Sustainability evaluation of beef cattle production systems in the Pampa Biome

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The Pampa biome covers approximately 2% of the Brazil territory, 63% of the Rio Grande do Sul State (RS), part of Argentina and whole Uruguay. The introduction and expansion of cultures and exotic forage (mainly soybeans) are leaving the rapid degradation of the natural Pampa grasslands, as well as social and cultural changes.
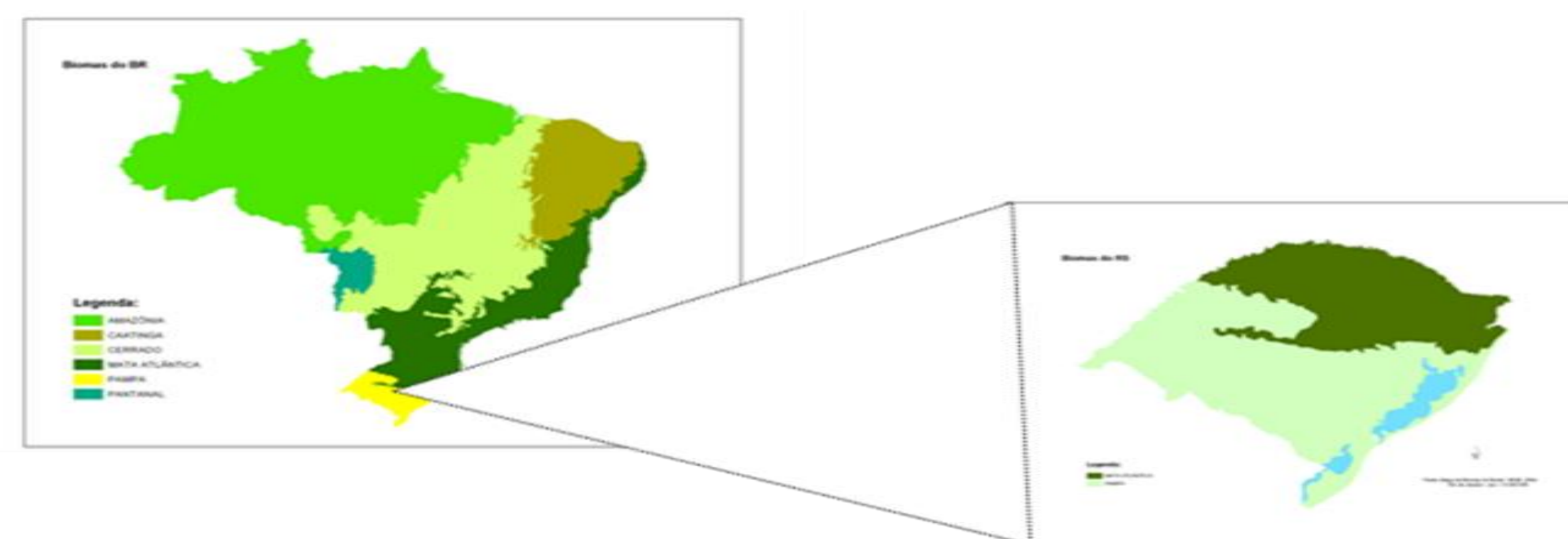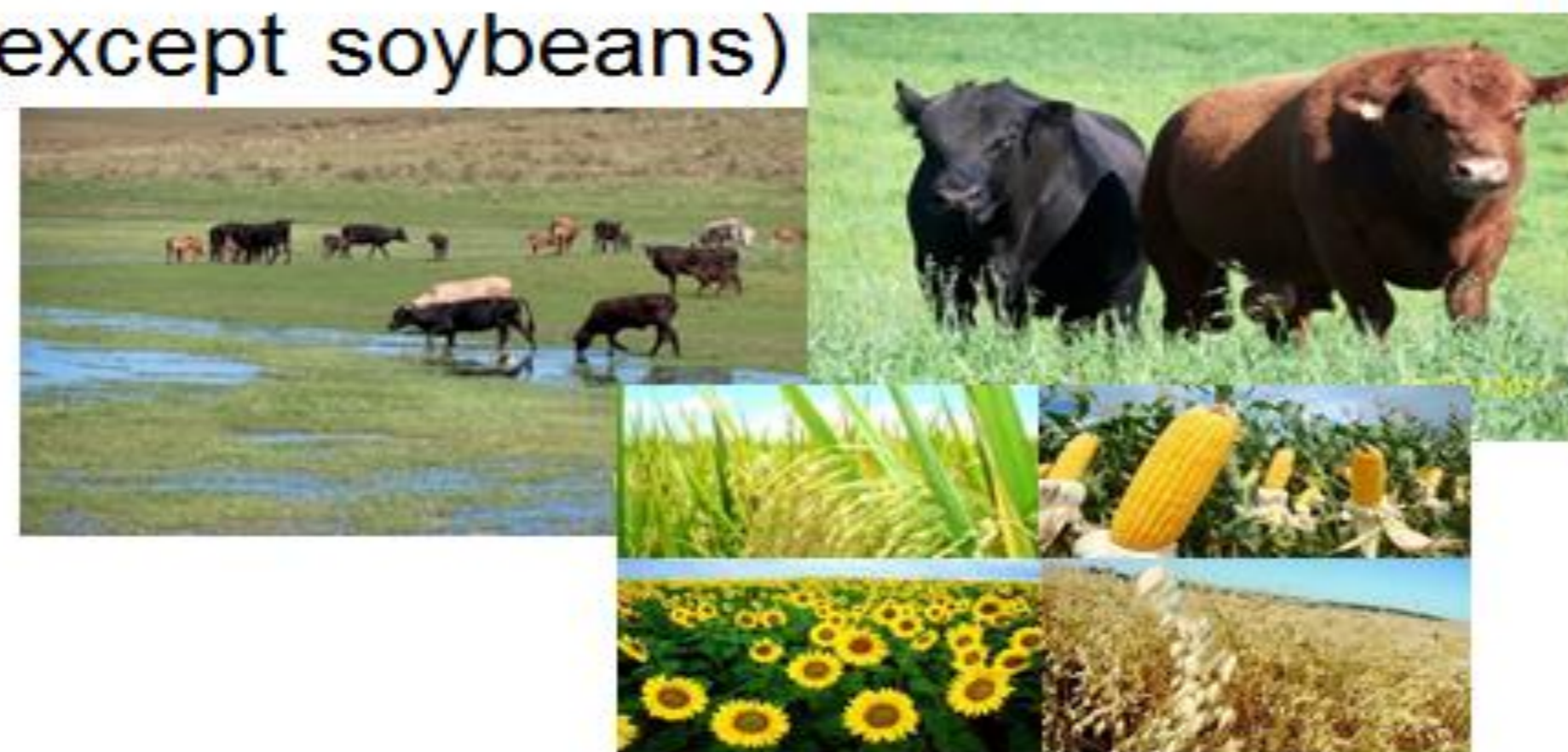
OBJECTIVE: evaluate the sustainability of family beef cattle production systems in biome Pampa, in RS-Brazil.

