

Cornelia Parisius

German Aerospace Center (DLR)  
Project Management Agency  
European and International Cooperation

Heinrich-Konen-Str.1  
53227 Bonn, Germany

**Project Acronym**

CAMED

**Full Project Title**

Roles of camel breeding in modern Saharan societies: contributing to their adaptive capacities face to global changes

**Call Identifier and Research Question**

RQ4: Societies/Ecosystems and Environment - Funded by all participating funding agencies, except: STDF and ASRT Egypt, CNRS-F France.

**Type of Activity**

Collaborative Innovation Project

**Cross cutting Issues**

Governance

**Main Keyword**

Climate, Environment, Sustainability -> Climate, Climatic protection, global change -> Research for Protection against Climate Impacts and adaptation to global change [FA03]

**Keyword 2**

Climate, Environment, Sustainability -> Ecology, Nature Conservation, sustainable use -> Obtaining and managing resources, resource substitution [FD12]

**Keyword 3**

Humanities, Economics & Social Sciences -> Humanities -> Cultural sciences [PA02]

**Keyword**

Camel system; Saharan societies; Rangeland resources management

**Start Date**

01-02-2017

**End Date**

31-01-2020

**Duration**

36

**Participation**

no

### Project Summary

The Mediterranean agriculture systems have known increasing pressures that include demographic growth, urbanization, increasing demand for high value products, and a high competition for land and water. Besides some vulnerable zones in inland knows a dramatic departure of their active labor forces through migration that induces important changes of the global social and natural functioning of these zones. This is particularly relevant in arid and desert lands of south Mediterranean countries where the traditional societies used to explore and valorize vast uncultivated arid lands thanks to original livestock systems based on camels and small ruminants, grazing systems and mobility, and kinships links to manage common resources in their spatial and temporal dimensions. In particular, the system based on camel system at the interaction between oasis and desert lands has known radical functional changes over the last decades, due both to the urbanization and modernization of living conditions in the oasis and also to the intensification (or, sometimes, extensification) of the crop systems in these fragile environments that raise many challenges and also risks that can impede their durability. So the proposed project aims to describe, understand and model the past and recent trajectories of these “camel societies”, identify the main drivers (factors) that impact the combined social dynamic and ecosystems processes on the use of resources, in order to propose socially driven solutions emerging from the societies to sustain human activities and their local resources.

The project CAMED proposes (i) to describe the past and recent trajectories of the societies based on dromedary system in Saharan zones of Algeria and Morocco (WP1) using holistic and systemic approaches (system approach at the community/territorial level and livelihood approach at the family level), and (ii) to analyze the present impacts of social and cultural changes and ecosystem dynamics on the whole socio-ecological systems (WP2) based on longitudinal and diachronic approaches at the farm, herd and resource system level. Along this process the research will have to determine critical key-pathways where sociocultural changes (WP1) affect radically ecosystem changes (WP2) and vice versa. The impact analysis in (WP3) will be based on the participatory impact pathway approach that will associate all the stakeholders of the local communities and policy-makers. The objective is to draw socially driven solutions. Some pilot projects related to value chain and resource management at the territorial level have been pre-identified. One important component of the project will be to provide research and development trainings (WP4) and share a common knowledge on these zones that are characteristics of the South Mediterranean countries. So this project proposes to combine systemic and holistic approaches, often used separately in human or natural/biological sciences, within selected socio-ecosystems related to camel society that have been little studied before. The goal is to share common scientific and indigenous knowledge between research and society related to these systems and to propose relevant actions for decision makers related to these zones that cover more than one third of the selected countries (Algeria and Morocco).

### project consortium

A: I confirm that this proposal is only submitted in this research question of the ERANETMED Call

### If B: Indicate explicitly how the proposals differ:

### If C: Summarize briefly

### Financial resources

No

### If yes, please specify

### confirm

I confirm that the information given in this proposal is correct.

**confirm**

I confirm that the proposal is endorsed by all project partners.

**Background, Questions and Objectives**

Overall objective:

The Mediterranean agriculture systems have known increasing pressures that include demographic growth, urbanization, increasing demand for high value products, and a high competition for land and water (with encroachment or grabbing) (Dixon et al., 2010). Besides some zones in inland knows a dramatic departure of their active labor forces through migration that induces important changes of the global social and natural functioning of these zones. This is particularly relevant in arid and desert lands of south Mediterranean countries where the traditional societies used to explore and valorize vast arid lands thanks to original livestock systems based on camels, grazing systems and mobility, and kinships links to manage common resources in their spatial and temporal dimensions (Duteurtre et Faye, 2009). So the proposed project aims to describe, understand and model the past and recent trajectories of these “camel societies”, identify the main drivers that impact the combined social dynamic and ecosystems processes on the use of resources, in order to propose socially driven solutions emerging from the societies to sustain human activities and their local resources.

Background and problematic:

The camel and palms are the two main pillars of the north Saharan and oasis agrarian systems (characterized with an average rainfall <100 mm per year). These systems have multiple functions, even if the specific roles of dromedaries have changed over the centuries: from functions of pack saddles, transportation, and military (Naylor, 2006) to more recent functions of food security with meat and milk valorization. Farmers have always practiced extensive-use of the resources (vegetation and water), in view of their dispersion and scarcity. In the past, the oases were important trading hubs allowed by the abilities of camels to ensure transportation and then the synergies and kinships between settled and nomad societies (Battesti, 2005; Senoussi, 1999). The first changes have been the development of palm trees in the rain-fed areas “bour” by camel breeders, and then the development of motorization in the 19th century, with its collateral effects: urban development, demographic growth and settlement of nomad societies (Senoussi, 1999). From the 1960s, most of the camel society was settled and practiced crop systems. These changes have generated new mobility practices, according to the available plant resources and access to wells. Nowadays, the life-pattern in a tent is exceptional and it is observed a diversification of economic activities that shape the household livelihoods, such as non-agricultural activities (petty trade, long distance trade, transportation, and salaried employment in mining or industry).

Over the last two decades, national plans have been developed and the camel herd has sharply risen to reach around 500,000 heads in Morocco and Algeria countries (FAOSTAT, 2016). New economic functions (mainly meat and milk) know a recent development. Beyond these changes, camel breeders have indubitably shows abilities of adaptation (both technical and social) to maintain their system and even grow (Dedieu et al., 2008). Nowadays, the urgent questions concern the impacts of these changes on the sustainability of these socio-ecosystems considering their vulnerable resource-base. The recent market logics related to camel products may induce rapid adjustments regarding resources access and use and the overall regulation of the grazing ecosystem. We can already see some camels grazing rangelands along the roads (where milk is sold to passengers) that have turned into barren lands. In all these changes, there is also a need to consider the new social aspirations of the young generation. In summary, these zones will know important coming changes related to the climate, the globalization and commoditization of exchanges and the local changes in link with resource distribution and mobility practices (Faye, 2016).

