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Cultivation among hunter-gatherers in Finland – evidence of activated connections?

1. Introduction

The emergence of agriculture has often been considered as the breakthrough in human culture. The progress in economy led to the increase in the number of people. Local groups were replaced by new ones and societies grew larger. Since the beginning of agriculture, growing populations needed ever increasing areas for cultivation and animal husbandry. This new situation triggered further changes in hierarchy and social structure, which usually had become more complex than before.

Archaeologists have seen the spread of agriculture as a dramatic process in the region of the Fertile Crescent. Due to its rapidness, there has been reason to call it “the Neolithic revolution”. This revolution would have been the beginning of the development of civilizations, i.e. the formation of the hierarchically organized and literate societies (Childe 1936).

In northern Fenno-Scandinavia and Karelia, among hunter-and-fisher societies of the coniferous zone, the introduction of agriculture did not take place in the same manner and pace. Archaeological data indicate that attaining the ability to produce food by new methods did not change the economy of the communities as much as we might assume. Animal husbandry along with the cultivation of land became included in the hunting-and-fishing economy, but the previous ways to earn a living nevertheless remained in a central role. The carrying capacity of the local communities increased, but the number of individuals within a local group or the amount of people in a larger area did not increase. Some cultural and social changes took place, but many features stayed as they were in earlier periods of these societies.

The main aim of my article is to discuss the role of early agriculture in the hunter-fisher populations. The central question is to ponder how and when the adoption of cultivation took place. It is important to discuss the environments in which early cultivation was practised and the kind of technique that was used. For the argumentation, both archaeological and palynological materials are used. They are discussed together with linguistic viewpoints considering loanwords, i.e. vocabulary in connection with the cultivation of land.

The areas under particular inspection are in the Finnish coastal zone of the Baltic Sea, the Lake District in southern and mid-Finland, and the upper water course of the River Oulujoki in eastern Finland. Neighbouring areas, for example the Karelian district in Russia, are referred to but they are left in a secondary role here. The time period in focus is dictated by the dating of the process of economic change, this is to say the Late Neolithic / Early Metal Period, between ca. 3000 calBC – 300 calAD.

The article begins with the presentation of the traditional archaeological viewpoint on agriculture in the northern coniferous zone. This will then be put together with the methodology and those palynological arguments by the virtue of which the interpretations have been made so far. Certain layers of loanwords bring their own relative chronology and supply the discussion with interesting viewpoints.

The distinction between the two basic techniques, slash-and-burn cultivation and permanent field cultivation, is a point which requires clarification and it will be discussed separately. Social changes depend on the type of cultivation adapted by the local group. It is necessary to consider the effect of agriculture on social systems and networks and how the resulting consequences are reflected at archaeological sites by the coast and inland.

Currently, the key evidence addressing the economic change comes from pollen analyses. Nevertheless, the reflections of the process had been traced in archaeological material already a few decades ago. The change was more or less traceable in linguistic data, too, because a new kind of economy led to the need for new material implements as well as new vocabulary in languages. Loanwords indicate cultural contacts which were essential for the learning of new strategies for subsistence.

Finally, the visibility of an agricultural society is different in archaeological material than that of hunters-fishers. The present discussion attempts to fit all the above-mentioned points of view together and to present a model of how and why the Late Neolithic and Early Metal Age economy – and first of all the cultivation – become visible in light of different materials used in these societies.

2. The spread of agriculture in the light of different sciences

2.1. Archaeologists' views concerning the earliest phase of agriculture in Finland

In this section, the aim of the inspection is to go through the main arguments and conclusions which have been presented concerning early agriculture in Finland. There are four main phases and cultural spheres: The Battle Axe culture, the Kiukainen culture, the Bronze Age in coastal Finland, and the Early Metal Age of the inland. Since the early 20th century, these have all been in an important position in discussions of the early cultivation history of Finland. In addition, even the late Combed Ware is worth discussing.

Archaeologists were the scholars who first raised the question about ancient cultivation in our country. Grindstones were found in prehistoric contexts already at the beginning of the 20th century (Ailio 1909). It became possible to date the early phases of agriculture, but any exact chronology could not be achieved. The first datings were done by shore displacement – the method that was gaining importance in Stone Age archaeology in Finland.

The next step in research history was taken in the 1960s when the ^{14}C method came into use in Finland during the 1960s. In the 1970s, the new essential method for research of early cultivation was pollen analysis. Although geologists had applied the method from the 1890s, it did not have a role in studying early cultivation until the 1970s. It was soon followed by macrofossil analysis (Aalto 1982), which gave archaeologists, geologists, and biologists the ability to take advantage of a previously overlooked group of ecofacts: fossilized seeds and biological remains of all kinds accumulated at dwelling sites by human beings. Paleobiological material considerably sharpened the picture of activities at these prehistoric dwelling sites.

2.1.1. The Battle Axe culture (3200/2900–2300 calBC)

Already Aarne Äyräpää (1939, 120–122) suggested that the Battle Axe culture had pursued agriculture and animal husbandry in Finland. He based this opinion on observations of the local environmental conditions near the known Battle Axe sites, which are not situated near the coast, but instead in regions favourable for animal husbandry. His second argument is that all the sites of the Battle Axe culture were on the warmer (maritime) side of the January isotherm over $-8\text{ }^{\circ}\text{C}$ (Äyräpää 1955, 195–96).

In addition, there was a third – and maybe this is the most important – argument: grindstones. At the very beginning of the 20th century this was the find group which included the first archaeological evidence of agriculture in a Stone Age context (Ailio 1909; Äyräpää 1939). A few grindstones were found at dwelling sites, and for a long time grindstones were considered the strongest evidence for crop cultivation by the Battle Axe groups in Finland. Later, this interpretation has met criticism. For example, Torsten Edgren (1970, 55) pointed out that in Finland none of the grindstones had been found in a context, which would make it plausible to connect these artifacts with the Battle Age culture (see below).

In some cases, the human hand may have left traces of cereals on the surface of Corded Ware – the ceramics of the Battle Axe culture. Any incontrovertible evidence of this has not been indicated in Finnish pottery finds so far (Meinander 1954a, 148; Edgren 1970, 55; 1999, 290; Carpelan 1973, 195; 1999, 264). However, it would be sensible to reinvestigate this material, as the number of ceramic sherds has increased and the methodology for the inspection of details on their surface has become more accurate than before.

Over 25 years ago some new evidence was found concerning the hypotheses that agriculture had begun during the Battle Axe phase in Finland. One methodological novelty was pollen analysis. For example, Ari Siiriäinen (1982) dated

the appearance of first cultivation to ca. 2500 calBC. This suggestion has proved to be the more acceptable in light of later analyses. Siiriäinen pondered the possibility, however, that the pollens of wheat (*Triticum*) and barley (*Hordeum*) in the sample from Lake Ahvenainenjärvi (Lammi municipality, Häme district) could be dated even as early as 3500 calBC (Siiriäinen 1982, 216 and 225 Fig. 2). The latter result was based on the pollen diagram of Lake Ahvenainenjärvi, which was analysed by a biologist Mirjami Tolonen (1978).

Some part of the pollen data were not unambiguous in their dating, but still fit the scanty archaeological data, which also were themselves disputable. Results from different pollen samples varied, but all in all they indicated that the beginning of agriculture had taken place between 2500 – 2300 calBC. In SW Finland, it was possible to suggest this both by the seacoast and in the inland (Huttunen 1982, 211; Aalto 1982, 234).

Professor C. F. Meinander (1954a) saw, in light of ceramic types, that contacts from both the Baltic region and Scandinavia had an important role in the development of the Battle Axe culture in Finland. Christian Carpelan (1982,

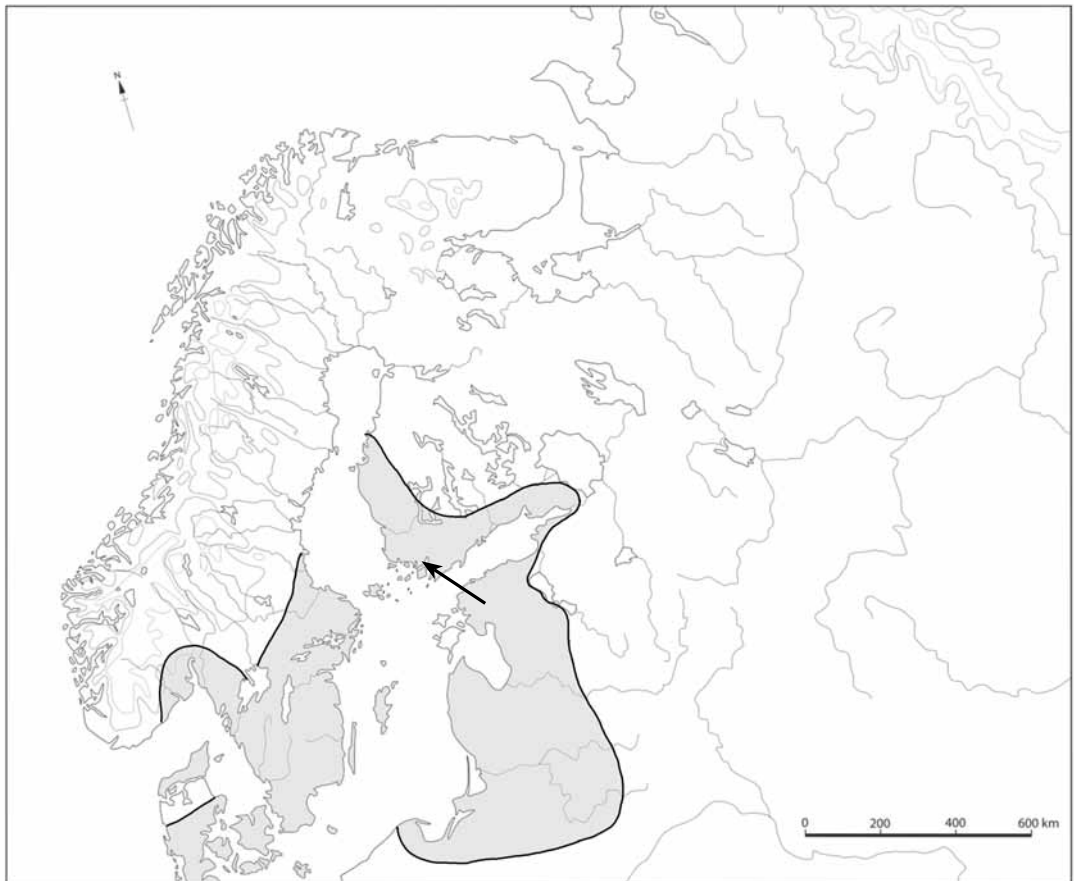


Figure 1. Corded Ware Culture in northern Europe and the possible direction of the influence of it in Finland.

