AGROFORESTRY SYSTEMS OF HIGH NATURAL AND CULTURAL VALUE IN EUROPE CONSTRAINTS, CHALLENGES AND PROPOSAL FOR THE FUTURE

reno G, Berg S, Burgess PJ, Camilli F, Crous-Duran J, Franca A, Hao H, Hartel T, Lind T, Mirck J, Palma J, Pantera A, P JA, Pisanelli A, Rolo V, Seddaiu G, Thenail C, Tsonkova P, Upson M, Valinger E, Varga A, Viaud V, Vityi A

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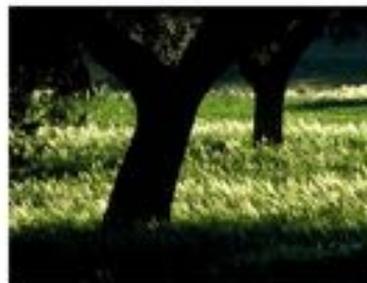
V FARMS: Farm types and **landscapes** valuable for biodiversity,

ey are managed at **low intensity** and that retains **semi-natural vegetation**.

ROPEAN HNV AGROFORESTRY include: Wood pastures (grazed), Meadows with scattered trees, Bocage and other saic-like farmed landscapes

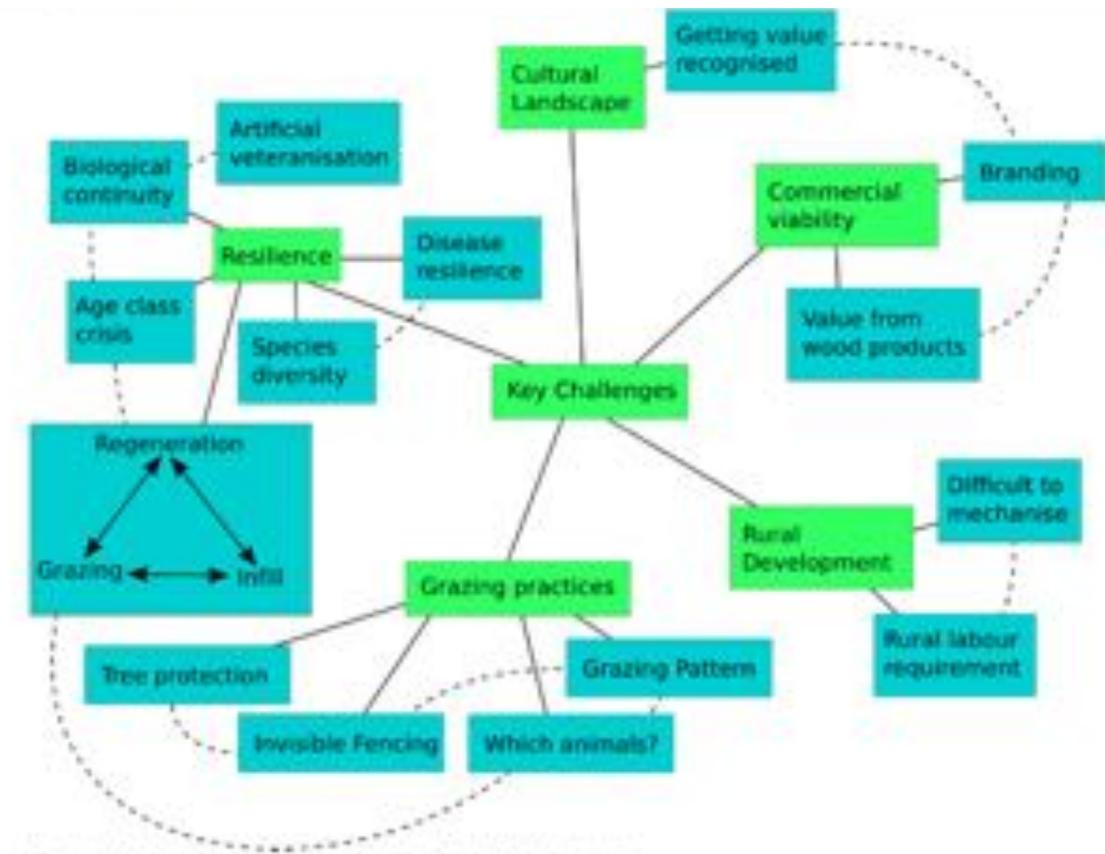**SEMINATURAL LANDSCAPES, but farmed**

Rationale

COMPLEX SOCIO-ECONOMIC and ECOLOGICAL CONT[...]

