Horticultural Exports and Livelihood Linkages of Rural Dwellers in Southern Ghana: Application of the Agricultural Household Model

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The World Vegetable Center

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High GDP at Independence **(1957)**

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Restricted Trade Regime **(60's and 70's)**

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Failure of Export Policy **(early 80's)**

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ERP with Trade Liberalisation **(1983)**

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Export Promotion & Developments in NTE's **(1984)**

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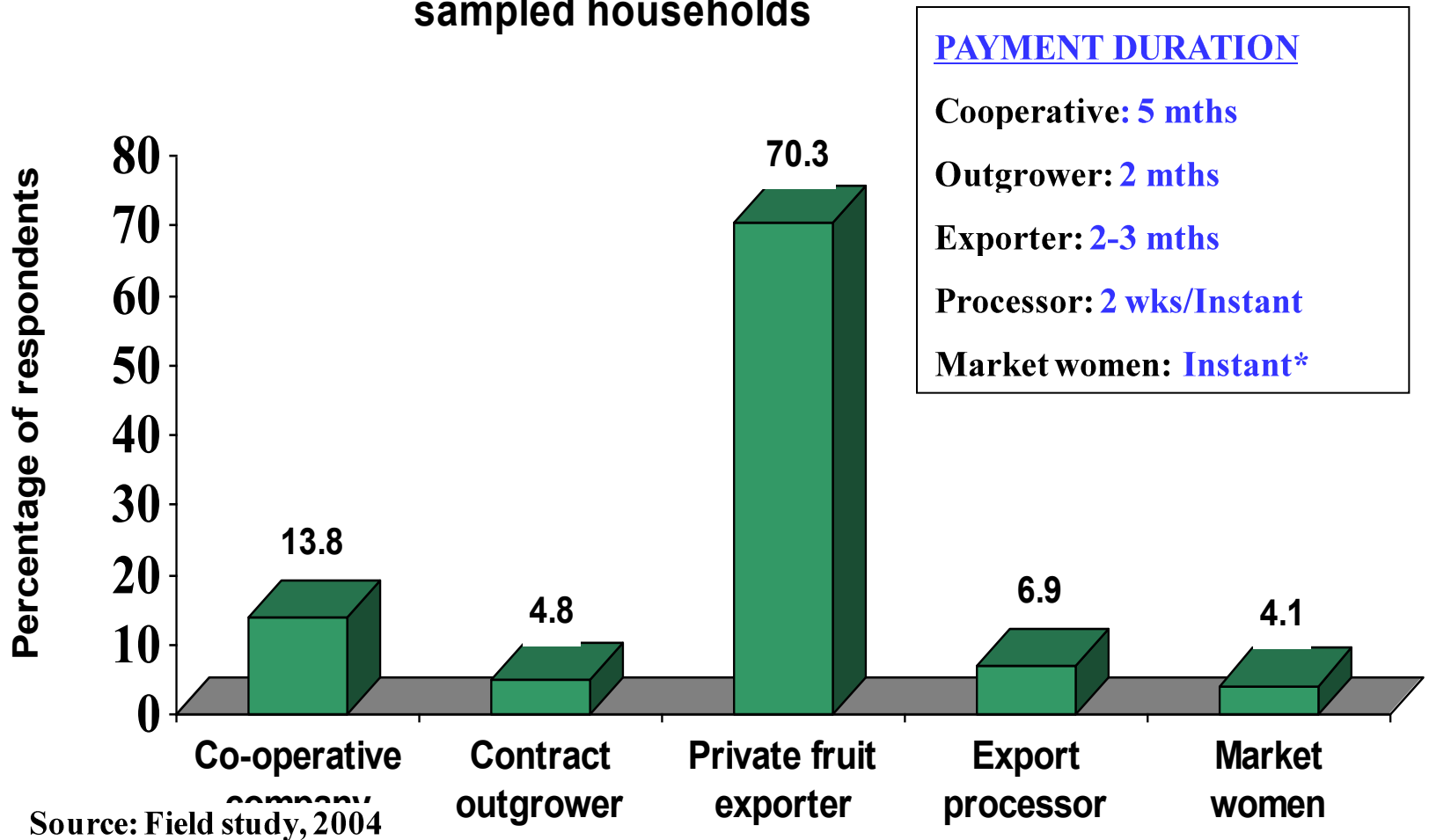| Smallholder Farm Commercialisation & Increase in Food imports **(On-going)** |
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Objective

