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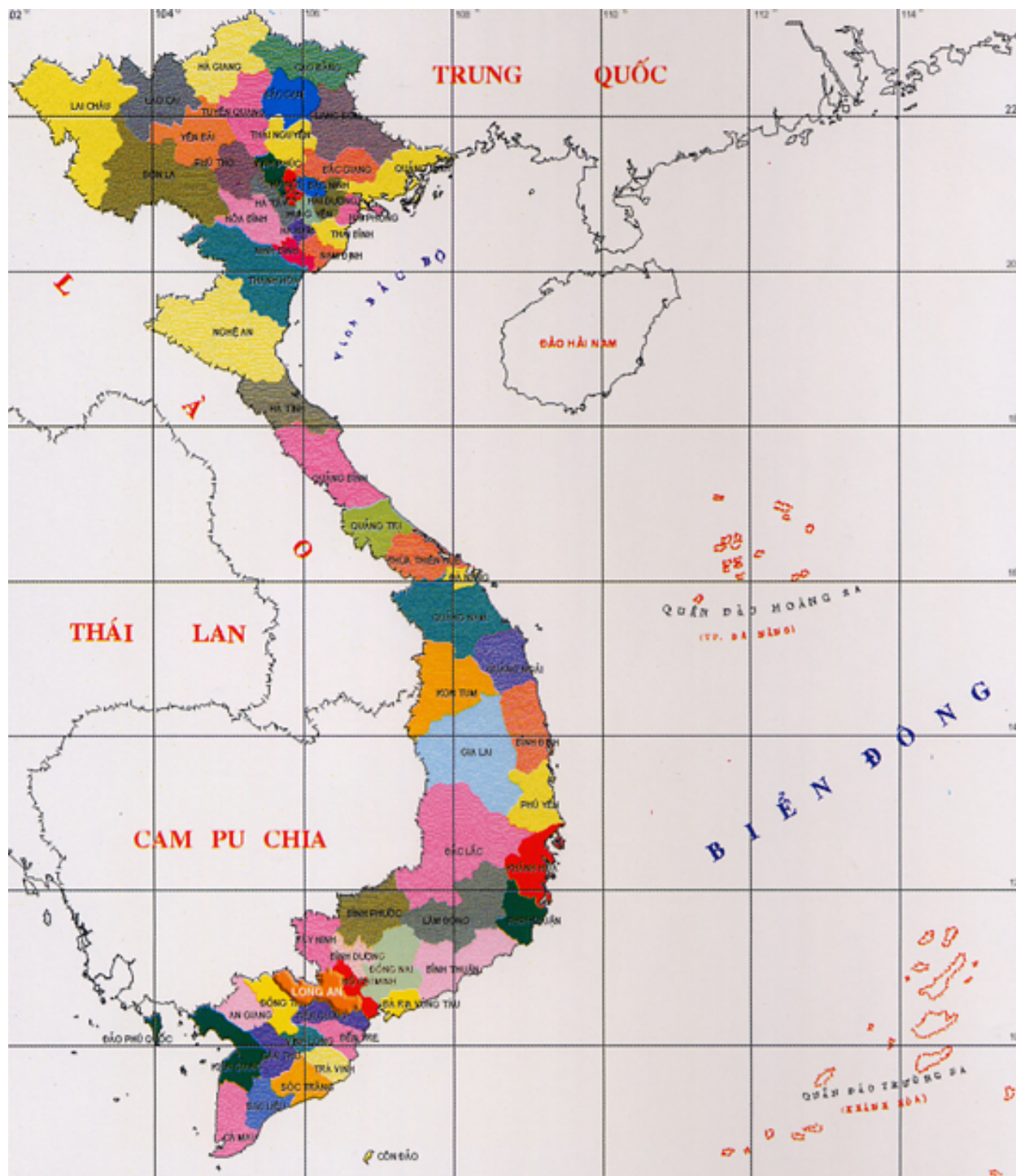


**RUBBER FARMER
PREFERENCES FOR
ADAPTIVE MEASURES TO
CLIMATE CHANGE
A CASE STUDY IN SOUTHEAST
VIETNAM**

Quang Minh Bui, Oscar Cacho, Rene Villano, David Hadley

Contributed paper prepared for presentation at the 59th AARES Annual Conference,
Rotorua, New Zealand, February 10-13, 2015

