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Farming systems facing global challenges: Capacities and strategies

The untied qualification processes of the argan agro-forestry systems

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Summary:

Agro-ecology is based on a close insertion of man in ecosystems (and thus needs a local control of the production of technical knowledge). Addressed at a territorial level, it calls the establishment of appropriate devices for valuation of products, resources and skills. The argan forests on the western slopes of the Moroccan High Atlas are intensive skilled labour agro-forestry systems. Its resilience is based on a close integration of man in the ecosystem and on the combination of multiple activities both at territorial and familiar levels. In this context, do the argan oil and argan kid meat qualification processes constitute development levers? Do they constitute, at the contrary, destabilization factors of familiar and territorial productive systems?

Our study lies in the framework of the theory of collective ownership building process, inspired by the work of Ostrom and Weber. It provides a dynamic and comprehensive approach: we will mobilize it to emphasize that the construction of the "food social space" and its devices must be thought of in reference to the technical and relational knowledge that structure the territory and reflect the relationship with nature, market and the overall political bodies.

Keywords: Collective appropriation, Local technical and relational knowledge, Territorial Development. Socio-technical approaches. Geographical Indications.

The untied qualification processes impacts on the argan territorial productive systems and on the “food social space” changes.

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Introduction

On the foothills of the High Atlas down to the ocean, the argan forest extends over an area of some 800,000 hectares and is home to about 2.5 million people. The argan tree is the mainstay of complex systems that combine narrowly gathering nuts, small ruminant and annual crops (mainly barley and wheat) under cover. In this region marked by rainfall low (about 280 mm), concentrated and random, the tree is pruned to ensure an optimal shading, it plays a vital role in water management and fertility. The configuration of cultivation plots (decks, fences ...), cultural practices (superficial plowing, broadcast sowing) and enclosure (*agdal*) of trees and tree plots complete the system. The diversification of activities (a maize crop after barley, plantations -olive groves, carob, almond...- picking activities, beekeeping and numerous productions for subsistence) provides risk management both at individual (family farms) and collective levels (mainly at the douars' area) (Auclair & Alfreioui, 2012). This collective risk management is based on the application of local standards that constitute the heart of our inquiries.

Local and technical local knowledge; the roots of the argan forestry system

Considered as a whole, this agroforestry system is very intensive in skilled labor. Resilience (as evidenced by the low final migration -until the early 2000s - the importance of the rural population and agricultural labor force) is based on the implementation of sophisticated technical knowledge, built locally according with environmental constraints: maintenance of trees, cultivation options, herding, and land plots management... Technical knowledge is closely linked with relational knowledge that structures the local society and its relationship to nature and to the market: enclosure practices, differentiated land status, labor organization, local merchant devices and inheritance practices... This secular equilibrium is now threatened. The growing involvement of cosmetic industries limits the control that local people have on nuts collecting and crushing activities. The forthcoming implementation of a PGI (Protected Geographical Indication) on the "argan forest kid meat" announces the dissemination of new technical recipes hardly compatible with the open temporal frames of livestock activities (Simenel *et al*, 2009; Linck & Romagny, 2011)

More generally, the argan forest is committed to a transformation of its territorial and ecosystem governance modalities: the customary rules give way to the operators of the argan oil industries, to the sheep and goat professional union (ANOC), to the Ministry of agriculture (with its narrow sectorial approach), to the Ministry of Interior and the Waters and forests Administration (handler in law of the forest domain, that is to say, of the entire territory concerned) (Bouderbala, 2013).

