMU TA1 hybrid sorghum planted in period 15(16)
SISHD15(16)	dry season, irrigated Hageen Dura 1 hybrid sorghum planted in period 15(16)
HLP1..(22)	hired labor in each of the 22 time periods
HLTOT	total hired labor
D1	the maximum amount by which a farm family is prepared to fall shy of its 1984 target income
D2	the maximum amount by which a farm family is prepared to fall shy of its 1985 target income
D3	the maximum amount by which a farm family is prepared to fall shy of its 1986 target income
D4	the maximum amount by which a farm family is prepared to fall shy of its 1987 target income
D5	the maximum amount by which a farm family is prepared to fall shy of its 1988 target income
TSP	total sorghum production
TMP	total millet production
Cr	amount of capital borrowed (credit)

Table 2. Interpretation of constraint names with corresponding resource endowments.

Constraint name	Interpretation	Column F
landrni	land that is rainfed with no irrigation facilities	<= 2.34
landri	land that is rainfed but can receive supplemental irrigation	<= 0.64
landsi	land that is fully irrigated in the dry season	<= 0.64
laborl..(22)	labor availability constraints for each time period	Table 3
hiredlab	hired labor equality constraint	= 0
tothired	hired labor availability constraint	<= 55
cash	cash constraint	<= 10
credit	credit availability constraint	<= 30.22
risk84	)	>= 235
risk85	)	>= 235
risk86	) Target MOTAD risk preference constraints	>= 235
risk87	)	>= 235
risk88	)	>= 235
riskcum	risk "weighing-by-state-of-nature" constraint	<= Γ
products	sorghum production equality constraint	= 0
productm	millet production equality constraint	= 0
mingrcon	minimum grain consumption constraint	>= 2,475

Table 3. Calendar of agricultural operations, Konni.

Period	Date	Available Labor (Equivalent man-hours)	Activities performed
1	May 1-15	358	non-perimeter land - field preparation
2	May 16-31	388	non-perimeter land - millet planting
3	June 1-15	358	non-perimeter land - replanting of millet - sorghum planting perimeter land - field preparation
4	June 16-30	358	non-perimeter land - replanting of sorghum - cowpea planting - 1st weeding of millet perimeter land - sorghum, millet, and cotton planting with SSP application[1]
5	July 1-15	358	non-perimeter land - replanting of cowpea - 1st weeding of sorghum and cowpea perimeter land - replanting of period 4 crops - sorghum, millet, and cotton planting with SSP application - 1st weeding of and 1st urea application to period 4 crops
6	July 16-31	388	non-perimeter land - 2nd weeding of millet perimeter land - replanting of period 5 crops - cowpea planting with SSP application - 1st weeding of and 1st urea application to period 5 crops

Table 3. Calendar of agricultural operations, Konni (continued)

Period	Date	Available Labor (Equivalent man-hours)	Activities performed
7	Aug. 1-15	358	<u>non-perimeter land</u> - 2nd weeding of sorghum and cowpea <u>perimeter land</u> - replanting of period 6 crops - cowpea planting with SSP application - 1st weeding of and 1st urea application to period 6 crops - 2nd weeding of and 2nd urea application to period 4 crops - irrigation, if available and necessary
8	Aug. 15-31	388	<u>perimeter land</u> - replanting of period 7 crops - 1st weeding of and 1st urea application to period 7 crops - 2nd weeding of and 2nd urea application to period 5 crops - irrigation, if available and necessary
9	Sep. 16-30	358	<u>non-perimeter land</u> - harvesting of millet <u>perimeter land</u> - 2nd weeding of and 2nd urea application to period 6 crops
10	Oct. 1-15	358	<u>non-perimeter land</u> - harvesting of cowpea <u>perimeter land</u> - 2nd weeding of and 2nd urea application to period 7 crops - harvesting of improved sorghums and cotton grown in period 4
11	Oct. 16-31	388	<u>non-perimeter land</u> - harvesting of local sorghum variety <u>perimeter land</u> - harvesting of improved sorghums and cotton grown in period 5 - harvesting of millet and local sorghum variety grown in period 4

Table 3. Calendar of agricultural operations, Konni (continued)

Period	Date	Available Labor (Equivalent man-hours)	Activities performed
12	Nov. 1-15	358	<u>perimeter land</u> - harvesting of millet and local sorghum variety grown in period 5 - harvesting of cowpea grown in period 6
13	Nov. 16-30	358	<u>perimeter land</u> - harvesting of cowpea grown in period 7
14	Dec. 1-15[2]	358	- field preparation
15	Dec. 16-31	388	- planting of wheat, cotton, and sorghum with SSP application
16	Jan. 1-15	358	- planting of wheat, cotton, and sorghum with SSP application - replanting of period 15 crops - 1st weeding of and 1st urea application to period 15 crops - irrigation
17	Jan. 16-31	388	- replanting of period 16 crops - 1st weeding of and 1st urea application to period 16 crops - irrigation
18	Feb. 1-15	358	- 2nd weeding of and 2nd urea application to period 15 crops - irrigation
19	Feb. 16-28	328	- 2nd weeding of and 2nd urea application to period 16 crops - irrigation
20	Mar. 1-15	358	- irrigation
21	Apr. 1-15	358	- harvesting of period 15 crops
22	Apr. 16-30	358	- harvesting of period 16 crops

[1]Super Simple Phosphate fertilizer.
[2]Cultivation in the dry season only occurs on the irrigated perimeters.

