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Modelisation of work organisation of livestock farms to simulate changes

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S.27 "Methods to assess LFS dynamics: adaptive strategies to changing socio-economic environment – 26/08/2009"

1. Introduction

1.1. Labour : a brake on the setting-up and maintenance of farms

↘ Family labour

↗ Salaried workforce, collective forms of farming and work

Enlargement of the farms

Problems of workload

New aims in terms of quality of life or improved productivity

Need of tools and methods to assist farmers in the process of changing their system

1.2. Work models

Work models (Work Assessement, Atelage) developed by livestock researchers

Based on same foundations (Madelrieux and Dedieu, 2008) :

- the farmer is a work organiser as well as a worker

-The tasks are not equivalent; the workers are not equivalent

- The work organisation at the scale of the year results from the linking up of periods whose organisational characteristics are different

=> The ‘Work Assessment’ method **quantifies** the work with the herds and lands and estimates work durations and time flexibility for farmers.
=> The ATELAGE model describes and **qualifies** the work organisation with its various regulations and time scales, integrating the other activities – economic or private – that farmers can carry on.

↳ Differences in taking into account the duration and the rythms of the tasks, the regulations of the work organisation and the non agricultural activities

↳ No simulation of technical changes or workforce changes

How to unify the concepts used, and also to take into account in a same model the quantification and the qualification of work organisation.

1.3. Objectives

To build an ontology about work organisation on livestock farming systems (farm level)

A step to design a Database or a Decision support system

2. Material and method

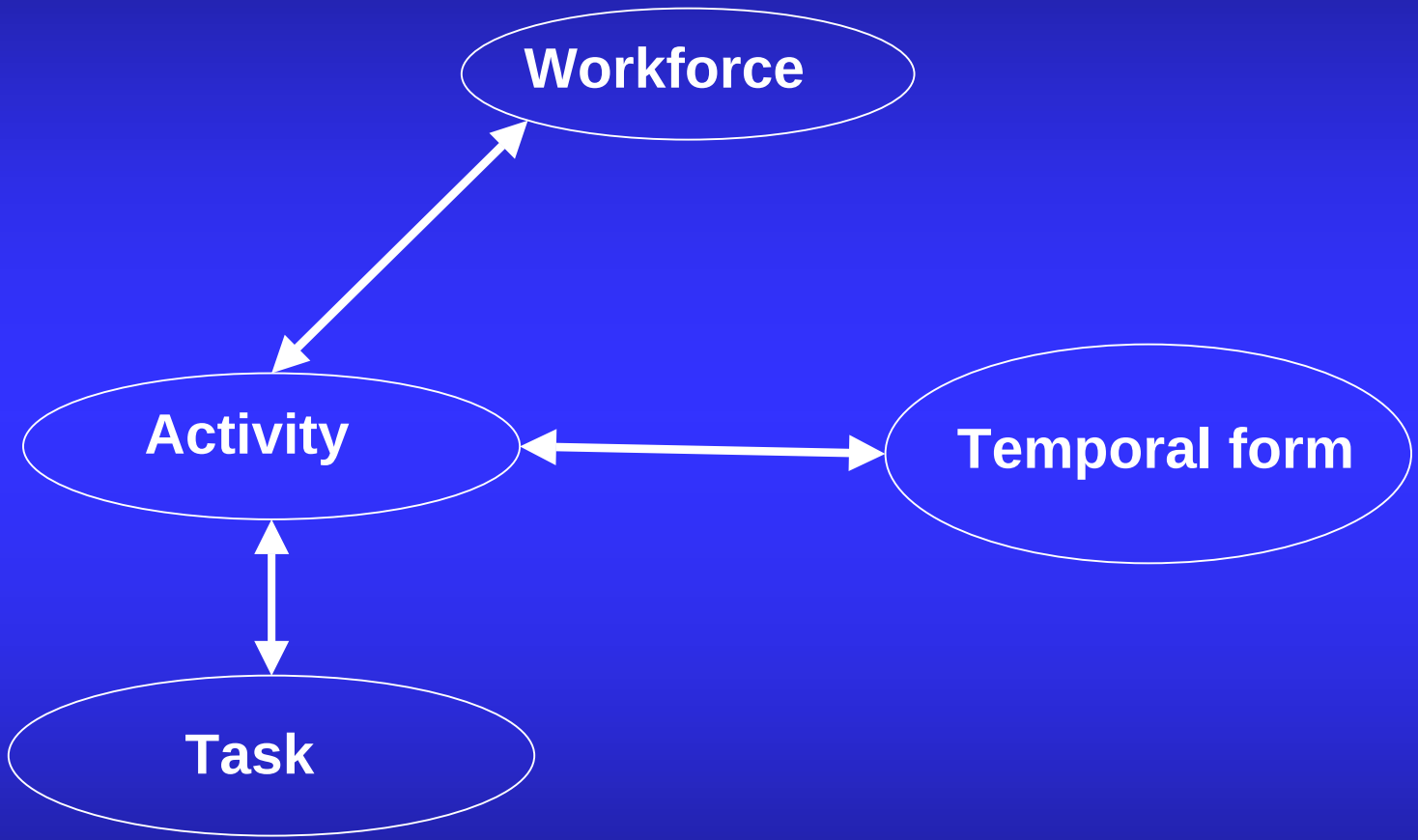
Steps to build the ontology :