[...]hough ecological and socioeconomical [...]ntexts vary enormously among [...]gions, European agroforestry systems [...]re a common challenges, [...]e low economic profitability [...]cause they are usually relegated to less [...]oductive lands.

Mindmap of issues raised in the initial discussion of stakeholder group in U.[...] illustrate the multiple constraints and challenges of European wood pastu[...]

Rationale

LOST OF TRADITIONAL PRACTICES

...y are currrently threatened by either

...nd intensification, what causes progressive lost of trees

...xtensification/abandonment, what results is an excessive

...k and lost of their potential productive.

rticipatory research project across Europe was conducted to identify main constraints, key challenges and poten vations to improve the resilience and reinforce their economic profitability and provision of ecosystem services

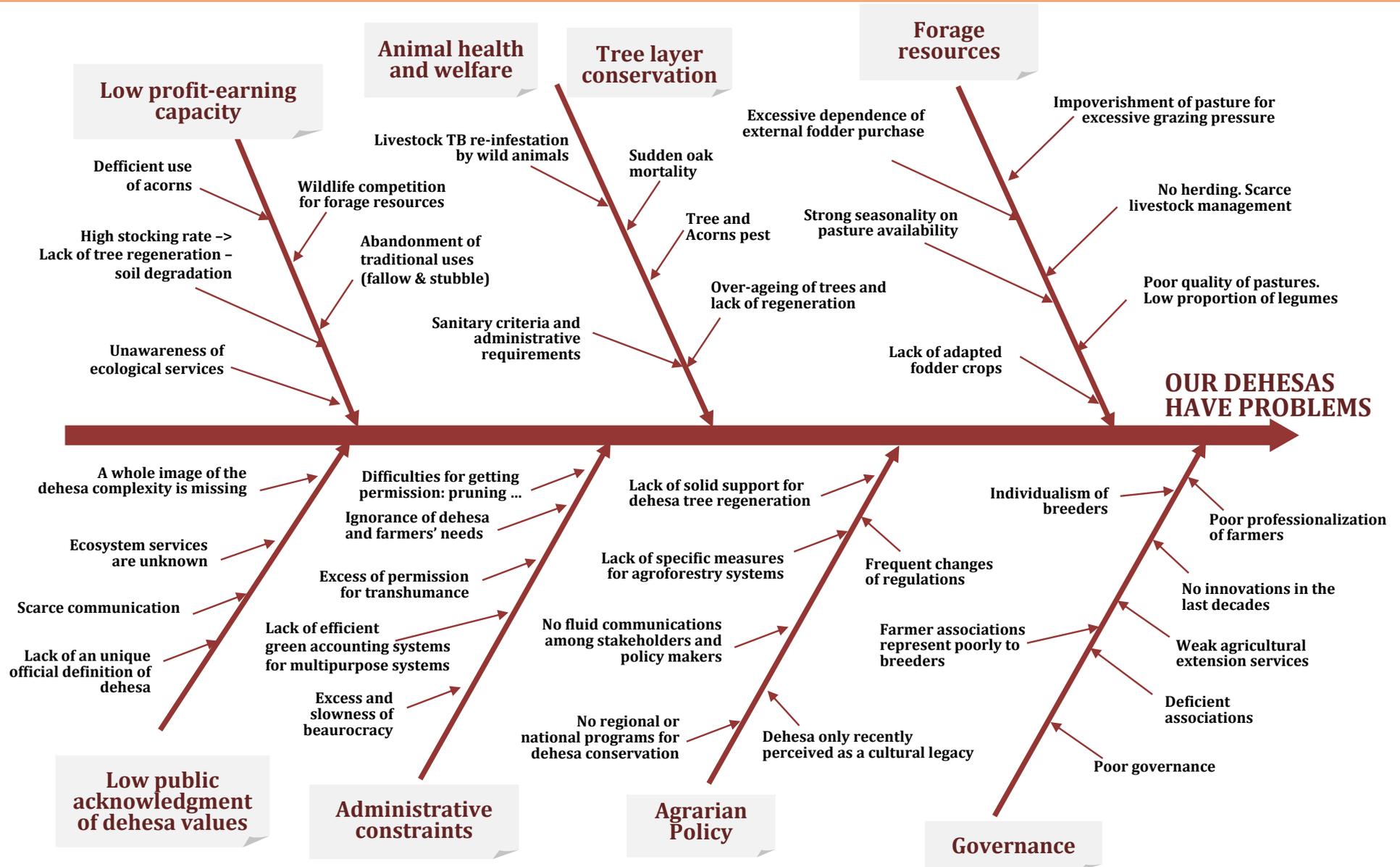national stakeholder groups (N= citipants): farmers, NGOs, companies, vate and public technical staff, consumers, earchers and policy makers.