267) considered it possible that the Battle Axe culture and cultivation connected with each other and that they both came from the Baltic region to the northern side of the Gulf of Finland (Fig. 1). In Finland, he scheduled the broad development between the new agricultural population and the indigenous Late Neolithic population which continued hunting and fishing. Carpelan thought that another piece of evidence of the influence from the Baltic region was the so-called “middle zone ceramics” (Sw. *mellanzonskeramik*) which were found in the area from Satakunta district to southeastern Finland, in the inland. “Den representeras närmast av en keramik som inte antyder omedelbara kontakter med Skandinavien men nog med Baltikum” (Carpelan 1979, 14–15). ‘It [mellanzonskeramik] is represented most clearly by ceramics which do not point to immediate contacts with Scandinavia, but contacts with the Baltic region can be seen.’ (My translation.)

Carpelan (1982) also outlined Bronze Age as an “agricultural society” (my translation, in the original Sw. *jordbrukssamhälle i Finland*) but in this case he draws a sharp borderline between the population that lived with the help of animal husbandry and cultivation by the coast of the western area. He separates the western Bronze Age – in the same way as it was done since the late 1800s – and the eastern culture, which was probably very different from the western one. Neither pollen analyses nor archaeological facts indicate that cultivation would have belonged to the economy in eastern Finland as early as in the western area. Carpelan (1982, 268) assumed, however, that in the future it might be possible to trace contacts between Bronze Age cultures in Central Russia and eastern Finland. This could prove that agriculture has spread to the latter area from an eastern direction. The most essential note here is that he wanted to separate the western Bronze Age from the eastern culture sphere.

Finnish scholars obtained good material for comparison from observations, which had been made in Battle Axe culture contexts in Sweden and Estonia. In a multidisciplinary seminar about the roots of the Finns in Lammi in 1997, Carpelan stated that “Maatalouteen viittaavat positiiviset indiisiot ovat yhä voimassa myös Suomessa.” ‘Positive indications of agriculture are still relevant in Finland, too.’ (Carpelan 1999, 264, my translation). This probably meant that he considered agriculture in the Battle Axe population in Finland very probable despite the scanty data, which are open to various interpretations. Some scholars doubted this interpretation, because they found the arguments for such early cultivation in Finland to be still missing or inadequate (Edgren 1999, 290). Thus the history of early crop cultivation still needs more evidence in Finland and therefore a compromise has been suggested. Instead of cultivation, it can be considered more probable that a means of livelihood for the population of the Battle Axe culture in Finland was animal husbandry.

The archaeological record includes the bones of sheep, goats, and also cattle. The data are indisputable in character but not very abundant in quantity. It would be easy to direct criticism against the hypotheses considering early animal husbandry and its role in society.

Summing up, the existence of agriculture in Finland during the Late Neolithic has been until now argued for by five main arguments: 1) change in the location of dwelling sites in the landscape, 2) the location of the sites of the Battle

Axe culture, in particular, in relation to climate conditions, 3) bone material as the indication of the emergence of animal husbandry, 4) archaeological material, i.e. grindstones and some other stone implements which may have been used for cultivation work, 5) human influence on the environment.

In the following, I will shortly discuss each argument in different geographical and chronological contexts. The periods under discussion are the Battle Axe culture, the Kiukainen culture, and the Bronze Age. In the inland, I will present the Early Metal Age context and this part of the discussion continues to the beginning of the Iron Age.

Already Äyräpää (1939, 120–122) pointed out that the environmental milieus of the sites of the Battle Axe culture are different from those, which had been favored by Stone Age populations earlier. The sites were not by the coast, though quite close to it. Most important was that they were in areas, which were growing scrubs and they were suitable for meadows. It was reasonable for him to approach the question by the hypothesis that the means of subsistence had changed. Cultivation was not the most likely reason for choosing sites. Another, and at the same time more understandable reason, also for Äyräpää, could have been animal husbandry.

It was Äyräpää (1955, 195–196) who also first paid attention to the distribution of the Battle Axe sites in relation to the -8 C° isotherm of January. Although the argument is controversial it has not been abandoned. Meteorologist Reijo Solantie (1991; 2005) has developed it further. His model is based on the hypothesis that large parts of southwestern Finland were not covered by snow during wintertime in the Neolithic. This made the area favorable for the breeding of swine. Archaeologists have been willing to accept this hypothesis but with the modification that instead of swine, the important domestic animals were either sheep or goats (Salo 2004, 113).

The third argument is based on the bones of sheep/goats, which have been found in excavations. In a few cases, the bones of bovines can be connected with Battle Axe sites, too (Salo 1997, 150–152). These data serve as a hypothetical explanation for the two above-mentioned arguments. In Finland, the osteological material, which would indicate animal husbandry in the Stone Age is still very small in amount (Deckwirth 2008). In neighboring countries, the situation is better preserved and the role of such evidence is indisputable there (Lang 1998, 97–99).

The fourth argument is slender, as actually all the archaeological finds in question are grindstones and most of them come from problematic find contexts. It has not been easy for archaeologists to argue that the other suggested stone implements were really used for cultivation in the past (see below).

The fifth argument concerns the human influence on the environment since the introduction of agriculture. It is reflected in the flora and sometimes we can trace it in the palynological material. Evidence of animal husbandry can be seen in the palaeobotanic material. In a few cases, it corresponds well with the dating and location of the Battle Axe culture in southwestern Finland (Vuorela & Hicks 1996). The relative proportions of herbaceous pollen, i.e. the increase in ancient

grazing fields and the decrease of the forest are visible on a local level (Alhonen 1988, 46–47). The possible existence of actual cultivated crops, i.e. *Cerealia* pollen has remained invisible.

Palynology and palaeoclimatology thus together suggest that the Battle Axe populations influenced their environment because of the domestication of cattle. Due to the deteriorating of climate, it was not possible to begin crop cultivation on any large scale. In my opinion, this conclusion is sensible but it cannot be accepted without critical comments.

One more argument has been paid attention by archaeologists. Ella Kivikoski (1961, 68), for example, has pointed out that hunting implements are missing at the dwelling sites of the Battle Axe populations. According to her, the archaeologists should come to the conclusion that hunting and fishing have not been in an important position in the economy of these populations. Kivikoski's brave interpretation urgently requires thorough investigation. It is then necessary to do careful analysis of the find material known from the excavated Battle Axe sites.

It has been recently proposed again that the beginning of slash-and-burn cultivation should be dated already earlier than the appearance of the Battle Axe populations. On the basis of pollen analytical data that were analyzed by Teija Alenius and Teemu Mökkönen (2010, 27) can be argued that this may have happened already by 3800 calBC or at the beginning of the Battle Axe culture at the latest. There is still no firm evidence of cultivation during the Combed Ware. Although the early remains of cultivation are visible in neighbouring countries, this point has continued to remain controversial in Finland.

2.1.2. The Kiukainen culture (2300–1700 calBC)

The very end of the Neolithic Stone Age is described as the so-called Kiukainen culture in southwestern Finland. In this phase, cultivation had already been adopted in the economy of the coastal area. It has generally been accepted by archaeologists and geologists that the earliest slash-and-burn fields in this region belong to this period. According to Unto Salo (2004, 129–131) the number of grindstones has remained very small at the excavated sites and their role as evidence for cultivation during the Late Neolithic has remained problematic. In any case, the strong pollen data (Vuorela 1999) attest to the continuous presence of cultivation in the economy. The importance of the role it played is a point urgently demanding further study.

In addition to grindstones, there is some other archaeological evidence about Stone Age cultivation. A few picks less than 20 cm in length are slender on their edge. For implements, polishing was done only to the edge. According to Salo (2004, 129), axes with thin edges are hoes, which were used for the preparation of small fields. The point is that they are carelessly made and thus they would not have been useful for any other purpose. Some tools were needed for making the slash-and-burn fields and the above-mentioned implements could be used, for example, for this purpose. In my opinion, the role of these implements is without any trustworthy evidence.



Figure 2.
The spatial
distribution
of Kiukainen
culture in
Finland.

A find group, which perhaps inspires more confidence as an observation of agriculture, is flint sickles, 20–25 cm in length. They are known only in a small number but they may carry some evidence of agricultural work on their shiny surface. A sickle may have been used for cutting grains but another plausible explanation is also that they were needed for cutting, for example, twigs for animals (Huurre 2003). In any case, the use-wear is distinct on the edge of the tools. The sickle finds are concentrated in the coastal zone, in the spreading area of the Kiukainen sites. So, both cultivation and animal husbandry would have been concentrated in the coastal zone.

At the Niuskala dwelling site in Turku, southwestern Finland, some macrofossils of *Cerealia* were found in the late 1980s. This site dates to the transition phase from the Kiukainen tradition to the Bronze Age. One macrofossil grain from the archaeological excavation has been AMS dated. In several layers, there

were grains of early species of barley (Vuorela & Lempiäinen 1988). According to contemporary knowledge, barley has been eaten at the site since approximately 2000 calBC (Lempiäinen 1999).

2.1.3. Bronze Age / Early Metal Age

The Bronze Age (on the coast) and the Early Metal Age (in the inland) have been accepted without hesitation as the periods when agriculture began to play an important role in the economy. In the coastal zone, its role has been considered as more evident than inland, however.

It has not been discussed in depth whether cultivation was practised in permanent fields. The question concerning the type of cultivation during the Bronze Age is problematic still today. Salo (2004) assumes that this was the applied technique in the coastal zone. It must be kept in mind that the conclusion Salo suggests about agriculture is not based on clear indication. Any straight support cannot be found in the archaeological material at the sites, however there are indirect data, which speak for this hypothesis.

For Salo, the remains of a house at a dwelling site are often considered as an important indicator of animal husbandry, as the cattle needed a warm shelter in the cold season. Animal husbandry and cultivation are often connected with each other. Such observations can elucidate crop cultivation, as well. In Scandinavia, rectangular dwelling houses and other buildings in the yard have been connected with evidence of permanent habitation and cattle breeding and ploughed fields in a reliable way. Discovery of the corresponding type of sites would also bring satisfactory proof for agricultural economy during the Bronze Age in Finland.