Project implementation

Risk management is the key of agro-ecological transition (Bonny, 2011). Literature and field research show that the argan forest productive system considered at different relevant scales (families, *douars*, municipalities and regional space) is still deeply based on a logic of internalization of environmental risks and costs¹. System resilience (Linck, 2012) can be explained by the synergies that link each together a high number of activities. It also depends on the mobilization of technical knowledge adapted to the harsh conditions that characterize arganeraie: technical routes that tend to optimize water uses and fodder resources as well as land development (terraces, drainage and water catchment runoff, upstream plots, and low walls erosion control, for example). Finally it also depends on local solidarities associated with a wide range of local institutions. This is particularly the case of land tenure that combines collective and private uses as well as local standards which establish the differed grazing of certain parcels. It is also probably the case of succession practices that, by the benefits they provide to male descendants, strengthen the endogeneity and, by this way, the cohesion of local society². The social space is thus highly structured by ties of solidarity and asymmetrical relationships that have an impact on the individual access conditions to common pool resources (land, local networks, knowledge, trust and social status ...) as well as to survival and accumulation options (Firdawcy & Lomri, 2000; Jouve, 2000).

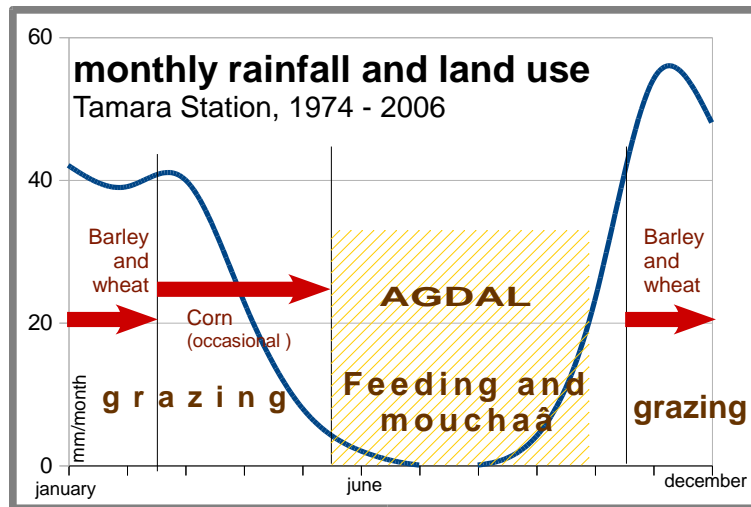
The significance of family ties and, hence, the acquaintanceship and the hierarchy that structure the local societies also deeply mark, their relationships with political (the municipal authorities, the *caïdat*, including the settlement of disputes) and economical environment (the *souk* with its ramifications and local devices to market products and access to employment). At a higher level, the resilience of local productive systems depends to a large extent on access (and maintenance) to these areas under the direct supervision of Waters and Forests Administration. These lands, often relatively close to the *douars*, are destined for collective "free" uses, with for only restriction, the prohibition of perennial installations (establishment of cultivation plots, enclosures, buildings...). This is a weak point of the system: they may be overfished by local users who are not (and do not feel) involved in their management, or by "outsiders" (invasion camels from the Sahara region during summer).

Due to the complexity of productive systems it is necessary to address the issue of risk management in a global perspective. Risks and uncertainties undertake sustainability of production systems, organization of activities and work, relationship to land, market and local society. As a corollary risk control -individual and collective resilience- building requires a global response. This concerns both the biotopes and development of technical routes, as patterns of arrangement of activities, treasury management, devices to market or territorial

1 We address this issue in terms of agro-ecological transition and socio-technical approach. Life and biotopes, as well as local knowledge and cognitive frames are addressed as common resources, produced and managed collectively. For agro-ecological transition and socio-technical approaches see Bonny S. (2011) Golden *et al* (2011), M Griffon (2011) Lagadeuc and Chenorkian, (2009) Wezl *et al* (2009). Our approach to the process of collective appropriation is based on the work of J. Weber and, to a lesser extent, E. Ostrom and B. Ventelou.

2 The establishment of mixed couple is more difficult with the only half share inherited by women (Bouderbala 1999).

solidarity... In the argan tree forest, the source of the risk is primarily climatic: rainfall is low concentrated, unpredictable and random. As the following graph shows, the rainfall is the key to understand the productive system.