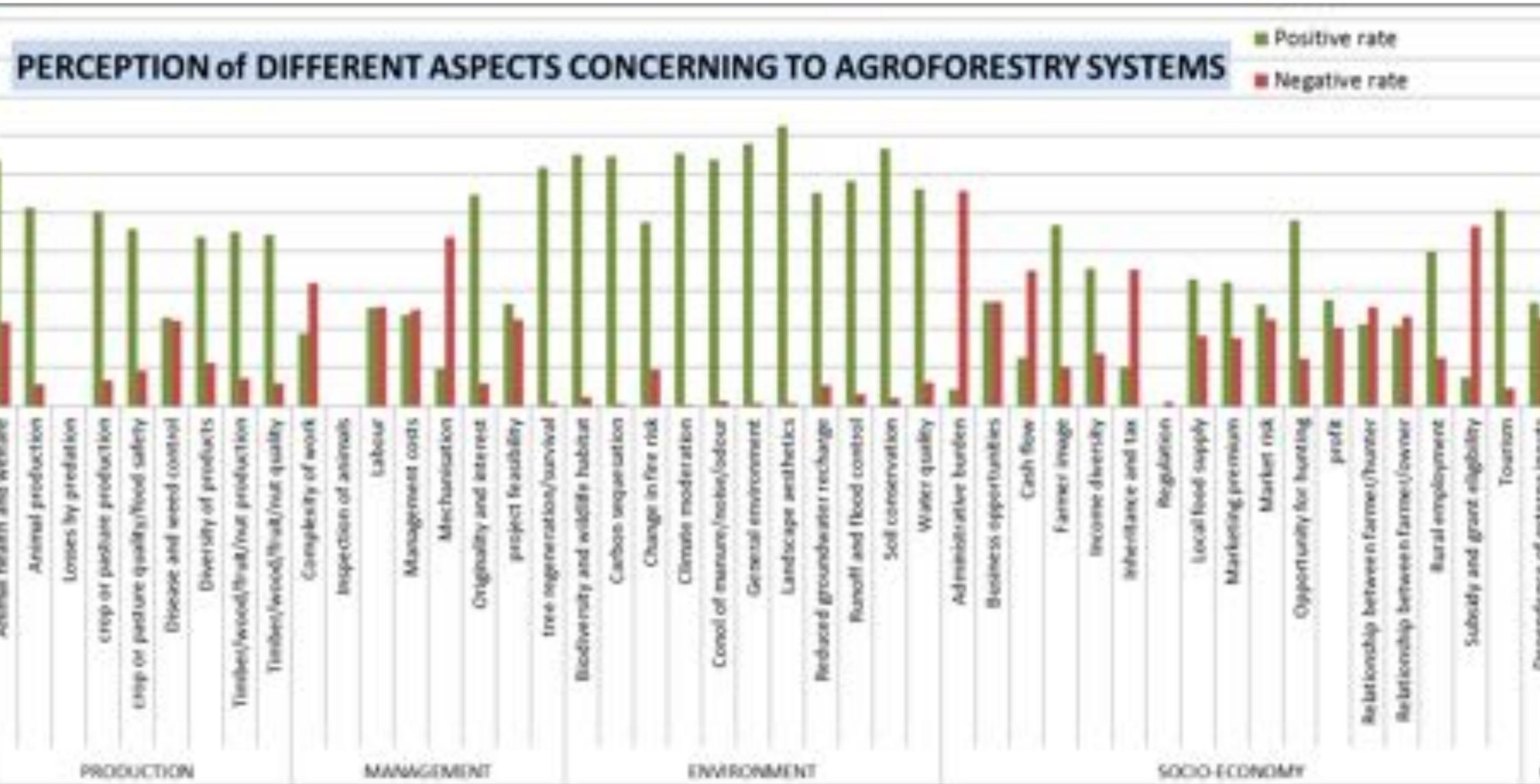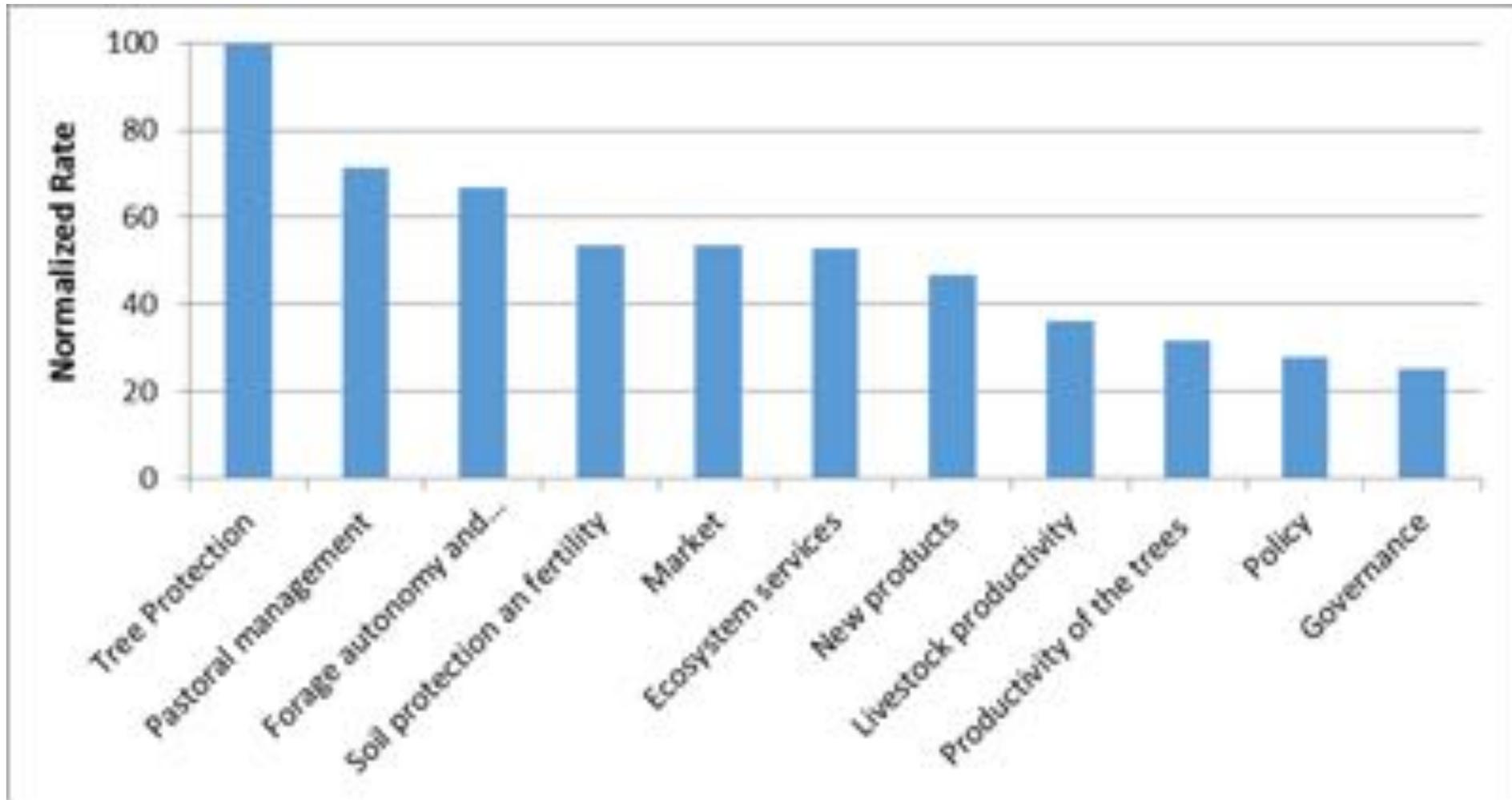