- expert knowledge and literature
- list of all terms used
- organisation of the terms into a hierarchy
- writing of a DataBase application using an iterative process

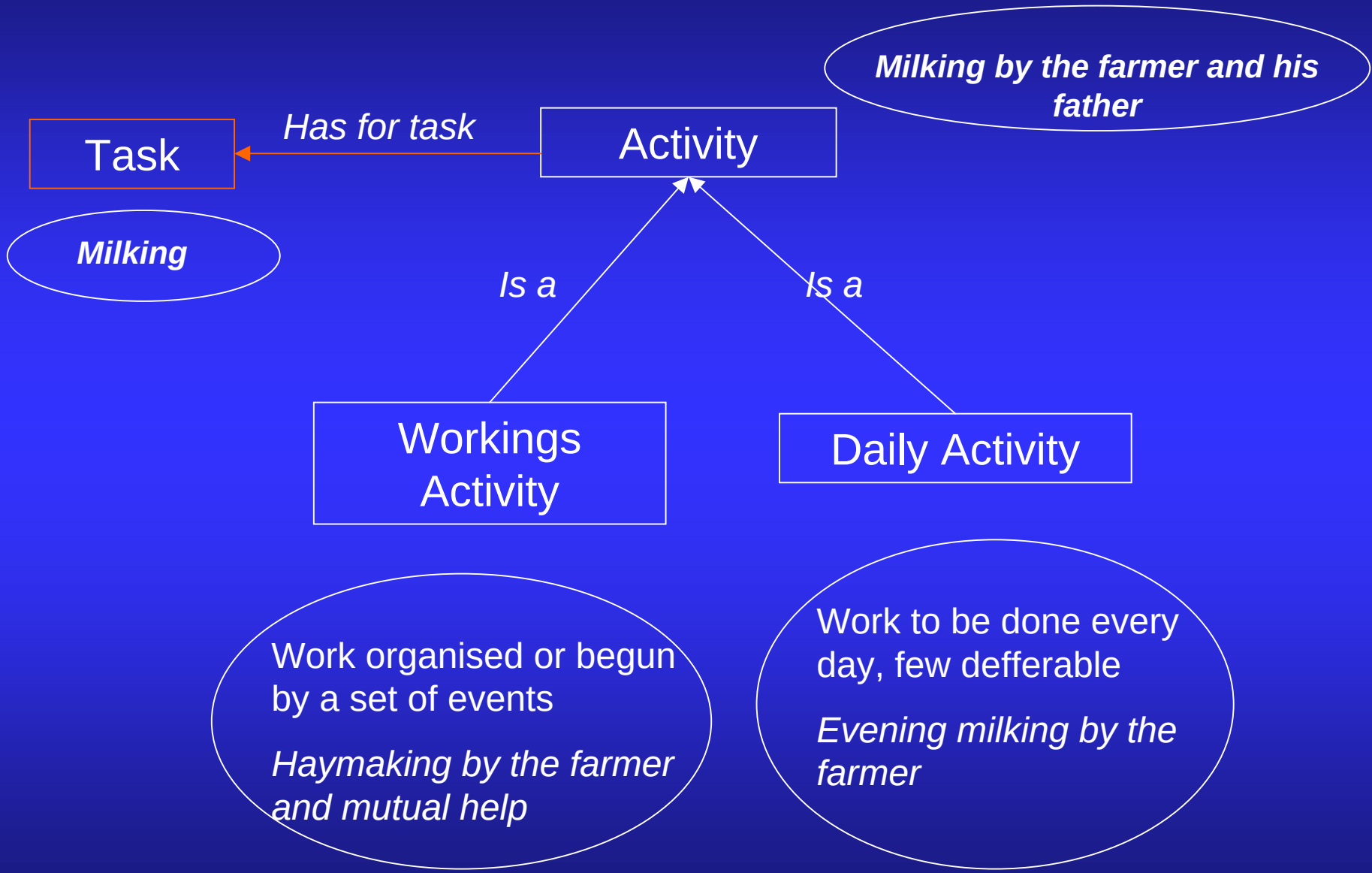
Framework used : Protégé Frames

3. Results

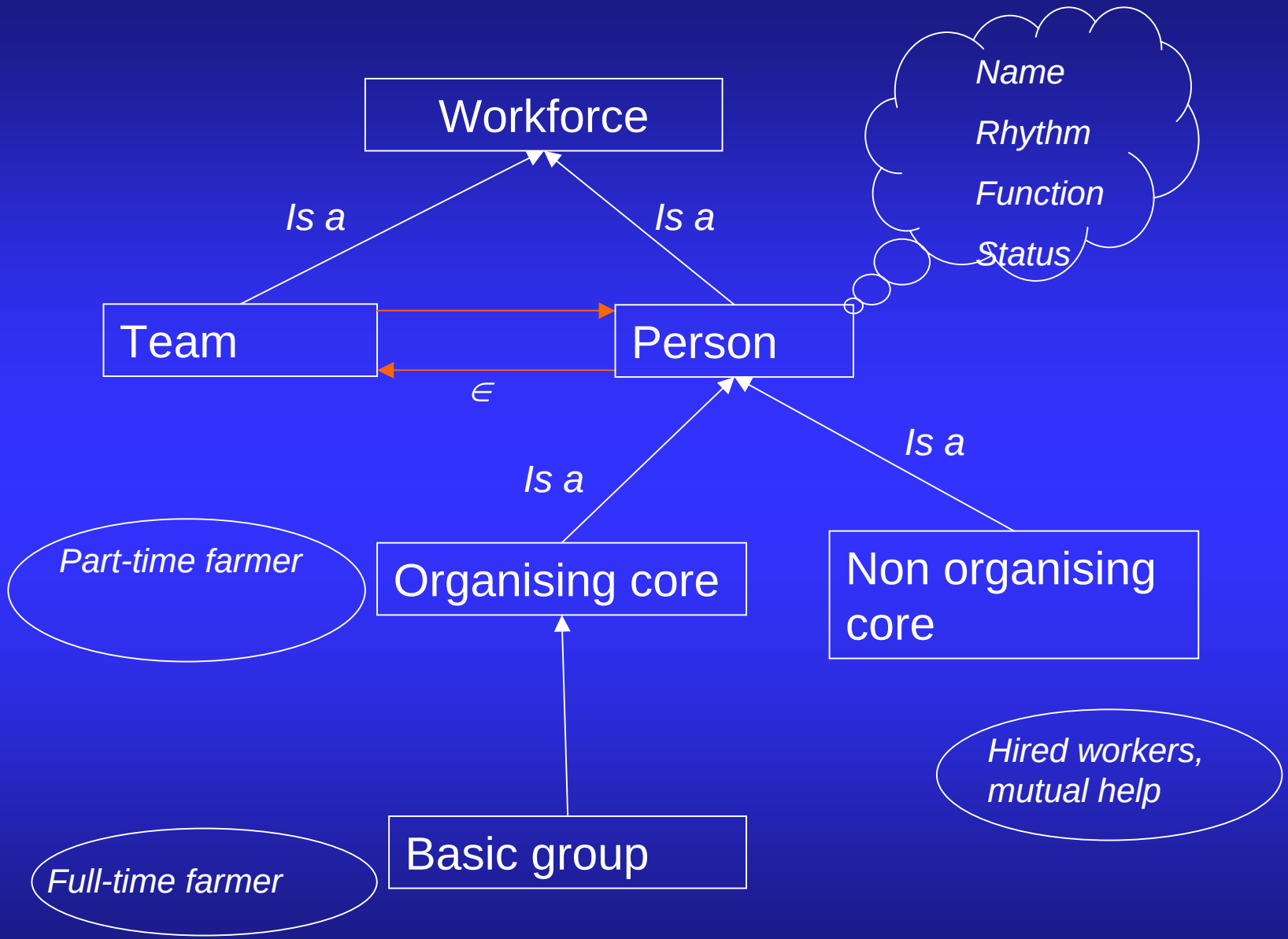
3.1. Structure of the ontology



3.2. Activity and Task



3.3. Workforce



3.4. Temporal form

Temporal form = pattern

Defined at 3 scales of time :

- Day : relationships between the daily activities

« milking the cows by the farmer and his wife, then feeding the herd by the farmer, and cleaning the cowshed by the hired worker »

The same daily activities and the same type of relationship between daily activities.

Relations between daily activities managed by Allen's relations and allow to define concomitant, successive activities, etc.