Research Questions:

Our project proposal aims at understanding the key-factors of dynamic of these socio-ecosystems by addressing specific questions: What are the evolutions of strategies and practices of these camel systems and their diversity in terms of functioning (notably in the interrelations between the society and ecosystems)? Are these recent dynamics of these systems induced by social and economic factors able to combine the local knowledge (and expertise) with emerging practices? Are they able to maintain the multiple functions of the grazed ecosystems and their resilience to climate hazards? What can be the tensions or contrary the

factors of agreement that can emerge from these new models? How the social-driven changes due to rural exodus (migration), modernization that change household composition and decision making process and camel products' demand can affect these new social and technical trajectories of camel breeding?

Main stakes of the project:

This proposal raises stakes and challenges of rural development for policy makers in terms of reduction of rural exodus (and controlling national migration towards coastal zones and cities) and in terms of food security knowing the recent success of camel meat and milk at the country level (and then source of protein). From a scientific point of view, the camel systems in terms of production and their spatial behavior in free driving are still insufficiently explored. Additionally, few research studies have addressed the various forms of marketing of these products that are still in an early-stage of organization (Faye et al., 2014.). More generally, the socio-economic and ecological contribution of these systems in terms of products and services at the different local scales has not well investigated to allow to local and national stakeholders, to elaborate coherent and sustainable actions for these zones. Therefore this proposal aims at providing a statement of the diversity of these systems and their trajectories over the last decades in order to approach their contribution to the duration of these fragile ecosystems. The project proposes to consider the major changes (social, economic and technical) that have affected these environments over the last decades knowing the roles of camel breeding in the occupation and management of rangelands (The Sahara desert represent around 8,000,000 km<sup>2</sup> and cover 10 countries); roles that have not been sufficiently addressed by research, and development and public policy makers. Moreover, the research and action of new sustainable and productive alternatives in remote zones become more and more strategic.

References:

- Battesti V., 2005. Jardins au désert, Évolution des pratiques et savoirs oasiens, Jérid tunisien. Paris, Éd. IRD, coll. « À travers champs »,? 440 p.
- Dixon, J., Li, X., Msangi, S., Amede, T., Bossio, D., Ceballos, H., Ospina, B., Howeler, R., Reddy, B.V.S., Abaidoo, R., Timsina, J., Crissman, C., Mares, V., Quiroz, R., Leon-Velarde, C., Herrero, M., Blummel M., Holmann F., Peters M., White D., Qadir M., Szonyi J. 2010. Feed, food and fuel: Competition and potential impacts in small crop-livestock-energy farming systems, CGIAR Systemwide Livestock Program, project report. SLP, Addis Ababa, Ethiopia, 114 p.
- Dedieu B., Chia E., Leclerc, Moulin C.-H., Tichit M., 2008. L'élevage en mouvement, flexibilité et adaptation des exploitations d'herbivores. Ed. Quae, Coll. UpDate Science technologie, 299 p.
- Duteurtre G. et Faye B. (Coord.), 2009 : L'élevage, richesse des pauvres : Stratégies d'éleveurs et organisations sociales face aux risques dans les pays du Sud, Quae, Versailles, 286 p.
- FAOSTAT. 2016. [www.faostat.fao.org](http://www.faostat.fao.org)
- Faye B. 2016. The camel: new challenges for a sustainable development. Tropical Animal Health and Production. 48, 689-692.
- Faye B., Jaouad M., Bhrawi, Senoussi A, Bengoumi M., 2014. Elevage camelin en Afrique du Nord : état des lieux et perspectives. Revue de l'Elevage et de Médecine vétérinaire des Pays tropicaux. 67, 213-221.
- Moussaoui H., 2015. Biskra : Un cheptel de dromadaires décimé par une suralimentation de son et de farine. EL Watan publié le 05-009-2015.
- Naylor P.C., 2006. Historical Dictionary of Algeria. Ed. Scarecrow Press,? 396 p.
- Senoussi, A. 1999. Gestion de l'espace saharien en Algérie: symbiose ou confrontation entre systèmes productifs en milieu agricole et pastoral (cas de la région de Ouargla). Thèse de doctorate. University de Ouargla, 808p.

### Project Description

Main objective:

The proposed project aims to describe, understand and model the past and recent trajectories of the "camel societies", identify the main drivers that impact the combined social dynamic and ecosystems processes on the use of resources, in order to propose socially driven solutions emerging from the societies to sustain human activities and their local resources.

Concepts and methods:

Our unit of observation will be the whole camel system in its environment in order to consider the complex interactions between the society and resources, by focusing on the dynamic feedback loops in which humans both influence and are influenced by ecosystem processes. This approach will be based on the analysis of the human perceptions and representations of their past and future that will influence their practices and use of natural resources (MacAllister et al., 2006). However the end-use of resource varies in different farming systems due to families' diverse livelihood strategies and the resources base (Scoones, 2009). Maguire et al. (2008) have proposed a global framework to understand a community's vulnerability, resources and adaptive capacities that drive its response to change and this based on a process of collecting, organizing and analyzing information about and with a community. This means organizing elements which corroborate and promote a transversal and multidimensional view of the system and this at different scale.

Therefore, the scientific originality of the project will be to combine different disciplines (economy, sociology, anthropology, animal science and agro-ecology) in a common framework of diagnostic based on impact pathways approach to have an interdisciplinary approach of the impact of combined social dynamic and ecosystems processes. Preliminary to this approach, a data collection system at the herd, animal and land/vegetation level will be organized to feed the analysis on observed changes. The project proposes also to associate development agencies and policy makers at the first beginning of the project to enhance the impact of the project and more especially the design of socially driven solutions for these zones that will be considered early in the research investigation for data collection system. This process will be also based on the mobility of young scientists and stakeholders between the countries to enlarge their vision on the possibilities of social improvement of these vulnerable zones, notably between Morocco and Algeria.

Overall description of the project and the methodology:

In the first step, the project CAMED proposes (i) to describe the past and recent trajectories (from the 60ies to now) of the societies based on camel system in desert or arid zones of south Mediterranean countries (WP1) using holistic and systemic approaches and (ii) to analyze the present impacts of social and cultural changes and ecosystems dynamics on the whole socio-ecological systems (WP2) based on longitudinal and diachronic approaches, respectively at the herd and resource system scale. In these harsh zones, social network constitute a pillar of the management of human and natural resources and also to face collectively to the uncertainty of events. The new configuration of the society in these zones in link with the rural exodus, increasing market connection, change of lifestyles, expectations of the young generations, and, by extension, changes of norms and values, will have significant impacts on the future trajectories that will be analyzed in (WP3). Along this process the research will have to determine critical key-pathways where social changes (WP1) affect radically ecosystem changes (WP2) and vice versa. The impact analysis in (WP3) will be based on the participatory impact pathway approach that will associate all the stakeholders of the local communities and policy-makers. The objective is to draw socially driven solutions that are recognized and perhaps supported by the decision makers or local agency. It will also allow having a first quantitative estimation of the contribution of this sector in the selected countries. Some pilot projects related to value chain and resource management at the territorial level (see WP3) have been pre-identified based on rapid interviews of key-resource persons and camel breeders. One important component of the project will be to provide research and development trainings (WP4) and share a common knowledge on these marginal zones that recently interested policy-makers and deciders in terms of rural development.

