A Test of Labour Market efficiency in Sudan: A Production Function Approach

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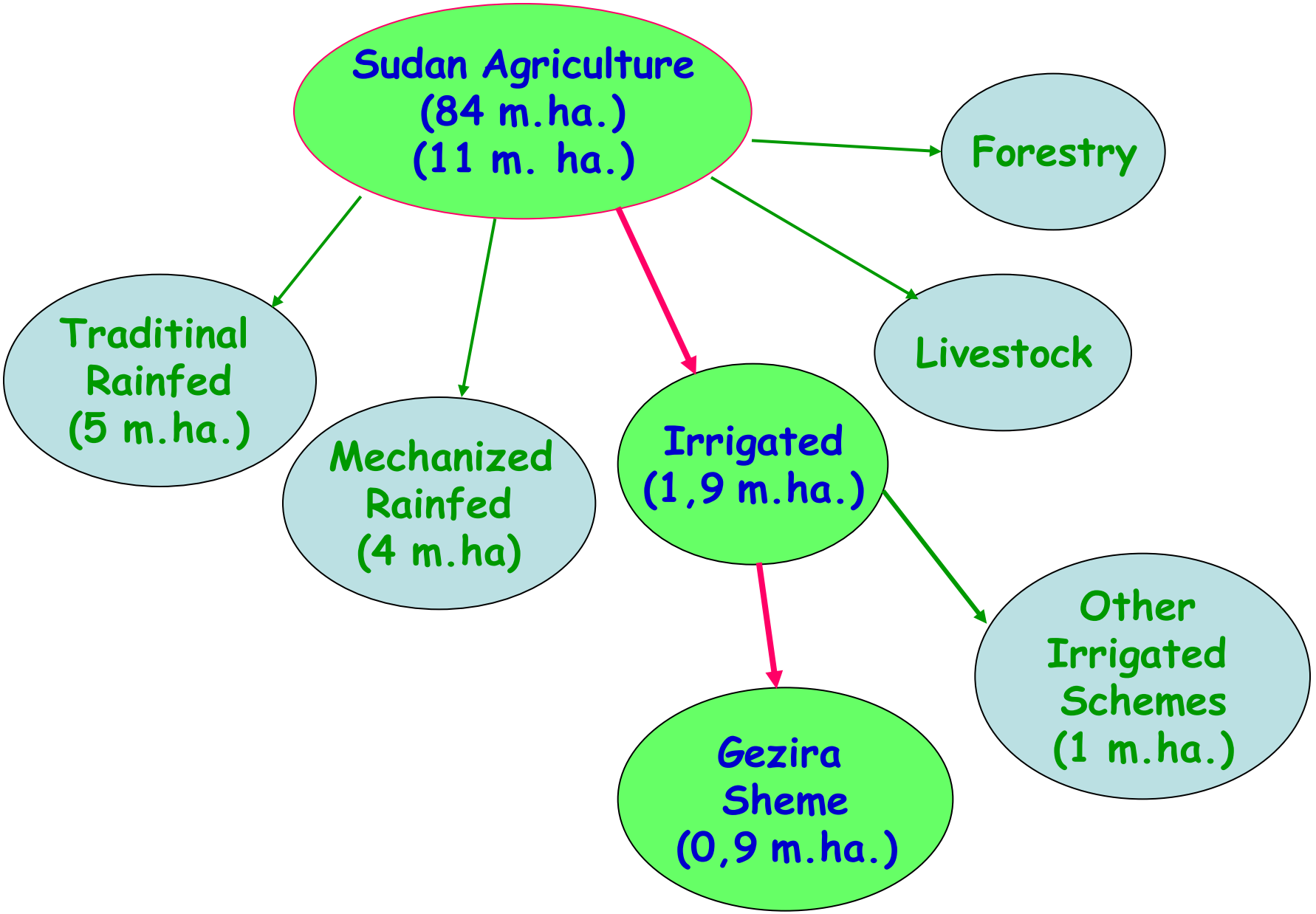
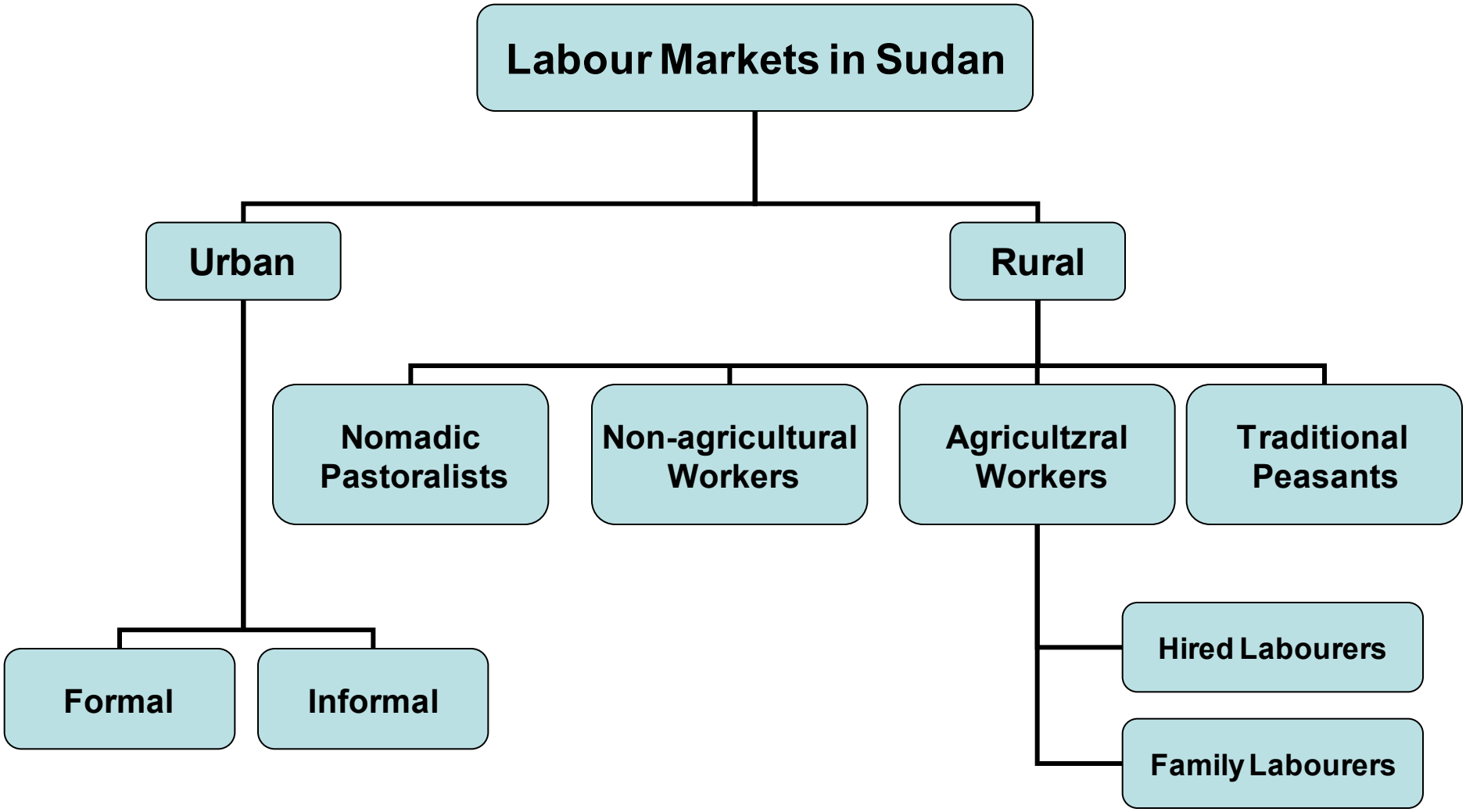
Gezira Scheme location:

The Importance of Gezira scheme:

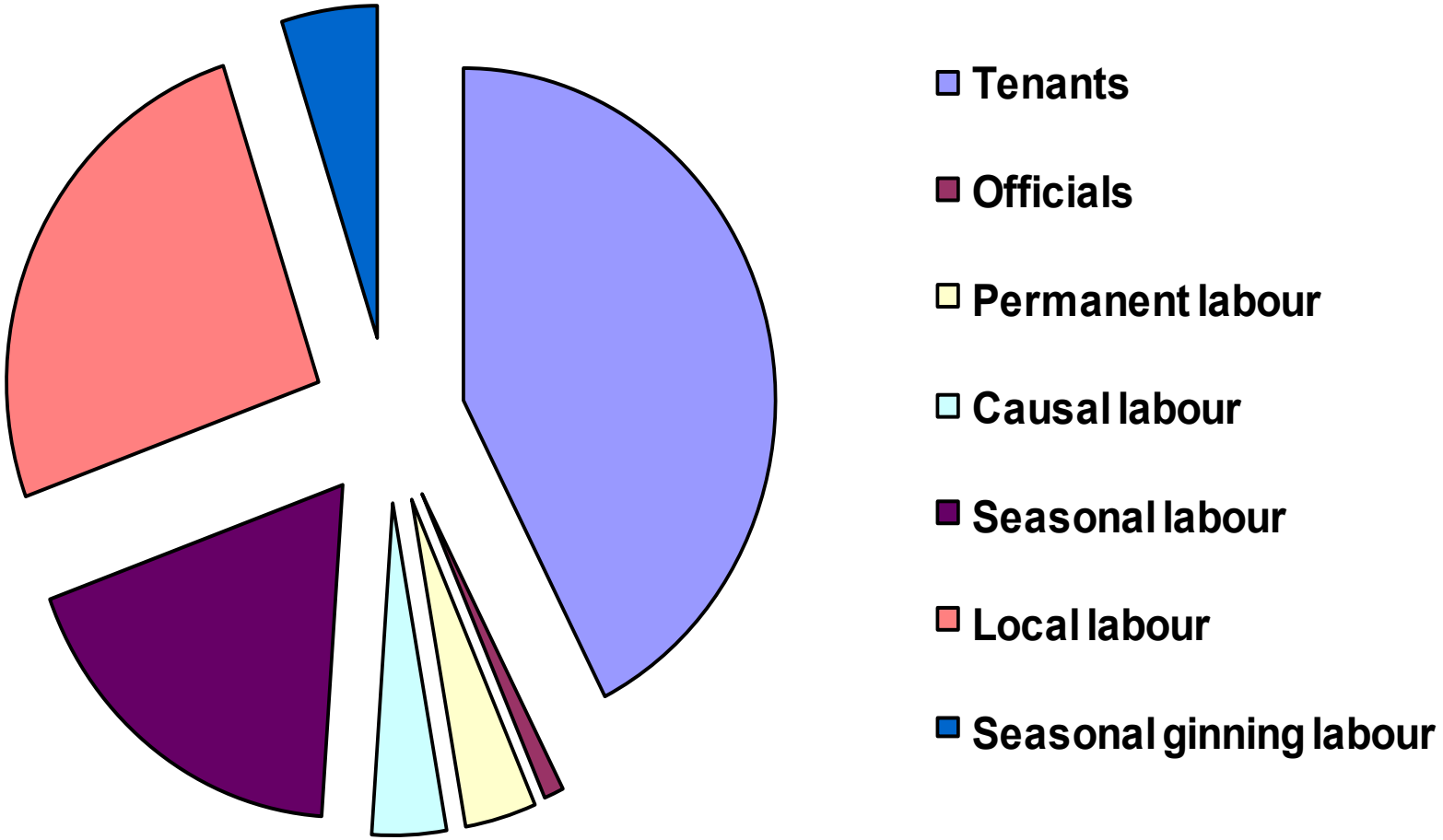


Labour Markets in Sudan:

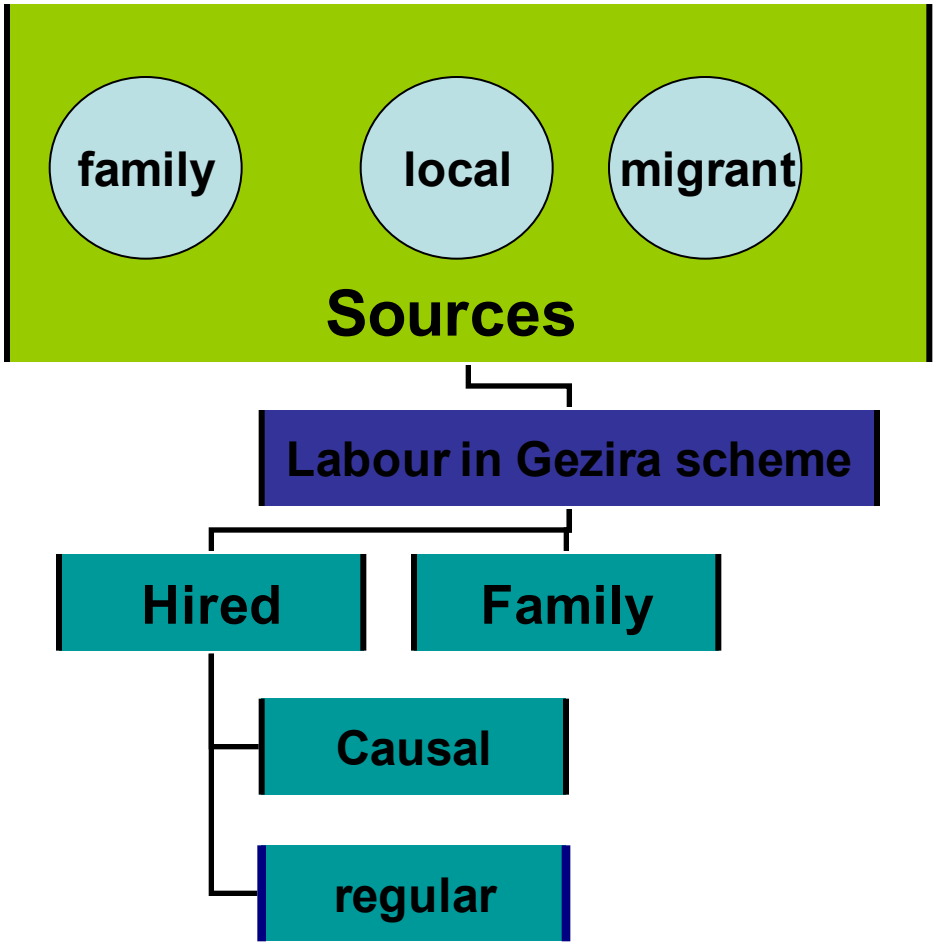


Labour markets in Gezira scheme:

man power in Gezira scheme:



Labour classes in Gezira scheme:



Reserch Objectives

To give a preliminary test of efficiency regarding the operation of the rural labour market in Sudan, taking the Gezira Scheme as example from the irrigated agriculture.

Conceptual framework

- There is an ongoing debate in development economics about the appropriate characterization of rural labour markets:

  (1) Powerful role of forces of supply and demand in wages determination (Benjamin, 1992; Kevane, 1994 and Sharif, 2000) .

  (2) The absence of well functioning markets, especially for labour but often for other inputs and output as well (Radwan,1989; Kanwar, 1998; and (Lamb and Worthington, 2003));

- In order to test whether the labour market operate efficiently or not, the relationship between the estimated marginal products and effective wage is examined.

Based on the assumption that household labour will be supplied to the point that its marginal product equates with the real wage, the following Form was used:

$$W^* = \alpha + \beta Wm + e$$

where:

W^* is the shadow wage rate,

W_m is the prevailing market wage, and

e is the error term.

