A History under Siege

Intensive Agriculture in the Mbulu Highlands, Tanzania, 19th Century to the Present

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Abstract

This doctoral thesis examines the history of the Iraqw’ar Da/aw area in the Mbulu Highlands of northern Tanzania. Since the late nineteenth century this area has been known for its intensive cultivation, and referred to as an “island” within a matrix of less intensive land use. The conventional explanation for its characteristics has been high population densities resulting from the prevention of expansion by hostility from surrounding pastoral groups, leading to a siege-like situation. Drawing on an intensive programme of interviews, detailed field mapping and studies of aerial photographs, early travellers’ accounts and landscape photographs, this study challenges that explanation. The study concludes that the process of agricultural intensification has largely been its own driving force, based on self-reinforcing processes of change, and not a consequence of land scarcity.

Keywords: Landscape, environmental history, geography, land use change, population pressure, incremental change, landesque capital, self-reinforcing processes, detailed mapping, participatory mapping, oral history, farming practices, aerial photographs, landscape photographs, Iraqw.
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Lowe Börjeson
1 Introducing the study

… current thinking about the environment in Africa rests on the shakiest of empirical foundations.¹

This book documents the history of intensive agriculture in the historical homeland of the Iraqw in the Mbulu Highlands in Tanzania for the period spanning roughly the last two hundred years. Throughout the African continent there are many highland areas which, like the Iraqw homeland, have become renowned for their long history of intensive farming. Like the Iraqw intensive farming system, many of these persist today. Because agricultural intensification remains one of the main concerns of development policy, these areas of indigenous historical intensification represent a crucial body of reference cases where specific historical and geographical circumstances can be analysed and compared with general theories of agricultural growth and development.

Making claims about sustainability, or its anti-thesis, is to make claims about historical facts. However, empirical historical research has thus far only attracted marginal attention in policy oriented debates concerning sustainable development in Africa. Currently, debates pertaining to environmental conservation and development are polarised. On the one hand, global narratives of environmental degradation have dominated policy concerns during the twentieth century and up to today. On the other hand, a growing number of researchers have demonstrated the inadequacies of such narratives, and argued for the inclusion of indigenous and local knowledge in the formulation of contemporary policies concerning sustainable agricultural development and land use in Africa. Most importantly, these critical assessments of human–environment interactions stress the need for a reorientation of the basic fundament of policy recommendations, away from models of change that tend to be ahistorical and overly simplistic, and instead toward empirically grounded studies that document change and which analyse its driving forces in local and regional contexts.²

² See Basset and Crummey 2003, p. 1ff. A similar argument, but at a much more generalised level of scale, based on an analysis of comparative international studies of economic growth, is made by Kenny and Williams 2001.
The history of Iraqw intensive farming in the Mbulu Highlands has previously been associated with a growing population pressure in their homeland area, which in turn was thought to have acted as a primary motivation for the Iraqw to start using arable land more intensively. According to this historiography, the Iraqw were confined to a relatively small enclave of the Mbulu Highlands because of the risk of cattle raids and attacks by other ethnic groups, mainly the pastoral Maasai, who were in control of large parts of the Mbulu Highlands during the nineteenth century. This is a type of historical scenario that has persisted as a rather typical explanation for many cases of pre-colonial agricultural intensification in African highland areas. Whilst much recent historical research in Africa has re-evaluated and revised old truths about agricultural and environmental change, especially pointing out an exaggerated belief in imminent and serious environmental degradation related to population growth and poverty, few efforts have so far been made to scrutinise the type’s of historical narrative that have been used to explain the development of intensive farming practices in highland enclave settlements such as the Iraqw example.

Until recently, empirical historical investigations of the environmental and agricultural history of the Iraqw homeland have been meagre, which has contributed to the retention of the same basic historical explanation for how and why the Iraqw intensified their farming practices. The primary aim of this study is to theoretically and empirically scrutinise this entrenched twentieth century historiography, and to reach a more up to date explanation for both the development of Iraqw intensive agriculture and the manner in which it has been sustained. Secondly, the study has a specific methodological focus that is concerned with the potential benefits of using the landscape as an active component in the historical analysis.