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3 LEADING AGRICULTURAL PRODUCTS IN EXPORT VALUES OF VIETNAM

1: RICE

2: COFFEE

3: RUBBER



RUBBER FARMER PREFERENCES FOR ADAPTIVE MEASURES TO CLIMATE CHANGE A CASE STUDY IN SOUTHEAST VIETNAM

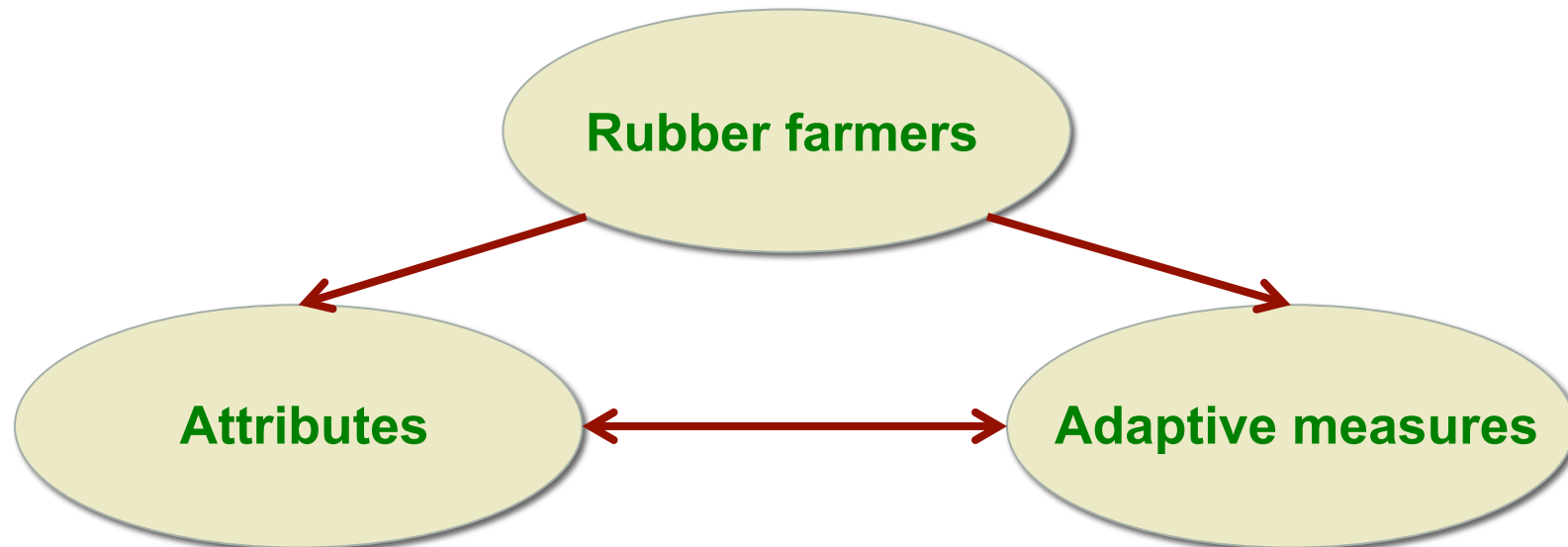
Quang Minh Bui, Oscar Cacho, Rene Villano, David Hadley

59th Annual Conference of the Australian Agricultural and Resource Economics Society,
at Rotorua, New Zealand, 10–13 February 2015

Lancaster (1966) developed a consumer choice model by assuming that consumers derive their satisfaction:

not only from the goods themselves

but also from attributes the goods give



Literature review

- Farmers have heterogeneous preferences for various adaptive measures
- Many solutions through technologies and cultivation practices, but inconsistent adoption patterns
- Adoption depends on attributes of technologies in combination with socio-economic conditions of farmers
- Assessment of the farm-level adoption of adaptive strategies for formulating policies (micro-level analysis of decision-making processes)

Context in Southeast Vietnam

- **Rubber trees**

- Important strategic plant (high earnings, poverty reduction)
- Planted rubber area: 56%
- Harvested rubber area: 65%
- Affected negatively by climate change and variability
- Require rubber farmers to adapt