To **analyse the response of farm households to alternative factor and product market changes resulting from horticultural export boom.**

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Field study results

Figure 1: **Major direct marketing channels for NTE produce of sampled households**

PAYMENT DURATION

Cooperative: 5 mths

Outgrower: 2 mths

Exporter: 2-3 mths

Processor: 2 wks/Instant

Market women: Instant*

Source: Field study, 2004

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Household Model : Optimization version in GAMS framework

$$\max_{f_{ij}, Ca_i, X_i, Cm_i, Cl_i, l_h} U \leq \alpha_u Cm_i^{\alpha_m} Cl_i^{\alpha_l} \prod_i Ca_i^{\alpha_i}$$

Where;

U = Utility of consumption of own agricultural produce, market purchased goods and leisure

Cm_i = Consumption of market purchased goods

Cl_i = Consumption of leisure

Ca_i = Consumption of own agricultural produce i

X_i = Marketed surplus of own agricultural output i

f_{ij} = Factor input j for the production of commodity i

l_h = Quantity of labour sold (-) or purchased (+)

$\alpha_i, \alpha_m, \alpha_l, \alpha_u, \ldots$ = Parameters of the utility function

Programming model constraints

Subject to:

$$\beta_i, const \prod_j f_{i,j}^{\beta_{i,j}} \geq Ca_i + X_i \longrightarrow \text{ \color{blue}{\textbf{Production technology constraint}}}$$
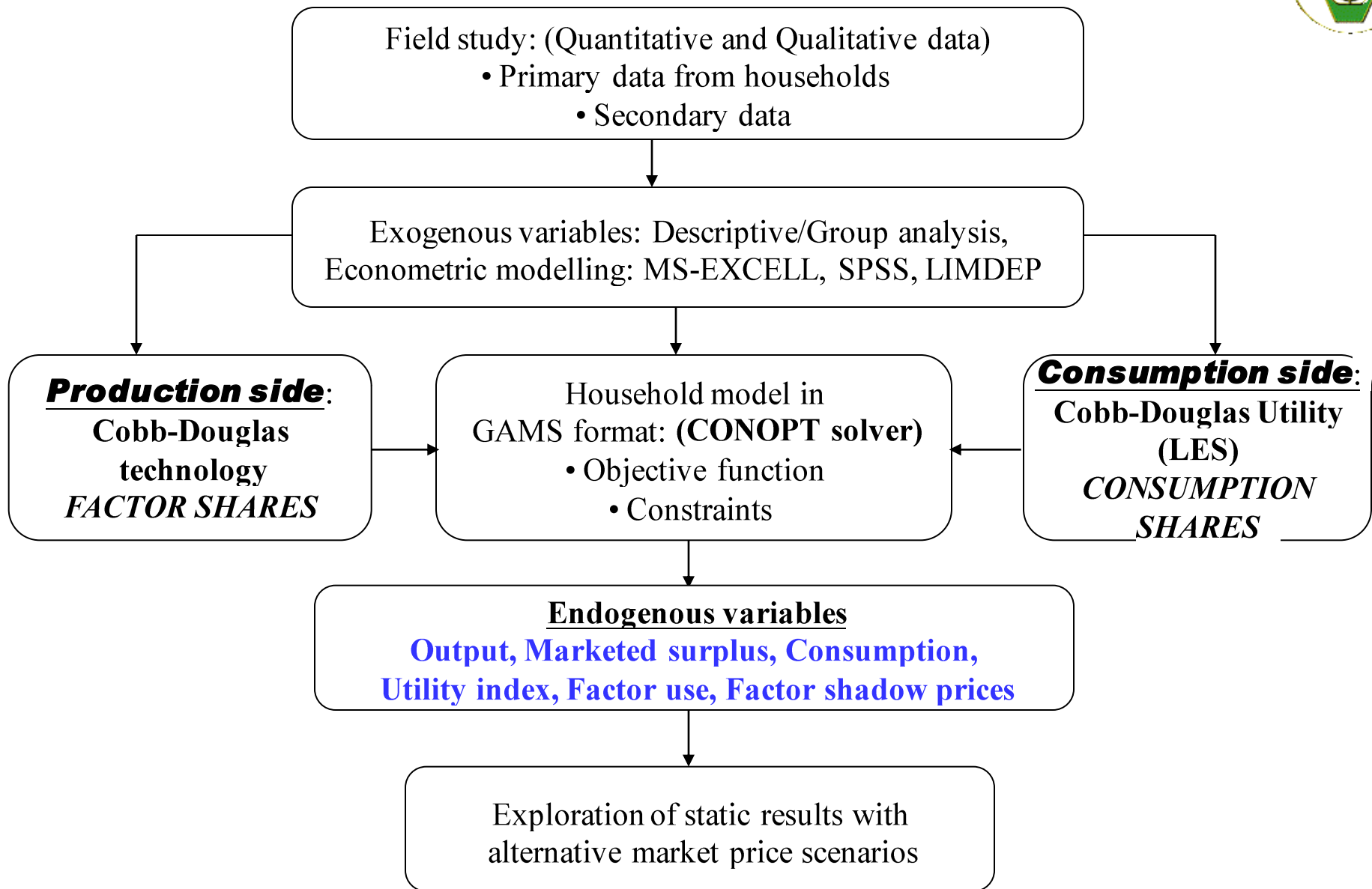
$$L + l_h \geq \sum_i f_{i,labour} + Cl_i \longrightarrow \text{ \color{blue}{\textbf{Labour constraint}}}$$