discussion and face-to-face interviews, with -structure questionnaires were held in .
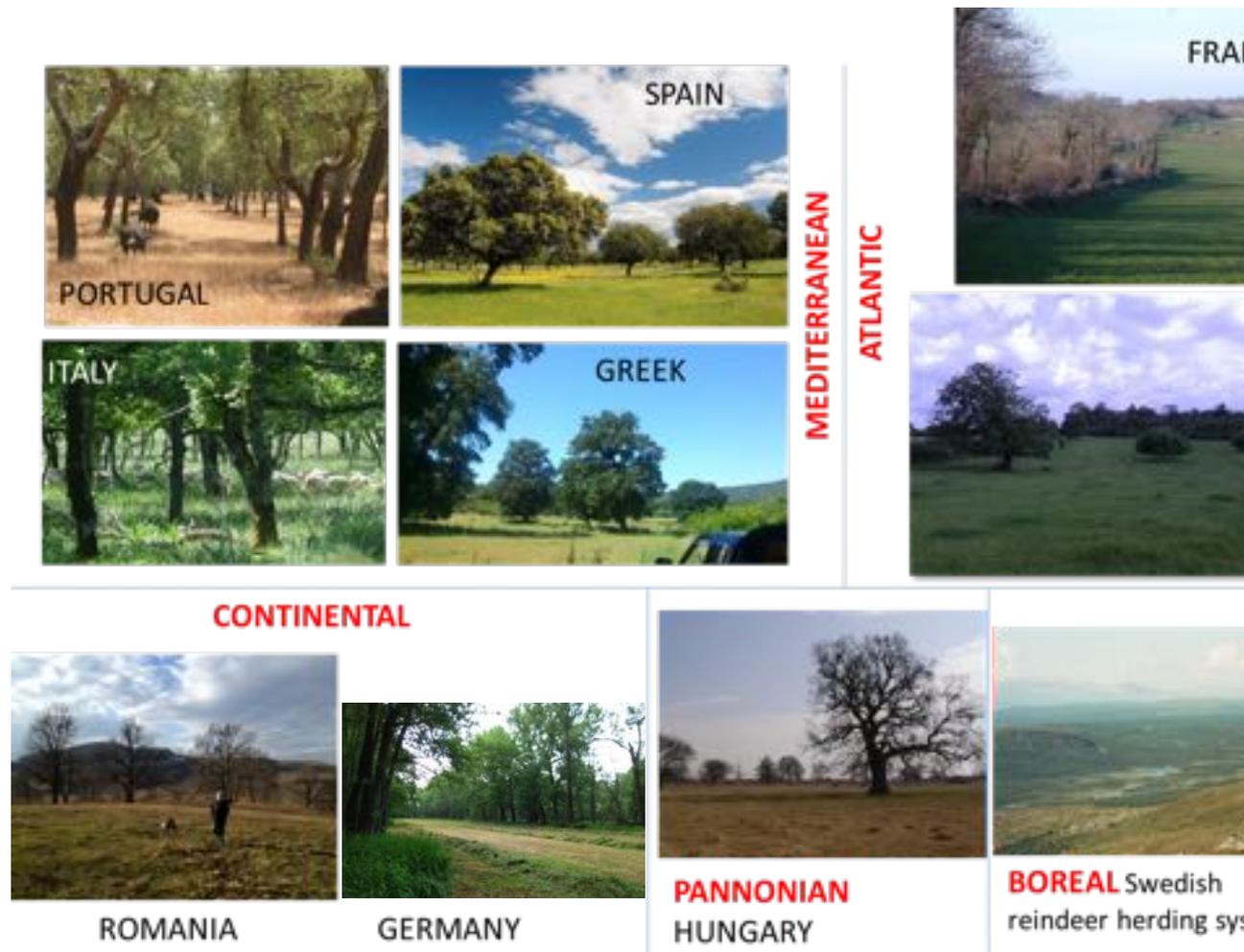
Work route