Work packages, tasks and methodologies:

WP0: Coordination

The main objective of WP0 is to coordinate and to favor the exchanges between the research teams and between the research teams and the stakeholders on order to reinforce the common knowledge on these camel systems. The team of coordination will be responsible for ensuring compliance with deadlines for each WP and tasks. It will have in charge the internal and external communications of the project results and the coherent use of the budget to achieve the objective of the project.

Task 0.1: Project Coordination

This activity consists at supporting each team leader of WP and facilitating the exchange of information and data between the different WP, tasks and teams. The first activity will be to finalize a detailed task schedule that will be approved by all partners at the first beginning of the project based on the proposed timeline of tasks (Section C already discussed).

#### Task 0.2: Internal and external communication

In the first months of the project, the team will develop a CAMED logo, a chart of graphic for all documents, and a model for the guidance notes and information sheets. A website (D02) will be developed for internal communication between research teams and for the dissemination of information and results of the project to interested groups.

#### Task 0.3: Dissemination of the results

The consortium will be responsible for the organization of training and for the valorization of the results via scientific and extensions publications in national and international journals and regional participatory workshops (D03). Different trainings are already planned (see WP4). This task includes also prospective activities regarding the partnerships with private stakeholders and development institutions, to promote the development of local and national dynamics for these regions. Some additional funds will be sought during the project, mainly for fostering training through research (bilateral, thesis grant, etc.).

#### Task 0.4: Organization of workshops and meeting

The team will have in charge the organization of regular and annual meetings (D04). A final restitution of results will be planned and organized as a session of an international conference (The International Society of Camelid Research and Development - ISOCARD - event).

To civil society and stakeholders, three types of communication tools are planned:

- Guidance Notes for policy makers,
- Specifications for producers, developers and the different training facilities and development support,
- Items in agricultural extension release addressed to a wide range of "stakeholders".

### WP1. Analysis of the trajectories of camel societies in the desert and arid zones

#### Task 1.1. Systemic approach of camel-oriented zones (territorial and agrarian context)

To analyze the trajectory of camel-oriented systems in desert and arid land, we propose to refer to these systems in their territorial and agrarian contexts that include the socio-cultural context (styles of residence, new mobility patterns, power and conflict, collective imagination, etc.) in the appropriation, perception, representation and use of the ecosystem, including its evolution. Moreover the territorial approach allows considering the different scales of analysis with different stakeholders and consequently understanding the interactions between social transitions and ecosystem dynamics. We propose to integrate the concepts of social network in this approach on order to have a social and geographical cartography of these zones (D11). Two trainings will be organized at the beginning and the final stage of the case-studies in order to use common approaches, to share a common view of these vulnerable zones and to reinforce some systemic approaches at local level.

#### Task 1.2. Farm trajectories analysis to assess the representation of changes at family level

A retrospective analysis of changes at the farm and family level will be done based on narrative approach of farm trajectories (Navegantes-Alves et al. 2012). The approach will allow defining the internal factor of changes in link with the live story and the asset accumulation at the family level and the external factors that have accelerated these changes. A second objective will be to analyse how family members have perceived or incurred the ecological and socio-cultural changes, and how this has affected their management at the whole farm level and, consequently, how these perceptions translated in adaptation strategies in livestock management and land use.

In arid environments where families used to deal with variability (mainly rainfall and wind), livelihood diversification including herd mobility and human migration has always been a strategy of survival. So the recent acceleration of ecological and social changes will be analysed considering the past events and the

recent perception of changes. The final results will be to identify and characterize different livelihood systems taking into account the history of changes of the family assets and the representative of changes that allow approaching the adaptive capacity (D12). This task will be based on interviews and family surveys.

WP2. Identification of camel management practices and resources uses

The overall objective of WP2 is to improve knowledge on the diversity of camels systems in contrasted socio-ecosystems selected in (WP1). This WP will allow identifying and characterizing the links between practices, livelihood and perception of environmental changes (societal and ecosystem).

Task 2.1: State of the art on performances of camel systems

A literature review of knowledge to gather information on demographics and production will be realized. This task will evaluate the existing database of potential production camels systems identified in task 2.2 or sometimes see the lack of data on some systems (D21).

Task 2.2. Typology of livestock systems at the community level

The clustering approach of the oriented camel farming systems aims at identifying and characterizing the diversity of systems, their modes of functioning, and their link to the social and ecological system [D22]. It will be based on farm survey in each identified local system defined in task 1.1.

Task 2.3. Identification of the diversity of breeding practices at farm level

Based on the clustering analysis (Task 2.2) and the literature review (Task 2.1), this task will see the establishment of longitudinal surveys throughout the animal to capture demographic and production parameters at different scale (animal, herd). A deep analysis of breeding practices related to the selection practices, crossbreeding (mainly in link with local knowledge), feeding, and marketing practices will be conducted over a restricted sample representative of the diversity of camel systems. The main results will be to produce some qualitative and quantitative measurements of the impact of breeding practices on ecosystems variables and societal variables (D23).

Task 2.4. Management and use of rangelands and change of feeding systems

This task aims at evaluating the spatiotemporal use and dynamics of the natural vegetation across the pastoral area. So far, very few studies have been conducted on desert rangeland ecology including the impact of camel farming system. Using concepts and tools from plant functional ecology, the response of rangeland plant communities to varying water supply and camel grazing intensity will be assessed in space and time. A diachronic analysis of plant spatial patterns and aboveground biomass productivity will be performed over multiple years by combining data from repeated field surveys and from historical satellite imagery. In addition, palatability and digestibility of plant biomass will be determined by monitoring plant species composition and relevant plant functional traits at key positions within the pastoral area. Precipitation variability will be described using localized integrated sensors. In order to identify where and when rangelands are grazed by camels according to year precipitation conditions and the farming system [Task 2.2], the movement of camel herds within the pastoral area will be described based on surveys with shepherds and using on-board GPS. This will allow determining the actual feeding trajectory in terms of biomass quantity and quality of camel herds of each farming system. In parallel, we will give special attention to the exogenous inter- and intra-seasonal feeding practices associated with complementation. Altogether the results will improve our understanding of the vegetation-camel system feedbacks and resilience (D24). Ultimately, the implementation of a cartographic database using Geographic Information System [GIS] would be considered in order to identify synergies among farming systems, possible extension areas, support the emergence of innovative practices and rules (Task 3.3).

