

Connecting Malagasy forests to international spice trade, intermediaries work and networks

Queste Jérôme

Rabe Santatra Fanambinaina

Rakotomalala Lova

Forests are usually referred to as providing wood, CO₂ storage and scenic landscapes. They also contribute to economy through provision of Non-Timber Forest Products (NTFP) such as honey, mushrooms, spices, perfumes and medicine. In developing countries, harvesting NTFP has long been an essential resource to neighboring individuals with limited capital and access to land. Globalization allows now such products to reach niche markets in developed countries where they are tagged as exotic, endemic, or more recently organic, equitable or sustainable.

On one end of the supply chain, NTFP harvesting activity is framed in a rural sociotechnical configuration. Fruits, leaves or roots collected are common goods, access rights are ambiguous, and forest landscape makes it difficult to monitor anything. Harvests are done occasionally. What is collected depends on what Nature is kind enough to give. Due to the lack of infrastructures, circulation of people, goods, money and information is a challenge in itself. On the other end, these products reach consumers in supermarkets and specialized shops in standardized packages. They comply with international regulations and contribute to taxes as any manufactured or locally grown product. In between, the effective organization of these supply chains is still largely unknown. How do local traders deal with significant uncertainties on these products availability, quantity and quality? How the successive transactions are framed? How does trust develop in absence of any formal institution? How are the economic circuits maintained, How are natural things harvested in natural ecosystem are transformed into commercial products circulated in international trade?

Our research focused on the wild pepper of Madagascar export supply chain. This spice was “discovered” by French chefs less than 10 years ago. Its taste, smell and its exotic origin led to a rapid development of a highly profitable export circuit. Its harvest, however, proved destructive to its natural ecosystem as it requires in most cases the tree to be cut. The Tsiperifery supply chain rapidly developed on an existing complex network of other NTFP economic circuits. Harvesters, intermediaries and exporting companies were investigated in four different regions to bring both an understanding of the circuits’ organization and an evaluation of their economic efficiency in terms of revenue generation and equity.

This research confirms the central role played by local traders called collectors (“*collecteurs*”). Using grounded theory analysis, we were able to highlight the qualities required to trade Tsiperifery such as trading expertise, information, networks and access to large amounts of cash. Intermediaries’ work is essential to connect circuits and maintain circulation of the product itself, of money and of information. These three items circulation relies on an existing infrastructure made of public transportation, social network, trust and institutional bricolage that connects remote location in Malagasy forests to the global world.

Further research should pursue investigations on the other half of the supply chain, from the harbor of Toamasina, Madagascar to specialized spices shops and chefs in developed countries.

Non-timber forest products trade in Madagascar

Forests are usually referred to as providing wood, CO₂ storage and scenic landscapes. They also contribute to economy through provision of Non-Timber Forest Products (NTFP) such as honey, mushrooms, spices, perfumes and medicine. In developing countries, gathering NTFP play a critical role by providing food and income to “the poorest of the poor” in rural areas (Neumann & Hirsch, 2000) This activity is usually not the main source of income and food but provides a safety net to vulnerable populations during hunger seasons between harvests. It should be however noted that even thus NTFP may provide significant economic activity, it does not always reduce poverty as powerful actors tend to take control of the resource and the revenues once it has been assessed that money can be made (Dove, 1993).

NTFP may reduce poverty when commercialized at least at a local level. Globalization could allow taking this commercialization from local markets to diverse and potentially lucrative niche markets all around the world. These niche markets include pharmaceutical molecules and spices. However, such a journey from forest to fine gourmet groceries is not an easy one. (Pandey, Garg, Malhotra, & Pandey, 2007) identified four economic factors limiting the ability of NTFP to reduce poverty: overexploitation of open-access resource, limited access to market, erratic control of quantities and qualities and finally the capture of the major part of the benefit by intermediaries.