The chart identifies the critical period: it runs from mid-May (establishment of Agdal) until the beginning of the rainy season from September to November. Nearest forage potential (the *douar's mouchaâ*) is exhausted. Feeding livestock (goats and sheep) then depends on accumulated forage resource during previous month and, of course, on grazing the Water & Forests' *mouchaâ*, often remote or degraded. Thus, at familiar level, the extent of cultivation plots and the number of trees can be identified as the cornerstone of the system. Harvested barley and nuts dried pulp reserves define the capacity to overcome the lean months. They may also allow a surplus to increase herd size, to develop other sources of income (like olive, carob and almond planting) or to engage in speculative activities: the purchase or the renting of animals of less fortunate or wealthy farmers. Access to *melk* plots can thus be identified as one of the most decisive factor of social and economic differentiation (Auclair & Alfriqui, 2012).

However, crops are far from being devoid of risk. Barley cultivation (sometimes followed by a maize crop) which is initiated in the month of October is a risky activity: rain can be a long wait or be deficient as to undermine any harvest. Yields are low: about 10 bags collected for one bag of seeds in the years considered as "normal." Risk has deep impact on livestock perceptions by local people: frequent sale of animals (especially mothers with their kids) in early summer and autumn restocking fail to consider the herd as the result of a long process of accumulation of care and effort, that is to say, as a heritage.

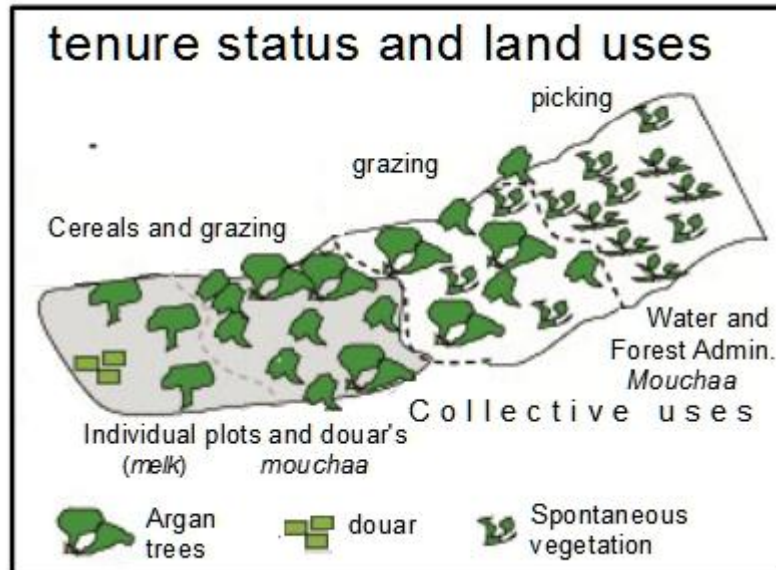
Taken together, these practices are part of a collective risk management that also relies on the organization of weekly *souks* in rural communities. Animals selling at the souk must also be considered as a control device that permits to adjust individual herd's size to forage availability and allows poorer families to maintain a breeding activity and ensure the sustainability of their exploitation. In this regard, the association barley-goat and souk can be considered the base of the productive system at a territorial scale. Territorial productive system can be regarded in its socio-technical dimensions. Beyond production and sharing of technical and relational knowledge that structure local society, the fact that a large majority of the population can develop farming activities and enjoy access to land, however limited it may be, is an important factor of social cohesion. Thus, livestock and access to land can be considered as identity markers in the meaning that they objectify both the individual

capacity to access community heritage and position -status- of people and families within the group.

Barley can be followed (in approximately 10% of cases, depending on rainfall intensity) by a maize crop. This practice is particularly uncertain (it depends entirely on soil water reserves): mature plants rarely exceed 50 cm and generally do not produce ears. The objective is twofold: increase forage production and preserve pastures that will be available in the summer, when the pressure on the collective potential forage is greatest.

Forage production does not constitute the only link between crops and livestock. Animal wastes are the subject of particular attention: they are systematically collected, processed and converted into manure before being incorporated into the plot. This practice helps to increase the capacity of the soil water retention and maintain, at this level, biodiversity and ecosystem functions. This practice finally reveals fertility flows from *mouchaâs* to individual plots and connects the territorial productive system with the family production units.