WP3. Innovative and socially driven solutions

Task 3.1. Participatory Impact pathways approach

Based on the local and scientific knowledge collected in WP1 and WP2, this task aims at co-build with the different categories of stakeholders (WP1) and the different sub-systems (WP2) a common representation of

the recent changes in these socio-ecological systems (territory) considering both their locally diversity and their common factors context. Two participatory workshops will be organized to co-design future of the systems in link with the current social and ecosystem changes, considering the local, national and transnational level. The expected outcomes will be: (i) to create or reinforce social network including different stakeholders: communities, private stakeholders, administrative and researchers; (ii) share a common vision of changes at medium and long terms and (iii) discuss different alternatives of changes based on the frame of the impact pathway approach (Douthwaite et al. 2008) (D31).

Task 3.2. Pilot project: Prospects on local value chains for camel products (milk, meat and hair)

The market logics related to camel products are relatively recent (even if this type of exchange is ancient) and they are generally not well organized even if some market opportunities, like milk demand in the oasis cities, induce some changes of breeding. In this task, through combined methodological approaches (literature review, interviews, field visits), it is proposed to develop a type of map of relationships (based on social links, functions, technical knowledge) between stakeholder groups and their influence over decision-making, in order to have a preliminary tool (D32) to promote participative knowledge and innovation transfer and networking along the value-chain. A subsequent result will be to establish a prospective analysis for genetic and reproductive management factors in the camel sector in link with observed practices (task 2.3), evolutions of this zone (task 3.1) and the first organisational systems related to agro-food systems.

Task 3.3. Regulation of collective spaces and social rights of access

Perceptions and tenure rights of pastoral areas and their structure for grazing vary according to the local society structuration, available resources and camel mobility management (transhumance, shepherd, etc.). This task aims to have a common knowledge on the social regulations and tenure rights to various areas of the space-grazing (zoning pastoral space, role of water points), and to propose a holistic and sustainable approach by recognizing that these natural resources and their use are often interconnected. Investigations will be conducted on the social organization (committees 'arch'), the existence of different statuses of rangelands (Private and/or collective), organizational arrangements, social segmentation of space in rangelands, type of agreements, etc. This knowledge combined with the camel systems breeding will give a whole view of this social-resource system [D33]. In this task, training on pastureland management will be organized.

WP4. Training and sharing knowledge

Trainings and workshops are two important tools to favour the exchanges and the construction of a common knowledge. By 'common' we mean also holistic and broad knowledge to address the whole context and objective and develop an original understanding of the dynamic of the camel society locally situated.

Task 4.1. Research training for young researchers

Two trainings are planned in order to improve our knowledge and common understanding of holistic approach (systemic approach at the territorial agrarian system that include socio-cultural and natural resources) and database management related to longitudinal collection data system [in order to combine qualitative narrative approach and quantitative herd monitoring approach]. And more specific trainings will be organized for master students and eventually PhD students in France and Italy. This task aims both to promote training for young researchers through joint training and mobility of researchers between countries.

Task 4.2. Workshop for professional knowledge exchanges

Two trainings organized respectively in the North and South Mediterranean will be organized in order to favor exchanges of experiences and knowledge between North and South pastoral society. The expected output will be the construction of an indigenous knowledge on pastoral societies.

Some references:

Douthwaite B., Alvarez S., Tehelen K., Cordoba D., Thiele G., Mackay R. 2008. Participatory impact pathway analysis: A practical method for project planning and evaluation. In: Fighting poverty through sustainable water use. Proceedings of the CGIAR Challenge Program on Water and Food 2nd International Forum on Water and Food, Vol. 4, Addis Ababa, Ethiopia, 10-14 November 2008, eds. R.S. Bayot and E. Humphreys;



31. Colombo, Sri Lanka: CGIAR Challenge Program on Water and Food.

Maguire, B., Cartwright, S. (2008). Australian Government acting through the Bureau of Rural Sciences has Assessing a community's capacity to manage change: A resilience approach to social assessment, Australian Government, Bureau of Rural Sciences, 27p.

McAllister R.R.J., Abel N., Stokes C.J., Gordon L. J. (2006). Australian pastoralists in time and space: the evolution of a complex adaptive system. *Ecology and Society* 11, 41-52.

Scoones, I. (2009). Livelihoods perspectives and rural development. *Journal of Peasant Studies*, Vol. 36, No. 1.

Navegantes-Alves L., Pocard-Chapuis R., Huguenin J., Ferreira L., Moulin C.H. 2012. Grassland deterioration linked to farm trajectories in the eastern Amazon. *Outlook on Agriculture*. 41, 195-201.

<http://dx.doi.org/10.5367/oa.2012.0100>

Description of the requested budget (in complement of breakdown of costs):

Partner 1: CIRAD will contribute by permanent staff (own funding) for a total of 58 months (493k€, not funded following ANR rules, marginal cost) for 4 researchers involved in the project, 4 researchers who will give support in IT, data management and data treatment; and 3 administrative staff who will support the organization of the events and facilitate the visits of foreigners. Personnel: 3 Master students will be enrolled at CIRAD-SELMET. Total: 12,800 €

Requested funding concerns:

- Travel costs: (economy class) flights, Visa costs, transfer to and from the airport. These costs (for the 11 persons) include travel costs for training workshop (9000 €), for coordination (7800 €), field work (11050 €) and participatory workshop (9450). Total: 37300 €. Subsistence or daily allowances related to these travels represent a total of 42,150€.
- Event costs: the amount request will be used for the organization of the regular meeting and training workshop (12000€), the organization of session in one symposium (2000€) and the organization of participatory workshops in WP3 (13000€). Total: 27000€
- Consumables: the amount requested will be used for durable equipment (mainly GPS and informatic material). Total: 13250 €; and consumables and supplies (mainly satellite images: 8000€; lab. Materials: 7000€ ) for a total: 17400€. Other operational costs include mainly the car rent and fuel (due to the distance of the field works). Total: 9000€.
- The other costs includes: Shipping costs for chemical analysis (600€); subcontracting for complementary analysis (plant functional analysis; website development): 6500€ and bibliography: 2000€.
- CIRAD will favor mobility and share of knowledge through invitation of foreign researchers: 20,500€ and communication: 3500€.
- The indirect costs cover the overheads (4% of the eligible costs) and the indirect costs of researchers (8000 €)

Partner 2: The university Kasdi Merbeh of Ouargla will contribute in permanent staff (own funding) for a total of 33 months (134,720 €, not funding) for 5 researchers involved in the project.