In one single case, such material has already been found. The Rieskaronmäki site in the municipality of Nakkila in Satakunta, southwestern Finland, has for several decades been the key site for interpreting the type of settlement in the coastal zone of Finland in the Bronze Age. The excavation was conducted by Unto Salo in the 1960s and he published the main results in 1981. Several kinds of indicators in the material suggest that this is a starting point for discussion concerning a comparison between the Bronze Age in Scandinavia and on the Finnish coast.

Rieskaronmäki had been close to the Baltic Sea coast in the ancient bay of Panelianlahti. Due to land uplift, the location is by the River Kokemäenjoki now. Finnish archaeologists have for a long time referred to Rieskaronmäki as an important indication of contacts between southern Scandinavia and the areas on the eastern side of the sea by the River Kokemäenjoki water system. This is because Salo has interpreted the most important building remains at the site as evidence of a long rectangular house of the Scandinavian type.

Salo (1981, 391–406; 1984, 157–162) saw that the largest house had been divided into two parts. One end belonged to the family and the other end was for the cattle. There were other remains of other buildings, too. These were of a different shape, not rectangular but round or roundish. According to Salo,

Rieskaronmäki was a small village and there were cultivation fields, too, close by the site. His opinions about the economy at this site have had strong influence on how researchers approach the coastal Bronze Age in Finland. Salo has repeatedly (2004, 146) stated that there is no reason to doubt that the livelihood was based on animal husbandry and agriculture, although Rieskaronmäki is exceptional as an archaeological site. Any Early Metal Age sites of this kind have not been found in inland Finland, either. In his excavation, Salo (2004, 146) found bones of sheep/goats but macrofossil analysis did not belong to the methodological toolkit, which would provide direct proof of cultivation.

Coastal area

Already before the excavation in Rieskaronmäki there were suggestions in Finnish literature that remains of excavated dwellings might be interpreted as Bronze Age houses. C. F. Meinander (1950; 1954a, 17–25, 164–165) suggested this for Kaunismäki in Harjavalta by the River Kokemäenjoki and the Böle site in Porvoo by the sea in eastern Uusimaa district by the Gulf of Finland. It remained doubtful whether these observations were possible to connect with Scandinavian long-houses.

The classic views concerning Bronze Age dwellings were based on the circular bottoms known from Otterböte on the island of Kökar in the outer archipelago of the Åland Islands (Meinander 1954b; Gustavsson 1997). These date to the Late Bronze Age like Riskaronmäki in Nakkila. The interpretation was that the huts were seasonally used. The house bottoms at Trofastbacken and Orrmoan in Mustasaari by the southern Ostrobothnian coast close to Vaasa, excavated by Tapio Seger (1986a; 1986b), were circular as well and were built for seasonal visits by Bronze Age hunters and fishers.

At the Borgmästars site in Karjaa in the western Uusimaa region the remains of a rectangular house were dated to the Early Roman Period (Uino 1986, 85–89). The house bottoms more or less resembling those of Scandinavian long-houses are known from the first millennium BC in Finland, though this interpretation is not without its problems. The remains at the Hulkio site in Kaarina near Turku, SW Finland and the above-mentioned Böle site in Porvoo in Uusimaa (see Strandberg 1996; 2002) have been suggested as being rectangular in form. The house remains at Ketohaka in Salo on the southern coast of Finland (Uino 1986, 85–89) were difficult to discern but they may date to a later period, i.e. to the Early Iron Age.

Conclusions can be made that although a few house remains of approximately the same age have been discovered in Finland, these do not fit the Scandinavian Bronze Age tradition – with one exception, the Rieskaronmäki house (see Asplund 2008, 263–272). Any straight evidence of cattle breeding is not known from most of the sites, however the cases are very different in character.

The most obvious reason for the lack of a satisfactory solution in determining whether agriculture was present in Finland during the Bronze Age is that there are very few known Bronze Age dwelling sites (Meinander 1954a;

Salo 1962; 1976; 1981; Salo & Lahtiperä 1981; Strandberg 1996; 2002; Asplund 2008). Another striking paradox is the conspicuous difference between the number of Bronze Age / Early Metal Age burial cairns and settlement sites from the period. The number of cairns exceeds surely 10 000 (Salo *et al.* 1992) but the traces of Bronze Age dwelling sites is not bigger than around 50. Understandably, the settlement history of the Bronze Age populations is still waiting for new evidence before it can be described in more detail.

Inland

In the inland, the number of known Early Metal Age settlement sites is considerably larger, evidently more than 200. Bone material indicating cattle breeding has remained restricted as well. Comparing all the research of crop cultivation on the one hand and hunting and fishing on the other, the investigation of the role of animal husbandry in the inland during the Early Metal Age has remained deficient. The insufficient material does not offer any clear or trouble-free indications of this part of the economy.

Though animal husbandry had begun to be in use and the most common domesticated species were sheep or goats, the archaeological contexts are incoherent. For example, at the dwelling site complex of Vaateranta in Taipalsaari, Southern Karelia, there were bones of cattle, which may date to the Late Stone Age (Räty 1995). In this respect the site is exceptional, as almost across all of eastern Finland and Ostrobothnia, bone material is missing until the beginning of the Iron Age or is ambiguous in quality. The contexts at Vaateranta site are problematic, however, and the question remains open whether the bones date to the Stone Age.

As already mentioned above, any remains of rectangular Early Metal Age houses have not yet known by now in the inland. There are bone finds from Vaateranta, however, and in the light of macrofossils, the observations of agriculture are remarkably more numerous than those indicating animal husbandry. In addition, we know that barley belonged to the nutriment of at least one group in the inland. The grains were analyzed at the Kitulansuo site in Ristiina (see below) in the Lake Saimaa basin (Lavento 2001, 142).

After the first experiments in the Late Neolithic, it took a long time both in the coast and inland before any considerable amount of places were taken into cultivation by prehistoric dwellers. A few areas of the early trials soon remained without human impact and they were returned again later.

According to the preliminary results of recent analyses, the beginning of agriculture did not take place at the same pace everywhere. On the contrary, pollen data from several areas in Finland show that this adaptation required a long time to take root during the Late Neolithic and Bronze Age / Early Metal Period. The tradition never completely broke down during any particular period though the development of animal husbandry and cultivation to a central role in the economy was slow (Hurre 2003). On the local level breaks may have occurred, but at the same time agriculture continued somewhere else.



Figure 3. Textile ceramics found at the dwelling site of Kitulansuo d in Ristiina. Photo: M. Lavento.

2.2. Pollen analyses in the research of environmental change

Pollen data show that the oldest evidence of agriculture in inland Finland dates from ca. 2300 calBC. This dating has been settled as a result of many pollen analyses made during the last four decades, as well as, contemporary datings of recent analyses (Vuorela 1999; Alenius 2007; Alenius *et al.* 2009). The appearance of the first *Cerealia* in pollen profiles does not indicate that cultivation of crops necessarily took place in fields, but instead only points to the presence of *Cerealia* in the pollen at the particular location of the sample. It addresses the cultivation in various environments and under different conditions – seeking to determine which areas were treated as suitable places for cultivation and which were the places of only sporadic attempts at cultivation. Approached from the viewpoint of agriculture today, it often seems that the areas of early cultivation had not been practical for permanent farming.

A considerable difficulty in the interpretation of pollen profiles is that often only a single pollen grain has been found in samples dating from the earliest periods. A single sporadic trace of *Cerealia* pollen is always interesting but understanding its role and explaining the human influence requires further data. These data indicate the human influence in the environment, the bog or lake where the sample has been taken. In practice, the influence is visible in the decrease or increase of virgin forest tree species, wild herbs, and certain other natural plants.

However, the human Stone Age activity can be traced without any observations of *Cerealia* as well (Vuorela 1994; Vuorela & Kankainen 1996; Koivula *et al.* 1994). In such cases, however, the cultivation of crops cannot be proved directly. An important reason why Late Stone Age communities influenced their environment was animal husbandry, i.e. grazing and collecting the nutrition for

animals. Other possible reasons, such as promoting some plants specifically for human use will be discussed below.

Pollen profiles can tell how actively, in what way, and for how long in time the area has been utilized in the past. The information value of samples varies in each case, because sometimes it is possible to combine them with archaeological data, i.e. the age and character of a nearby site. Still, in many cases the results are rewarding and they open possibilities for building models about the meaning of the close environment to the ancient dwellers there. Sometimes traces of cultivation are sporadic not only from Stone Age but from other prehistoric periods, too.

In Finland a considerable part of the Late Neolithic / Early Metal Age sites are found in forests or in areas covered by forests in the past. In the history of such environments the change in the percentage of pollen from trees is the first clear indicator that development has begun to proceed in a different way relative to the natural development in the past.

Arboreal pollen (AP) of *Picea*, *Pinus*, *Betula*, and *Alnus* are the most typical in the Finnish forest. Non-arboreal pollen (NAP) and pollen of broad-leaved trees (QM) come from *Corylus*, *Ulmus*, *Quercus*, *Tilia*, *Carpinus*, *Fraxinus*, and *Fagus*. Together the AP, NAP, and QM tell the total sum of terrestrial pollen grains and the share of the forest in relation to all pollen remains can be calculated. Change in their relative proportion in the local vegetation addresses long-term changes in climate. *Juniperus* (Fi. *kataja*) pollen values are followed in the diagrams. This is because the human impact on the trees has resulted in an increase of juniper close to dwelling sites.

Variations in the percentage of tree species cast light on the climate history on a local level. Such changes may show that trees have been cut by man, and accordingly the relative share of grasses has increased in open areas. The first appearance and increase in the amount of *Picea* are an interesting general benchmark at all the sites where pollen analyses have been done in Finland. It identifies the point in time when this species “arrived” at the area in question from east to west. This change was independent of human populations as such, but still it is an important phenomenon from the cultural point of view, as environmental conditions directed in what kind of place cultivation could be started.

The increase of *Poaceae* (or *Graminae* group) includes large number of flowering plants (Fi. *heinäkasvit*) and *Urtica* (nettle, Fi. *nokkonen*) as well as the often just sporadic evidence of *Plantago lanceolata* (ribwort plantain, Fi. *heinäratamo*) and *Plantago minor / major* (greater plantain, Fi. *ratamokasvit*) are usually of particular importance in the pollen record. These species include several different plants including common weeds in human-influenced environments and they are often considered as indirect indicators of grazing, too. Their existence refers to human influence. In the coniferous zone they often emerge in pollen diagrams close to Neolithic sites. These sites belonged to hunting-and-fishing communities but the particular value of the pollen information is that they involve faint evidence of either pastoral or cultivated lands. Some of them also have had value as a medicine.

