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▶ **To cite this version:**

Serge Svizzero, Clement Allan Tisdell. The Persistence of Hunting and Gathering Economies. Social evolution & history, 2015, 14 (2), pp.3-26. hal-02150099

HAL Id: hal-02150099
https://hal.univ-reunion.fr/hal-02150099v1

Submitted on 7 Jun 2019

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The Persistence of Hunting and Gathering Economies

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ABSTRACT

After agriculture commenced ten thousand years ago, hunting and gathering economies are supposed to have shrunk rapidly, almost vanishing except in areas unsuitable for cultivation. We demonstrate that, even after the diffusion of agropastoralism, some of these economies persisted until recent times and some even survive nowadays. We develop three main arguments. First, foraging should be viewed as a possible optimal alternative to farming. Second, some foragers were involved into a dual economy in which they traded with farmers. Moreover, food procurement (gathering and hunting) and food production were combined by some groups of people. While these mixed-economies are often perceived as a necessary but temporary and an unstable stage in cultural evolution, in some cases, they proved to be a stable end-point or to be sustained for a very long time. Third, it is argued that some hunter-gatherers did not adopt agriculture owing to their values, beliefs and institutions.

1. INTRODUCTION

The shift from foraging to farming first occurred in the Levant, around 10,000 BC, and was one of the major events in the evolution of human societies. At its roots was the shift from humankind's reliance on wild plants and animals to dependence on domesticated plants and livestock. Since Childe's (1936) seminal work, the task of explaining the transition of hunter-gatherers from

Social Evolution & History, Vol. 14 No. 2, September 2015 3–26
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food procurement to food production had been a major challenge for anthropologists, archaeologists, and historians and as well it has recently attracted the attention of economists (Weisdorf 2005; Svizzero and Tisdell 2014b).

The commencement of agriculture in the Neolithic period is seen by many writers as heralding the commencement of civilisation because agriculture subsequently was able to support significant urban settlements and much later, the Industrial Revolution. From the eighteenth and nineteenth centuries onwards, many famous authors – economists (*e.g.*, Smith 1776) as well as anthropologists (Morgan 1877) – have adopted such a serial vision to describe the evolution of human societies. For instance, Adam Smith (1776, 1978) described the economic development of human societies as following a successive four-stage process: hunting and gathering, pastoralism, agriculture and finally trade.[1] According to this vision of social and economic evolution, which proceeds through all stages serially with rapid and complete transition from one stage to the other, hunter-gatherers (HGs hereinafter) should have disappeared. This could have occurred either quite rapidly, just after the Neolithic revolution or, as hypothesised by Richerson *et al.* (2001), in the long run because agriculture becomes compulsory owing to the 'competitive ratchet' of inter-group competition.[2] What is certain is that while the entire earth belonged to HG until the Neolithic revolution, HG societies have all but disappeared within the last 10,000 years. They formed 1 per cent of the population in AD 1500, and they accounted for 0.001 per cent in 2000 (Zvelebil and Pluciennik 2003). Although some current HG societies – such as the !Kung and Hadza – are widely studied and frequently viewed as living examples of 'Stone Age peoples', they are also considered to be representatives of a vanishing way of life.

Several variations of the definition of HGs exist in the literature, but without loss of generality we can consider the following one provided by Panter-Brick, Layton and Rowley-Conwy (2001) as being typical:

> Hunter-gatherers rely upon a mode of subsistence characterised by the absence of direct human control over the reproduction of exploited species, and little or no control over other aspects of population ecology such as the behaviour and distribution of food resources.

However, this minimal definition is only the starting point in defining hunter-gatherers. Indeed, recent anthropological and archaeological research has brought a more nuanced understanding of the issue of who the HGs are and why they have persisted (Lee and Daly 2004). Despite their shrinking number, as a percentage of the world population, HGs in recent history have been surprisingly persistent. As recently as AD 1500, HGs occupied fully one third of the globe, including all of Australia and most of North America, as well as large tracts of South America, Africa, and Northeast Asia. As noted by Diamond (1997: 105), 'There exist many actual cases of hunter-gatherers who did see food production practiced by their neighbors, and who nevertheless refused to accept its supposed blessings and instead remained hunter-gatherers'. Even nowadays, HGs are still persistent. For instance, Indigenous peoples throughout the Arctic maintain a strong connection to their environment through economic practices, such as hunting, herding, fishing and gathering renewable resources, which provide the basis for food production and have endured over thousands of years (ACIA 2005: Ch. 12). Therefore, and as stated by Lee and Daly (2004: 2),

> Hunter-gatherers live on, not only in the pages of anthropological and historical texts, but also, in forty countries, in the presence of hundreds of thousands of descendants a generation or two removed from a foraging way of life, and these peoples and their supporters are creating a strong international voice for indigenous peoples and their human rights.