- **Small-scale rubber farming**

- Rubber farm households: 56% of the country
- Contribution: 40–50% of natural rubber production
- Highly vulnerable to market uncertainties
- Requires special attention of formulating adaptive strategies

Research questions

Heterogeneity of adoption preferences at the farm level is an important research question of relevance in Southeast Vietnam

- 1. How are farmers likely to respond to climate change?**
- 2. What are the attributes related to different adaptive measures?**
- 3. Why do farmers choose some adaptive measures, but not others?**

Methodology

- **Identification of adaptive measures and attributes**
 - **Using a structured questionnaire to measure attribute preferences (through stated preference)**
- **Reliability analysis helps identify a reduced set of attributes**
- **Factor analysis helps identify the optimal number of farmer preference types**

Data

Table 1: Adaptive measures being practiced and applied at the farm level and their attributes

No.	Adaptive measures	Rank	Short-cut attributes
1	Proper ground preparation	1	Resistance to drought
2	Proper clones, planting materials and establishment	2	Resistance to heavy winds
3	Alter the fertiliser application strategy	3	Resistance to plant disease
4	Employ spray and drip irrigation technologies	4	Skilled labour availability
5	Water conservation techniques	5	Capital availability
6	Soil conservation techniques	6	Time availability
7	Rain guard technology	7	Property rights
8	Correct tapping techniques	8	Knowledge
9	No adaptation	9	Institutions
		10	Market access
		11	Early yields
		12	Latex yield
		13	Latex quality
		14	Technical and economic efficiency

Adaptive measures

Measures and initiatives

- **Are undertaken through adjustments or interventions over time**
- **To diminish the vulnerability of small-scale rubber farming to actual/potential impacts of climate change (through manage the losses or take advantage of the opportunities caused by climate change)**

Attributes

Attributes

- Latent variables
- Not directly observable

Farmer preference levels to an attribute

- 5-point Likert scale
- Measuring preference of the most important measure

Table 1: ...

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Results

- **Sample size: 430 rubber farm households in 3 provinces (Binh Phuoc, Tay Ninh and Dong Nai)**
- **Field surveys: from January to April 2014**
- **Nearly all of them conducted some combinations of the measures**
- **3 most preferred measures**
 - Proper rubber clones, planting materials and crop establishment (chosen by 32.6%)
 - Rain guard technology (23.7%)
 - Correct tapping techniques (26.3%)

Results: Reliability Analysis

- **Considered 10 attributes when formulating the preference**
- **Importance of each attribute varied across rubber farmers**

Table 2: Reliability analysis for measuring the adaptive attributes

No.	Rank	Short-cut attributes	Cronbach's alpha if attribute deleted
Cronbach's alpha of full model			0.71
1	1	Resistance to drought	0.68
2	2	Resistance to heavy winds	0.68
3	4	Skilled labour availability	0.69
4	5	Capital availability	0.66
5	6	Time availability	0.69
6	7	Property rights	0.70
7	8	Knowledge	0.69
8	10	Market access	0.67
9	11	Early yields	0.71
10	14	Technical and economic efficiency	0.71

- (i) **resistance to plant disease,**
- (ii) **availability of institutional support,**
- (iii) **better latex quality and**
- (iv) **higher production and yield**