Maintaining both quantities and qualities of exported spices is a recurring issue in Madagascar. Insiders refer to the big island as “*the land of samples*” to mock the differences between in quality of the sample used to initiate the export transaction and the final lot sent later on. At the same time, local journalists recurrently denounce speculative practices of intermediaries. An urban rumor even pretends that national roads are intentionally left in a catastrophic state to reduce access to markets and maintain high profits for inter-cities trade of agricultural products, making of Madagascar an “*Economy of intermediaries*”.

This study was conducted under the assumption that these factors are no fatalities but may be overcome by public policy instruments and private sector coordination instruments. In the first category may be found infrastructures, capacity building, and a better framing of occurring transactions. In the second category, quality-driven organization of the supply-chain and ethic certification may potentially benefit to all and therefore be of interest by private companies. Such actions require however, a better understanding of the effective organization of these supply chain. Based on preliminary investigation, we did formulate the hypothesis that intermediaries, those who are accused of speculation and degradation of the quality of the products, play a central role in the supply chain. Therefore, it seemed relevant to spend some time and resources to better understand

who they are, what their activity looks like, what are their values, logics and how they influence the supply chain efficiency.

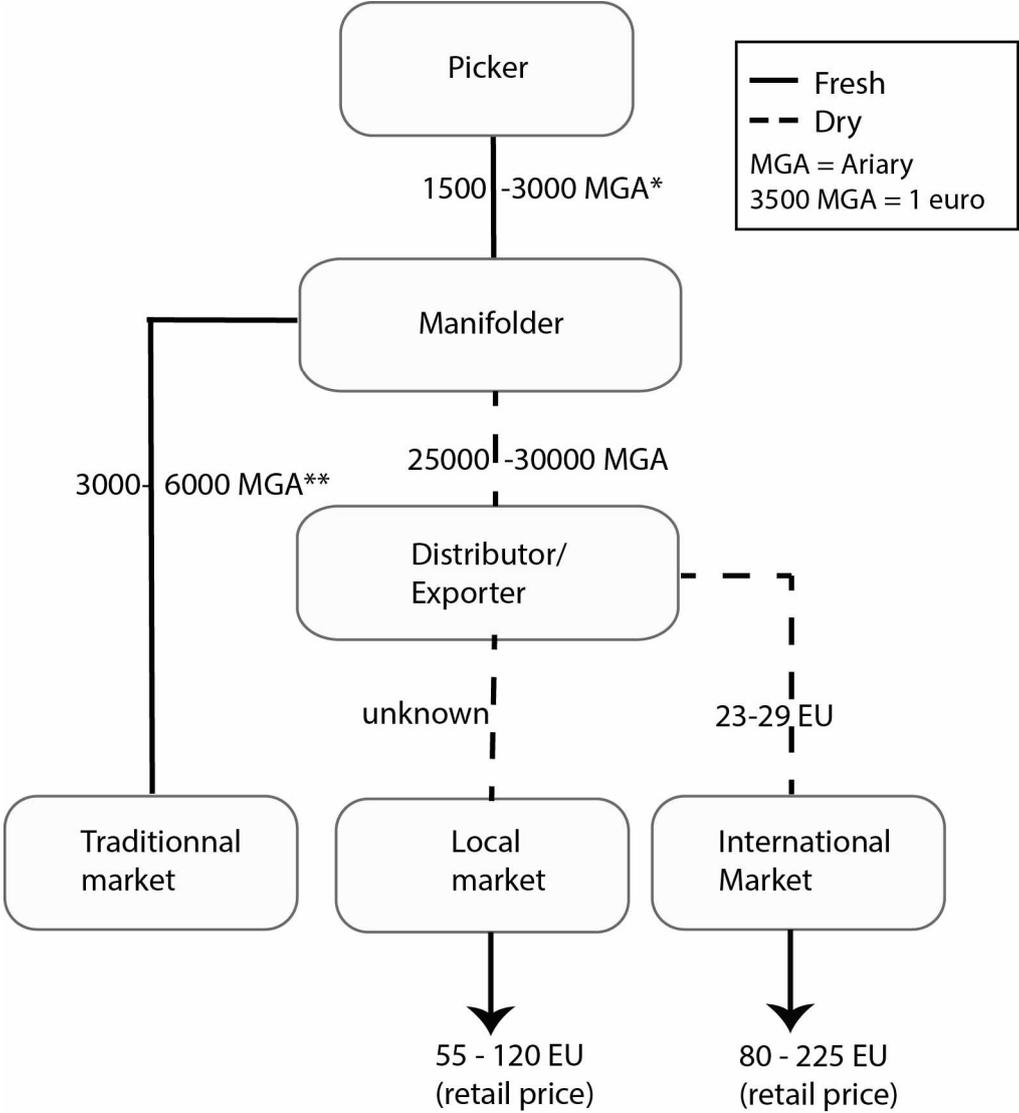
Tsiperifery (Wild pepper), an emerging high-value spice