The *Agdal* is probably the most iconic traditional institution in the argan forest. The enclosure of collective land use is now supposed to preserve trees of "predatory" action of goats and ensure harvesting fruit when they reach maturity. In reality, the enclosure relates probably more to preserving forage resource than fruit. We have to note that the beginning of the *Agdal* is formally established on a specific date (18 May in 2013) which must be respected by all, and that it ends with the end of harvest. During this period of grazing, available forage resource is determined by the reserves (barley and pulp nuts, mainly), *melk* grazing and the Waters and Forests' *mouchaâ*. Thus unequal access to land induces a strong pressure on this *mouchaâ* as evidenced by its frequent deterioration.



Risk management is also based, in a similarly obvious way, on interactions between livestock, collecting and crushing the nuts of the argan tree. The importance of these interactions must first be assessed from the point of view of the formation of the family income. The impact of cosmetic industries over the past decade has led to a considerable increase in the value of nuts and associated products (Romagny & Boujrouf, 2010). Whatever their size and land endowment, families get, from the "nuts workshop" (collection, crushing and / or extraction), incomes substantially higher than that they receive from breeding.

The interactions must also be assessed in terms of technical articulation of the two activities. The fruit itself constitutes an important forage resource. In summer, in *melk* plots, goats swallow the fruits, metabolize the pulp and regurgitate nuts. They are thus appreciated auxiliaries of harvesting and pulping: they make only short periods (agdal is not applicable in *melk* plots), morning and afternoon. They return to sheepfold at the highest heat to regurgitate nuts. The sheepfolds are landscaped and maintained accordingly: the soil is generally cemented and daily scanning nuts keeps them clean. The use of goats for nuts collecting is illegal: this practice derogates from a requirement of PGI argan oil which prohibits certification of oil extracted from regurgitated nuts³. This is a constraint that farmers bypass without difficulty by drying nuts for several days. On one hand the exposure to a dry and warm air eliminates any suspicious smell. On the other hand, the anonymity and complicity of the *souk* ensure their integration into the merchant circuit.

The goat and nuts interactions can also be highlighted in the family labour organization. If breeding is a traditionally a male activity (old and younger are more heavily involved in herding), the nuts "workshop" is fully supported by women and adds new constraints to those imposed by their involvement in regular household tasks. In a chayanovian perspective⁴, the domestic group size, and more specifically, the male / female ratio, is an important limiting factor. The ability to work has a direct impact on the valuation methods of the product. The fruit can be sold in the state after drying or after pulping. Crushing operations and extraction can be performed within the workshop: the oil obtained can then be sold at the souk, short circuits through direct sales or be consumed by the family. Demographic constraints can be circumvented by employing domestic helpers: this option will then appear more frequently in the register of mutual assistance and family solidarity than in the wage relationship pattern. Anyway, the traditional oil industry is based on a labour organization which takes sense at territorial level and which is also largely structured by the *souk*. The families that do not as strongly undergo the demographic constraint can acquire their raw material at the *souk* and then resell there the oil or the pulp and the nuts they have produced. It thus appears that the resilience of territorial productive system also results from the labour organization and its structuring action territorial scale.