Results: Factor Analysis

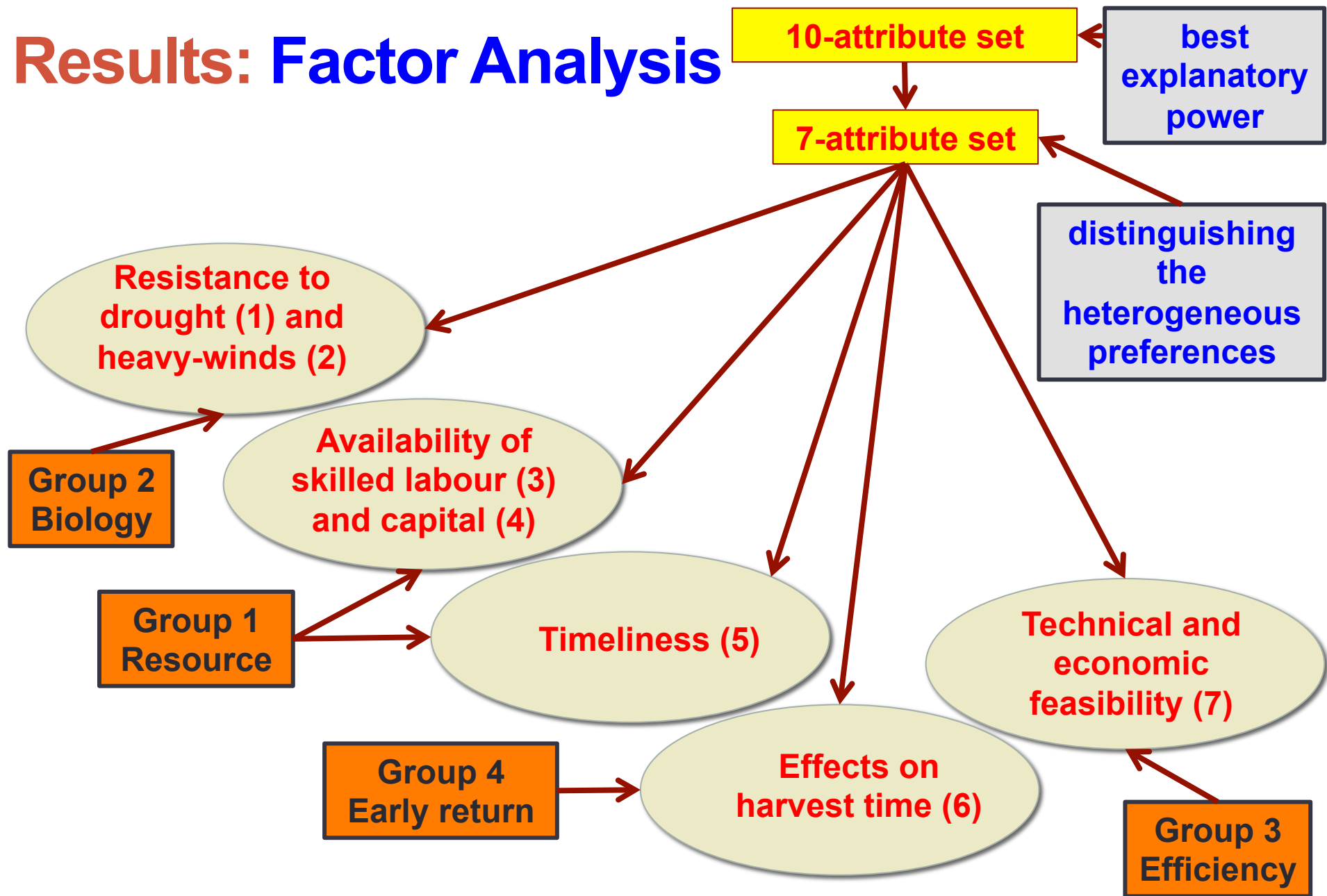


Table 3: The rotated component matrix in the factor model

No.	Rank	Short-cut attribute	Factor 1	Factor 2	Factor 3	Factor 4
1	1	Resistance to drought		0.95		
2	2	Resistance to heavy winds		0.95		
3	4	Skilled labour availability	0.71			
4	5	Capital availability	0.75			
5	6	Time availability	0.73			
6	11	Early yields				0.83
7	14	Technical and economic efficiency			0.86	
KMO measure of sampling adequacy			0.65			
Bartlett's test of sphericity			1403*			
Cumulative %			68.99			

(i) **land-use rights,**

(ii) **appropriate techniques and application knowledge**

(iii) **market access**

*: $p < .05$

Discussion

Group 1 - *resource attributes*

Concerns 3 attributes

- (i) skilled labour availability
- (ii) ability to obtain investment capital
- (iii) ability to conduct tasks at the suitable time

Related to availability of economic inputs

This group is willing to adopt adaptive measures when there is availability of financial and labour resources.

Discussion (cont.)

Group 2 - *biological attributes*

Concerns 2 attributes

- (i) drought resistant ability
- (ii) heavy wind resistant ability

Related to clones and methods that improve drought and heavy wind resistant ability

This group expects to deal with forecasted climate risks.

Discussion (cont.)

Group 3 - *efficient attribute*

Concerns 1 attribute

- (i) **technical and economic feasibility**

This group expects the feasibility of the method

Discussion (cont.)