The NTFP we choose to track is an endemic wild pepper emerging rapidly on the international spices market. Tsiperifery, or Voatsiperifery (the fruit of tsiperifery in Malagasy language) has been gaining a growing gourmet notoriety due to its unique organoleptic properties and its exotic origin (Razafimandimby et al. 2017). In Madagascar, a dozen export companies started to search for these fruits and trade it overseas toward specialized traders mostly located in Europe. Our latest inquiries reported Freight-On-Board (FOB) prices ranging from 20 to 40€ - a price roughly equivalent to an average monthly wage (100.000 ariary) for a kg.

Unfortunately, tsiperifery is not easy to exploit. It is a wild liana that climbs up to 10 m high on large trees in rainforests on the East coast of Madagascar. Although this liana could be spotted in a wide area, from Toalagnaro in the South of Madagascar to Antsiranana in the North, it could be accessed only in remote forests. Because fruits are too high from the ground to be picked easily, most pickers tend to cut the tutor to harvest the fruits more easily, damaging the forest ecosystems and endangering the survival of the species. Recent inventories in original picking areas of Ambongamarina and Tsiazopanira indicated a near-disappearance of female lianas.

Tsiperifery supply chain is very young. Commercial exploitation started in 2010. Preliminary investigations suggested that this supply chain organization was close to other NTFP supply chain organizations, with three levels of actors (pickers, handlers and export companies), quality and quantity issues and a very unequal distribution of the added-value (Razafimandimby et al. 2017). These researches proved helpful to describe the added value distribution, to identify direct actors of the sector and to formulate hypothesis but failed to explain the reasons of such a structure.

Figure 1: Structure of the sector and retail price scale (ariary/kg) for fresh and dry *tsiperifery* in the picking catchment of l'Angavo in 2015.



Investigating the Tsiperifery value-chain

The research we conducted aimed at better understanding the way these intermediaries, those everybody accuse of speculation, fraud on quality and intentional degradation of infrastructure, work, how they interact with the other actors of the sector, including other intermediaries and, through their action, contribute to the effective circulation of goods, money and information despite dysfunctional infrastructures (Cholez & Trompette, 2015). Because little information was available on this quite

elusive and secretive population, we did adopt an inductive approach based on grounded theory analysis (Glaser & Straus, 1967). Data was collected through semi directive interviews conducted with intermediaries, pickers, exporters and institutional actors on six different districts of Madagascar. Qualitative data analysis could be crossed with preexisting data and participatory observation. Two distinct analysis were conducted. One used a model of economic transaction suggested by Dufy and Weber (Dufy & Weber, 2007) to identify the elements that contribute to the framing of the interaction between pickers, intermediaries and exporters. The second extracted a set of variables from the interviews transcripts to identify what are the most significant elements of the profession of intermediaries. What makes a good (or a bad) tsiperifery intermediary? What does matter in the profession? From these variables, we tried to come up with some sort of typology of intermediaries. During the two-month investigation however, only 23 intermediaries could be identified and interviewed. This small number makes unfortunately statistical treatment of the data only indicative.

The first level: what do gatherers sell? Fruits or workforce?