METHODOLOGY: Farm sustainability was evaluated using MESMIS framework. It relies on a systemic approach by the definition of five basic sustainability attributes: (a) Productivity (capacity to provide the required level of goods and services); (b) Stability (the ability of the system to cope with change); (c) Adaptability (the ability to find new levels of balance or to continue offering benefits to long term changes in the environment); (d) Equity (the ability to distribute both intra – and intergenerational benefits and costs fairly); (e) Self-reliance (the ability to regulate and control interactions with the outside). Three family beef cattle production systems were studied:
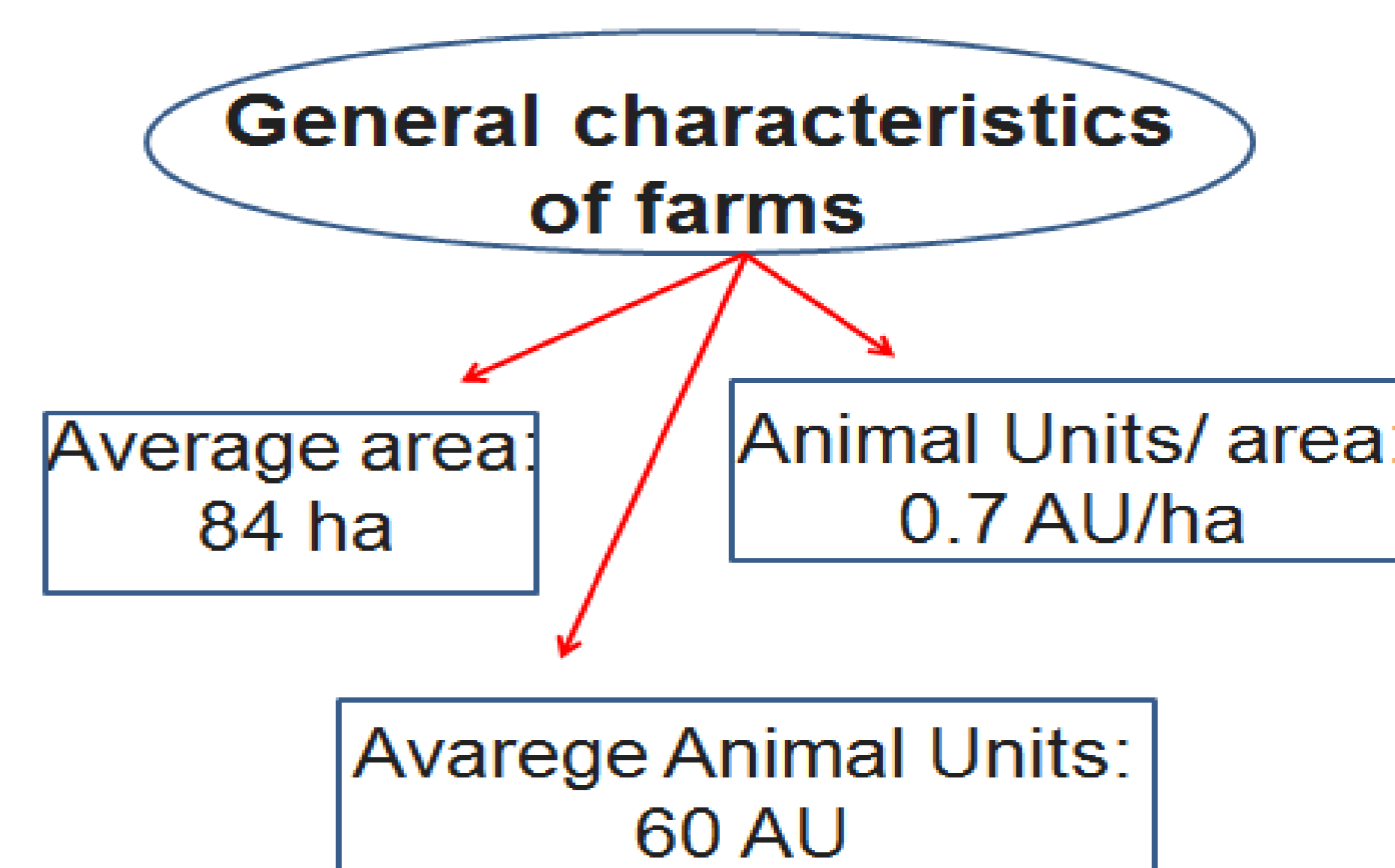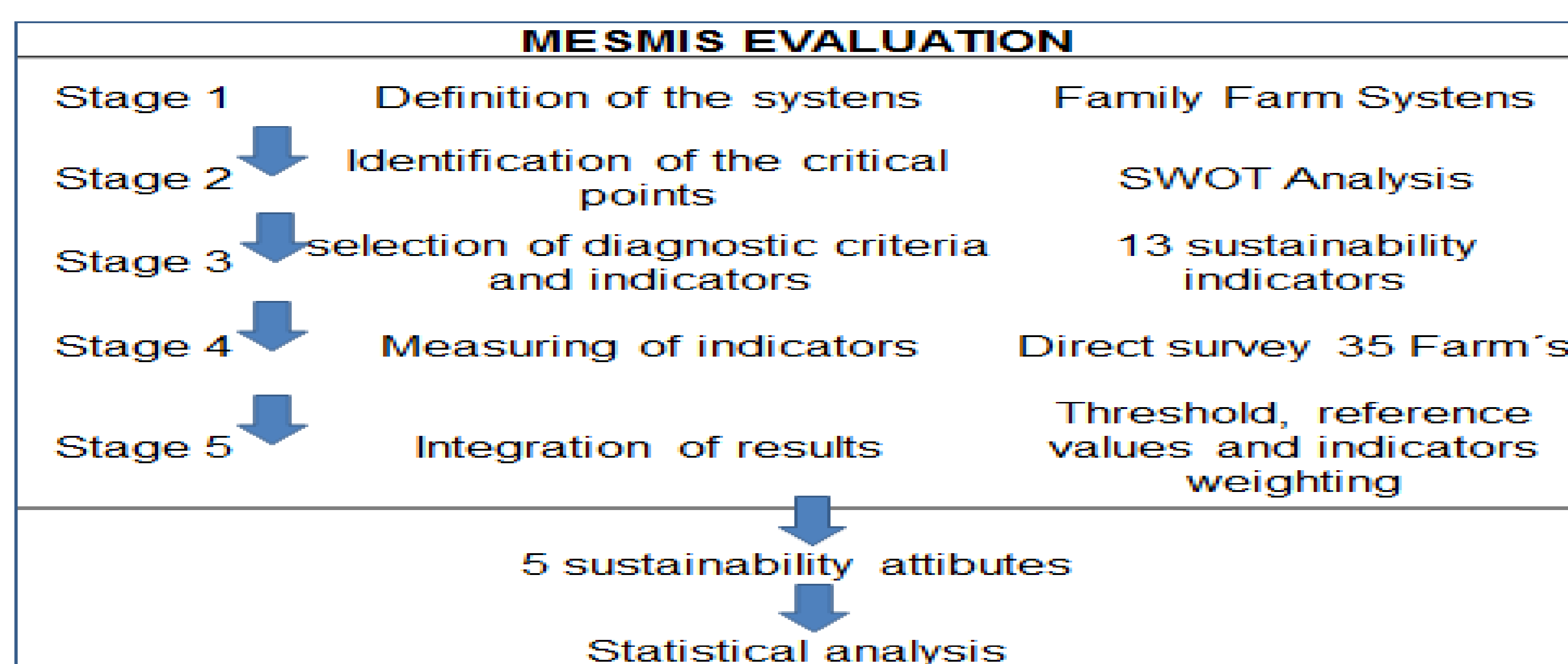
GPN - family farmer, with production systems in natural pastures and no commercial crops.