Indeed, HG societies are a fraction of the 370 millions of Indigenous peoples (United Nations 2009: 7) for whom issues are discussed through a permanent forum of the United Nations.[3]

This leads to many important queries such as the following ones. Why did some HGs not adopt agriculture? Is it because they ignored it, or were unable (for ecological, cognitive, institutional or cosmological reasons) to adopt it? When HGs adopted some aspects of the Neolithic package, why did some not give up foraging completely and instead developed trade with farmers and/or adopted various forms of mixed-economies? After HGs began to rely on domesticated plants and livestock, why did some of them become farmers while others continued as social entities relying on hunting and gathering?

It is the aim of the present paper to conduct – from an economic point of view – an analysis of the reasons for the persistence of hunting and gathering economies, in past as well as in recent times. A central point in our study is that HG economies encompass a wide range of subsistence strategies and economic organisation, varied types of socio-political systems, differences in group size, variations in their degree of mobility, and many other key factors. While the literature on HGs usually indicates that these societies were diverse, it often fails to capture the full extent of their diversity (Svizzero and Tisdell 2014a).[4] It is suggested that this diversity increased with the passage of time and was shaped by the varied local eco-geographic conditions (local resource endowments) in which these societies existed and by the contacts with other non-foraging societies. Thus, it has been acknowledged in recent years that contemporary hunter-gatherers, rather than representing forms of organisation that evolved during the Palaeolithic and persisted unchanged ever since, are the products of continuing evolutionary processes and, in some cases, of interaction with other populations, including agriculturalists and even, in recent times, centralised states.

The paper is organised as follows. First foraging is examined as an adaptation to environmental conditions and the relative attractiveness of foraging and farming is discussed. Some HGs instead of becoming farmers developed a dual economy: they continued to forage but traded with agriculturalists and this resulted in their increasing economic specialisation. Others developed mixed economies based partly on foraging and horticulture or partly on pastoralism. These mixed economies provided in many cases to be very persistent and in some cases, were almost stable end-points in cultural evolution. Each of these aspects are examined in turn, before considering behavioural and institutional constraints which increased the persistence of several hunting and gathering economies.

2. FORAGING AS ADAPTATION TO ENVIRONMENTAL CONDITIONS

After Diamond (1997), the various paths of different societies towards the adoption of agriculture among societies were widely explained by differences in geographic and biogeographic conditions. Geographic conditions include climate, latitude, soil, rain, orientation of continental axis (...); biogeographic conditions

consist of edible plants and animals suitable for cultivation and domestication. Many subsequent works, following Diamond's publication, have tried to verify the importance of these conditions as factors influencing the occurrence of the Neolithic transition and in promoting the further economic development of the regions concerned (Olsson and Hibbs 2005). In some areas, the diffusion of agriculture has been hindered by geographical conditions (hills, mountains, rivers, seas). In some other areas, it has even been stopped by disease – in sub-Saharan Africa, cattle herding was not possible due to the presence of tsetse fly – or by ecological barriers, that is places where plants and animals reached their tolerance limits.

The Environmental Determinism

According to this approach, the existence of agriculture as well as the persistence of foraging is dependent on environmental determinism. While HGs were positioned by scholars for a long time at the lowest rung of the evolutionary ladder, in recent years, they have been increasingly perceived as ecological peoples occupying a special niche. Thus, foraging can be seen as a way peoples are able to survive in ecological niches that are either unsuitable for agro-pastoralism or where farming provides a lower return than foraging. Foragers can be said to occupy niches to which there are ecological and/or knowledge-based barriers to farmers entering these niches, and foragers will have greater security in that niche the greater are such barriers (Tisdell and Seidl 2004). Such situation can be the result of two different evolutionary processes.

First, there are the areas of the world where modern hunter-gatherers have persisted in a more or less direct pattern of descent from ancient HG populations. This characterises, for instance, the North American Eskimo, the aboriginal peoples of Australia, north-western North America, the southern cone of South America, the African !Kung and Hadza, and pockets in other world areas. Indeed, neither farming nor herding developed in prehistoric times in North America's Arctic because of climatic factors nor could food production spring up spontaneously in deserts remote from sources of water for irrigation, such as central Australia and parts of the western United States.