The historical sources that have been used date from the late nineteenth century and onwards, which means that the empirical focus is on changes in land use, settlement and farming practices during the twentieth century. This is somewhat problematic however, as it is mainly the nineteenth century history that constitutes the focus of this study. The dearth of nineteenth century historical sources is a general problem in terms of the history of the Iraqw, and previous accounts concerning the nineteenth century are based on interpretations and observations dating from the last decade of the nineteenth century onwards. Descriptions of matters pertaining to the nineteenth century are therefore largely intertwined with the historical narratives and theoretical assumptions about Iraqw farming and settlement change during the twentieth century, and vice versa. Hence, in an analysis of nineteenth century agricultural and settlement change in Iraqw society, it is crucial to investigate both the assumptions and theoretical grounds upon which that Iraqw historiography rests and its empirical foundation in the twentieth century historical source material.
The approach to historical inquiry used in this study roughly follows that of Ann B. Stahl (2001) in her work on the history of Banda society in west central Ghana. Utilising a combination of different types of contemporary and historical source materials, she based her study on the methodology of “upstreaming”, in which contemporary structures and practices are taken as a point of departure, or a “baseline” in the historical analysis.3

1.1 Main themes and problems

History and development

East Africa provides striking contrasts in terms of land use intensity. Landscapes shaped by centuries of intensive agricultural activities may be found in the midst of wide stretches of pastoral savannah land or mountain forests. These latter biomes are often taken to represent archetypal African wilderness environments. However, both savannah and forested land have been used by countless generations of people for livestock herding, farming and foraging, as well as for the extraction and processing of raw materials such as metals, ivory, hides, and salt, for barter, trade and export. Still, contrasts between extensively used savannah land and forests on the one hand, and intensively cultivated areas on the other, are conspicuous. What are the historical, social and ecological contexts of such “islands” of intensive agriculture? These were questions that I set out to answer as I begun the work on this doctoral thesis in 1996.4

A subsequent question pertains to the specific use of initiating and carrying out such a study? Historical knowledge is based on interpretations and narratives which must be constantly rewritten and analysed in order to make sense and be useful to policy makers. If history is to survive historical change, we can never stop posing the same questions about what really did happen. Further, as pointed out by Dan Brockington: “environmental narratives wield considerable power”.5 Thus, in discussing environmental or agricultural change, we cannot ignore the politics that go with them, past or present.

At a more general level, this necessitates that we take into account the legacy of Eurocentric historiographies and factual ignorance of the histories of African peoples so as to arrive at new and hopefully better grounded understandings of the development of small-scale agriculture in Africa.6 Since

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3 See discussion in Stahl 2001, p. 19ff. See also Lane 2004, for some critical comments on the use of ethnographic and historical data in studies of African history and archaeology.
4 This thesis is part of a research initiative on the historical driving forces behind locally developed intensive agriculture in eastern Africa. Information on this research initiative titled Islands of Agricultural Intensification: the social, ecological and historical contexts, is available at http://www. humangeo. su.se/research/project/islands. Results from the project are published in Widgren and Sutton 2004.
5 Quoted from an unpublished research proposal, received from Brockington in November 2003.
6 Eurocentric understandings of history are by definition false or based on false assumptions (Blaut 2000).
many overtly Eurocentric theories have by now been discarded (particularly those based on racism and religious aspects), the situation has improved. But Eurocentric history is still being produced, and it stand a better chance of surviving in areas or countries where few resources are expended on historical research than in places where more historical investigations have been carried out. African countries are in a particularly vulnerable situation and erroneous arguments about African environmental and agricultural change are thus preserved and spread in contemporary debates on development, globalisation and historical change. Historical misinterpretations of African farming systems are all the more serious since they may misguide contemporary efforts to combat poverty and support social and economic development in African countries. The “islands” of intensive agriculture, mentioned above, are concrete examples of places where local processes of development have resulted in increased levels of agricultural productivity. As pointed out by William Adams:

Attempts to identify a route towards sustainable agriculture in contemporary Africa have much to learn from the past, . . . . Such learning is vital to avoid development interventions that reduce the capacities of rural smallholders to cope with the multitude of environmental and political and economic challenges that face them and hinder their efforts to achieve sustainable livelihoods.