Urtica (nettle) grows at refuse heaps, which are caused by human culture. Although often overlooked today, the plant has several good characteristics and it was utilised by people from early times. It is nutritive and medicinal but first of all it has good fibrous qualities and it was handy to make nettle nets and ropes. It is reasonable to assume that conditions, which propagate the growth of the nettle had been actively formed by people already in the Late Stone Age.

Plantago lanceolata / *minor* / *major* (see above) and *Cannabis* (hemp) were useful plants already in the Stone Age. They are practical as medicine and suitable for making resin or oil. Their function as drugs has been known for a long time. Hemp textiles and ropes are in use even today. Both plants can be used as nutrition by cattle as well as humans.

The *Ranunculaceae* family (Fi. *leinikkikasvit*) consists of different plants, which are divided into the buttercup family and the crowfoot family. Usually, single species cannot be separated in pollen analyses. Despite this, the presence of the family in the pollen record tells us that forest, be it coniferous or deciduous, had vanished or the number of trees has diminished and the environment was mostly open. For the cultural study, this not too detailed information is interesting because it, in any case, indicates the change and probable influence of human activity in the area. The species of the *Cichoriaceae* family (Fi. *sikurikasvit*) are complicated to separate as well, but some of them are frequently recorded in pollen profiles near archaeological sites. The observation refers to influence from outside in a virgin forest.

The *Brassicaceae* (*Cruciferae*) (Fi. *ristikukkaikasvit*) family includes a few flowering plants. They are all indicators of an open environment, not the forest, and they have likely been propagated by man. Some of the species are food plants, for example cabbage and turnips (Fi. *kaali*, *nauris*). The latter may have grown on the slash-and-burn fields. An interesting plant is woad (*Isatis tinctoria*, Fi. *morsinko*) because it was used for producing blue color; even more important was that it had a great value for medical purposes. In Finland, it grows in the southern part of the country. In some cases macrofossils, too, indicate its occurrence in the Stone Age context.

Sampling sites

In the Finnish research, most archaeological pollen samples have been taken from the area close to the dwelling sites. There are several exceptions from this starting point, which will be discussed later. The hypothesis implies that agriculture could be found close to concentrations of either synchronous or multi-period sites. A logical consequence of it would then be that the places for agriculture were not far from the dwelling sites. Settlers of sites burned the forest away first of all for themselves but also in order to widening open area for grazing and cultivation. All these activities influenced the flora and this can be recorded in the pollen sediments. The intention to connect settlement and cultivation has guided researchers to choose the sampling locations by following this principle and the reflected results. Pollen analyses seem to provide valuable knowledge of how sites and environments were used.

Cultivation in permanent fields took place near permanent settlement sites, i.e. houses and villages. On the basis of pollen analysis alone it is difficult to tell when this kind of agriculture had begun. On the southwestern coast of Finland, the most probable period for the increase in cultivation was the later Bronze Age. According to Irmeli Vuorela (1999), the most plausible date could be the Early Iron Age. From that time the tradition spread to Satakunta, Häme, and Karelia.

In eastern and northern areas of present-day Finland and even in the northern parts of ceded Karelia the cultivation practices were different. Slash-and-burn may have been the only way of cultivation for a long period of time. It is worth noting that Bronze Age and Iron Age farmers often had slash-and-burn fields along with more permanent areas for cultivation.

For the research of field cultivation it is sensible to take pollen samples from the close neighborhood of dwelling sites. In cases where we look for evidence of slash-and-burn cultivation this is not the most typical situation (Engelmark 1995). There may not be any settlement remains in close proximity of places for occasional cultivation. Sites have been in use for short periods only because the maximum time for the utilization of land for agriculture was limited. For example, in a forest where the soil is gravel or the bedrock is close to the surface, it is possible to receive one or two good harvests but not more. Such a place must be left for 20–30 years until it regains its fertility and can be brought into use again. This type of cultivation played a major role in prehistoric northern Fennoscandia and the coniferous zone of Russia from the Late Neolithic to historic time (Orman 1995; Aalto 2006; Vuorela 1999). Unfortunately, many potential areas are still out of the scope of investigations, because pollen samples have usually been taken near known archaeological sites.

The territorial representativeness of pollen samples is a noteworthy deficiency in the current research but not the only one. Another difficulty lies in the dating of samples dated by the conventional ^{14}C method during three decades leading up to the end of the 1990s. AMS-dating (Accelerator Mass Spectrometry) has become the common method for the dating of pollen samples in Finland since the late 1990s. A considerably larger amount of material is required for a conventional dating than in the case of AMS. For sampling 5 g of charcoal are required. It takes several hundred years for such a layer of turf to accumulate. As a consequence the accuracy of a conventional ^{14}C dating can be poor, i.e. a standard deviation of over one hundred years in both directions from the "correct" date is not unusual. Along with the AMS method this problem has often been solved but comparison with previous and methodologically different analyses is problematic.

The palaeomagnetic dating of the sediment is new and often an accurate method (Ojala & Alenius 2005). In the case the material has accumulated in the water bottom without disturbance, the layers can be dated to the accuracy of ± 50 years, however the accuracy can be as good as ± 30 years (Saarinen 2000). This method is based on measuring the declination, inclination, and intensity of the particles in different layers.

Despite the considerable number of pollen analyses from Finnish sites it is not always easy to get access to the results. Many pollen analyses have remained unpublished. In some cases the main result, i.e. the (approximate) dating of the first phase of cultivation can be found in literature but the environmental history of the sampling site is not described and the later history of cultivation is not discussed (Grönlund *et al.* 1990; Simola *et al.* 1995). In practice, there is a lot of “silent” knowledge among the pollen specialists, but it is not available officially.

The history of cultivation in Finland is known quite well since the Bronze Age but many issues of the late Stone Age have remained problematic. For instance, we know that there are ca. 20 locations where pollen indicates early cultivation in the 2nd millennium BC. More accurate dates for the beginning of earlier cultivation should be determined at new locations and in each case the land use in later times should be better clarified. Last but not least, an open question pertains to the Karelian Isthmus and Karelia around Lake Ladoga. For some reason, the analyses so far show that the beginning of cultivation would date to the early Iron Age, only during the first century AD. But the corresponding Finnish material clearly attests to the beginning of the sporadic agricultural land use already during the Early Metal Age.

2.3. Macrofossils – grains of four crop species from the early phase of agriculture

In light of the Finnish material, it is difficult to determine the importance of the role the earliest cultivation played for local populations. The pollen evidence shows only that some agriculture certainly has been practised since the final phase of the Neolithic and during the entire Bronze Age and Early Metal Age (Grönlund *et al.* 1990; Vuorela 1982, 265; Vuorela & Hicks 1996; Vuorela 1999).

After adopting pollen analysis as a central natural scientific method of archaeology, the even more local and useful method, macrofossil analysis, came into archaeology in the 1980s. Macrofossils are a greater indicator of agriculture than pollen analysis, because the material and results are wholly connected with dwelling sites. They give concrete proof as to which types of grains or parts of vegetables were used at dwelling sites. Thus far, however, this kind of evidence is scanty from the earliest phase of cultivation in Finland. The practical problem is that the research material connecting to the Late Neolithic, Bronze Age, and Early Metal Age sites is not rich and as already stated earlier, the excavation methodology has not been exact enough for collecting the material in the excavations carried out before the 1990s. Some material does exist and the outlines of the ecology at the sites can be presented.

In Finland, the oldest known grain of barley found thus far is at the Niuskala dwelling site in Turku. This site is located on a low hill, which was located just by the sea during the late Neolithic Kiukainen phase (Lempiäinen 1999, 153) (see below). The dating 3800 ± 100 BP as calibrated is 1690–1260 calBC (Asplund 2008, 292) and it indicates that the earliest cultivation may have happened in the southwest part of the country already at the turn of the Stone Age

and Bronze Age. In the inland, macrofossils of crops are usually scanty in the soil samples of the period preceding the Iron Age. Nevertheless, it seems possible that cultivation has been a part of life already in the early Metal Age. At the Kitulansuo dwelling site in Ristiina, Southern Savo district, a grain of barley was dated to 1400–1020 calBC (Lavento 2001, 139) (see below).

From the late Bronze Age, there are two AMS-dated grains in the Finnish material. The grain from the Luistari dwelling site in Eura, Satakunta, is from 2560±55 BP (780–562 calBC) (Lehtosalo-Hilander 1999, 42). The calibration is in this case somewhat problematic, as the dating result fits the phase where the calibration curve rises up to twice inside the 1 σ probability value. Accordingly, the result falls between 830–510 calBC and 470–410 calBC (Asplund 2008, 298).

In southern Ostrobothnia, a grain was dated from a sample taken by Peter Holmblad (2007, 153) in his excavations of an ancient cultivation site at the Peltomaa site complex in Alatalo in Laihia municipality just recently. The calibrated date is 830–550 calBC on the 2 σ confidence level. In the case of Peltomaa, it is very interesting that in addition to barley, several grains of oats were found, too. The sampling context was not unproblematic but the result may actually represent a later phase of use in the same field, as the area had also been used actively later on. According to Holmblad it is possible that permanent and manure cultivation already began at the site during the later part of the Bronze Age. Interesting results also have been found at other dwelling sites.

So far this is almost all the macrofossil evidence for crop cultivation from the Bronze Age in Finland. As far as the Pre-Roman Iron Age is considered there are dated grains from the Hannunniittu dwelling site in Turku (Häkkinen & Lempiäinen 1996) and from Huilu 2 in Lappi municipality, Satakunta (Raikie & Haimila 2003, 18).

It has usually been assumed that the cultivation of rye did not begin before the Iron Age in Finland. However, recently this crop species was found in an Early Bronze Age context in the inner archipelago by the southern coast of Finland. At Lake Söderbyträsket in Dragsfjärd on the large island of Kemiönsaari, there was both barley and rye in a context dating to 2200–2030 calBC (Alenius 2008, 576; Asplund 2008, 298). According to present knowledge, such an early dating of rye is exceptional. On the same island, several samples from five different sites indicate many short periods of crop cultivation during the long period of settlement from ca. 2100 calBC up to the Viking Age. According to Alenius (2008, 581–582) and the viewpoint presented based on pollen evidence, there has been continuous settlement almost without any breaks from the late Neolithic to the present day.