Second, there are some cases of reversion from farming to foraging which occurred where farmers found themselves, for various reasons, in adverse environments and so modified their economies accordingly, often converting to hunting and gathering. The southern Maoris, the Punan of Borneo, and the Numic speakers of the Great Basin (Smith 1993) are excellent examples of this (Smith 2001; Bellwood and Oxenham 2008). One of the best known cultural reversions involves Polynesian hunter-gatherers on the Chatham Islands and the South Island of New Zealand (Bellwood 1987). They abandoned agriculture and adopted a maritime-based foraging subsistence because of the presence of rich marine resources and the inability of these islands to support cultivation of tropical crops. Another example of former food producers who were obliged to revert to hunting and gathering owing to adverse human impact or environmental changes is given by the demise of maize agriculture in the Fremont culture of Utah (Madsen and Simms 1998).

3. FORAGING AS AN OPTIMAL ALTERNATIVE TO FARMING

However, one should not conclude from the arguments in the previous section that the persistence of HG economies results only from an environmental determinism. Indeed, as stated by Diamond (1997: 103) 'Finally, peoples of some areas ecologically suitable for food production neither evolved nor acquired agriculture in prehistoric times at all; they persisted as hunter-gatherers until the modern world finally swept upon them'. Therefore, other explanations of HG persistence have to be found. These explanations include that summarised by Diamond (1997: 109) as follows:

> ...we should not suppose that the decision to adopt farming was made in a vacuum, as if the people had previously had no means to feed themselves. Instead, we must consider food production and hunting-gathering as *alternative strategies* competing with each other.

The Low Attractiveness of the Farming Lifestyle

It is often believed that farming was highly desirable even in the early stages of agriculture development because the initial effect of the shift from hunting-gathering to agriculture should be an in-

crease in food production. However, recent studies have challenged this vision, demonstrating that, compared to foraging, agriculture in its early stages was an activity with low returns and involving high risks. Archaeological findings (including palaeo-pathology) suggest that in many ways, adoption of agriculture was not a boon but a catastrophe from which humans have never recovered (Diamond 1987). This conclusion is supported by Bowles (2011) who estimated the caloric returns per hour of labour devoted to foraging wild species and cultivating the cereals exploited by the first farmers, using data on foragers and land abundant hand-tool farmers in the ethnographic and historical record, as well as archaeological evidence. From this, Bowles (2011: 4763) concludes that

> the evidence presented here is not consistent with the hypothesis that at the dawn of farming the productivity of labor in cultivation generally exceeded that in foraging; indeed it suggests the opposite. This conclusion is especially the case when account is taken of risk exposure and the more delayed nature of agricultural production.

Indeed, in examining foraging and farming as alternative strategies, one must account not only for the work involved in foraging and cultivation but also for storage, processing, and other indirect labour, and for the costs associated with the delayed nature of agricultural production and the greater exposure to risk of those whose livelihoods depended on a few cultivars rather than a larger number of wild species. Although in good years agriculturalists may reap far more calories per unit of land than hunter-gatherers, HGs can and do move in times of drought or flood – something that agricultural populations are limited in doing. Thus, Bernesque *et al.* (2014) using the standard cross-cultural sample (provided by Murdock and White 1980), which consists of 186 cultural provinces of the world (including 36 HG societies), demonstrate that HGs had significantly less famine than other subsistence modes. In addition, increasing sedentism and living in close proximity to domestic animals leads to poor sanitation and an increased prevalence of zoonotic disease. Farmers also had to endure less egalitarian social structures than hunter-gatherer societies. Since there are almost no indications of increased standards of living immediately after the agricultural transition (Diamond 1987), this raises the question as

why HGs should have decided to give up their way of life in order to adopt agriculture?

The Opportunity Cost Principle

This principle was articulated succinctly by the !Kung bushman who was asked by an anthropologist why he had not turned to agriculture (as his neighbours had done). His reply: 'Why should we plant when there are so many mongongo nuts in the world?' (Lee and DeVore 1968: 33) In other words, man would not have given up the HG life had there not been a change in the terms of trade between man and nature that made the HG way of life more costly compared to agriculture (Smith 1993, 2008). The !Kung realise that agricultural innovations would be detrimental to their subsistence, simply because it takes more energy for less payoff.