Fishbone or Ishikawa diagram that summarizes main constraints for Spanish dehesas identified by stakeholders

PERCEPTION of DIFFERENT ASPECTS CONCERNING TO AGROFORESTRY SYSTEMS

- Positive rate
- Negative rate

QUESTIONNAIRES: EVALUATION OF SERVICES AND DISSERVICES FO AGROFORESTRY

Work route

QUESTIONNAIRES: PRIORITIZACION OF POTENTIAL INNOVATIONS

Work route

ACE TO FACE DISCUSSION: AGREEMENT FOR FIELD TEST OF INNOVATIONS PROPOSED

Main Concerns and Challenges

Low profitability of HNCV as a key constraint for the future sustainability.

New system design and management for new challenges and socio-economic context.

To reconcile grazing livestock with tree layer conservation and regeneration

More efficient use of local forage resources to increase the fodder autonomy of the farms.

Cost efficient herding, including technology to improve the efficiency of herding.

Animal production and Livestock health in extensive semi-natural systems.

Conservation of non-productive features, veteran trees and tree species diversity.

Public acknowledgment of the cultural value and the ecosystem services provided by HNCV agroforestr

Extension was seen as critical issues in southern countries.

Maladapted policy measures for extensive and multipurpose HNCV agroforestry.

ough most of stakeholder groups acknowledged the importance of ecosystems services provide
CV agroforestry, they demanded mostly research focused to solve their daily management probl
to increase their profitability.

Country	System	Main concerns
Portugal	Montado: grazed open oak woodlands	Possible negative consequences of shrub encroachment woodlands on cork yield and quality
Spain	Dehesa: grazed and intercropped oak woodlands	Low profitability, marked seasonality of fodder resource and deficient tree regeneration
Italy	Grazed oak woodlands in Sardinia	The lack of forage availability and quality
Greece	Grazed valonia oak woodlands	Oak regeneration and poor pasture understory yield/ quality
France	Bocage agroforestry in Brittany (hedgerows integrated with grassland and arable land)	Decrease of hedgerow density and their reduced importance in farming management and ecological serv
UK	Wood pasture and parkland	Re-instituting tree management, balancing the preventi of infilling with natural regeneration
Romania	Grazed wood pastures and grasslands with ancient non-productive trees in Transylvania	Conservation of veteran non-productive trees and of tr species diversity. Need of economically and socially viable strategies to increase tree regeneration
Germany	Flood plain meadows with tree hedgerows	Hedgerows abandonment Lack of interest of farmers for trees
Hungary	Grazed wood pastures and grasslands with ancient non-productive trees	Infilling of abandoned wood-pastures, and lack of publi awareness of their nature and cultural values
Sweden	Wood pastures and grazed forests devoted to reindeer husbandry	Adaptation of forest operations to reindeer husbandry