Wheat emerges first in the Pre-Roman Iron Age in the Finnish material. The earliest evidence is from the dwelling site complex around the Rapola hill fort in Häme, which has been one of the most important settlement concentrations in the inland from the Pre-Roman Iron Age until the historical period (Vikkula *et al.* 1994, 52–54). Despite its emergence already in Iron Age contexts, wheat did not achieve any important role in Finland before the late Iron Age. Particularly in the inland, there were rye and oats, which had an essential role in cultivation.

2.4. Linguistic support for the dating of the earliest agriculture

Linguistic material is of central importance for understanding change in societies and their economy. Cooperation between linguists and archaeologists has been useful in researching early agriculture in Finland.

Any absolute chronology cannot be constructed for either loanwords or toponyms, but the relative chronologies of these two categories are available (Kallio 2006). It is important to note that the Late Neolithic and Bronze Age / Early Metal Age are considered here as the periods during which certain characteristics emerged in the languages spoken within the research area. In the following section, I will highlight a few examples of vocabulary, which are connected with cultivation. Though toponyms might bring many interesting insights, they are not discussed much in this work.

The important loanwords which were needed by the groups adopting cultivation practices are Fi. *ohra* ‘barley’ (*Hordeum*), *ruis* ‘rye’ (*Secale*), and perhaps also *vehnä* ‘wheat’ (*Triticum*). According to contemporary palaeobiological data, the oldest cultivated crops were barley and rye, and thus the linguistic dates of these two words are of special interest here.

The etymology of *ohra* is connected with the meaning ‘sharp issue’, i.e. with a shape like a barley seed. The word may have existed already in Indo-Aryan but the more probable dating is the Baltic layer of loan words in Finnish (Häkkinen & Lempiäinen 1996; Häkkinen 1999, 170). The etymology of *ruis* is probable Germanic. Fi. *kaura* ‘oat’ belongs to the same chronological layer of loan words (Häkkinen 1999, 170–171).

The name of the fourth important crop species *vehnä* refers to the Volga-Finnic context. In Finnish, the same crop was also referred to by the synonym *nisu*, but today the word is used in dialects or for a specific nuance only. The distribution of *nisu* ‘wheat’ is from Finnish in the north to the Baltic languages. However, it is almost extinct over large parts of this region (Häkkinen 1999, 170).

The Finnish word for the open area used for slash-and-burn cultivation is *kaski* and the verb *kasketa* means ‘to prepare *kaski* in a forest’. The attribute *hu(u)hta* refers to spruce forest in particular, hence *hu(u)htakaski* ‘area for slash-and-burn cultivation in a spruce forest’ (Sarmela 1995). The word *kaski* or (Gen) *kaske* is a very early loanword, possibly of Indo-European origin (Koivulehto 1988, 289–290). Archaeological material supports the dating.

April was the month when trees, the spruce in particular, should be felled in the forest in order to allow them to dry over the summer and (usually) the next winter (Tvegsberg 1995, 109). This knowledge is kept in mind by the speakers of modern Finnish, although in an implicit way: the word for April is *huhtikuu* (*huhti* < *huhta* + *kuu* ‘month’). Jorma Koivulehto (1985) suggested that *huhta* could be of Baltic origin in Finnish, but more recently (1999, 225–229) he has also considered the possibility of it being an Iranian loan.

Based on cultural context, Fi. *pelto* : *pello-*, ‘field for cultivation’ is assumed to be newer than *kaski* and *hu(u)hta* and the linguistic characteristics of

the word suggests the same. According Jorma Koivulehto, *pelto* belongs to the Germanic layer of loans or it may be of Pre-Germanic origin in Finnish. In the latter case, the cultural contacts would date to ca. 1000 BC (Koivulehto 1984, 198). All scholars, archaeologists, biologists, and linguists alike agree that cultivation was first adopted in the form of slash-and-burn in the territory of the present-day Finland.

Other valuable linguistic traces of early agriculture and the change of society in this phase are *jyvä* ‘corn’, *jauhaa* ‘to grind’, *siemen* ‘seed’, *kylvää* ‘to sow’, and *kyntää* ‘to plough’. The oldest of these may be *jyvä*, which according to certain opinions is dated to the Neolithic Stone Age (Joki 1973; see also Koivulehto 1984, 195).

The word *siemen* is most probably a Baltic loan word (Thomsen 1890), while a Germanic origin has been suggested for *kylvää* (Koivulehto 1984, 194–195). One important, but also complicated, word is *kyntää* : *kynnä-*, which may derive from *kynsi* : *kynne-* : *kynte-* ‘nail’ (see Vilkuna 1971, 20–22). The Finnish word for (homebrewed) beer *kalja* may also date to the same phase of loans, as recently suggested by Petri Kallio (1998).

As far as the up-to-date archaeological data are considered, all the above-mentioned concepts were necessary for communication in the Late Stone Age and Bronze Age / Early Metal Age if cultivation of any kind was practised. Nevertheless, the words for slash-and-burn, *kaski* and *huuhta*, are older. These give us the general picture of what was the most important type of cultivation in Finland through these periods and even up to fairly recent times.

I have discussed above the relative chronology of words only. Previously it has been discussed which of those words have become generally accepted as “old words” and which can be connected with the oldest cultivation. However, the etymologies and chronology raise different opinions and these issues have yielded a large number of articles. Reconstructing any absolute chronology is anything but easy and it is reasonable to make with the help of interdisciplinary methodology. In his excellent article about the absolute chronology of the Finnic languages, Petri Kallio (2006) shed light on the methodological and chronological difficulties of dating on an etymological basis. He indicates that the absolute chronology of these words varies very much. From the perspective of the archaeologist, it is evident that numerous linguistic arguments are sensible and plausible and the possibilities to date words with the aid of various arguments seems promising, though it depends a great deal on the researcher and his/her viewpoints.

In the following two chapters, I will discuss how the different categories of available data, archaeological, palaeobiological, and linguistic, could be combined together. The palynological and archaeological dating of the earliest phase of cultivation, i.e. the Late Stone Age ca. 2300 BC, fit more or less together. The Battle Axe culture raises discussion in this respect, because it could be a strong candidate for explaining from which the direction the innovation spread on the coast of Finland. The problem is, however, the small amount of evidence.

Nevertheless, it is reasonable to accept the hypothesis that cultivation began on a larger scale during the Late Neolithic – this is to say during the early Kiukainen culture at the latest. The development during the Bronze Age / Early Metal Age must be discussed in light of all possible evidence because archaeological material alone is too scanty for this ambitious task.

3. Evidence of early agriculture in Finland – slash-and-burn cultivation or permanent fields?

3.1. Discussion in the 1980s in Finland

The search for evidence of early agriculture began with the question of where and how prehistoric groups could have practised cultivation of crops and other useful plants. It seems that scholars were willing to find signs of agriculture of any kind. However the most probable evidence might have been found in searching for signs of slash-and-burn cultivation in southwestern Finland. Today scholars might also expect to find signs of ploughed fields but the emergence of these would have taken place later. However, it was essential and wise that sampling was done in most parts of the country. The general picture of the history of cultivation in Finland has been relatively evenly outlined although it is always important to take into account the amount of samples and the preciseness of each analysis (Vuorela 1999, 145–149).

It is not easy to trace field cultivation in the empiric material. First, in the sediment profiles the early evidence of pollen tends to be scanty and the distribution of pollen is inhomogeneous. This often leads to the conclusion that there was not any continuation of cultivation in the past. Second, thus far the archaeological observations of ploughed fields are very few in Finland. In the pollen profiles, separating these from the effectively used slash-and-burn field is also not without problems.

Kimmo Tolonen's (1982, 323) interpretation of his pollen samples from the Häme region was that continuous cultivation began there already during the Early Bronze Age, during the second millennium BC. After a break between ca. 800–600 BC, the cultivation of barley continued and rye was introduced, too. Since 600 BC, agriculture has been practised until the present day. Pollen analyses in other parts of Finland have indicated a long prehistory of cultivation since the Late Neolithic and Bronze Age / Early Metal Age (Vuorela 1999, 145–146; Alenius 2008, 579–582).

It seems that during the early phases of the introduction of pollen analysis in the research of cultivation, interpretations were optimistic towards field cultivation. Scholars understandably thought that areas by the coast had been the most suitable for a cropping system with rotation. The differences within the country then became clearly visible. In the southwestern part of the country, cultivation was easier and it was possible to use ploughs in the fields (Orman 1991). Despite this, the analyzed early pollen profiles did not normally indicate

the continuous pollen sequence reaching from the Late Neolithic to the Late Iron Age.

Irmeli Vuorela thought in the early 1980s that Bronze Age cultivation could not have been the “most primitive” because the pollen of the Swedish turnip (*Brassica napus subsp. Napus*) and turnip (*Brassica rapa var. Rapa*) were found. Her interpretation was that early cultivation already had been practised in ploughed fields in southwestern Finland (Vuorela 1982, 255). Today, when more data are available, they do not necessarily support Vuorela’s idea that the settlement structure was stable yet.

In the 1980s the general view was that field cultivation may have been practised on the coastal zone of southern Finland and the archipelago of Åboland perhaps already in the Kiukainen culture and during the Bronze Age, in particular. The transition from fishing and hunting towards a mixed economy was most apparent on the coast among the groups, which also had adopted the first bronze implements in this region. In other areas the cultivation in question instead had been experiments. Archaeologist Christian Carpelan (1982, 275) applied the term Sw. *gård* ‘farm’ and pointed to the possibility that on the coast the households had animal husbandry, cultivation on both slash-and-burn fields and ploughed fields, along with fishing and hunting as a means of subsistence.

3.2. Current research of early slash-and-burn cultivation

At this point it has already been very well attested with the help of the palaeobotanical data that agriculture has been carried out in large parts of the present-day territory of Finland since the late Neolithic. The pollen diagrams indicate, however, that in most cases cultivation has been very sporadic (Vuorela 1999; see also Suomen historian kartasto (Vuorela 2007)).

The prevailing hypothesis is that hunters-fishers tried to introduce agriculture but they failed due to the climate deterioration, which began already during the Late Neolithic. Due to the harsher environmental conditions, the size of the population decreased – despite trials to support the economy by new innovations. This is evident in the number of Early Metal Age sites which are, in fact, less numerous than the known sites from the Late Stone Age phase. Already Julius Ailio (1909) wrote that changes in the settlement pattern were due to climatic reasons.