As shown by Weisdorf (2005: 570), the economic literature on prehistory concentrates mainly on the transition from foraging to farming and can be examined through 'the relationship between the size of the labour force and the marginal product of labour in food provision', that is as a choice between alternative technologies – namely, foraging and farming. During the past few decades, a new discipline called evolutionary ecology has developed, and one of its subset called human behavioural ecology (HBE) studies the fitness-related behavioural trade-offs that humans face in particular environments (Winterhalder and Kennett 2006, 2009). Optimal foraging models are the core of human behavioural ecology, and attempt to explain the changes in subsistence activities and related technologies in terms of increasing fitness to fluctuating situations. In this approach, the transition from foraging to farming has increasingly been seen not as a progression from one subsistence type to another but as a set of alternative adaptive strategies with particular advantages and disadvantages which vary with environmental (ecological) circumstances. It should, however, be noted that the choice of which resources are exploited depends not only on their caloric returns and ecological constraints but also on risk and prestige associated with their capture and use. This conclusion requires the narrow economic focus of optimal foraging models to be extended to take account of social issues like gender, prestige and power that structure and affect economic activities.

4. A DUAL ECONOMY: FORAGING-SPECIALISATION AND TRADE

Several hunting and gathering groups have lived in various degrees of contact and integration with non-hunting societies for long periods of time. Some of these arrangements have persisted for millennia and were present on all continents (*e.g.*, see Lee and Daly 2004). Some HGs kept their economic system and engaged in trade relationships with their neighbouring farmers or herders. It is likely to have occurred in the past because the introduction of agriculture led to a more intensive division of labour (also between foragers and farmers) and specialisation. These are both possible if and only if trade occurs. However, such trade may have been either beneficial to HGs – as illustrated by the Mlabri – or have led to HGs impoverishment in the long-term, and finally resulted in HGs adopting agriculture – as illustrated by the Ertebølle culture.

The Mlabri is an HG group of about 300 people who nowadays range across the provinces of north and north-eastern Thailand and the western Laos. Oota *et al.* (2005) provide evidence about a founding event in the Mlabri some 500–1,000 years ago, from an ancestral agricultural population. The Mlabri then subsequently adopted their present hunting and gathering lifestyle, possibly because the size of their group was too small to support an agricultural lifestyle. Whether or not the Mlabri can be considered to be a typical case of reversion from farming to foraging is still a controversial issue (Waters 2005). What is certain, however, is that they have persisted as skilled HGs in Southeast Asia for the last 600 years, and during that time had lived in symbiotic, trading relationships with more settled groups.

Impoverishing Trade

While agriculture spread quite rapidly from the Levant to most parts of Europe during the sixth millennium BC, its adoption was delayed to the fourth millennium in Northern Europe, an area inhabited by complex hunter-gatherers (Price and Brown 1985) – mainly the Ertebølle culture. This delay needs to be explained. While most of the literature relied on social competition between HGs to explain the shift to agriculture, Svizzero (2015) provides an alternative explanation of this shift, based on an economic mechanism – derived from the Prebisch-Singer thesis – related to trade

between foragers and farmers. He demonstrates that the terms of trade of raw materials (or non-food resources) extracted and sold by foragers have a tendency to decline in the long term in relation to the food resources produced and sold by farmers. Neolithization of Northern Europe can therefore be viewed as the outcome of a long-term process based on trade in which hunter-gatherers get voluntary involved without forecasting that it will, in the end, constrain most of them to give up their way of life. Such explanation seems more convincing than social competition between hunter-gatherers since it is a long term process, that is it is consistent with the long period of contact between foragers and farmers provided by archaeological records.

A Modern Case of Forager-Trader: The Arctic Indigenous Societies

In the Arctic, the longstanding dependence of contemporary indigenous societies on hunting, herding, fishing and gathering continues for several important reasons. One main reason is the economic and dietary importance of being able to access customary, local foods. Another reason is the cultural and social importance of hunting, herding and gathering animals, fish and wild plants, as well as processing, distributing, consuming and celebrating them. Indeed, these activities remain important for maintaining social relationships and cultural identity in indigenous societies. However the ability to carry out harvesting activities depends not only on the availability of animals, but is nowadays also dependent on the availability of cash to purchase equipment for modern harvesting activities. This equipment can be extremely expensive in remote and distant Arctic communities. Thus, throughout the Arctic, many indigenous communities are increasingly characterised by dualistic activity in that cash is generated through full-time or part-time paid work, seasonal labour, craft-making, commercial fishing or other pursuits such as involvement in tourism that support and supplement renewable resource harvesting activities. Therefore indigenous communities in the Arctic today are living in an economy combining foraging and trade (ACIA 2005: Ch. 12).[5] Such increasing reliance on other economic activities does not mean that 'production' of food for the household has declined in importance. Hunting, herding, gathering and fishing activities are mainly aimed

at satisfying important social, cultural and nutritional needs, as well as economic ones, of households, families, and communities.