A first result is a fine characterization of the transaction through which intermediaries obtain tsiperifery fruits from pickers. These transactions are characterized by the fact tsiperifery is still largely unknown in Madagascar and has not been consumed by local villagers. Therefore, it is not usual for forest dwellers to pick these fruits. The first chronological step is for intermediaries to inform potential pickers that he is willing to buy some quantities of tsiperifery. To do so, he attends weekly markets in villages in the vicinity of rainforests and looks for forest dwellers who would have heard of this plant or who would already pick these fruits. Once he finds potential pickers, discussions on the expected price, the amount to be bought and the delivery planning may start. A social bond is tied between the intermediary and the dwellers, some advance payment may occur on rare occasions but this does not mean that any form of exclusiveness is still expressed. In the village, the information that some traders are looking for tsiperifery spreads and other dwellers may decide to pick some tsiperifery without and explicit order.

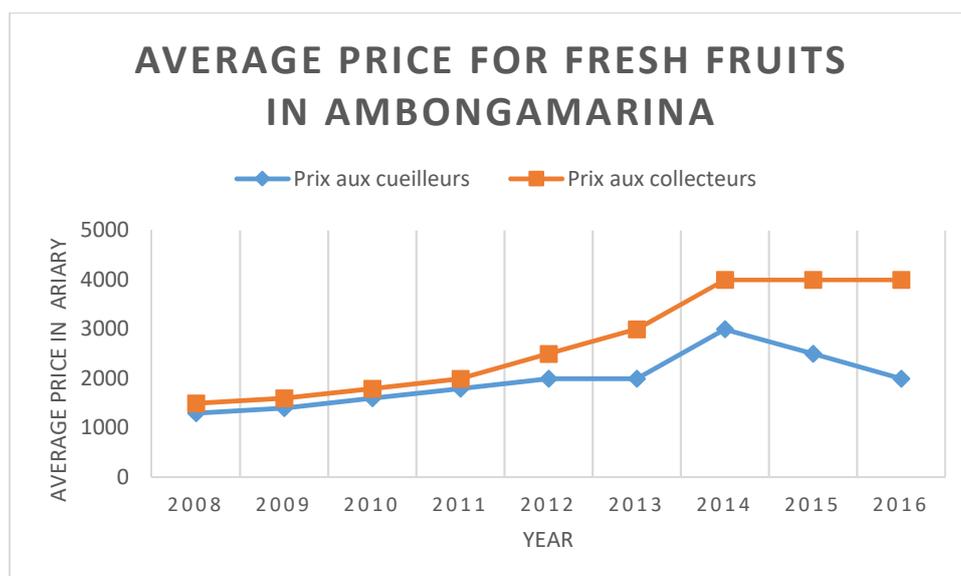


Picking tsiperifery is a difficult task. It requires long hours of forest walk, climbing or cutting trees and fruits transportation. Because most Malagasy forests legal status is unclear, tsiperifery is an open-access resource and pickers may not find any liana if some other pickers came before them. The legal status of tsiperifery is itself unclear and some pickers fear to be caught by police officers for harvesting some forbidden protected vegetal species. Forest dwellers remain quite elusive about where they picked it. Just like mushroom gatherers in Europe, they tend to keep their tsiperifery spots secret. For dwellers, tsiperifery is not a product they will consume, transform or stock. Picking is done one or two days before the rural market day in order to sell their harvest fast before it rot or before they are caught with it. Most transactions occur at the market. Some intermediaries pay “sub-handlers” to intercept tsiperifery carriers on their way to the market to buy the products before competitors and on a lower price. The money paid is directly spent on the market to buy rice, groceries and small products such as batteries or farming tools. The price paid depends on the weight. The price per kg is raised or lowered depending on the quality of the stock sold. Rotten and immature fruits are sold cheaper.

The quantities traded are less than what a man can carry on his back. A big bag of 20kg of fresh tsiperifery can be bought for 50.000 ariary – 10 notes of 5.000 ariary, about half a month of an average wage. A decent sum in a rural market but not a fortune to die for.



Two aspects of this transaction are worth noticing. First, the price is indeed set by intermediaries who meet on occasions and exchange information on each other expected prices and quantities. Competition between intermediaries does not lead to a war on prices. On the contrary, intermediaries tend to match their colleagues prices. It is considered fair to short-cut a colleague by posting a sub-handler on the way to the market but it is not considered proper to buy at higher prices than the other intermediaries. On the Ambongamarina market, this collective strategy allowed intermediaries to contain purchase price increase over time.