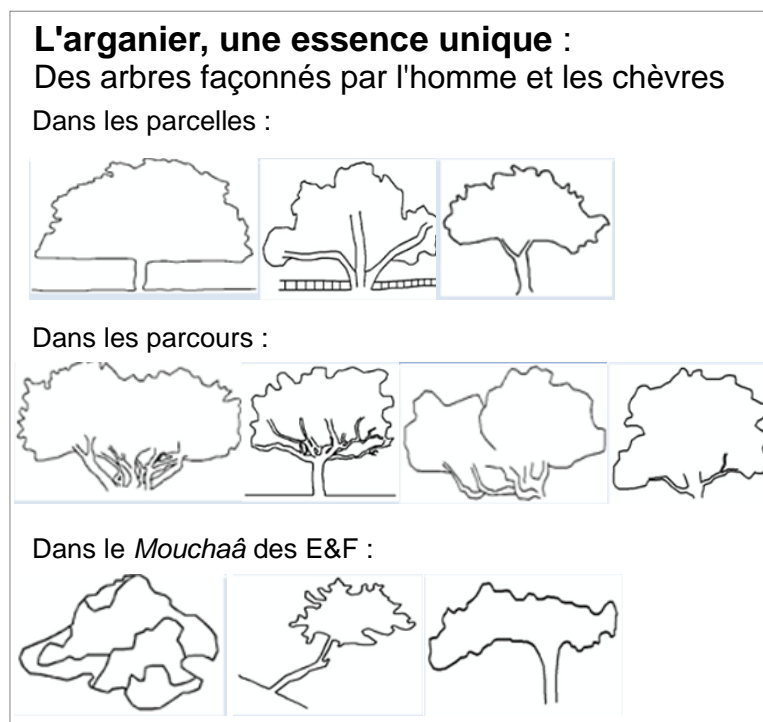
At last, nuts and goats interactions make sense in the construction of the food social space. Here we refer to the concept developed by JP Poulain (2002) and Fischler (1990), but considering it in a socio-technical perspective while Poulain basically connects it with consumers' practices and rituals associated with food. The kid meat is usually associated with festive uses, it is then prepared as *tagine*. It is also found, burned, in the souks and popular restaurants at Smimou and other regional urban centers. Its organoleptic qualities, real or supposed, worth it to be at the heart of a GPI project supported by the National Sheep and Goat Association and its representatives, at Essaouira and Smimou. Argan oil is a scarce product (production requires a lot of work) and now highly valued (the development of cosmetic industries substantially increases the opportunity costs). It is therefore in the full sense an exceptional product ousted from common uses by ordinary oils. Nevertheless, it is ostentatiously used when special guests are received. The incorporation of technical and relational local knowledge, their association with specific uses and rituals (the number and arrangement of dishes, how they are served ...) evidences the place of argan oil and argan kid

3 This requirement probably aims to insure the control of raw material and argan forest at the expense of users and benefit for the cosmetic chain.

4 Referring to Alexander Tchayanov, the author of the *Theory of peasant economy*.

meat in the gastronomic heritage of the argan forest. In this way, both products can be considered as identity products and, therefore, as structural elements of local social cohesion.

Argan forests are part of the royal domain. They are usually ancient tribal territories which are Preserves individual use and inheritance rights. They are then subject to special care from their owners: the young shoots are removed and trees trimmed so as to facilitate access to fruit or foliar feed, optimize shade and allow the harness cultures, they are shaped, finally, in an aesthetic concern. The trees of the Waters & Forests Administration' *mouchaâ* are not subject to any exclusivity and therefore, do not receive any care by local users. The status of these lands located in the heart of the mountains occupying the center and the edges of our study area is the result of an ancient agrarian policy that aimed to settle populations and subtract these lands from the control of the tribes, their segments, and finally the *douars* (Jouve, 2000). These forest areas are basically managed in a conservative and repressive perspective, occasionally marked by regeneration cuts, in accordance with municipalities, and the establishment of a long-term *agdal* designed to ensure forest regrowth. The lack of involvement (and accountability) of local population is reflected in the absence of corollary caring for trees. The contrast between the Waters & Forests' *mouchaâ* and *douar's* finage is striking. Depending on the distance, the first one bears the scars of overexploitation and gives the impression of being totally abandoned. Located below, the *douars'* territories appear as fully developed areas. Trees, in particular, are maintained, protected, carefully cut, shaped by men and animals according to their place in the production system.



Despite all the restrictions, the Waters and Forest' *mouchaâ* is an essential part of the productive system. It's basically a space dedicated to the gathering: forage resources, argan nuts, carob and other products (medicinal herbs, firewood or lumber, materials, etc..). Gathering activities fall squarely within the logic of diversification that characterizes the productive system and explains its resilience: they enable the poorest families to survive and keep on a modest scale, crops and livestock activities and thus, preserve, somehow, their collective identity. This *mouchaâ*, although under the supervision of Waters and Forests Administration remains largely a functionally an un-owned space. The prohibitions of

perennial installations, the lack in local people participation in the management of the *mouchaâ*, poverty and free access for all... do not promote accountability of users, wherever they come from. A situation that is reminiscent of the Hardin's tragedy of the commons (Auclair & Alfriqui, 2012). This important part of the production system is therefore also its weakest link.