5. MIXED ECONOMIES AND GEOGRAPHICAL MOBILITY

Another possible pattern of evolution of HG societies is that, given their contact with farmers, is the selective filtering of the Neolithic package by HGs. This led them to retain some useful élements of this package, such as some food production Neolithic methods. In fact, a variety of stable subsistence economies, extant, historic, and prehistoric, drew upon both elements of hunter-gatherer and agricultural modes of production. These are difficult to characterise in existing terminologies except as 'mixed' economies (Winterhalder and Kennett 2006: 2–4). Among these 'mixed economies', some foragers may have retained animal husbandry or horticulture as a complement to their hunting and gathering activities, and after a while, some of them may have shifted towards a complete pastoralist or horticulturist societies. However, shifting to pastoralism was more consistent with their social values and habits, namely the ones associated with the nomadic lifestyle of most HGs. Indeed, the inherent mobility of the pastoralists allowed point-to-point migration which mitigated any conditions of population pressure or strain on the resources of the given environment. As such, this seasonal migration was the alternative chosen by several HGs rather than adopting agriculture.

Hunter-Gatherer and Horticulturist

Horticultural societies are differentiated from HG societies by their use of domesticated plants as the major basis for subsistence and are technically differentiated from agrarian societies by their lack of ploughs and animal traction. Horticulture first developed in the Middle East beginning about 9,500 years ago and by about 5,000 years ago this technology had spread far eastward and to the Atlantic in the West. Many people still depend upon horticulture in the wet tropics, using 'slash and burn' or swidden horticulture, because in many areas of the hot, wet tropics, high rainfall has developed soils that are very poor in nutrient-holding capacity.

Horticultural societies cover a wide range of the types and distinguishing them from HG societies is not as clear-cut as it is usually believed. Indeed, one difficult question is how best to catego-

rise people who secure a proportion of their food needs from both foraging and cultivation? Indeed, some groups adopted farming but not herding, especially in the Americas, where there were few large animals able to be domesticated. In eastern and south-western North America, even after societies took up farming, hunting and fishing continued to play a key role, providing meat and fish to supplement crops of corn, beans, and squash. In Southeast Asia, most highland groups are a product of the socio-ecological world of highland Southeast Asia. Most of the groups combine elements of both modes of subsistence: none of them are strictly horticulturalists or HGs, but most are horticulturalists who supplement their diet by foraging. Similarly, almost all tropical South American foragers today plant gardens as a part of their annual trek. Likewise, early Austronesians colonists adopted a combination of both producing food and foraging (Sather 1995).

Hunter-Gatherer and Pastoralist

Still other societies embraced herding but not farming, especially in Central Asia, where the arid climate and sparse vegetation were suitable for grazing animals but not for growing crops. Pastoral societies are those that have a disproportionate subsistence emphasis on herding domesticated livestock. Although they produce their food, they are sometimes perceived as being not very different from HG societies. For instance, most of the Siberian 'small peoples' are still classified as hunter-gatherers although they herd reindeer. This blurred frontier between HGs and pastoralists can be explained by a common thread to both societies: typically herding societies are 'nomadic', with nomadism being a technological adaptation to scarce and ephemeral pasturage.

In the Old World, the main region of pastoralism – which first developed about 5,000 years ago – was the broad band of steppe, mountainous country, and temperate desert stretching from the Hungarian Plain eastward to Manchuria. The existence of extensive tracts of temperate grassland (steppe), subtropical desert, or tropical savannah, combined with the technology of animal husbandry, led to the development of pastoral societies that competed very effectively with more 'advanced' agrarian societies for these open country environments. For example, pastoral peoples routinely prevented farmers from occupying the rich steppes of South-

eastern Europe which are now the main grain producing regions of Hungary, Russia and the Ukraine.

A Military-Oriented Strategy

The choice of HGs to shift to pastoralism or to horticulture can also be viewed mainly as a defensive strategy. The most famous hypothesis (Lattimore 1951) about the origin of pastoralism focuses on the military consequences of pastoralism combined with nomadic movement. On the basis of the history of Chinese relations with the Eastern nomads, it is argued that pastoralism grew out of mixed farming on the margins of the main centres of agrarian states. It should also be noted that pastoralism was also an offensive strategy as pastoral peoples used the mobility afforded by a wealth of riding animals to plunder civilised states and to impose themselves as elites upon conquered agrarian societies.