The second dimension worth noticing is the mandatory aspect of transactions. Both intermediaries and pickers insisted that under no circumstances could a buyer refuse to buy a lot of tsiperifery, even if he did not order it. If one were to do so, he would endanger his reputation badly. Such behavior would be considered an insult and could lead to violent reactions from pickers. This mandatory transaction lead us to question the nature of the transaction. From the pickers perspective, what is traded is not a product or a good they sell. Tsiperifiery picked in the forest does not really belong to them and they are not confident to sell something they did not grow or produce. At this point, it seems dwellers are paid for a picking service more than for fruits they can't claim ownership on. Adopting this perspective explains why transactions are mandatory: The picking work has been done and should be paid subsequently. The price paid, however, does not depend on product scarcity or buyers willingness to pay but on an estimate of the amount and the intensity of work: The price may increase, not because the fruit is scarce but because picking it requires more work and more time to walk.

The second level: Entering formal economy while losing traceability

Once bought to forest dwellers, intermediaries may sell either fresh fruits or dried fruits to exporters. This second transaction is critical as it marks the entrance of the tsiperifery in the formal economy. This transaction usually starts before the picking season. Exporters and intermediaries exchange phone calls. The intermediary is supposed to announce the quantities he could get, the exporter the price he could pay. At this stage, intermediaries may resell each other's products. Once the picking season starts, exporters place orders for a fixed quantity and usually grand partial advance payments. Intermediaries use this money to buy tsiperifery in rural markets and resell it with a margin. Quantities may be adjusted and the price may be lowered if the quality of the lot is not considered satisfying. At this stage, a buyer may refuse a transaction.

Quantities traded at this stage are significantly bigger. A typical transaction is a delivery of a few hundred kilos of dried fruits in exchange for several millions ariarys, an amount of money that requires a small bag to conceal and is not safe to walk the streets with.

Intermediaries should hold a professional card and pay local taxes at municipal level and regional level. In practice, only one out of four did follow these rules, the other either bribing officials or using collective transports to dodge economic barriers. In order to sell their products on the international market, exporters however have to bend to international regulations and to comply with administrative constraints. They hold a gathering license and are supposed to be able to assess the

region of origin of the products they buy. The Malagasy state asks them to collect a 10% Value Added Tax from intermediaries. In practice, this means that they have to keep track of their purchases and pay 10% of the amount to the Public Treasury.

Intermediaries evaluate the quality of the tsiperifery they buy visually. They empty the bags to assess the maturity of the fruits and the absence of rotten fruits. Exporters do the same. When a lot arrives in the warehouse, it is inspected visually and manually. The size of the fruits, the absence of rocks, nails or pieces of wood, the ratio of rotten fruits is evaluated, the price may be lowered or some parts may be refused. Quality assessment when exporting is stricter. Samples have to be analyzed by neutral laboratories to assess the absence of bacteria such as salmonellas or chemical hazards such as pesticides. Once the tsiperifery enters the exporter's warehouse, its weight, quality, and sanity get recorded and a traceability assessment mechanism may be set into motion.

Unfortunately, it is at this same moment that most relevant information to be traced disappears. Intermediaries must buy everything, including immature and rotten fruits. They then have to try to sell everything, including immature and rotten fruits. To do so, they use different techniques to make poor quality fruits more difficult to identify. The easiest and fairest technique is to dry the fruits. Once dried, it is difficult to identify visually if the fruit was picked immature or mature: Drying the fruit will change the color, from red to brown for mature fruits, from green to black for immature. Another tactic to cheat the quality assessment is to blend large quantities of good quality tsiperifery with small amounts of bad quality tsiperifery. Other techniques include washing the rotten fruits with vegetable oil to make them shine and add some chemicals to remove the spots from the rotten fruits. The first key information for quality assessment, the maturity of the fruit picked, has been washed away.