History, however, rarely provides practical solutions to current problems. For example, the agricultural technology and intensive farming practices that were common in the past are not likely to solve current problems of low productivity in African agriculture. However, without historical narratives we can neither explain nor understand the world we live in, and we constantly act upon our historical knowledge of politics, business and social conventions. Historical knowledge remains a principal analytical tool for planners, development professionals and policy makers alike, and who, if misinformed about the history of the peoples targeted by their development initiatives, are more likely to misjudge current problems. In this perspective, the most concrete and tangible result of this study is perhaps the insights it offers about the local landscape and settlement history of the Iraqw and the Mbulu Highlands in Tanzania, and the implications these have for East African

7 Ibid.
8 Adams 2004, p. 140.
10 See for example Niemeijer (1996) for a discussion about the need for understanding dynamics of African agricultural history and Ferguson (1994) for a critical analysis of development and policy initiatives. Discussing the Sahel draughts in the 1970s, McCann (1999b), for example points to the problem that poor farmers and pastoralists in the Sahel region were largely blamed for causing desertification. Closer inspection and research instead show that they rather appear to have been the victims of global climatic processes, which in turn may be an effect of global warming caused by the emissions of greenhouse gases to the atmosphere by industrial countries.
environmental and agricultural history more generally. Accordingly, it also contributes to the wide range of studies which, over the past few decades, have confronted well-established African environmental historical narratives by gathering and examining empirical data.¹¹

Population pressure theory as a development narrative

Theories of change that focus on population pressure as a primary driving force are commonly divided into two opposing standpoints regarding the effects of population pressure on the environment and human use of natural resources. While Malthusian (or neo-Malthusian) population pressure theory basically predicts environmental degradation as population pressure increases, Boserupian theory proposes that population pressure can be a primary driving force for agricultural intensification, development and environmental conservation.¹² This difference is also reflected in the way these two population pressure theories have been used. While the strength of Malthusian theory lies in its usefulness in addressing the risk of future ecological disaster, Boserupian theory has mainly been used to explain historical change. Hence, the two theories have been used parallel to each other, but for different aims and purposes. Possibly, this divide could perhaps explain why these contradictory theories have both remained strongly influential in discourses on agricultural and environmental change and development. When assessing the validity of these contrasting theories it is thus important to include the politics and different objectives associated with each of them in the analysis.

There are several well-documented examples of how population pressure theory has reached mythical proportions in African environmental history. Efforts to revise misguided historiographies have typically challenged narratives of environmental degradation, i.e. Malthusian theory.¹³ It has by now been confidently shown that the alarming rates at which processes of desertification, deforestation and over-grazing were predicted to proceed in the 1970s and 1980s, were largely based on false assumptions, misjudgements and miscalculations. The problems are still present, but their dynamics and complexities are better understood and they are no longer seen as readily understood and ubiquitous threats to human livelihoods.¹⁴

¹¹ E.g. Lambin et al. 2001.
¹² The works of Thomas R. Malthus (1766–1834), see Wrigley and Souden 1986, and Boserup (1965, and later publications) have become synonymous with the scientific terminology on discussion about population pressure and historical change.
¹³ See for example Leach and Mears 1996; Dahlberg 1994; Tiffin et al. 1994; Roe 1995; Rocheleau et al. 1995; Carswell 2003; Leach and Farihead 2000. For comparative perspectives see Drechsel et al. 2001; Zaal and Oostendorp 2002; and Lipton 1989.
¹⁴ Lambin et al. 2001; Brockington 2003. Some recent discussions on population and agricultural change in general are found in: Netting 1993; Turner et al. 1993; Djurfeldt 2001; Bilsborrow and Carr 2001.
However, there is an important difference between the critical assessments of degradation narratives mentioned above, and the examination of historical facts versus myths pursued in the present study. Accordingly, the historiography of the Iraqw intensive agriculture is not based on a degradation narrative. In fact, it is quite the opposite. In the Iraqw case a limited resource base and escalating population pressure have been viewed as the main driving force behind agricultural intensification. Thus, we are here confronted with a development narrative, a case that describes a good example and not a threat to sustainability. It is a case where measures have been taken to increase agricultural productivity and to sustain livelihood opportunities.

The debate concerning Boserupian versus Malthusian readings of population pressure continues to be an important issue as policies pertaining to sustainable development are contested and debated in the light of population increase and environmental change at global and local scales. In the following discussion I do not so much focus on formal population pressure theories such as that proposed by Boserup, but on the received wisdom it builds upon (i.e. “necessity is the mother of invention”), since it is this common sense assumption that has been the theoretical fundament of Iraqw nineteenth century historiography. But, in the same way as degradation narratives have been critically examined, and in many cases refuted, I will show that there are also cases, e.g. Iraqw agricultural history, where development narratives have been instrumental in producing misguided historiographies.