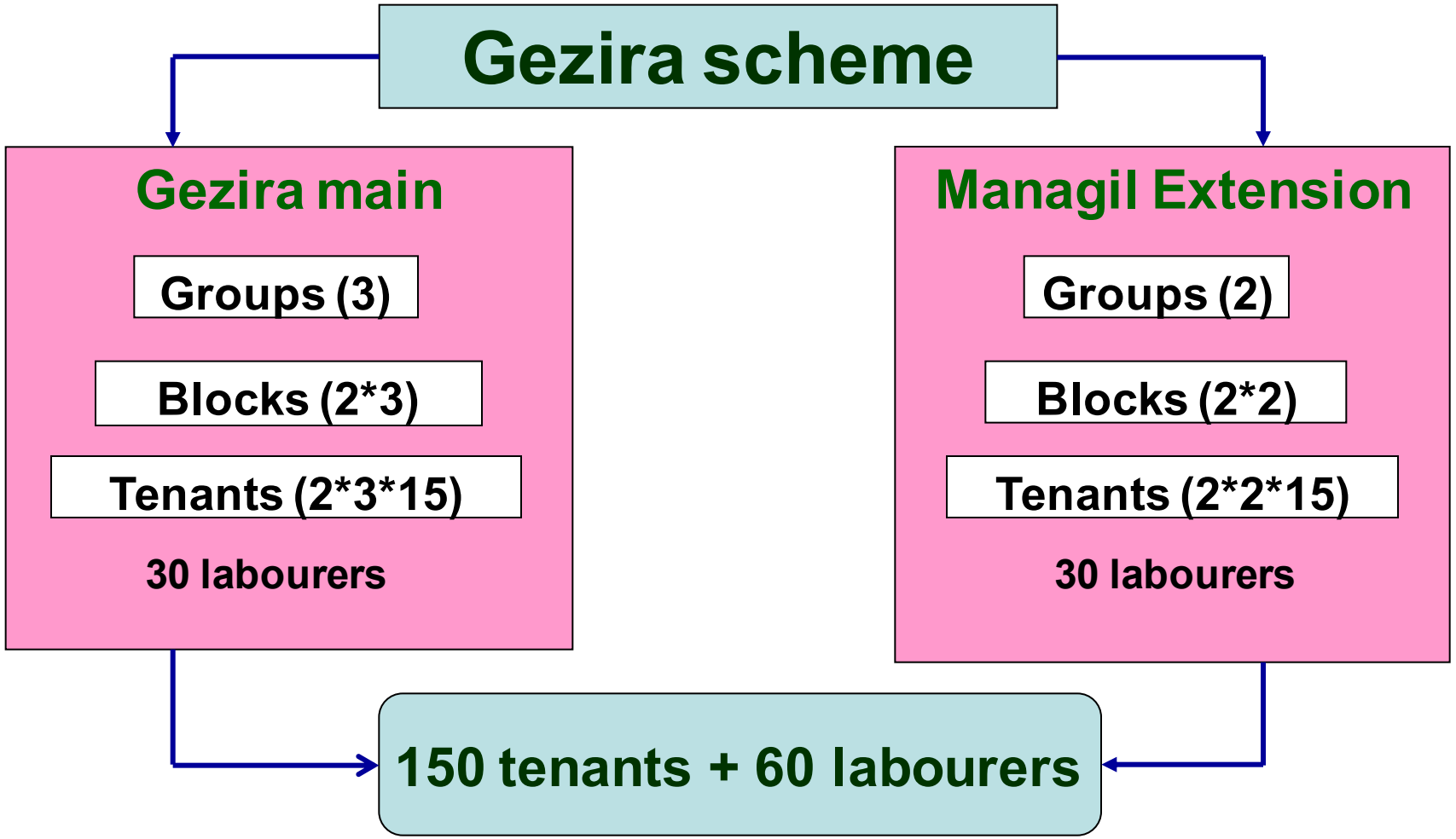
α and β **are constants**

The objective is that, the test will support labour market efficiency, if $\alpha = 0$, $\beta =$ one

The rejection of the null hypothesis is that *F*-value is significant at any level of significance

Methodology

Following the administrative division of the Gezira scheme into two areas then further into groups and blocks, the primary data was taken as follow:



Results

Production function:

$Y = ax_1 \beta_1 . x_2 \beta_2 . x_3 \beta_3 \ldots\ldots\ldots x_n \beta_n + e$

$\text{Log } Y = \log a + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + \beta_5 \log X_5 + \beta_6 \log X_6 + \beta_7 X_7 + \beta_8 X_8 + e$

Where:

The dependent variable (Y) is the output of crop, taken in physical units, Kentar per feddan for cotton, sacks per feddan for wheat, sorghum and groundnut.