The other information that could be relevant to track is the geographical origin of the fruits. Some evidence indicates that the taste of the tsiperifery could depend on the region of origin. Some exporters have started targeting tsiperifery from specific areas. Also, setting up ethical labels that would include a sustainable harvest quotas require the administration to be able to identify the area where each lot was obtained. But for intermediaries, the area of origin is an essential information to be hidden. They may have spent years finding new pickers in rural markets and developing social networks and do not wish to see fellow intermediaries compete with them on these rural markets. Secrecy is one of the essential dimensions of rural products trade. Geographical origin of tsiperifery is well known of intermediaries as they know where and to whom they bought their stock. But this information cannot be written down.

Profession “collecteur”

We were therefore able to confirm our main hypothesis, that these intermediaries play a central role in the circulation of tsiperifiery from rainforests to the airport of Antananarivo and the harbor of Toamasina. We wished however to dig a little deeper to understand what it means to be an intermediary tsiperifiery reseller. Using grounded theory analysis, we came out with a short list of key features of this quite confidential profession.

First feature are the local recognition. Most intermediaries gather their products in a small district, less than a dozen of municipalities. Most of them have their family cave there, either live there or have some family that does. They have a good knowledge of this area, of the different villages. Their social network includes some people who can monitor the products available on the markets, some who can speak on their behalf, whom they trust enough to buy in their name, and some to transport it. They are also well-known in these areas. They are identified as traders, as people who carries significant amount of cash and is willing to give it in exchange for diverse products.

A second feature is the trading capacity. All intermediaries interviewed define themselves as traders. Tsiperifiery is only one of many products they buy, transport and sell. Some operate local groceries and sell both to the villagers and from the villagers. Such a situation is convenient as raw NTFP may be directly traded in exchange for basic products and inserted in a long term commercial relationship. Other intermediaries gather pretty much anything they can sell with a decent price, from agricultural products such as beans and rice, NTFP such as honey and medicinal herbs to wood logs and less legal things such as lemur meat and crawfishes. In rural villages and in cities, they are well-known as traders and their reputation does matter. Reputation is not everything. NTFP also require the ability to store, transform and transport products. Storage requires owning or having access to one or several well-guarded warehouses. Transformation at this stage mostly means that some family members, usually woman will dry the products in the sun on the floor. The ability to transport products in decent quantities from rural villages to cities is more essential to the profession. In Madagascar, the extreme state of the infrastructures makes transportation of products a daily challenge. Moving large amounts of NTFP from a village to a city requires to solve a complex equation that involve trucks, mini-buses, drivers, assistant drivers, gas, but also spare parts and technicians for maintenance and to fix broken engines, spare tires, peasants with shovels to fix dirt roads, places to stay at night and small restaurants.

Reputation and accounting skill is not enough. Tsiperifiery intermediaries also develop complex social networks. Our research highlighted the fact that even thus tsiperifiery may on some occasions be

traded on a “one-shot” opportunity, most transactions are indeed embedded in dense social networks that constitute a **third feature**. (Granovetter, 1985). The first type of network is the family network. As said earlier, most intermediaries have family members in their gathering area. Malagasy concept of family is not limited to nuclear family but extend to descendants of a common ancestor. Families also include members of the family in law, close relatives, some schoolmates and old close friends of other family members. Families have boundaries and conflicts between families may occur and last long. Involving family members in business relationships is very common in Madagascar. Family network provide trust and long-term mutual engagement.

Intermediaries social network extend beyond family networks to “friendship” social networks. To our understanding, friendship in rural areas of Madagascar is a relation that develops over time. Long discussions about family, life trajectory and values allow potential “friends” to know each other. Then small transactions allow them to test each other’s trading skills and reliability. Trust and mutual respect develops through successful transactions. Social bound and business relations seem to reinforce each other and it is unclear whether intermediaries trade with friends or make friends with their counterparts.