The settlement continued on the coastal zone in southwestern Finland and Lapland. Habitation did not disappear in inland Finland, either, but the character of sites became different. Stone Age ceramic types were replaced by Textile pottery. Bronze came into use and agriculture was practised along with the traditional means of livelihood already since 2300 calBC. In comparison to the large Stone Age sites, sites during this period become considerably smaller. The data are based on the research done in Finland since the 1970s by the Geological Survey of Finland, the Karelian Research centre, and various universities.

In eastern Finland, some Stone Age groups may have diminished considerably or even disappeared in some areas and new groups arrived (Lavento 2001).

In any case, communities became more mobile than before (Lavento 2005). On the other hand, most of the Early Metal Age sites are located in the same type of environment as during the Stone Age, i.e. on the shores of lakes and rivers. In surveys, the sites are easy to find but sometimes they are hard to date. In many areas, we can distinguish between Stone Age and Early Metal Age habitation by the aid of shore displacement chronology. But in the supra-aquatic regions this does not work out, of course. Further we note that in a few cases there are layers from different periods on the same site and the material is mixed.

The model suggested before does not fit in the inland of southern Finland. Usually, there is not any continuation from the Stone Age to the Early Metal Age in these sites. The Kiukainen population and the Bronze Age groups may have lived simultaneously in the coastal zone for some centuries. The economy of the Kiukainen population was based on grazing and restricted cultivation along with hunting and fishing in the same way as in the region of Lake Mälär, Sweden at that time (Jensen 1989). The Bronze Age population may have favored grazing and cultivation. Gradually, the Kiukainen groups were replaced by the Bronze Age population or were assimilated into it. Unto Salo (2004, 140–148) has dated the replacement of the Kiukainen sites by the southern Scandinavian type of settlement to ca. 1200 calBC.

Populations have always been able to search for the optimal means of subsistence in different conditions. The last half of the millennium BC and the beginning of Common Era were the coolest times in Finnish prehistory since the arrival of the pioneer settlement ca. 10 000 years ago. Nevertheless, recent palynological analyses indicate that slash-and-burn cultivation continued in some places in the inland (Alenius *et al.* 2009). These locations are unsuitable for farming today but in the Early Iron Age they may have been even favorable for small-scale, though sporadic, agriculture.

In the Repovesi national park in the municipality of Valkeala, southeastern Finland (Alenius *et al.* 2009), the pollen analysis shows that cultivation was practised in the near vicinity of the small lake. Areas of potential agricultural land are scarce and small, though. The landscape is characterized by steep slopes, deep lakes, and large cliffs (Fig. 4). A likely hypothesis is that the cliffs saved the warmth of the sunshine and this reduced the risk of night-frost. Slash-and-burn cultivation has been carried out on similar sites in historical times, too (Talve 1979; Vilkuna 1977).

The dominating tree species by Lake Repovesi species is spruce. Thus the most probable slash-and-burn method has been *Fi. huuhtakaski* in the spruce forest. After burning, the field was fertile during three seasons (see Orrman 1995, 98–99). After this it had to be abandoned for rotation or it was used for grazing. Thus one group of people needed several fields of the *huuhta* type, and in principle these could be found in archaeological surveys. So far there are very few such observations, though. In the future, we should pay more attention to areas, which are traditionally overlooked by archaeologists who search for Stone Age settlement in lake areas.



Figure 4. Slash-and-burn cultivation forest in Repovesi, Valkeala.
Photo: M. Lavento.

3.3. Evidence of field cultivation and interpretations

It is a complex question how to date the beginning of year-from-year cultivation in ploughed fields. In the coastal zone, agricultural fields belong to the way of life since the Bronze Age. Unto Salo (2004, 146) does not doubt that the dwellers of the Rieskaronmäki site in Nakkila were farmers. In the Bronze Age there was new population that occupied coastal areas. Salo discusses the question about ownership on the basis of linguistic facts and according to him the occupiers of the land were Germans who brought a few loanwords connected with agriculture to the Early Finnic language (Salo 2004, 140–148; Koivulehto 1987, 33–36). These people were used to living in permanent houses instead of huts and they were familiar with animal husbandry and cultivation. The exact type of agriculture they practised is unknown, but the impression is that there were grazing lands not very far away from the dwelling houses.

Further, in the inland in the Kokemäenjoki river basin the Sarsa ceramics indicate habitation, which professor C. F. Meinander (1983) connected with the introduction of field cultivation. Christian Carpelan continued the same line of argumentation and suggested that there had been a so-called Middle-zone group in the Häme region (Carpelan 1978; 1982). Salo (2004, 148) points to the lack of

adequate research in the region in question (Sastamala). He does not believe that hunting and fishing sites could have been suitable for cultivation at all. His argumentation begins from the hypothesis that the way of life of farmers required a house with a cowshed (Salo 2004, 140–148). However, he assumes that in the Sastamala region farmhouses may have been similar to those near the sea coast.

Carpelan thinks that since the agrarian-pastoral and hunting-fishing were two different socio-economic systems during this period it is reasonable to consider agriculture as a decisive factor, which separated populations from each other. In other words, crop cultivation is an aspect of ethnic identity (Carpelan 2006, 79; Carpelan & Parpola 2001, 68). There was a border between the coastal zone of southern Finland and the inland. It existed for ca. 2500 years, until the Merovingian period (beginning of the 7th century AD).

Salo (2008) shares the same view. With a reference to Meinander (1983) he considers it probable that in the Häme Lake District the hunter-fishers were Saami who practised slash-and-burn cultivation already in the Early Metal Age. They could not start any field cultivation, however, as annual circulation between summer and winter villages prohibited the essential prerequisite of farming: permanent houses (Salo 2008, 164–165).

I agree that the hypothesis about two culture areas can be accepted. However, the method of cultivation is not the best argument for proving it. According to Henrik Asplund (2008, 304) there have not been any fields of a “Celtic” / “Baltic” type in the area of today’s Finland. He argues that geological factors, i.e. the soils, were probably the main reason that this kind of agriculture was not introduced on the northern side of the Gulf of Finland. This is a new argument, as the classical explanation for the lack of evidence of settlement in the Pre-Roman Iron Age (4th – 1st centuries BC) has been the poor climatic conditions (Alenius *et al.* 2009).

At the moment, the earliest remains of ploughed fields are in the village of Salo in Laitila. According to Birgitta Roeck-Hansen and Aino Nissinaho (1995, 32), the dating is between ca. 350–600 calAD. It seems that the earliest cross-plough fields in the inland are at the dwelling site complex in Rapola, Sääksmäki parish in Häme. It is dated to 780–1217 calAD (Vikkula *et al.* 1994, 56). At Orijärvi in Mikkeli in the Savo district, the fossil fields have been excavated and analyzed very carefully. They were in use already in the 6th century AD and the cultivation continued in the Viking Age (Mikkola 2005, 57–58). In southwestern Finland, a few sites were suggested as candidates for ploughed fields and some data from the Iron Age have been connected with them.

In conclusion, it seems that knowledge about the history of field cultivation is inadequate in Finland until the Middle Iron Age (Asplund 2008). From that time on there is more evidence, and relevant results have been obtained for the late Iron Age (Mikkola 2005; Alenius *et al.* 2008). However, the oldest phase, Middle and Late Neolithic, definitely require further research.

3.4. Some viewpoints about the later phases of cultivation in Finland

Agriculture remained in a secondary role in the economy for the whole Bronze Age / Early Metal Age in all areas of the present state of Finland, even on the coast where the Scandinavian / “Germanic” influence was the most intense. The same can be said about the Karelian Isthmus and areas west of Lake Ladoga. In general, we can say that hunting and fishing were the dominant means of subsistence at the beginning Iron Age, too, with the exception of the coastal zone from southwestern Finland to central Ostrobothnia in the north and a few sporadic areas in the inland. From the 6th century AD onward, the cultivated crops and plants become more frequent in the palynological record (Simola *et al.* 1991; Taavitsainen *et al.* 1998).

In the early phase, the agricultural lands were used for a few years only and the risk of a poor harvest or no harvest at all was apparent all the time. In places the cultivation ceased for years or for a generation before a new trial can be observed in the pollen profile. The transition towards more continuous cultivation proceeded in two ways, depending on the local environmental conditions. In the most favourable coastal zone, field cultivation got its proper start following the end of the cool climate period after the 4th century AD. In Häme, Southern Savo, and Karelia, the slash-and-burn sites were used more often but without exact time when to come back. The settlement was quite sparse and the forests with large uninhabited regions may have remained without cultivation for long periods (Vuorela 1999; Alenius 2007; Alenius *et al.* 2008).

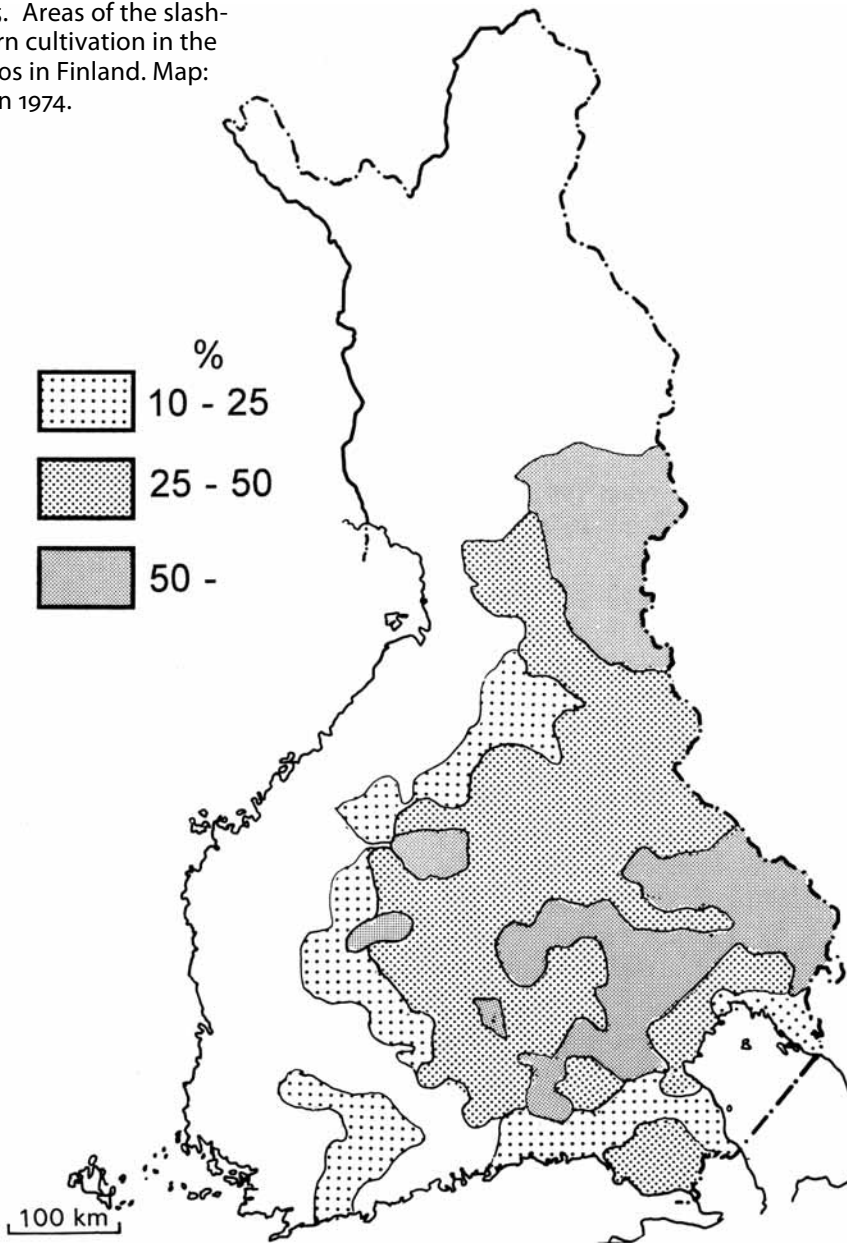
In the Late Iron Age, the habitation grew remarkably in areas where soils were suitable for field cultivation and the climate permitted good or modest harvests in most years. As ploughed fields require manure, the role of animal husbandry cannot be underestimated from this viewpoint, either.