Requested funding concerns:

- Event cost: the organization of the fist training workshop on systemic approach (5000€) and the organization of a doctoral school in year 2 (5000€)
- Travel cost: (economy class) flights, Visa costs, transfer to and from the airport. These costs covers the cost of travel to attend the different meetings and training workshops for 5 researchers (total: 6500€) and 5 doctorates (total: 5000€).
- Daily allowances: an amount of 13750€ to cover the field work for doctorates and their supervisors (researchers);
- Durable equipment (weighting machines, GPS mobiles, Penetrometers, lacto scan,..) for an amount of 9150€
- and consumables costs related to satellite images (4000€) and Lab materials (4400€) for a total of 8400€
- the others costs includes: an amount of 4050€ for operational cost ( laboratory analysis); 450€ (for shipping cost); 1000€ for documentation; 6000€ to favor the mobility of foreign researchers ; 5000€ for publication ; 5700€ for other costs related to car rent and oil.

Partner 3: IAV Hassan II will contribute permanent staff (own funding) for a total of 16 months for the two researchers of IAV and 2 engineers of ORMVAO of Ouarzazate. Total: 45,696€.

Requested funding concerns:

- Event cost: the organization of the workshop of restitution on systemic approach (3000€) and the organization of the training on data management and herd monitoring (3000€). Total 6000€.
- Travel cost: (economy class) flights, Visa costs, transfer to and from the airport. These costs covers the cost of travel to attend the different meetings and training workshops for 4 researchers (total: 9000 €) and 2 students (total: 2000€).
- Daily allowances: an amount of 6780 € to cover the field work for students and their supervisors (researchers);
- Durable equipment (weighting machines, GPS mobiles, Penetrometers, lacto scan,..) for an amount of 8500€ and consumables costs related to satellite images and Lab materials for a total of 5900€
- Others costs includes: an amount of 450€ for shipping cost; 950 € for documentation, purchasing books; 1200€ to favor the mobility of foreign researchers; 1720€ for communication costs (publishing);
- Indirect costs: 7500€ (15% of the eligible costs).

Partner 4: University of Bari will contribute Permanent staff (own funding) for a total of 19 months (71,285 euro) of three senior researchers involved in WP2 and WP3 (for establishing a critical overview of the current status and future prospects for genetic and reproductive management factors in the dromedary sector in the considered study areas, as a basis for orienteering decision makers in future strategic planning for the dromedary sector).

Request funding concerns: travel costs (around 3 travels/year). Total: 7000€ and corresponding daily allowances for a total of 3000€; Operational costs (mainly for car rent and fuel to cover field work expenses) for a total of 5500€.

Its associate institute CREA-Rome (Animal Production Research Centre) will contribute in task 3.2. to implement a preliminary tool to promote participative knowledge and innovation transfer and networking along the value-chain; Total: 30,000€ (including the cost of the workshop organization for participatory approach) and the invitation of foreign researchers for 12,000€.

The others costs include: 2000€ for bibliography; 3500€ for result dissemination.

Over heads: 6,600 € (around 5% of the eligible costs)

### **Gender, young researchers, ethics**

It is generally recognized that the Mediterranean agriculture systems have known increasing pressures that include strong demographic growth, urbanization, increasing demand for high value products like animal products and vegetable, and a high competition for land and water. In this context, pressures on resources raise many challenges and sometimes competition in the trade-offs of the use of resources (land, water, and nutrients) that can affect the sustainable development of these systems. Moreover the marginal zones of inland knows a significant departure of their active labor forces through national and international migration that induces important changes of the global social and natural functioning of these zones. This is particularly relevant in arid and desert lands of south Mediterranean countries where the traditional societies used to explore and valorize vast rangelands in arid lands thanks to original livestock systems based on camels, grazing systems and mobility, and kinships links to manage common resources in their spatial and temporal dimensions. If migration has always been an adaptive mechanisms of these societies to face external events like drought (recurrent but unpredictable chocks in these zones), this phenomena takes new "contours" with the expectations of the young generations of new lifestyles, the economic competition in urban zones that enhances the international migrations and then the duration and feed-back effects of migration (change of mind). In the arid zones, this migration induces a deep social change of the local society with a reinforcement of the decision-power of the women and consequently some new ways to manage the natural resources with some impacts on the ecosystem. All these changes will be considered and the project proposes to observe and understand the impacts of these social changes on the whole system.

In parallel, the project proposed to have a specific WP on training that aims to favor capacity building mainly for young researchers but also mobility of researchers and actors to favor the creation of a common

knowledge and understanding of these zones.

### **Project management**

The coordination will be ensured by CIRAD-SELMET in collaboration with the team leader of each partner. CAMED partners have identified different entities to ensure the communication within the consortium and the achievement of the main activities in order to fill the objectives. This management structure is designed to ensure the achievement of all objectives of the project CAMED.

Governance Entities:

#### 1. Project coordinator

The project coordinator will be from the UMR Selmet in charge of the daily management of the project. The coordinator will ensure in collaboration with partners the production and transmission of intermediary reports (technical and financial reports) and deliverables. From a scientific point of view, the coordinator will ensure the overall coherence of the project and timeliness in completing each task while the financial and administrative issues will reveal, mainly, of each partner in its country.

#### 2. Project Coordination Committee

The coordination committee will include a scientific representative from each partner involved and the project coordinator. This committee will be responsible and ensure the scientific direction of the project. At the beginning of the project, the committee will work on developing the work schedule of the project based on the objectives, the research tasks, and deliverables to be achieved. This work will result in the production of a work plan document and a scientific agreement that will be signed by all the partners. A project coordination meeting schedule will be established with at least one meeting every six months. This committee will also be responsible for planning the annual workshop, which will then be hosted by one of the country partners. At the end of the project, the committee will be responsible for the organization of the restitution; this will be organized in the form of a special session of ISOCARD. A final detailed action report of the entire project will be delivered two months after the end date.

#### 3. Project Management Team

The project management team will be composed with one leader for each task. This team will have in charge to inform the project management tool (online) in order to ensure the daily management of the project by the coordination team and the exchanges between the teams.

The governance of the project will be ensured by two entities:

1. The steering committee (COPIL): This body has the role of defining and keeping (or adjusting) the scientific directions of the project. This committee will be composed of institutional partners of CAMED and experts (Bernard Faye, FAO; A. Ickowicz, UMR-SELMET; a farmer of Ouargla and one representing of ORMVAO Ouarzazate). Members of the COPIL will be mandated by their institution or membership structure to be engaged in the project. COPIL will meet once a year throughout the project under the guidance of the Project Coordinator, at the launch, mid-term and end of project.

#### 2. Monitoring committee

The objective of this committee is to conduct operational monitoring of the project. It will consist of the management team, the coordination committee and the coordinator. It will ensure the transmission of information inherent in each on-going and future activity. It will be responsible to report on the progress of the tasks and the project. It will meet regularly at 3 to 4 times per year. In order to minimize transactions and energy costs, it will use the means of communication such as e-mail, telephone, video-conferences.