GPNC - family farmer with production systems in natural pastures and the presence of commercial crops (except soybeans)
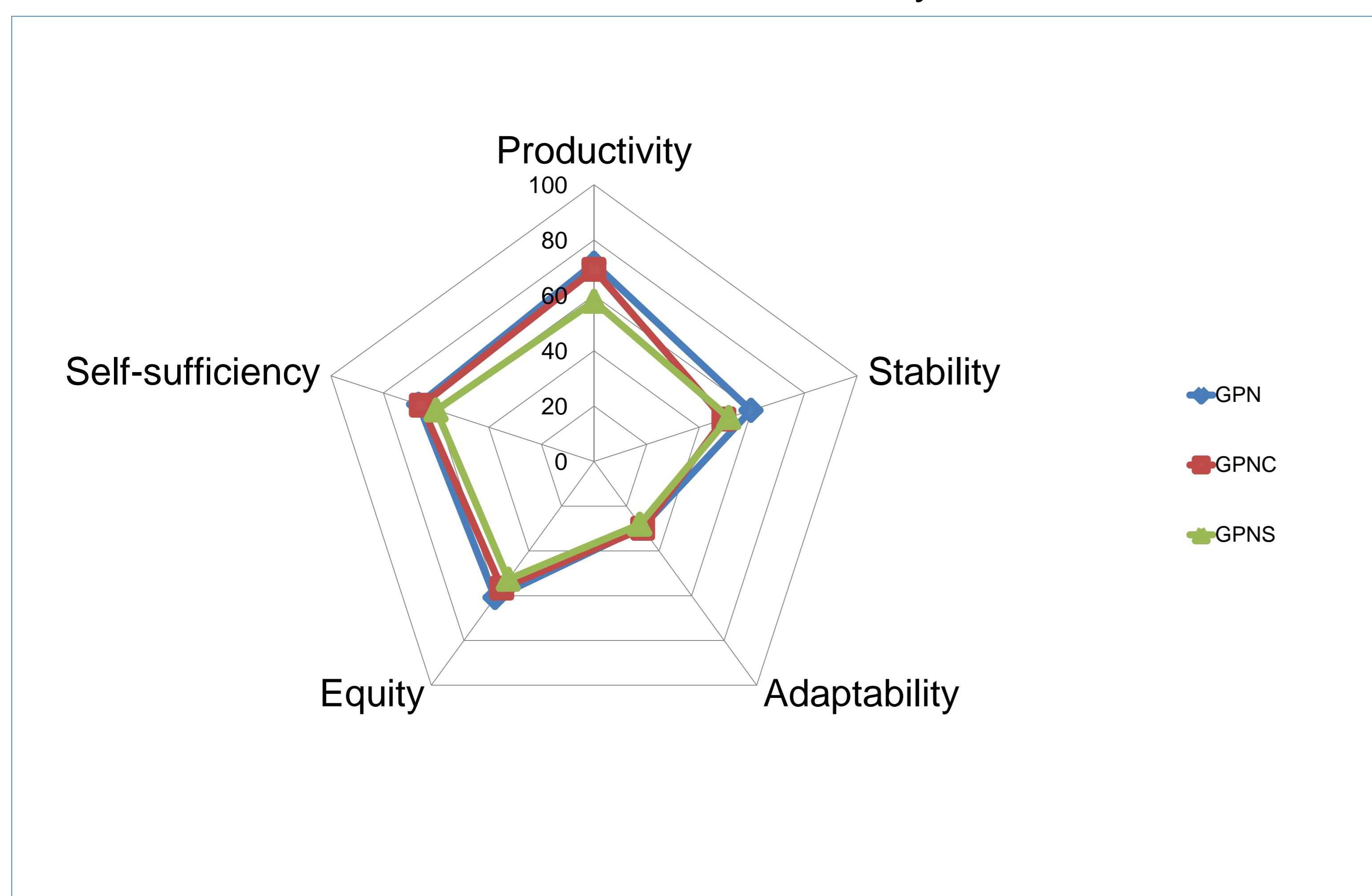
GPNS - family farmer with production system on natural pasture and soybean cultivation.