The important cultivation fields during the Iron Age were on the southwestern coast (Finland Proper), in Satakunta (the River Kokemäenjoki area), and the area in and around the town of Mikkeli in southern Savo (Orrman 1991; Mikkola 2005). However, in eastern Uusimaa and the Kymenlaakso district (in and near the valley of the River Kymijoki) the data are still missing. On the Karelian Isthmus permanent cultivation of fields reached a productive level between the 5th and 9th centuries AD (Simola 2003, 114–115) but in a few areas the settlement remained quite scanty, though (Uino 2003, 295).

Along with field cultivation, slash-and-burn cultivation also did not lose its meaning in the economy during the Iron Age or in the medieval and post-medieval periods in Finland. In eastern and northern Finland, it continued until the beginning of the 20th century (Linkola 1985). There are several different methods for slash-and-burn cultivation and these were applied when cultivating plants like cereals in different climatic conditions (Nieminen 2005, 5–9).

The agricultural fields were not far from the dwelling sites (houses), of course, but a few suitable sites for cultivation were located further away and taking care of them required that people overnight in huts or temporary shelters

Figure 5. Areas of the slash-and-burn cultivation in the late 1840s in Finland. Map: Soinin 1974.



there (*Fi. kaukokaski*). In practice, the work was carried out by joint forces and the division of labour (between men) was organized according to common rules (*Fi. kaskiyhtiö*) (Vilkuna 1977).

The well-developed knowledge of swidden cultivation was probably one of the reasons why colonisation of new areas proceeded fairly quickly in eastern Finland during the Middle and Late Iron Ages and more actively, as in the medieval and historical periods (Taavitsainen 1987; Simola *et al.* 1991). Good

harvests were produced, however slash-and-burn cultivation was destructive to forests. In the 18th century, the exploitation of forests became even more difficult due to the production and overseas trade of tar becoming a profitable part of the livelihood of the peasants (Fig. 5). After the end of the era of wooden ships, tar lost its importance. At the same time, the millennia-long tradition of slash-and-burn cultivation was almost extinct.

4. Early cultivation in Finland

4.1. The sites and interpretation of sedentarity

Above, I have tried to discuss the reasons that dwelling sites are difficult to find in the coastal zone of Finland from the Early Metal Age. A further challenge is to find out more carefully whether certain areas in southwestern Finland were settled by two populations during the first and second periods of the Scandinavian Bronze Age, between 1700–1200 BC. First, the groups representing the local tradition of the Stone Age were named after the eponymous site of Uotinmäki, located in Kiukainen in Satakunta. Second, a culturally and probably also genetically new population emerged due to the influence of visitors from the areas with the Scandinavian populations. The difference between the material cultures of these two peoples can be seen in ceramics. The most visible feature is stone cairns (Fi. *röykkiö*, *vare*) which were built by these aforementioned groups in particular. A small number of bronze implements belonged to them, too, but the evidence of dwelling sites and their settlement structures is almost missing (Meinander 1954a, 1954b; Salo 1984; Edgren 1992; Huurre 2005).

In Finnish archaeology, the sites have often been separated between the coastal Bronze Age and the Early Metal Age site in the inland (Meinander 1954b; Carpelan 1982; Salo 2004). The main argument has been that the large stone cairns are on the southern or southwestern coasts. Further, rectangular house remains have not been found at all on sites, which date to the second millennium BC in the inland (Tallgren 1931; Salo 1976, 1984). In the inland these are also very uncommon. The coast in northern Ostrobothnia is a region of its own, where the dating of cairns does not fit the model of southwestern Finland.

In this context it is necessary to underline that the Kiukainen groups lived on the southwestern coast of Finland. Clay vessels characteristic of the inland have textile impressions on their surface, hence the term Textile pottery. One should keep in mind that although we call the ceramics either Textile ceramics or Sarsa-Tomitsa ceramics, the surface impressions are often not made by a textile. The impression may have been produced by many different types of implements (Patrushev 1993; Lavento 2001). The Sarsa-Tomitsa and Textile ware differ considerably from any of the ceramic types on the coast. It is interesting to note, however, that Textile pottery can be found in several areas in the coastal zone. Textile impressions on ceramics have been found at dwelling sites and on some hillforts by the River Volga and its tributaries (Lavento 2001).

It is accepted by many Finnish scholars that grazing fields for domestic animals and cultivation fields near the dwelling sites were in use during the Bronze Age, but in the inland, houses with meadows and fields nearby did not develop before the Iron Age (Carpelan 1982; 1999; Salo 1984; 2004). It is true that so far neither Early Metal Age permanent fields nor Scandinavian house remains have been found in the inland. However, this does not indicate any straightforward division between the coast and the inland, as the remains of Bronze Age fields have not been found on the coast, either.

The chronology of the coastal Bronze Age is coarsely known through bronze finds and the shore displacement, while detailed datings are missing. The cultivation of fields close to houses may have begun from the second half of the Scandinavian Bronze Age, at the beginning of the first millennium BC (Holmblad 2010). In the inland, the synchronous sites have been found, but the observations do not give any observable evidence of fields like this. Slash-and-burn cultivation had remained there as a central method of cultivation.

In some cases the macrofossils also indicate cultivation in the inland. One example is the dwelling site at Kitulansuo d in Ristiina, in Southern Savo district. A grain of barley has been AMS-dated to the Early Metal Age (Lavento 2001, 139). The interpretation of the site is complicated because ceramics and other find material seem to belong to a hunting-fishing population, which used it from the beginning of the first millennium BC to the end of Early Metal Age. Nevertheless, there were some pieces of coastal Bronze Age ceramics at the Kitulansuo d site, too. An interesting iron smelting furnace was uncovered there, which may have been in use at the beginning of Common Era or even as late as the 5th century AD (Lavento 1999).

At first sight the environment around the dwelling site at Kitulansuo does not look suitable for cultivation. The soil is sandy and the natural vegetation is pine forest. The site is surrounded by mires and in a few places the surface is plain bedrock. Nearby, on the bedrock formation, there are three Lapp cairns which are usually connected with inland graves both in the Early Metal Age and in the Iron Age. Most of the Lapp cairns in the municipality of Ristiina are small and for this reason are difficult to observe. This may have been the reason why they remained undiscovered until the late 1980s.

In addition to Kitulansuo, there are also other sites in the inland, which indicate connections to the coast in the Early Metal Age. For example, the coastal type of ceramics named after the eponymous site Paimio (near Turku) have been found at the Hiukkasaari dwelling site in Tyrvää, in the valley of the River Kokemäenjoki. Other finds in the same context included Textile pottery of the Sarsa type and Luukonsaari ceramics, which belong to the group of Säräisniemi 2 and to the tradition that began ca. 800 calBC in the inland and northern Ostrobothnia. In Tyrvää, there is another site, Haapakallio, where Luukonsaari pottery and Textile pottery were found along with scratched surface ceramics (*Fi. naarmupintainen*) (Salo 2004, 155). Scratching belongs to many ceramic types of the first millennium in the large area of the Baltic Sea. The complex find contexts of finds at these sites indicate the connections between coastal and

inland groups. The examples of visiting in different environments have been made by coastal and inland populations (Lavento 2009).

During the Neolithic, sites were of the village type on the coast and also inland, as a large amount of depressions and the semi-subterranean houses are known. Unto Salo's (1994; 2004) model concerning the large Bronze Age "villages" and Christian Carpelan's (1982) view about the sites of small farms (*gårdar*) have emphasized these sites as examples of the way foreign populations lived on the coast. In the Early Iron Age, there are almost no dwelling depressions or any other kind of easily distinguishable evidence of dwellings visible at the sites. On the coast, there was not any great break in the tradition of the buildings at the settlements, although their number is not considerable. What happened was a quick change in the material culture. The groups were small and people probably lived in huts, which did not leave much evidence for archaeologists to find.

The small size of the inland sites and the thin culture layers give an impression that people did not settle in one place for a long time, but that instead the sites were visited seasonally. It should be noted, however, that in a few cases there are relatively large Early Metal Age sites, too, and some dwelling depressions have been found in Early Metal Age contexts (Lavento 2001; Schulz 2002). Leaving the exceptions aside, the Early Metal Age sites resemble neither Neolithic "villages" in the inland nor Bronze Age "villages" in the coastal zone of Finland. Change towards a more mobile way of life can be observed in Karelia in Russia, too (Lavento 2001; 2005). This evidence has been discussed by several researchers in Russia (Kosmenko 1992, 1996; Zhulnikov 2005), Sweden (Forsberg 1985; Lundberg 1987; Norrberg 2008), and Finland (Okkonen 2003).