### Management of information and communication

Particular attention will be paid to the management of communication. It will have in charge to gather, exchange, and communicate internally and externally the main results. In the first months of the project, this team will develop a CAMED logo and chart of graphic for all documents. A website will be developed with restricted access to the communication and dissemination of information between research teams and public access for the dissemination of project results to interested groups. Some documents will be broadcasted in French and English. The communication team will participate in the organization of regular meetings for project research teams.

The other objective is to realize a data management system able to gather the diversity of data, collection

methods and data entry in order to favor crossed analysis and share the information. This organization will take into account the specificity of information or partner rules in this domain. It will allow to constitute and feed a common data base for the project that can serve of references for future research or sectorial prospective. A data management plan and a technical documentation database will be developed and applied.

An agreement on rights, conditions of data management (protection and confidentiality) will be signed between the contributors. The protocols and agreement on the management and use of data will be one deliverable of this action. The IT team will develop and deliver the conceptual model of the database during the first months.

Possible risks and solutions:

A potential risk could be related to the excess of proposals for the communication (documents, multiplication of events), led to any financial risk. But many of these technical and management tools already exist. And the main work will be to adapt these tools to the project and the partners. Moreover the long partnerships between the partners or the individuals in the projects can facilitate the procedures. Regarding data acquisition, the overall objective will be to have a set of equivalent, consistent and reliable information on the different collection sites. The main problem will be to group the data issued by all sites. An information system including databases and ad hoc software capture and consistency check will be out in place. A second risk is due to the zones in project. These zones are generally far from main cities. Moreover some zones can be temporally forbidden for some partners due to their security rules. It is why the project has created a specific WP on training that will favor the interactions and share of knowledge between the partners if field studies become difficult.

### Impact of Project results

The main overall expected results of the project are:

- Develop common scientific and indigenous knowledge on the camel societies (that doesn't exist until now) that can be shared at the national level, mainly for decision makers or future research or development projects;
- Provide socially driven solutions or alternatives for these communities that emerged from the main actors and stakeholders, their perception and knowledge, and the perceived future of changes of their roles. These solutions will be conceived collectively based on the quantitative and qualitative data collected along the project.

Related to the societal challenges, the project aims to:

- answer to frequent questions related to : how favor the development of these zones and their attractiveness of the young generations?
- what are the positive, negative or loop effects of the migration in these zones? Is it a determinant factor of changes?
- what are the current changes in the camel society in terms of women and youth empowerment, family management?

From a methodological point of view, the main challenge will be to combine systemic approaches in human and social sciences (agrarian and territorial system approach, livelihood, adaptive capacity approach, narrative approach) and biological and natural science (production system, longitudinal monitoring at herd system level, ecological approach) in one common framework to analyze the interactions between society and ecosystem and to have a global approach of changes in a given region or ecosystem and considering the interactions at the different scales. And see how the Impact Pathway approach can be an interesting tool to cross the information and stakeholder point of views.

The project aims at providing a holistic understanding from the ground of the dynamic of society and resources in specific zones where demographic pressure are less but climatic more stronger. It will also allow assessing what can be the roles of these zones in the future in terms of socio-economic development, natural preservation, touristic development, etc.

To achieve this objective, the transfer of know-how and experiences is forecasted all along the project through bibliography review (task 1.1 and 2.1), research and professional workshops (task 1.1, task 2.3, task 3.1, 3.2 and 3.3) and meetings that involve all partners and their associates. Moreover all tasks will require team fieldworks that will consolidate the partnerships. More specifically the WP3 has the objective to build the premise of a social network along the value chain at the territorial level. Some collective publications combining results of different tasks will be planned early in the project in order to favor interactions.

Beyond the usual ways of valorization (already mentioned and including publications and other information-sharing activities as databases, technical solutions, etc), the project proposes to produce regular information sheets (very 6 months) with some significant results in order to inform regularly decision makers or stakeholders of the sector or the zone about the progress of the work but also provide regular update data. This information sheet will also include update information about other experiences, projects or regulation. If it is possible, a topic of testimony of camel farmers will be inserted. This sheet will be published online with some hard copies that can be diffused locally or nationally. This sort of communication with scientific results and local or national new information will allow interacting permanently with other national and trans- or international projects and favor the diffusion of knowledge. Moreover this information sheet will allow creating knowledge and contact between actors of the two countries and exchange experiences.

Regarding intellectual property rights, some agreements exist already between the research and universities partners at the institutional level that will constitute a global framework for the project. Based on this, the coordination team should develop a specific agreement that will mention the specific rules for this project if necessary.

#### Team information

Partner 1 (coordinator): CIRAD-SELMET  
Associate institute: ICARDA

CIRAD is a targeted research organization that works with and for developing countries to generate and pass on new knowledge, support agricultural development and fuel the debate on the main global issues concerning agriculture. The main research units involved (UMR SELMET) is dedicated to Mediterranean and tropical livestock systems (LS), the main topics of the unit address the LS dynamics at the landscape level, the adaptive animal/resources interactions and the management innovations in the livestock ecosystems. System approaches, environmental description, co-conception in LS and methodological tools attached are classically used. The Mediterranean research activities are developed in South France, Egypt, Tunisia, Algeria, and Morocco. Moreover this unit had a very long expertise on camel systems over the world, mainly in animal production, genetic, biotechnology and health through one researcher Bernard Faye ([https://www.researchgate.net/profile/Bernard\\_Faye](https://www.researchgate.net/profile/Bernard_Faye)). This project aims to transmit this knowledge to the actual research team and to develop new approaches regarding the link of this species with space and society.

The CIRAD team will be composed with 3 researchers in the Unit SELMET: 1 agropastoralist specialist, 1 animal production science and 1 socio-economist (based at ICARDA Rabat) and 1 agro-ecologist from the UMR-SYSTEM. These 4 competences will allow covering the main research domains of the project. Moreover two of them, already based in Morocco, will facilitate the implementation of the project and relations between the country teams. Other researchers from the UMR will intervene on specific topics.