<u>Sources</u>: Clark (1988), Shapiro (1989), and Adesina (1985, p.121).

Table 4. Base Model: Sorghum-based Whole-farm Programming Model.

VARIABLE	HRM	HRMC	HRSNK	HIM4	HIK4	HISNK4	HISMSB4	HISTAM4	HISHD4	HIM5	HIK5	HISNK5	HISMSB5	HISTAM5	HISHD5	HIC6
MAXIMISE	38.6	56.8	35.6	60.5	115.2	81.9	41.0	108.7	122.5	60.5	115.2	81.9	41.0	108.7	122.5	125.2
RESOURCE:																
landrni	1.0	1.0	1.0													
landri				1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
landsi																
labor1	12.0	13.0	14.0													
labor2	16.0	16.0														
labor3	3.0	3.0	28.0	12.0	15.0	14.0	14.0	14.0	14.0	12.0	15.0	14.0	14.0	14.0	14.0	12.0
labor4	81.0	69.0	6.0	34.0	90.0	46.0	46.0	46.0	46.0							
labor5		19.0	88.0	97.0	112.0	107.0	107.0	107.0	107.0	34.0	90.0	46.0	46.0	46.0	46.0	
labor6	31.0	31.0								97.0	112.0	107.0	107.0	107.0	107.0	86.0
labor7		18.0	20.0	52.0	59.0	41.0	41.0	41.0	41.0	5.0	5.0	5.0	5.0	5.0	5.0	113.0
labor8				5.0	5.0	5.0	5.0	5.0	5.0	52.0	59.0	41.0	41.0	41.0	41.0	5.0
labor9	27.0	20.0														47.0
labor10		10.0			85.0		42.0	42.0	42.0							
labor11			26.0	27.0		26.0					85.0		42.0	42.0	42.0	
labor12										27.0		26.0				135.0
labor13																
labor14																
labor15																
labor16																
labor17																
labor18																
labor19																
labor20																
labor21																
labor22																
hiredlab																
tothired																
cash	1.2	2.6	1.1	12.7	17.4	12.7	12.7	13.0	13.0	12.7	17.4	12.7	12.7	13.0	13.0	16.3
credit																
risk84	58.1	83.2	52.9	64.5	126.4	169.4	206.3	277.8	261.7	64.5	126.4	169.4	206.3	277.8	261.7	209.7
risk85	54.8	65.7	57.9	73.2	80.0	143.3	41.5	112.5	91.3	73.2	80.0	143.3	41.5	112.5	91.3	201.4
risk86	26.3	40.2	20.1	33.2	110.2	51.0	8.8	58.9	77.6	33.2	110.2	51.0	8.8	58.9	77.6	63.3
risk87	16.2	19.2	10.9	22.4	121.8	39.5	42.9	86.2	107.3	22.4	121.8	39.5	42.9	86.2	107.3	53.1
risk88	29.1	56.9	29.2	62.6	136.2	25.0	8.9	55.2	66.3	62.6	136.2	25.0	8.9	55.2	66.3	176.8
riskcum																
products			549.4			1414.0	801.9	1819.2	2026.4			1414.0	801.9	1819.2	2026.4	
productm	515.4	515.4		949.5						949.5						
mingrcon																

Table 4. Base Model: Sorghum-based Whole-farm Programming Model.