The untied GPI of the argan forest

What will be, at the scale of the argan forest and its entire population, the impact of the qualifications processes of argan oil and the argan kid meat on the resilience of familiar and territorial productive systems? The answer will be most likely negative. It is a priori insofar as the qualification system, that is supposed to preserve and enhance the productive system, focuses on a single product, while resilience is based on the arrangement of diverse and complementary activities. The qualification system is inherently dissociative. It is even more that, in this case, the two approaches are managed separately and have not or only marginally, solicited local populations.

Basically, Geographical Indication is an ownership device. Formally, it only covers the product name and the benefit that can be obtained from the reputation and values attached to it. It often may be considered as a development lever: the code of practices prescriptions are supposed to insure the origin attributes while capital, knowledge and incomes flows will ensure economic growth. But, as a corollary its implementation requires technical and organizational innovations, scale changes, a transformation of supply chains, the conquest of new markets and will generate new interests and conflicts. So, the appropriation process does not refer only to the name ownership: it also covers all the technical and relational knowledge that structure the argan productive systems as a whole. So, the analysis of territorial impacts needs to emphasize the collective appropriation building process. It will aim more specifically the study of concrete devices that determine the ownership reconfiguration of land and resources (such as technical or normative changes). Approached from this perspective, the research question can be formulated in the following terms: Does certification allow enhancing and preserving local technical and relational knowledge? How does certification processes impact on local people empowerment? Do they not tend to feed, at the contrary, a dispossession process -a kind of enclosure of biotic and cognitive resources- aimed to instrumentalize and "de-build" local knowledge?

Both GPI are more interested in the name and reputation than by local knowledge and practices that constitute the basis of argan forest's reputation. Thus GPI's argan oil highlights the exceptional virtues of the argan tree by presenting it as exceptional, as a gift of Nature. Thus, it ignores the fact that the argan forest is the product of a long historical, accumulation of kills and work. As a corollary, all the activities associated with nuts collecting, especially goat's livestock is raised in terms of competition and not of complementarities. So, the goat is demonized, stigmatized: aerial grazing can only be detrimental to the development of trees, while historical experience, scientific literature and field observations reveal a symbiotic relationship between trees and goats.

The GPI's argan kid meat does not display such a radical posture because breeders have a major concern for preserving nuts and trees. Goats are products of the argan tree forest and aerial grazing and the pulp and leaves ingestion give to the meat appreciated sensorial and sanitarian attributes (Bas *et al.* 2005). But the GPI exclusively focuses on meat and animal, much less on technical routes and multifunctionality. The ANOC (National sheep and goat association) is in charge of the implementation of the certification project with the support of the DPA (Provincial direction of agriculture). This purpose is to promote the "modernization"

of farms sheep and goats and the "professionalization" of breeders and facilitate their integration into market economy. This aim therefore leaves little space for the involvement of local stakeholders in the formulation of technical choices or for implementation and, much less, for valuation and adaptation of local knowledge. This is even more the case that, according to ANPC's appreciation, breeders usually have a "passive" (Outmani *et al.* 1999) attitude. In its original formulation, the GPI specifications do not refer to local production practices but mainly to short term economic criteria. The objective is to increase production by improving performance of individual animals to satisfy an expected growing market (tourists and urban middle classes). This goal is difficult to reconcile with the requirement of preserving and strengthening territorial anchoring of livestock activities and resilience of productive systems. Technical support provided by ANOC to the "project group" refers essentially to prophylactic measures and support for complementation of animals. Its technical support action in the management of races focuses on the phenotype (the color of the dress) and does not take into account the identification and strengthening animal skills. The AMIGHA has not achieved its objectives regarding the establishment of a specific chain destined to dominate the collection and market nuts. The 25 women's cooperatives⁵ affiliated to the association must buy nuts at Souk, so they do not maintain any direct relationship with the tree and the forest. Therefore they cannot ensure the traceability required by the GPI. Their activities are limited to the crushing and grinding of nuts and partly in oil extraction (Faouzi, 2012).