$$A \geq \sum_i f_{i,land} \longrightarrow \text{ \color{blue}{\textbf{Land constraint}}}$$

$$Y_x + \sum_i P_i X_i \geq \sum_i (P_i Cm_i + \sum_i q_j f_{ij}) + wl_h$$

Income constraint

5.5: Analytical framework

Field study: (Quantitative and Qualitative data)
• Primary data from households
• Secondary data

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Exogenous variables: Descriptive/Group analysis,
Econometric modelling: MS-EXCELL, SPSS, LIMDEP

Production side:
Cobb-Douglas technology
FACTOR SHARES

Household model in
GAMS format: **(CONOPT solver)**
• Objective function
• Constraints

Consumption side:
Cobb-Douglas Utility (LES)
CONSUMPTION SHARES

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Endogenous variables
Output, Marketed surplus, Consumption,
Utility index, Factor use, Factor shadow prices

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Exploration of static results with
alternative market price scenarios

# Impact of Output Price Scenarios on Welfare (base run= 100)

Variable/ Farm type	Sc. 2a= 40% increase in staple prices	Sc. 2b= 10% reduction in NTE world market price	Sc.2d=Combined output price changes*
CONSUMPTION			
Non-Hort.			
Maize	333.33	100.00	333.33
Cassava	97.32	100.00	97.32
Local cash crops	109.45	100.00	109.45
Leisure	91.14	100.00	91.14
Market goods	118.82	100.00	118.82
Hort. & Staple			
Maize	106.89	95.22	98.55
Cassava	105.97	96.35	97.32
Local cash crops	99.93	94.23	95.43
Leisure	100.04	84.58	84.58
Market goods	100.07	87.52	94.31
UTILITY INDEX			
Non-Hort.	104.19	100.00	104.19
Hort. & Staple	100.02	87.91	96.51