VARIABLE	HIC7	SIK15	SIW15	SISNK15	SISMSB15	SISTAM15	SISHD15	SIK16	SIW16	SISNK16	SISMSB16	SISTAM16	SISHD16	HLP1	HLP2	HLP3
MAXIMISE	125.2	85.7	187.6	108.9	148.4	182.3	183.0	85.7	187.6	108.9	148.4	182.3	183.0			
RESOURCE:																
landrni																
landri	1.0															
landsi		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
labor1														-1.0		
labor2															-1.0	
labor3	12.0															-1.0
labor4																
labor5																
labor6																
labor7	91.0															
labor8	113.0															
labor9																
labor10	47.0															
labor11																
labor12																
labor13	135.0															
labor14		15.0	78.0	39.0	39.0	39.0	39.0	15.0	78.0	39.0	39.0	39.0	39.0			
labor15		90.0	170.0	41.0	41.0	41.0	41.0									
labor16		119.6	124.5	110.6	110.6	110.6	110.6	97.6	198.5	48.6	48.6	48.6	48.6			
labor17		6.0	22.5	6.0	6.0	6.0	6.0	118.0	118.5	109.0	109.0	109.0	109.0			
labor18		60.0	58.5	60.0	60.0	60.0	60.0	6.0	22.5	6.0	6.0	6.0	6.0			
labor19		8.4	31.5	8.4	8.4	8.4	8.4	62.4	67.5	62.4	62.4	62.4	62.4			
labor20		12.0	45.0	12.0	12.0	12.0	12.0	12.0	45.0	12.0	12.0	12.0	12.0			
labor21		60.0	285.0	16.0	27.0	27.0	27.0									
labor22								60.0	285.0	16.0	27.0	27.0	27.0			
hiredlab														1.0	1.0	1.0
tothired																
cash	16.3	17.4	24.9	12.4	12.7	13.0	13.0	17.4	24.9	12.4	12.7	13.0	13.0			
credit																
risk84	209.7	80.3	148.2	199.3	352.9	370.1	381.6	80.3	148.2	199.3	352.9	370.1	381.6			
risk85	201.4	83.3	223.6	84.7	116.2	156.5	158.3	83.3	223.6	84.7	116.2	156.5	158.3			
risk86	63.3	90.2	136.3	55.8	105.2	130.9	131.6	90.2	136.3	55.8	105.2	130.9	131.6			
risk87	53.1	45.3	282.1	149.8	170.9	167.0	163.9	45.3	282.1	149.8	170.9	167.0	163.9			
risk88	176.8	111.2	160.1	69.5	63.4	93.8	93.0	111.2	160.1	69.5	63.4	93.8	93.0			
riskcum																
products				1517.9	2016.6	2445.0	2453.9			1517.9	2016.6	2445.0	2453.9			
productm																
mingrcon																

Table 4. Base Model: Sorghum-based Whole-farm Programming Model.

VARIABLE	HLP4	HLP5	HLP6	HLP7	HLP8	HLP9	HLP10	HLP11	HLP12	HLP13	HLP14	HLP15	HLP16	HLP17	HLP18	HLP19
MAXIMISE																
RESOURCE:																
landrni																
landri																
landsi																
labor1																
labor2																
labor3																
labor4	-1.0															
labor5		-1.0														
labor6			-1.0													
labor7				-1.0												
labor8					-1.0											
labor9						-1.0										
labor10							-1.0									
labor11								-1.0								
labor12									-1.0							
labor13										-1.0						
labor14											-1.0					
labor15												-1.0				
labor16													-1.0			
labor17														-1.0		
labor18															-1.0	
labor19																-1.0
labor20																
labor21																
labor22																
hiredlab	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
tothired																
cash																
credit																
risk84																
risk85																
risk86																
risk87																
risk88																
riskcum																
products																
productm																
mingrcon																

Table 4. Base Model: Sorghum-based Whole-farm Programming Model.

VARIABLE	HLP20	HLP21	HLP22	HLTOT	D1	D2	D3	D4	D5	TSP	TMP	Cr		RHS
MAXIMISE				-0.1								-0.2		
RESOURCE:														
landrni													<=	2.3
landri													<=	0.6
landsi													<=	0.6
labor1													<=	358.0
labor2													<=	388.0
labor3													<=	358.0
labor4													<=	358.0
labor5													<=	358.0
labor6													<=	388.0
labor7													<=	358.0
labor8													<=	388.0
labor9													<=	358.0
labor10													<=	358.0
labor11													<=	388.0
labor12													<=	358.0
labor13													<=	358.0
labor14													<=	358.0
labor15													<=	388.0
labor16													<=	358.0
labor17													<=	388.0
labor18													<=	358.0
labor19													<=	328.0
labor20	-1.0												<=	358.0
labor21		-1.0											<=	358.0
labor22			-1.0										<=	358.0
hiredlab	1.0	1.0	1.0	-1.0									=	0.0
tothired				1.0									<=	55.0
cash				-0.1								-1.0	<=	10.0
credit												1.0	<=	30.2
risk84				-0.1	1.0							-0.2	>=	235.0
risk85				-0.1		1.0						-0.2	>=	235.0
risk86				-0.1			1.0					-0.2	>=	235.0
risk87				-0.1				1.0				-0.2	>=	235.0
risk88				-0.1					1.0			-0.2	>=	235.0
riskcum					0.2	0.2	0.3	0.2	0.2				<=	235.0
products										-1.0			=	0.0
productm											-1.0		=	0.0
mingrcon										1.0	1.0		>=	2475.0