The way forward: Innovations proposed

m profitability

anding better HNCV products: improving knowledge of customer
d tax-payer interests.

oduct diversification. Surveys to assess the willingness to pay a
emium price for agroforestry products.

uality of tree products.

m design and management

sign and management of the system to new multiple practices:

veloping modular models of hedgerow systems

novative tree species which can resist livestock.

vestock management: species, races and stocking rates.

rotection and regeneration

otecting trees: Wide range of methods for protecting trees from
estock.

s browser livestock races

azing calendar

re quality

dder crops: e.g. legume-rich pastures and winter forages
apted to shade.

apted silvicuture: e.g. selection of forage tree/shrub species

. **Grazing systems and cost efficient herding**
  - Selection of specific livestock breeds
  - Holistic grazing (intensive fast-rotational grazing)
  - Location of facilities (e.g. watering points, suppleme
    fodder, salt)
  - GPS collar technology and "invisible fencing"

. **Animal production and Health**
  - Control of access to water points and supplementary foo
  - Design of hedgerows to improve shelter

. **Nature conservation**
  - Choice of livestock species and breed
  - Methods for fire control
  - Improved understanding of the effects on soil carbon
  - Methods of soil protection

. **Extension**
  - The use of pilot farms
  - Encouragement of local state officials in extension activit

. **Policy and governance**
  - Payment for historical landscapes
  - New co-operative models for developing agroforestry

novations for HNV agroforestry: some examples

stem design, renewal

aptations of forest management to promote better conditions for reindeer husbandry: soil scarification, planting with Lodgepole Pine, more and harder pre-commercial thinning and thinning, and forests with ger rotation periods in some areas

ree-dimensions adaptive design and management of hedgerows to promote ecosystem services (by mparing different bocage structure: age, density, size of hedgerows)

newal of hedgerows, with valuation of the potential of harvested biomass and different harvesting ethods to finance new tree protection

Legend: Plantation...
... on flat ground
... in double-line
... on bank made with forest plough
... on bank made with excavator
... on old bank

novations for HNV agroforestry: some examples

tegrating grazing livestock with tree layer conservation and regeneration:

t-efficient protectors for tree regeneration, included virtual fencing and GPS-based devices, and managem
ctices compatible with tree regeneration.

st-efficient methods for tree regeneration
razing exclusion
ursery shrubs
atural protectors (pruned branches)
rtificial wire thorny shelters
hemical organic repellents
esign of comprehensive strategies (social participation)

ture quality / Fodder Autonomy	Grazing schemes. Cost-efficient Herding
rcome strong seasonality of "natural" forage resources: *ume rich permanent pastures; Woody Forage Banks*	Cost-efficient herding. Technology: Invisible fencing; GPS tracking; Multipurpose GPS collar
ease pasture productivity and quality	More efficient and even use of extensive forage resources
oration of degraded pastures / disturbed areas	Livestock species
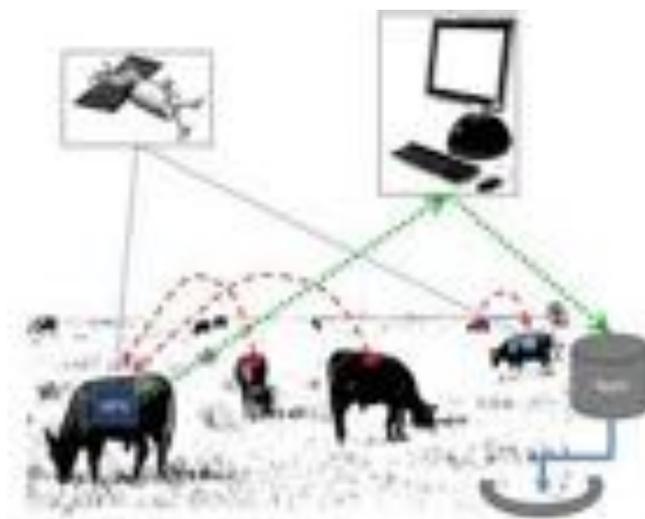
PASTOREO ROTACIONAL