Group 4 - *early return attribute*

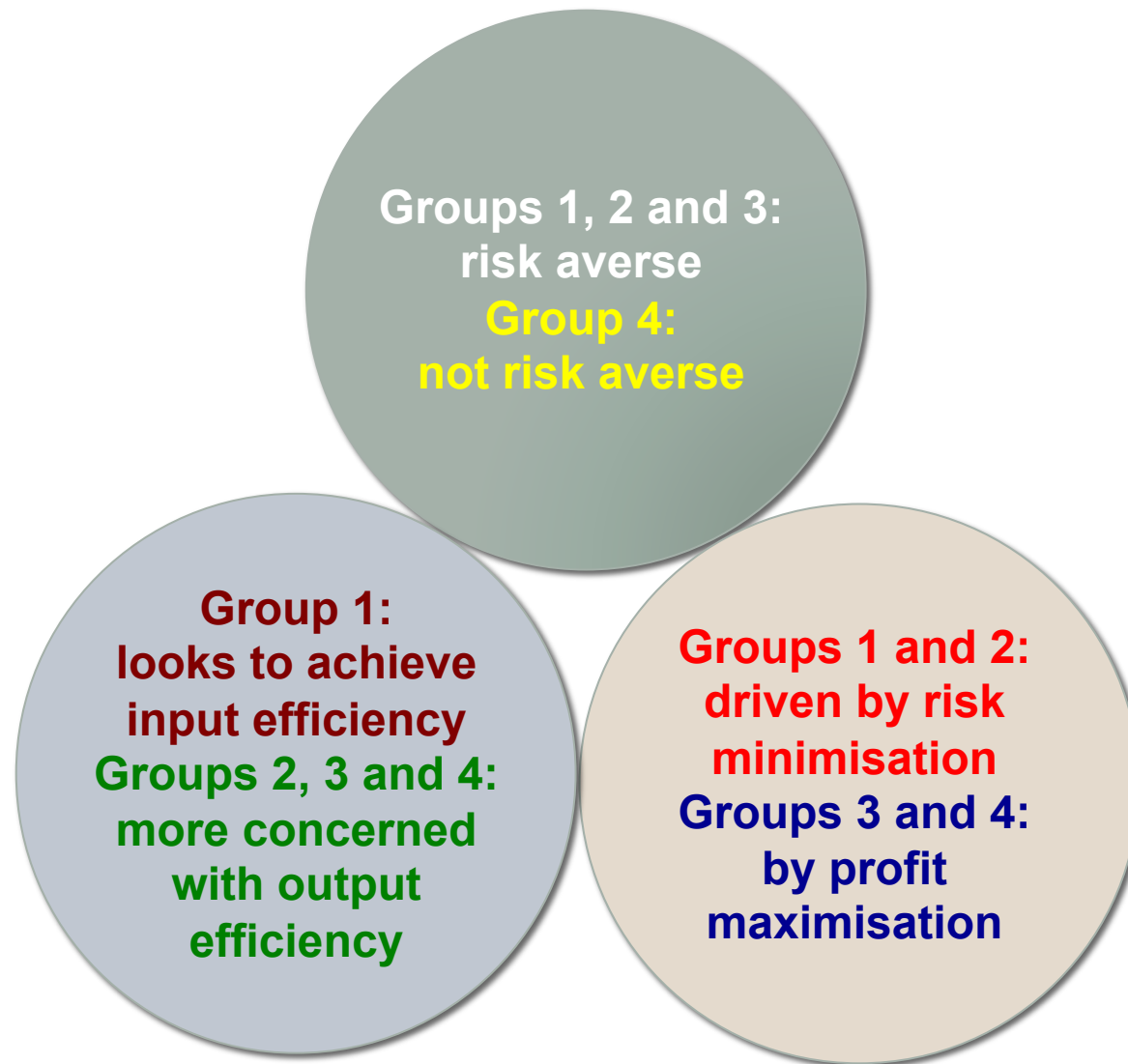
Concerns 1 attribute

(i) **harvest timing**

Concentrates on obtaining early income (e.g. applying latex stimulative materials)

This group expects to earn early profit.

Discussion (cont.)



Contributions

- **Formalising** the study of adaptive strategies at the farm level
- **Providing a background for further research on factors affecting the probability a farmer becoming a membership of a given group**



Thank you for your attention!