Some references:

- Alary, V., Hassan, F., Daoud, I., Aboul Naga A., Osman, M. A., Bastianelli, D., Lescouat, P., Tourrand, J.F., 2014. Bedouin Adaptation to the Last 15-Years of Drought (1995–2010) in the North Coastal Zone of Egypt: Continuity or Rupture? *World Development* Vol. 62, pp. 125–137, 2014
- Alary, S. Messad, I. Daoud, A. Aboul-Naga, M. A. Osman, P. Bonnet, J.F. Tourrand, 2016. Social Network and Vulnerability: A Clear Link in Bedouin Society (Egypt). *Human Ecology* (DOI 10.1007/s10745-016-9807-z)
- Barkaoui, K., Bernard-Verdier, M., Navas, M.L., 2013. Questioning the Reliability of the Point Intercept Method for Assessing Community Functional Structure in Low-Productive and Highly Diverse Mediterranean

Grasslands. *Folia Geobot.* 48, 393–414. doi:10.1007/s12224-013-9172-2

Slimani S., Chehma A., B. Faye B., Huguenin J. 2013. Régime et comportement alimentaire du dromadaire dans son milieu naturel désertique en Algérie. *Livestock Research for Rural Development*, 25 (12), 9 p. <http://www.lrrd.org/lrrd25/12/slim25213.html>

Huguenin J., Hammouda R., Jemaa TS, Capron J.M., Julien L. 2015. Évolution des systèmes d'élevage steppiques au Maghreb : adaptation ou métamorphose ? In : *Espaces pastoraux, espaces socioéconomiques particuliers. Pastoralismes du monde*. Avignon : Ed. de la Cardère, 28-31. ISBN 978-2-952395-43-4

The CIRAD team has a long experience in training and workshop organization. The unit is also equipped of a special office room to welcome external researchers. Moreover the research team has accessed to the different software that we need in the project. The specific instruments like GPS and others will be provided through the project. The CIRAD team will provide mainly experiences and knowledge in holistic approaches of pastoral societies.

Partner 2:

UNIVERSITY OF KASDI MERBAH OUARGLA, ALGERIA

The university of Kasdi Merbah Ouargla is one of the main research unit specialized on arid lands. Localized in an oasis, this university has conducted many research projects on sustainable development of arid lands and oasis and camel systems over the last decades.

CAMED will be backed by the research laboratory on Saharan Bioresources; Preservation and Promotion, of the University Kasdi Merbah Ouargla, mainly specialized in issues related to arid regions. The team involved in this project consists of a coordinator for the supervision of the research activities that will be conducted and four members; all are professors-researchers. The 5 researchers are: Pr. Abdelhakim SENOUSI who will be involved in the activities related to WP1 and WP2 (in link with the valorization of camel products); Pr. Abdelmajid CHEHMA on the activities in Task 2.4 related to rangelands and resource, Pr. Abdelkader ADAMOUCHE specialist of camel systems and farm trajectories, Dr. Saliha BOUDJENAH (Lecturer) for biochemistry and technology of milk; and Dr. Samira BECILA (Lecturer) on agri-food chain.

The team will address the different aspects related to the camel system and camel breeding, using survey and laboratory analysis. The study will focus on three major areas of the Northern Algerian Sahara, namely Ghardaia, Ouargla and El-Oued, which extend over a radius of 450 km.

In addition, each senior researcher will have a PhD student or a junior researcher, committed and involved in the project CAMED. Exchanges of students in internships will be also organized between partners of the project.

More than 40 publications have been recorded. Among them:

Senoussi A, Hadbaoui I., Huguenin J. 2014. L'espace pastoral dans la région de M'sila, Algérie: état et perspectives de réhabilitation. *Livestock Research for Rural Development*. 26 (11) 2014.

Trabelsi H., Senoussi A., Chehma A. 2012. Étude de la dissémination des graines des plantes spontanées dans les fèces du dromadaire dans le Sahara septentrional algérien. *Revue Sécheresse*. 23, 94-101.

Adamou A., Boudjenah S et Senoussi A. 2011. La kémaria, un produit du terroir à valoriser, In *Bulletin Scientifique des Sciences Naturelles de Tunisie*. 38, 7-15.

Chehma A. 2004. Productivité pastorale et productivité laitière en Algérie. *FAO, Production et Santé Animale*, 2. Rome, 2004. 43-51.

The university has also the experiences and facilities to conduct analysis on resources (characterization of the vegetation) and biomass. Due to their long research in the oasis, the team has developed a strong partnership with development stakeholders but also camel breeders that will allow developing a research-development partnership.

Partner 3: IAV Hassan II

Associate: OMRVAO

IAV Hassan II is a leading agricultural high school in Morocco. It has 50 years-old tradition of training

graduates in both agronomy and veterinary medicine sciences. IAV Hassan II has also a well-established network with local agricultural offices, as it has achieved several expertise and field work research activities. For the specific tasks related to the CAMED project, the IAV Hassan II team (Pr. Mohamed Taher SRAÏRI, animal scientist and Pr. Mohammed YESSEF, range land resources' scientist) has already developed similar approaches related to dairy cattle systems in other areas of Morocco. The team will also benefit from strong ties established with the administrative staff of the regional office dedicated to the agricultural development of the Ouarzazate (ORMVAO) area, where research on livestock systems characterization has been realized during 2014 and 2015 (cf. Sraïri et al., 2016).

Partner associate: OMRVAO, Regional Office of the agricultural development of the Ouarzazate area. The representative of the Ministry of Agriculture in the Ouarzazate region, as it covers a wide area of almost 2 million ha, of which only 26,000 are irrigated, representing the Drâa valley. Otherwise, very large areas of poor rangeland are available, as the average annual rainfall does not exceed 150 mm. These rangelands are however intensively used by herds of different species (sheep, goats and camels), and few references are available of the evolutions of these livestock systems and the people involved in such activities. Two specialists of ORMVAO (engineer Mohammed BENIDIR and engineer Ahmed RAMDANE), respectively in animal production and rangeland management, will be involved.

In final the team will be composed of 4 members: 2 animal scientists and 2 pastoralists. The activities related to WP1 and WP3 on the approach of the camel society and camel value chains/network will be implemented in partnerships with PhD students and master students, in joint supervision with CIRAD and the University of Bari.

#### References:

- Sraïri M.T., M'ghar F.A., Benidir M., Bengoumi M. 2016. An typological analysis of livestock diversity in the oases. Oral communication in the international workshop « Integrated and sustainable management of oases ». Zagora, Morocco, April 15th and 16th, 2016.
- Sraïri M.T., Benjelloun R., Karrou M., Ates S., Kuper M. 2016. Biophysical and economic water productivity of dual purpose cattle farming. *Animal*. 10, 283-291. <http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=10082209&fulltextType=RA&fileId=S1751731115002360>
- Sraïri M.T. 2015. Extensive livestock farming in Morocco: From marginal territories to major social and environmental roles. *Revue d'Élevage et de Médecine Vétérinaire des Pays tropicaux*, 68, 123-128. [http://remvt.cirad.fr/CD/derniers\\_num/2015/REMT15\\_2-3.pdf](http://remvt.cirad.fr/CD/derniers_num/2015/REMT15_2-3.pdf)
- Sraïri M.T., Chergui S., Igueld H., Sannito Y. 2014. Performances of family dairy farms in Morocco: arguments for improving farm milk price and technical support. *Revue d'Élevage et de Médecine vétérinaire des Pays tropicaux*. 67, 183-191. [http://remvt.cirad.fr/cd/derniers\\_num/2014/REMT14\\_183\\_191.pdf](http://remvt.cirad.fr/cd/derniers_num/2014/REMT14_183_191.pdf)
- Faysse N., Sraïri M.T., Errahj M. 2012. Local farmers' organisations: A space for peer-to-peer learning? The case of milk collection cooperatives in Morocco. *Journal of Agricultural Education and Extension*. 18, 285-299. <http://www.tandfonline.com/doi/full/10.1080/1389224X.2012.670053#.U19HGvv5MnY>