art GPS collars

al fencing & Remote shepherding (negative
ulation: ultrasonic and electric signals)

ection of regeneration (inexpensive RFID (Radio
uency IDentification) tags)

tock Diseases Control (e.g. transmission of tuberculosis
ild ungulates and animals such as wild pigs that cohabit
livestock) by keep the domestic animals from drinking
e same ponds as the wildlife.

al reproductive males without human supervision is
a demanded functionality provided by the collar, since
ngs will be detected, recorded and transmitted to a
ote server storage.

novations for HNV agroforestry: some examples

luing traditional and new marketable products:

nding strategies to communicate to consumers the high quality
l low (or positive) ecological footprint of wood-pasture products.
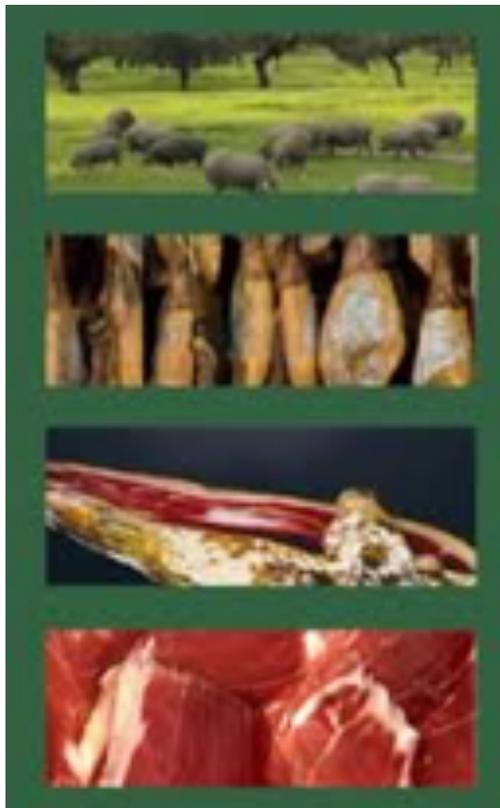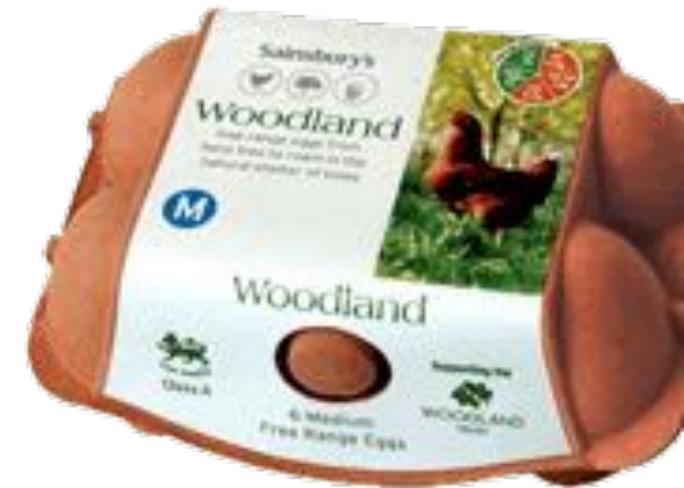
ONCLUDE & GO FORWARD

- Elaboration of innovative techniques for the long term production of timber and non-timber agroforestry products;

- Integrated analysis of economic and environmental values to incorporate recreational and ecosystem values in public policy;

- Modeling and predictive tools to create integrated systems of support for decision making;

- Elaboration of policy proposals to reinforce the public environmental goods and services provided by agroforestry of high nature and cultural value; and

- Development of effective institutions and governance structures to help value and manage silvopastoral systems.

THANK YOU