MESMIS EVALUATION

Stage 1	Definition of the systens	Family Farm Systens
Stage 2	Identification of the critical points	SWOT Analysis
Stage 3	selection of diagnostic criteria and indicators	13 sustainability indicators
Stage 4	Measuring of indicators	Direct survey 35 Farm´s
Stage 5	Integration of results	Threshold, reference values and indicators weighting

5 sustainability attributes

Statistical analysis

General characteristics of farms

Average area: 84 ha

Animal Units/ area: 0.7 AU/ha

Avarege Animal Units: 60 AU

RESULTS

Scores obtained for sustainability attributes

Avarege values os sustainability indicators for the three production systens.

Family production systen	GPN	GPNC	GPNS
Grazing height	25.0	20.0	21.5
Degradation level	27.9	33.3	29.2
Crop presence	18.7[a]	16.0[a]	7.1[b]
Succession	26.3	21.7	25.4
Heritage	0.4	0.6	3.1
Life quality	21.3	19.4	19.7
Source of income	11.7[a]	7.8[ab]	3.1[b]
Formation	6.9	8.1	7.1
Participation	22.6	21.9	21.0
Production systen	62.9	57.7	54.0
Land Ownership	35.0	28.9	23.1
Financial autonomy	20.0	24.4	23.1
Supplementation use	13.3	14.4	13.8

($p < 0.05$)

CONCLUDING REMARKS

- There were no significant differences between the three production systems, to the attributes of MESMIS. We found significant differences in the indicators "Crop presence" (productivity) and "Source of income" (stability).

- The three systems presents income from Other Activities, but GPNC and GPNS are high values reflecting the appreciation of the grains in the market. The Crop presence indicator (productivity) considers the team and percentage of crops in the production system. The GNP had better results by having a lower percentage of crops in the system.

- Although there is no statistical differences in MESMIS sustainability attributes, significant differences in the indicators are representative and point to a greater or lesser sustainability for the systems, in different ways.