β_1, β_2 to β_6	are the coefficients (elasticities).
x_1, x_2 to x_8	are the independent variables.
e	error term.
X_1	average area cultivated for each crop in feddans.
X_2	average labour/crop in mandays per feddan.
X_3	average total net farm income (S.D.).
X_4	off-farm income (S.D.).
X_5	average number of irrigations for each crop.
X_6	average number of weedings for each crop.
X_7	dummy variable, sowing date.
X_8	dummy variable, harvesting date.

Regression coefficients and statistics for the production functions of the major field crops in Gezira scheme

Variables	Cotton	Wheat	Sorghum	Groundnut
Cultivated area (Fed.)	0,264 (1.031)	0,275 (1.797)*	0.258 (1.869)*	0.112 (1.436)
Total labour (mandays)	0,480 (5.647)***	0,201 (1.896)*	0.371 (6.870)***	0.396 (3.094)***
Capital expenses (SD)	0.303 (1.762)*	0,328 (2.262)**	0.389 (3.325)**	0.405 (5.063)***
Number of irrigations	0.161 (1.258)	0.147 (1.081)	0.239 (2.915)**	0.029 (0.492)
Number of weedings	0,005 (0.054)	-	0.001 (0.017)	0.043 (0.915)
Tenant age (years)	0,507 (3.380)***	0.087 (1.891)*	0.034 (0.358)	0.021 (0.750)
Educational level (years)	0,102 (2.914)**	0,014 (0.875)	0.028 (1.077)	0.001 (0.125)
Sowing date (dummy)	0,059 (1.180)	-0.195 (7.500)***	-0.025 (-0.714)	0.108 (5.684)***
Harvesting date (dummy)	-0.131 (-2.673)**	-0.245 (-6.622)***	-0.022 (-0.846)	-0.096 (5.333)***
R-squared	0,644	0,704	0.579	0.654
F -value	24.531	39.851	18.612	22.714
Constant	1.554 (2.556)**	2.778 (7.149)***	2.977 (10.945)***	3.262 (20.516)***

Figures in parenthesis are t-values

F-value: 9,459 (0.000). R^2 = 0,572. R^{-2} = 0,511

*, ** and *** denotes significance at 10%, 5% and 1% levels respectively.

Test of equality of estimated labour shadow wagesand prevailing market wages in Gezira scheme

Crop	Estimated shadow wage	R2	F-value	Constant	Log wage
Cotton	681.7	0.339	4.652 (0.087)	**0.647 (0.648)**	**0.758 (2.157)****
Wheat	953.8	0.391	3.229 (0.077)	**0.205 (2.029)****	**-0.643 (- 1.797)***
Sorghum	463.0	0.301	2.972 (0.087)	0.411 (3.262)***	- 518 (- 1.724)*
Groundnut	218.0	0.404	3.142 (0.080)	0.404 (3.206)***	- 0.785 (- 1.773)*

***, ** and *** denotes significance at 10%, 5% and 1% levels respectively.**

❖ **These results may support:**

- The phenomenon of low productivity of labour in the developing countries
- In case of each crop, the shadow wage of labour were significantly Different from the ruling market wages.
- They were also different and lower compared to the ruling wages in non-agricultural activities.
- Non –market forces such as household characteristics and government policies.
- There may also be some employment constraints, some transaction costs or labour market imperfections. There is also seasnality in labour demand and supply.
- Markets do not behave as predicted by the neoclassical competitive notion, hence the shadow wages significantly deviates from the market wage.

* faire market-regulations, effective labour market information system and labour organizations