Associated to hours

Changes of daily activities change, relationships or hours

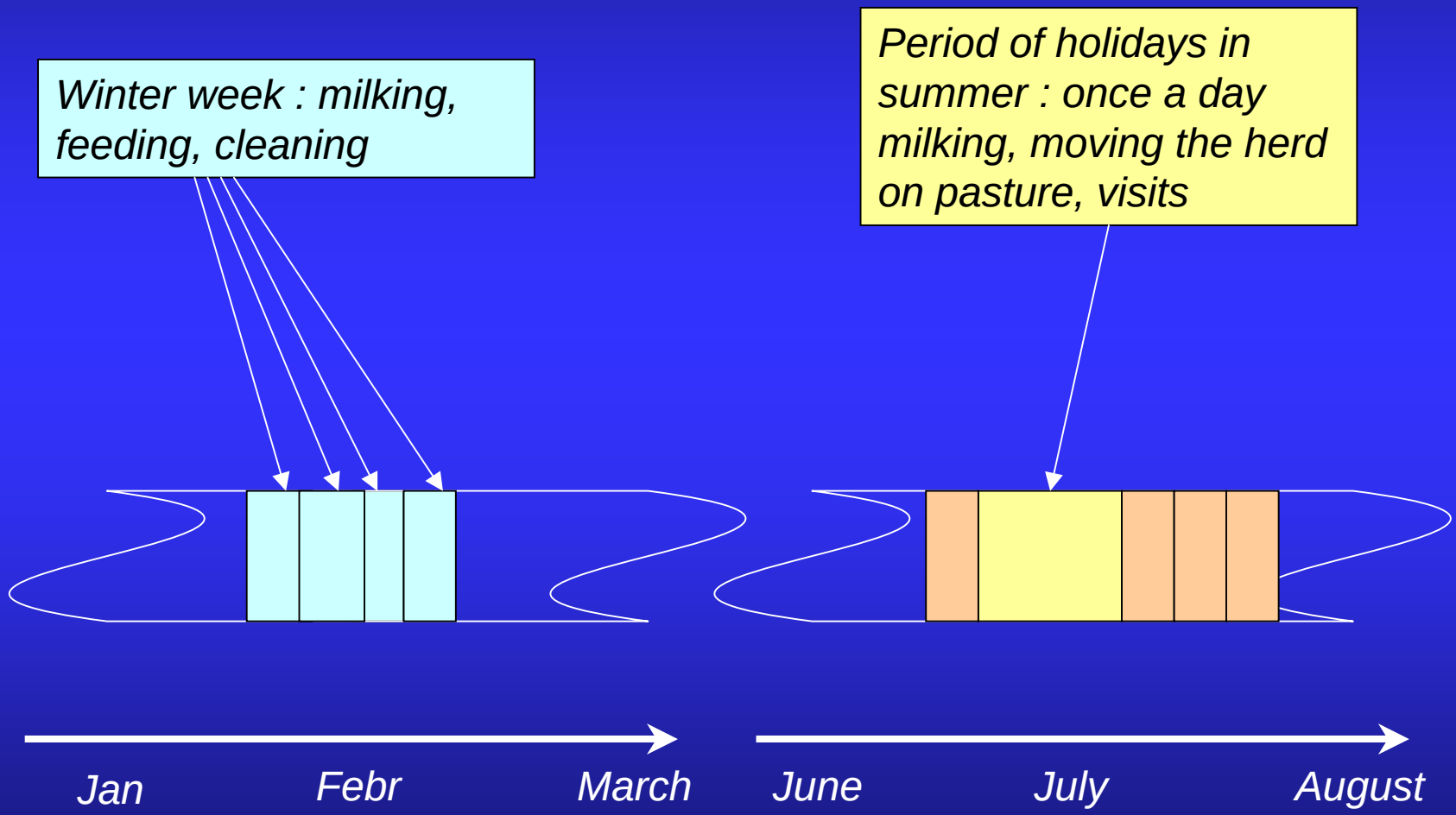
3.4. Temporal form

- Day : relationships between the daily activities

- Week : weekly organisation

- Period : several weeks or months; homogeneous in term of daily activities and workforce.

An example of temporal form



4. Conclusion

- Iterative process to design the ontology
- Improving the ontology taking into account buildings and equipment, farm territory (plots and distance)
- Valid for ruminants, pigs and poultry farms. Specialized farms or not;
- It was tested and implemented on a Database (Access), based on a farm survey

DataBase, step to build a framework :

- indicators of work organisation on livestock farming system and constitute then a basis to elaborate references

- used to assess scenarios of changes on farms (development of grazing, employment of hired worker...)

Thank you