In southern Madagascar, one population, the Mikea, still live as hunter-gatherers and horticulturists. While earlier writers thought the Mikea were descended from ancient forager groups who have maintained their way of life up to the present, most modern scholars (Pierron *et al.* 2014) argue that the Mikea reverted back to the forest for political or economic reasons, such as Sakalava royalty pressure or French colonisation.

South American hunter-gatherers also present an interesting case, since archaeological evidence indicates that in Amazonia, farming replaced foraging several millennia ago. Thus, much of the foraging observed in tropical South America can be viewed as a secondary re-adaptation because after the European conquests of the sixteenth to eighteenth centuries, many groups found that mobile hunting and gathering made them less vulnerable to colonial exploitation. Additional evidence is provided by the Cherokee who, through the late eighteenth century, responded to increasing risk and uncertainty – due to interaction with Europeans – by shifting towards subsistence strategies (including foraging and farming) that had more immediate rewards (VanDerwarker *et al.* 2013).

6. ABOUT THE STABILITY OF MIXED ECONOMIES

The transition from hunting and gathering to agriculture is not necessarily a one way process. It has been argued that hunting and gathering represents an adaptive strategy which may still be ex-

ploited, if necessary, when environmental change causes extreme food stress for agriculturalists. Thus, it is sometimes difficult to draw a clear line between agricultural and hunter-gatherer societies. From an economic point of view, subsistence options include mixing aspects of both economies at once, or cycling between the two economies over the course of an individual's lifetime.

Low-Level Food Production: A Stable End or a Necessary Stage?

It is widely agreed that in the development of agriculture, there has to be a transitional phase during which food from domesticated plants and animals partially replaces hunted or gathered food in the diet. Thus, the usual dichotomy between food procurement and food production must be qualified by the consideration of mixed-economies. Among these economies, some have been labelled as 'low-level food production' (Smith 2001), and defined as a 30–50 per cent dependence on domesticated plants and animals, the remaining food being derived from hunting and gathering. Although the existence of low-level food production *per se* is obvious in the economic record of humanity, it raises a central question, namely, whether these foraging-farming economies should be viewed as being a stable evolutionary end-point (Smith 2001) or as a necessary stage on the route to more intensive forms of food production (Bellwood and Oxenham 2008)?

It seems unlikely that low-level food production played a major role in the rise of global food production, except as a stage to be passed through in regions where agricultural originated, such as in the Levant. Thus, low-level food production was probably only a stable and successful long-term socioeconomic solution when environmental limitations offered little chance of intensification. Indeed, many ethnographic cases of low-level food production involved previous farming populations who crossed environmental limits into agriculturally marginal zones, or people who depended heavily on arboriculture. Their low-level food production was thus environmentally contingent, not representative of a significant and stable way of life relevant for the early millennia of food production. One famous example is provided by the Fremont complex case.[6] It reflects a mosaic of behaviours including full-time farmers, full-time foragers, part-time farmer/foragers who seasonally switched modes of production, farmers who switched to full-

time foraging, and foragers who switched to full-time farming. In the end, the transition from foraging to farming was followed by a millennium of adaptive diversity and terminated with the abandonment of farming (Madsen and Simms 1998).

In others areas – where agricultural zones are not marginal – few societies occupied an intermediate position in which food production provided under 50 per cent of their food intake, owing mainly to scheduling differences between mobile forager and sedentary agriculturalist lifestyles. In other words, populations over the long term (regardless of the existence of short-lived intermediate stages) seem to be pulled toward either hunting and gathering or farming.

7. AFFLUENT HUNTER-GATHERERS AND THE SATISFICING PRINCIPLE

Behavioural attitudes can lead to the rejection (non-adoption) of agriculture. Their importance is supported by some archaeological and anthropological studies. For instance, in the case of Mesolithic hunter-gatherers in the Baltic, Zvelebil (2008: 58) claimed:

> Among such hunter-gatherer communities, the overarching belief system or cosmological framework must have played an important role in promoting or proscribing social and economic change. (... which) in northern and temperate Europe was based on egalitarian principles, communal ownership of resources and the convention of sharing, inherent in the perception of nature as a 'giving' environment.