* 40% increase in staple prices+10% reduction in world market prices of NTE's

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Impact of Combined Policy Scenario on Production and Consumption Decisions of Horticultural and Staple households (base=100)
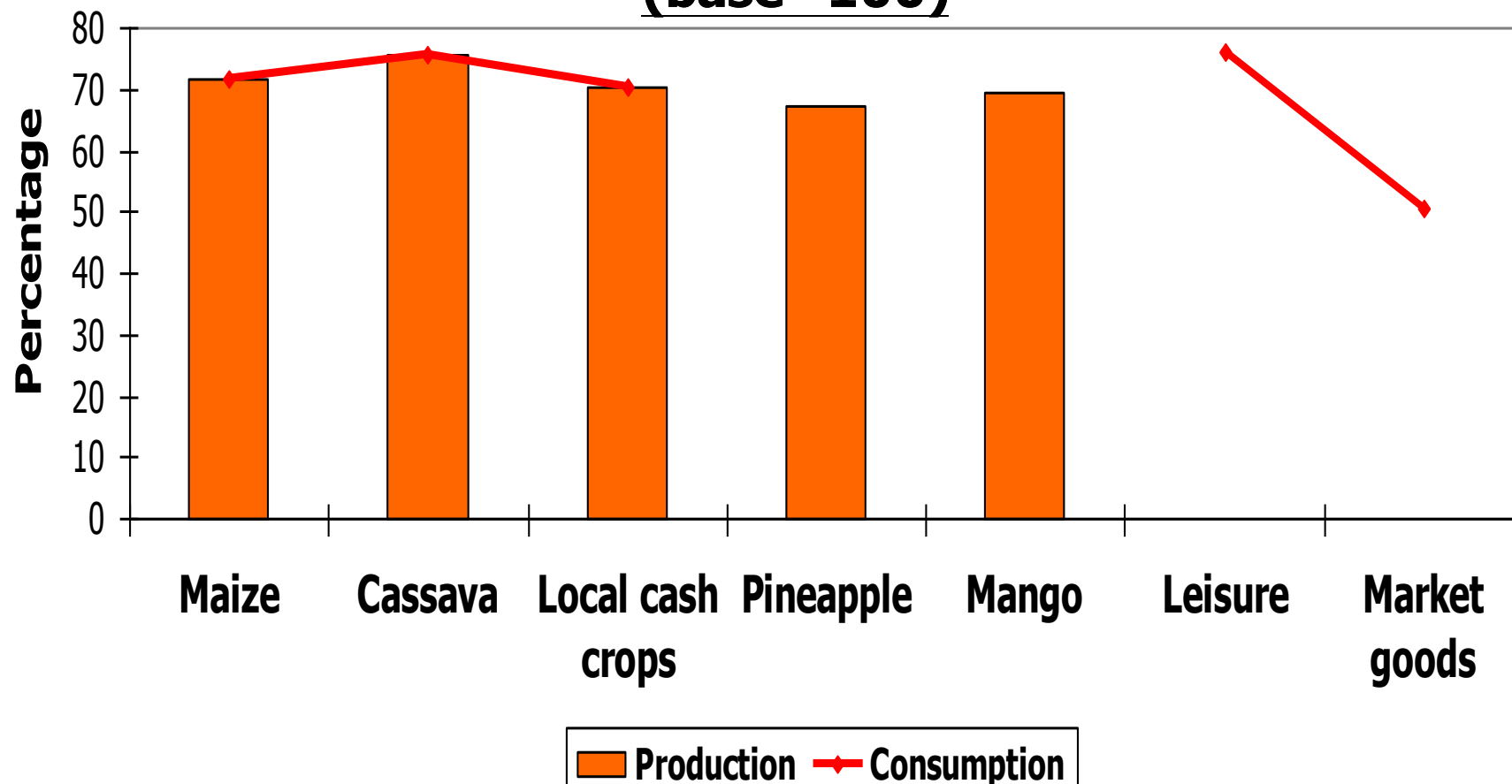
* **Scenario 3b:** 50% increase in wages, 40% increase each in prices of agrochemicals and other capital inputs, 50% increase in land price, 40% increase in staple crop prices, and 10% reduction in the world market price of horticultural export crops.

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Policy Recommendations

1. Establishment of more export-oriented agro-processing industries.

2. Integrating smallholders with export and processing industries.

3. Promotion of an urban-rural migration policy for specialization in export horticulture.

4. Improving infrastructure to enhance input and market access.

5. Encouraging formation of farmer groups and strengthening of exporter-producer associations.

THANK YOU