When asked to define what a “good” intermediary is, a **fourth key aspect** comes out: A good intermediary is the one that does not takes advance payments. The demonstrated ability to raise large amounts of cash is both an asset for trading products and a proof of success. An intermediary with accounting problems may be put in a position where he cannot buy the products that are proposed, or cannot pay for what he ordered. He will then need to call exporters, make some offers and accept advance payments before to start his gathering campaigns. Doing so, he loses his liberty to sell his products to the better bidder, to buy when the prices are low and to speculate on the sale. Intermediaries evaluate economic actors, exporters and fellow intermediaries based on their buying power. In Madagascar, banks may grant loans to formal economic actors but this financial system is not accessible to informal and rural actors such as these intermediaries.

NTFP gatherer profession evolution

How does this profession and the overall organization of the tsiperifery supply chain evolve?

On an individual level, we could identify that 3 out of 4 intermediaries develops strategies to sell tsiperifery whatever its quality is and to remain hidden from the administration in order to skip taxes and administrative constraints such as sustainable exploitation quotas, traceability and quality assessment. We found however that the last fourth of our sample develop strategies to improve

traceability, administrative recognition and quality assessment. Only 2 out of 23 intermediaries do actually refuse to buy poor quality tsiperifery. Doing so, they build a reputation of poor buyers but are able to generate much better margins by selling quality patches of tsiperifery for a much better price (about 4 times higher). Only 4 out of 23 do have a professional card, pay local taxes and provide geographical origin information when selling their products to exporters. This strategy has two goals. One is to generate better margins by selling for a better price a product to exporters who do not have to cover up for them (about 2 times higher). The other is to enforce administrative constraints that existing intermediaries will not be able to follow in order to take them out of the business.

On a collective level, two formal organizations operate that attempt to circumvent the intermediaries. In Anjozorobe, a local NGO has set a transformation workshop in the direct vicinity of rainforests. This NGO buys fresh tsiperifery directly to several associations of forest dwellers for a better price. In Fenoarivo, on the Est coast of Madagascar, a farmers cooperative integrates vertically all steps of the supply chain, from fruit picking to export. To some extent, we were able to calculate the added-value distribution of the three distinct organizations. Results indicate that the cooperative model is quite interesting for pickers, while the difference between the NGO and a conventional intermediary is less obvious.

ACTEURS	Zones	Organisation libérale				Groupement GIE			Coopérative
	Séchage par →	Frais	Sous-collecteurs	Coll.	Export.	Frais	Cueill.	GIE	Cueill.
CUEILLEURS (Cueill.)	Amb.	17		17	17	18	28	18	100
	Anj.	11	11	11	11				
	Mor.	14	14	14	14				
SOUS-COLLECTEURS	Anj.	3	11	17	3	Groupement Sahanala			
	Mor.		14	17					
COLLECTEURS (Coll.)	Amb.	9		11	9	Vente aux Exportateurs			
	Anj.	11	6	17	11	24	12,4	24	
	Mor.		6	17		Exportation par le GIE			
EXPORTATEURS (Export.)		77	72	72	77	82	72	82	

Some elements of conclusion

Trying to tie the pieces together, our study confirms that intermediaries connect rainforests dwellers in rural markets and urban exporters in major cities. Their local networks and reputation, their master of transportation and their social, technical and financial capacities allow them to conduct trade in both spaces and to maintain open the trade routes between them. Tsiperifery is only one of many such economic circuits. Intermediaries are not the one who overexploit forests, pick immature fruits or let

them rot. The degradation of the quality of tsiperifery may be traced to forests dwellers picking practices. However, the unique relation between pickers and intermediaries plays an essential role, as intermediaries conceal the consequences of these practices and pay the pickers for them. [COMMENT TRADUIRE LE TERME RECEL?].

A key to this problem seems to be this bizarre transaction when intermediaries pay for something that is between a picking service and a product that is the result of a picking activity. The ambiguity of this poorly framed transaction does not encourage the pickers to improve their practices, as they get paid whatever they do, and puts intermediaries in an embarrassing situation where they are forced to pay for a poor quality product they will have difficulties to resell. An effort to clarify these relations could prove useful. But the solution to implement should preserve the intermediary reputation and secure the pickers revenues. Such a solution is still to be found.

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