'Affluent' Hunter-Gatherers Societies

The traditional vision of HGs living a miserable life was challenged in the 1960s by ethnographic studies (Lee and DeVore 1968) of some current hunter-gatherer societies still living in Africa, namely the !Kung and the Hadza. These societies were very different from the traditional description: they did not experience scarcity of food and individuals had to do little work to satisfy their limited ends. Therefore, they were labelled as the 'original affluent society' (Sahlins 1974).

In fact, !Kung and Hadza were not really affluent – in the modern meaning of the word. They were considered as affluent because their needs were limited while their means, offered by the

nature, were infinite (not limited) relative to their needs (Gowdy 2004). In other words, their tastes combined with their opportunity costs led them to keep unchanged their lifestyle. Although there was not so many natural endowments in their environment, two to three hours of daily work were enough to satisfy their basic needs. These populations had the same package as the simple hunter-gatherers, but their economic behaviour was different.

Another illustration of an 'affluent HG economy' is provided by the Australian Aborigines since they expressed no need to increase the yield of food plants through agriculture, that is they were able to develop a way of life that was harmonious with the rhythms of their environment, where the adoption of agriculture was perceived to be unnecessary (Flood 1990). They limited their own population density in accordance to their environment through infanticide or migration. Cultural behaviours and conservatism limited technological innovation that would lead to the development of agriculture. Nonetheless, the Aborigines exhibited some types of proto-agriculture such as fire-stick agriculture (Pryor 2004).

The Satisficing Principle

HG living in an affluent economy and those living in a subsistence economy shared the same attributes (foragers, nomads, low density of population, social equalities) but not the same economic behaviours. In the economy of subsistence, any HG acts as a *Homo oeconomicus*, that is he/she tries to maximise his/her utility or satisfaction whatever are his/her natural environment and his/her own cognitive capacities. On the contrary, in an affluent economy, any HG acts according to the *satisficing* principle (Simon 1947). Indeed, he/she does not try to maximise his/her utility but he/she tries to reach a pre-determined level of satisfaction. Once this threshold is reached, any additional work becomes useless – such as that required to learn how to cultivate plants or to domesticate animals.

8. INSTITUTIONAL CONSTRAINTS EXEMPLIFIED BY ATTITUDES TOWARDS OWNERSHIP

Because institutions are constructed to solve local problems of interaction and encourage economic performance, they varied widely between different economies (North 1990). Thus, many institutions of those engaged in farming and foraging differed. Existing social

institutions can conflict, with social change. Examples include the sexual division of labour (Bright 2002) or the levelling mechanisms common to foragers which encourage sharing and redistribution. Sharing is the central rule of social interaction among HG and its presence in hunting and gathering societies is almost universal. There are strong injunctions on the importance of generalised reciprocity, that is of the giving of something without an immediate expectation of return is the dominant form within face-to-face groups. This, combined with an absence of private ownership of land, has led many observers (from Morgan 1877) to attribute to hunter-gatherers a way of life based on 'primitive communism'. Therefore, the shift to agriculture – the exploitation of cultivars – requires in HG societies coevolution of technology and institutions; institutional changes such as the privatisation of resources marked the end of the forager sharing ethic (Bowles and Choi 2013).

Attitudes at the Individual Level: The Endowment Effect

The Hadza Bushmen (North Tanzania) is a well-known nomadic hunter-gatherer population – still living as HG – who have a high degree of isolation from modern culture. Although the Hadza remain relatively isolated, a subset of this population has increased contact with modern society and markets. The Hadza social life differs from that in industrialised countries in its high degree of collectivism and lack of market interactions. Indeed, while the Hadza do own some items, ownership is limited to what can be carried.

Apicella *et al.* (2014) use a natural experiment in the Hadza population to provide evidence on the universality of a behavioural bias – the endowment effect – its dependence on cultural factors, its evolutionary significance and its dependence on environmental factors. The endowment effect can be defined as the tendency to value possessions more than non-possessions; it is therefore considered, in standard economic theory, as a departure from rational choice, that is a deviation from rational behaviour. The results of the experiment were as follows: the Hadza living in isolation were found to have no endowment effect, while those living in the area with increased contact with modern society and markets do exhibit an endowment effect and were much more reluctant to trade their endowed good. With respect to the influence of culture on econom-

ic preferences, the results imply that cultural and environmental factors play a key role in the presence of the endowment effect. In other words, it suggests that cultural factors, and in particular the degree of market integration, influence economic preferences. To the extent that analogies can be assumed between current and prehistoric HG societies, we may transpose in the prehistoric framework the results of this experiment; it then means that repeated contacts with farmers led to modification of HG's economic preferences. Those HGs being content with non-HGs tend to value possessions, that is to behave as farmers do. This behavioural change favoured the integration of HGs in the agrarian economic system and finally their adoption of the farming lifestyle. Conversely, HGs who remain in isolation do not value possessions, and therefore, this hinders their ability to progressively adopt agriculture.