All categories of archaeological artifacts – finds at sites or stray finds – prove that the size of the population decreased in a large area in Eastern and Central Finland at the turn of the Late Neolithic / Early Metal Age (Lavento 2001; Okkonen 2003). The decrease in the number of sites gives the same indication. This development is observable in most parts of Finland, up to the River Kemijoki region in the North, as well as, in northern Lapland, though the finds and some datings indicate continuation in the settlements. Still also there, the amount of people may be smaller than during the Neolithic (Carpelan 2003; Halinen 2005). The overlapping populations have been assumed to have existed on the southwestern coast, where the influence of the Kiukainen groups and Bronze Age population are known.

In the inland, there is one striking feature, which should be noted. The number of Lapp cairns is considerable also there. Hundreds of Lapp cairns are known in the inland, although their number is small in relation to the known cairns in the coastal region. It is evident that inland cairns have remained somewhat unstudied so far and that their number will grow when more surveys are conducted. This increase in material and accompanying careful study will also bring up many new aspects about their chronology, contexts, and relations between influences coming from different areas (Saipio 2011).

Although the essential empiric evidence for the mobility hypothesis can be seen as adequate, the reasons for it are all but self-evident. In the following, I will not seek the reason for the drop of the population size. Instead, I will approach the question by asking in what ways the populations that survived were able to organize their economy. The role of cultivation will be emphasized, in particular. The discussion concerns both the coast and inland but not northern Lapland, as cultivation was not practised there prior to historical time. According to contemporary data, agriculture was not introduced there during the Late Neolithic or in the Early Metal Age.

4.2. Overview on a larger scale

Already at the final stage of the Neolithic and during the Bronze Age, small local groups had to change their settlement pattern on the coastal zone and in inland Finland, in particular. In the inland we know only a few sites from the transition period. Although the new archaeological surveys have uncovered a considerable amount, the number of Neolithic and even Early Metal Period sites have remained few. One reason for this may be the way archaeologists approach their survey. It follows the shore displacement model by accepting the hypothesis that the environments used in the past were in sandy moraines or eskers on particular shore levels – all calculated for each area. The sites concentrate on the Stone Age type of cultural milieus, which are well-known to us from previous experience. In other words, we have probably not yet found suitable models for tracing the Bronze Age / Early Metal Age layers of these landscapes.

One possibility for approaching this problem is to assume that the “missing” sites and groups of people are invisible in the archaeological record simply due to their way of using the environment, i.e. slash-and-burn cultivation. The sites are located in ecological milieus different from those of the hunting and fishing groups and the archaeological remains are not of the same type, either. What we need is a new kind of survey methodology.

The earliest phase of cultivation from ca. 2300 calBC onward (Vuorela 2002) did not change the communities in any dramatic way. The amounts of *Cerealia* pollen in the pollen profiles are very small and thus it is reasonable to assume that food production did not radically increase either in the coastal zone or in the inland. The development of the culture has been seen in the light of cultivation which led to the changes in the social patterns and culture on the coast. It was still not necessarily the case in the inland, where the Stone Age type of settlement continued (Tallgren 1933; Kivikoski 1961; Huurre 1979). This statement has recently been called into question on the grounds of archaeological (Carpelan 1999; Lavento 2001) and palynological data (Tolonen, K. 1982; Grönlund *et al.* 1990; Vuorela 1999), although many characteristics of the economy did not change quickly.

If it is assumed that cultivation came to Finland together with the Battle Axe culture, then this should mean that it would have changed local cultures radically. It is evident that the dating results obtained so far do not support

without problems the synchronous arrival of the Battle Axe population and the earliest cultivation in Finland. It is assumed that societies developed towards animal husbandry, i.e. by keeping sheep and pigs (Edgren 1970; 1992; 1999). Human influence in the forests has been recorded in the pollen data in many areas in Finland (Vuorela 1982; 1999; 2002). The process started in many phases but cultivation became established when the first Kiukainen ceramics appeared in the archaeological material (Alenius 2007; 2008).

A considerable cultural change took place in Finland since the period between 1900–1700 calBC. The settlement structure changed on the coast and people moved closer to environments where field cultivation was practised. The displaced shores in the lower terraces of the eskers and end moraines reached silts and clays. Still, at least some sites have been found in areas where shore displacement influenced the water systems and more clayish soils. Normally the population did not live close by the new potential agricultural lands.

The transition to an economy where agriculture was in the dominant position took a long time. It seems possible that both in the coastal zone and inland the process lasted in Finland maybe even longer than 2000 years. We might wonder why this period was so long. The traditional argument is the degradation of climate, which began ca. 3000 calBC (Äyräpää 1922; 1939; Kivikoski 1961). On the basis of contemporary information, agriculture arrived in Finland at a disadvantageous time. This argument is sensible, but it requires more detailed research.

In light of the material presented above, we know that agriculture may have been practised in its various forms despite the difficulties which were caused by the harsh climate conditions (Vuorela 1982; Vuorela & Hicks 1996; Vuorela 1999; Grönlund *et al.* 1990). Further, the traditions of slash-and-burn and field cultivation have continued through the Iron Age and medieval and post-medieval periods, although the climate conditions have not been the best possible at that time, either. Although climatic cooling should be accepted as one reason for slow adaptation of agriculture in the early phase, it is not the only reason for this situation. It seems that cultivation did not continue without breaks in any area in Finland (Alenius 1998; Asplund 1998).

In the Häme and Southern Savo districts the conditions for crop rotation were less favorable than on the coast. Thus field cultivation was not adopted before the Middle Iron Age there (Vikkula *et al.* 1994; Mikkola 2005; Alenius *et al.* 2009). Prior to then, agriculture followed other traditions. The beginning of firm settlement in fields close to the farm houses dates back to the Iron Age. The validity of this argument has been indicated by the fossil fields (Vikkula *et al.* 1994; Mikkola 2005).

Slash-and-burn cultivation with its different variations prevailed for a long time both in the coastal zone and in the inland as an important means of cultivation. Agriculture was not the main source of livelihood. Local societies were small and the preserved archaeological sites are small, too. Until the Middle Iron Age most of these sites were seasonal in character and were used not only for agriculture but also for hunting, fishing, and grazing animals. However, the

same site could be in use for a long period of time. During the later part of the Early Metal Age, islets were found in the inland. These sites are favorable for keeping sheep and goats (Lavento 2001). Examples of sites of this kind are known first of all in eastern Finland. As in many cases the bone material has not been preserved or analyzed, this hypothesis cannot be verified.

Two assumptions concerning late Neolithic and Bronze Age / Early Metal Age culture can be proposed based on the discussion presented up to this point:

1. Dwelling sites were not chosen for their suitability for agriculture. Slash-and-burn cultivation took place, but not necessarily in the immediate vicinity of the dwelling sites.
2. Dwelling sites were not located close to the slash-and-burn fields, although pollen analyses nevertheless may indicate human activity in the region.

Regarding the first assumption, in light of contemporary data, the long adaptation process of slash-and-burn cultivation continued alongside other means of subsistence. Slash-and-burn cultivation was known since the Late Neolithic but it did not play any dominant role prior to the Iron Age.

My second assumption is that the difference in the economy between coastal and inland groups was not as sharp as it has often been emphasized. The question is more complicated and needs rethinking. Small scale animal husbandry was practised in the coastal and inland environment. The archaeological data which have been collected so far do not indicate unambiguously clear evidence of “villages” (Sw. “*gårds*”) resembling those in southern Scandinavia. In practice, the traditional economy continued during the entire research period.

5. Conclusions

Summing up the results obtained from pollen analyses tells us that agriculture has been practised in most parts of southern, eastern, and central Finland since the Late Neolithic. According to the available pollen data, this statement comprises all districts in Finland except northern Lapland. The pollen material available dates the beginning of cultivation to the Battle Axe although an even earlier start to cultivation in Finland is possible.

In the first phase of cultivation, slash-and-burn cultivation reached Finland, which can be observed in many areas across Finland. The experimental agriculture increased and in the final stage of the Kiukainen culture it became more or less the permanent economy. Cultivation ceased locally but it continued in some other locations. This kind of local discontinuity is evident until the Pre-Roman Iron Age. The slash-and-burn technique was the way to practise agriculture during the entire Bronze Age in the coastal zone; it was the tradition in the inland throughout the Early Metal Age.

Fossil fields are not known in periods earlier than the Iron Age in Finland although they should be possible to find here. The reason for the late dating can

be the unsatisfactory state of archaeological research. Fields such as these are not known in the Bronze Age / Early Iron Age. Finding these early fossil fields is an important challenge for Finnish archaeological research, as it should help us understand when permanent habitation in farmhouses began.

We know that agriculture was practised during cooler climate periods and not just during warm phases. In this article it has been pointed out that despite the disadvantageous climate after ca. 3000 BC, slash-and-burn cultivation continued in several areas. Archaeological data have remained insufficient in the coastal zone and in the inland. The challenge is to investigate places, which have been climatically more profitable than others, especially from the point of view of the frost problem.

According to contemporary data, the early phase agriculture became known among hunter-fisher groups in different parts of Finland. However, early farmsteads emerged in the southwestern part of the country, but probably not earlier than the late Neolithic Kiukainen ceramics. The first agricultural societies date to the Pre-Roman Iron Age but agriculture was not adopted as the main means of economy prior to the Roman Iron Age. Relatively soon a corresponding change took place in the Satakunta, Häme districts. On the Karelian Isthmus and Southern Savo, the same development repeated in the Middle and Late Iron Age.

On the basis of archaeological remains, peasant settlements should be easier to discern than in preceding periods. However, the task has not proved to be easy. In the coastal zone at least one candidate – the Rieskaronmäki site in Nakkila – is known, but in the inland there are no sites, which would fit the description of a farmhouse. It is the challenge of the future to better understand the settlement structure of the Late Neolithic and Bronze Age sites in Finland. The distinction between these two separate cultures still requires revision.

The linguistic evidence can be connected with the various phases of cultivation and animal husbandry. Some place names indicate the adoption of different types of agriculture. The analysis of loanwords gives us hypotheses about the direction of these innovations, as well as, their relative dates. The relative datings of the words are problematic because of the wide flexibility of the time scales. Although they do not solve the problem of determining when and where cultivation began, they can be connected with the archaeological evidence, macrofossils, and pollen data.

These interpretations are suggested by the researchers, but we should not forget the creativity of people in the past. Environmental conditions varied during the long period from the middle Neolithic to the Iron Age. The introduction of cultivation was not a revolution in the economy either on the coast or in inland Finland. It was a slow process combined with the economies that were based on hunting, fishing, and gathering. Together with the growing importance of animal husbandry, cultivation proceeded when the populations grew. In the periods when populations stayed small the role of cultivation was important.

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