Both qualifications devices follow a top-down approach largely based on the action of external aggregators. This is partly due to the scale and projects ambitions. The argan oil denomination area covers about 850000 hectares and more than two million people. This is also due to the absence of democratic -social or professional- local organizations. Moroccan government policies have always tried to encourage agrarian individualism and to impulse market economy to limit the power of the tribes and their segments (Bouderbala, 2013). On the other hand, public policies do not have the means to provide direct assistance to all producers. Priorities must be set and diffusion channels of innovation must be identified. In the second pillar of the Green Morocco Plan, the aggregator plays an essential role: it is supposed to function as a relay between producers, on the one hand and, on the other hand, the administration and the market. This is often an industrialist, a rich producer, a local notable...⁶ who are frequently part of local conflicts and the struggles for the appropriation of collective resources, as well land as life and cognitive resources⁷.

Under such conditions these externally driven projects fail to find the necessary support in the local population. GPI argan oil, as we have seen, had set up cooperatives because they could not (or they refused to) rely directly on farming families. The fate of the argan kid meat project rests entirely on a local project group set up with the support of a local notable. The group brings together 37 members: it is really very little compared to some sixty miles

5 About 1000 members, 200 families and 100,000 argan oil liters a year.

6 "The Green Morocco Plan was built on the principle of aggregation as a tool for agricultural development, its implementation lies in creating a win-win partnership between the upstream production and downstream business and / or industrial. [...] The aggregation is a suitable workaround for the problem of the small size of farms and to cope with the lack of organization in the agricultural sector. ("http://www.ada.gov.ma/Plan_Maroc_Vert/plan-maroc-vert.php, consulted on 10/20/2013).

7 <http://www.agriculture.gov.ma/pages/le-modele-de-lagregation> (dicember 2013.).

breeder that account Tamara region. The group receives the full attention from the DPA and the ANOC: it profits exclusively of the DPA technical and economic supports and had received in 2012 -a bad year for cereal production- half the stock of barley to be sold at subsidized prices to all farmers in the region.

Finally the impact of Geographical Indications on configuring collective resources appropriation processes and also relates to the devices for local regulation. This concerns in particular the *souk* and its territorial anchors, its responsiveness and its role in economic activities organization. Our observations show that it is an essential relay both for the industrial cosmetic supply chains of argan oil and for the valuation of end and intermediates products from the traditional sector. The construction of an autonomous nuts supply system, keyed on women's cooperatives, seems to have definitively failed. Similar comments can be made about argan kid meat. Its commercialization is entirely controlled by agents of the souk that are not willing to give up their prerogatives. They refused to adapt the Smimou's slaughterhouse to technical and relational requirements of GPI. A new slaughterhouse will be built close to the former, we can bet it will soon buy animals from the souk and will struggle to establish the meat traceability.

The territorial authorities -the *caïdat* and municipal presidency- are closely linked to the Ministry of Interior. This is also the case, in a different register, of the Regional Waters and Forests Administration. All these authorities are indirectly involved in the establishment of Geographical Indications. The *caïdat* is a little challenged authority. This is due to its local roots, to its role in the settlement of disputes (especially linked with land), to its relay position with the Ministry of Interior and the king, and to its comprehensive, pragmatic and realistic approaches of negotiation and compromise. *Caidat* probably weighed on relaunching the IGP argan kid meat project. Territorial authorities, under the *caïdat* leadership closely resonate with souk's interests⁸: they are heavily involved in the construction of the new slaughterhouse.

8 It should be noted that the souk is a major focus of surplus levy (control over a long period of grain stocks and, more importantly, argan nuts). Nuts storing (they can be kept for two or three years) opens a wide field for speculation. The new slaughter will not adversely affect the interests of the souk. At a contrary, it will expand costs without improving sanitarian norms; it will introduce a gap between GPI and traditional chains but will likely open new options for speculation at the expense of consumers and non-affiliated farmers.

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