Attitude at the Social Level: The Land Tenure Systems

A characteristic common to almost all HG societies is a land tenure system based on a common property regime called 'scramble competition' (Tisdell 2013: Ch. 7). Even if not all HG societies (probably most) had open-access or scramble-competition economies, most had customs or codes for sharing property. Common property (*res communis*) rather than *res nullius* (open-access) seemed to be very common in HG societies. Until recently these regimes were far more common worldwide than regimes based on private property. In traditional scramble competition, while movable property is held by individuals, land is held by a kinship-based collective. Rules of reciprocal access make it possible for each individual to draw on the resources of several territories.

While foraging is associated – most of the time – with an immediate-return economy (Woodburn 1982), farming necessitates many 'investments' (such as ploughing, sowing, weeding, irrigating…) before crops can be harvested. Farming is thus intrinsically associated with a delayed-return economy. Therefore, any farmer will have incentives to incur the investments previously described if and only if he will be in the future the owner of the output resulting from these investments. Such a condition is fulfilled if there is territoriality, or contest competition. Contest competition means that property rights related to land ownership are introduced. In-

deed, such introduction is completely consistent with – and even necessary to – the transition from foraging to farming, as stated by North and Thomas (1977: 230).

While common property is appropriate to describe competition for access to resources among HGs, it is not to describe land competition among farmers which is ruled by contest competition. Therefore, the slow shift from foraging to farming could have stemmed in some HG societies by their reluctance to modify their land tenure system. Indeed, HG societies have very diverse attitudes with respect to property. For instance, Maxwell *et al.* (2002: Sections 3 and 5) have considered 44 HG societies[7] and proceeded to an examination of ten parameters related to property and exchange relationships. From this, these authors identified five clusters of foraging economies and illustrate their considerable diversity.

9. CONCLUSION

While all humans lived as HGs during 99 per cent of human history, most of them gave up this lifestyle after the introduction of agriculture following the so-called Neolithic revolution. After this development, few human were able to live as 'pure' foragers owing to the competition with farmers for access to land and other natural resources. Despite this competition, some HGs have persisted by means of various adaptive strategies. Some have developed a symbiotic relationship through trade with their neighbouring farmers. Others have engaged in mixed economies, combining foraging – as the dominant mode of subsistence – with subsidiary food production. Nowadays, most HGs are not only threatened by competition with farmers but also with other industries (for mining, oil, timber…) and with states which try to 'control' them. However, many indigenous peoples, including HG societies, mainly located in tropical forests, are still able to commercialise various forest products (Stiles 1994) (such as medicinal wild products, wild animals, bamboos and rattan…). Because the commercialisation of renewable forest products is now considered to be crucial to curb deforestation, some foraging societies might well persist into the future if land rights were to be accorded to indigenous peoples as has already occurred in some countries.[8]

NOTES

[1] In Adam Smith's publications, this process is often implicitly described (1776) but it is also explicit (1978).

[2] Richerson *et al.* (2001, table 2) proposed seven reasons (which were focused on external factors, such as climate instability, and the constraints posed by processes of cultural evolution) why the full evolutionary transformation from foraging to food production might go slowly.

[3] See http://undesadspd.org/indigenouspeoples.aspx.

[4] In addition to diversity about subsistence strategies (a topic to which the present paper is restricted on), HG societies also exhibit diversity about their social organization forms, and their cosmology and world-view.

[5] Such economy is labelled as a 'mixed economy' in ACIA (2005) but this is not appropriate since arctic indigenous peoples do not produce their food (*i.e.* through agro-pastoralism).

[6] The Fremont complex is composed of farmers and foragers who occupied the Colorado plateau and great basin region of Western North America from about 2100 to 500 years ago.

[7] The data base consisted of all HG societies present in the standard cross-cultural sample, and a foraging society is defined in this study as any society directly obtaining 75 per cent or more of its food from hunting, gathering, or fishing.

[8] Even given the growth of land rights to indigenous people, they face many continuing economic obstacles in adapting to modern societies as is illustrated by Australian Aborigines in remote locations (Tisdell 2014: Ch. 16).

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publication stats