Partner 4: UNIVERSITY of BARI

Associate institute: CREA

The team from the University of Bari (two professors, two tenured researchers and one research fellow) will include scientists with agronomical, veterinarian and biological background applied to Animal Science. All the participants matured previous experience and competencies on the dromedary sector, through ultra-decennial collaborations with Northern African partners and, recently, through participation to the international EU ENPI CBC MED PROCAMED I.B.1.1/493 «Promotion des filières camelines pour le développement durable des territoires sahariens», coordinated by Bernard Faye (CIRAD – France), notably to the Activity 2 “Improve productivity and innovate in camel breeding systems”. In CAMED, the team will be involved in the follow up in Task 2.3 related to dromedary genetic, reproductive, ethological, and nutritional aspects. In addition, the University of Bari will activate a collaboration agreement with the CREA (Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, Centro di Politiche e Bioeconomia, Bari), a research institution developing analyses and interpretative studies of socio-economic dynamics in the agro-

food system, evolution of rural areas and competitiveness factors, sector policies effects, impacts and implementation approaches. Notably, two researchers from CREA will be involved in task 3.2, based on their specific experiences related to management of processes and participatory decision-making methods, organizational models and stakeholder analysis.

Some references:

Muzzachi, S., Oulmouden, A., Cherifi, Y., Yahyaoui, H., Zayed, M.A., Burger, P., Lacalandra, G.M., Faye, B., Ciani, E. Sequence and polymorphism analysis of the camel (*Camelus dromedarius*) myostatin gene (2015) *Emirates Journal of Food and Agriculture*, 27 (4), pp. 367-373.

Monaco D, Padalino B, Lacalandra GM. 2015 Distinctive features of female reproductive physiology and artificial insemination in the dromedary camel species. *Emirates Journal of Food and agriculture*, 27 (4): 328-337

Padalino B, Aubé L, Fatnassi M, MonacoD, Khorchani T, Hammadi M, Lacalandra GM (2014). Could dromedary develop stereotypy? The first description of stereotypical behaviour in housed dromedary camels and how it is affected by different management system. *PLOS ONE*, vol. 9, p. 1-9, ISSN: 1932-6203, doi: doi:10.1371/ journal.pone.0089093

The team from the University of Bari will

- (i) contribute, through both remote and in loco surveys, to improve knowledge on the diversity of camels systems and practices, demography, production, productivity and reproduction, behavior;
- (ii) through combined methodological approaches (literature review, interviews, field visits), and thanks to a strict collaboration with the CREA (Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, Centro di Politiche e Bioeconomia, Bari, Dr. Graziella Valentino and Dr. Massimilian Schiralli), develop a map of relationship between major stakeholder groups and their influence over decision-making, in order to have a preliminary tool to promote participative knowledge and innovation transfer and networking along the value-chain;
- (iii) establish a critical overview of the current status and future prospects for genetic and reproductive management factors in the dromedary sector in the considered study areas, as a basis for orienteering decision makers in future strategic planning for the dromedary sector;
- (iv) contribute in knowledge and capacity transfer to researchers and professionals through remote and in loco training actions.



**Project Coordinator**

Academic Title	Dr.
First name	Johann
Family name	HUGUENNIN
Name of institution	Centre International de Recherche Agronomique pour le Développement (CIRAD)
Organisation/ Division	Public research institute (EPIC)
Organisation Type	RO, Universities, other non company participants
Street, No. / Post Box	C-112/A, Campus international de Baillarguet
Postal code	34938
Town	Montpellier Cedex 5
Country	France
Phone	+33/467593807
Fax	
E-mail	johann.huguennin@cirad.fr
Website	www.cirad.fr/
Total Cost of the consortium partner	693,680
Requested Funding	200,000

**Project Partner 1**

Academic Title	Prof. Dr.
First name	Hakim
Family name	Senoussi
Name of institution	Université Kasdi Merbah Ouargla
Organisation/ Division	Research laboratory on Saharan Bioresources
Organisation Type	RO, Universities, other non company participants
Street, No. / Post Box	Route de Ghardala
Postal code	30000
Town	Ouargla
Country	Algeria
Phone	+213/29711714
Fax	
E-mail	senoussi.hakim@yahoo.fr
Website	www.univ-ouargla.dz/
Total Cost of the consortium partner	209,720
Requested Funding	75,000

**Project Partner 2**

Academic Title	Prof. Dr.
First name	Taher
Family name	Srairi
Name of institution	Institut Agronomique et vétérinaire Hassan II
Organisation/ Division	Agronomie
Organisation Type	RO, Universities, other non company participants
Street, No. / Post Box	Madinat al Irfane
Postal code	6202
Town	Rabat
Country	Morocco
Phone	+212/537771745
Fax	
E-mail	mt.srairi@iav.ac.ma
Website	www.iav.ac.ma/
Total Cost of the consortium partner	95,696
Requested Funding	50,000

**Project Partner 3**

Academic Title	Dr.
First name	Elena
Family name	Ciani
Name of institution	University Bari Aldo Moro
Organisation/ Division	Animal Science, Genetics
Organisation Type	RO, Universities, other non company participants
Street, No. / Post Box	Piazza Umberto I
Postal code	70121
Town	Bari
Country	Italy
Phone	+39/805442413
Fax	
E-mail	elena.ciani@uniba.it
Website	<a href="http://www.uniba.it/english-version/">http://www.uniba.it/english-version/</a>
Total Cost of the consortium partner	140,885
Requested Funding	69,600

## Finance plan

	Name	Name of organisation (short)	Country	Requested funds (EUR)	Total costs (EUR)
Project coordinator	Johann HUGUENNIN		France	200,000	693,680
<b>Total</b>				<b>200,000</b>	<b>693,680</b>

	Name	Name of organisation (short)	Country	Requested funds (EUR)	Total costs (EUR)
Project partner 1	Hakim Senoussi		Algeria	75,000	209,720
Project partner 2	Taher Srairi		Morocco	50,000	95,696
Project partner 3	Elena Ciani		Italy	69,600	140,885
<b>Total</b>				<b>194,600</b>	<b>446,301</b>

---

**Overall**
**394,600****1,139,981**