The problem with nineteenth century Iraqw historiography

Basically, this book is concerned with the three Iraqw in the photograph (Figure 1.1) taken at the end of the nineteenth century. It is about how they made a living and what their landscape looked like. Looking at the picture we note that one of them is carrying a few maize cobs. We can not be sure whether the maize is deliberately or incidentally included in the picture. But, as this is the only picture in the book relating Oscar Baumann’s expedition in East Africa from 1891 to 1893 where someone is portrayed together with maize, it may serve as an illustration that the early foreign observers regarded the Iraqw as skilled farmers. Both the German and the later British colonial administration in Tanganyika (present day mainland Tanzania) described the Iraqw as particularly capable and knowledgeable farmers who practised

16 There are nearly 30 similar portraits of people in Baumann’s book and of those a handful depict Iraqw people and landscapes. The agricultural landscape depicted in Figure 4.1 is a similar case in point, where the Iraqw are associated with agriculture, which will be discussed in chapter four.
soil conservation and cultivated their land intensively. The supposed reason behind their agricultural efforts and skills have, in previous accounts of Iraqw history, generally been understood as the result of coercive external forces, i.e. that the Iraqw were forced to become intensive cultivators in order to cope with land scarcity in a secluded highland enclave primarily due to hostilities from neighbouring pastoral peoples. During the middle of the twentieth century, the Iraqw settlement and political and economic influence expanded rapidly in the Mbulu Highlands and beyond, while the pastoral peoples (Datoga and Maasai) who had formerly dominated most of these areas were marginalised. This expansion process has in turn been interpreted as a consequence of the Iraqw no longer being forced to live in their densely populated nineteenth century homeland area. Hence, the historical narratives of nineteenth and twentieth century Iraqw settlement are strikingly different, shifting from a story of confinement and hardship, to a situation of expansion and opportunities.

To what extent did land scarcity and population pressure characterise nineteenth century Iraqw settlement? How can we explain, in more detail, the process of agricultural intensification during the nineteenth century and the persistence of Iraqw intensive farming during the twentieth century? These are questions that I endeavour to answer.

17 Cf. Lawi 1999; and Snyder (1993, pp. 61, 65) for statements made by British district officials in Mbulu.
The landscape as method

In the present study, the agricultural landscape of the Iraqw homeland has primarily been approached in terms of its physical forms, the agricultural practices it is associated with and also as lived experience through interviews with the farmers. The study of landscape morphology has a long tradition within historical geography (e.g. the study of urban and rural landscapes and their genesis, function and characteristic physical forms). During the 1990s, however, it became common, particularly in Anglo-American cultural landscape research, to approach landscapes as primarily mental and ideological constructs. Within this school of thought landscapes were read and interpreted as “texts”, e.g. as representations of ideology, gender or power relations, rather than mapped and investigated as a material fact. Recently, however, the morphology and materiality of landscape and its interconnectedness with social and political realities have become rehabilitated as an important analytical focus in landscape research, for example by focussing on the landscape as a dialectic. Furthermore, as interest in embodied knowledge and aspects of performance have grown within human and social sciences, not least following work by feminist scholars, landscape theorists have argued in favour of a view on landscapes as an integral part of human practice. As Mitchell notes, the landscape “is a dialectic”. Social practices and landscape form should not only be understood as mutually constitutive. Form also is social relations, practices and processes and vice versa. The dialectical landscape is thus defined in terms of relations and change in contrast to the binary opposition between the social and the material landscape. A crucial question is of course how we can study the landscape as a both physical (material) and at the same time a lived (immaterial) reality?

In the present study, the landscape has been used both as a method and as a historical source. Interviews with local farmers about agricultural practices and land use history have mainly been performed in direct association with the forms and practices about which inquiries were made. The idea with this methodological approach has been to give the landscape an active role in interviews and in the historical interrogation in general. I refer to this idea as listening to the land.

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18 See for example Sauer 1925.
19 I refer here to what has been called the cultural turn in geography. See for example Cook et al. (2000) for recent discussions on the impact and future of this theoretical reorientation.
23 This point is also made by Saltzman 2001, pp. 109–110, who discuss the dialectics of landscapes on the basis of Harvey 1996, 1999.
1.2 The concern for sustainable agricultural intensification

In this and the following two sections, different aspects of agricultural intensification will be discussed from both empirical and theoretical viewpoints. The main aim is to relate the present study to the wider academic and policy concerns associated with agricultural intensification.

Agricultural intensification and development

Most academic and political discourse on contemporary agricultural intensification is fuelled by one fundamental underlying concern: *how to produce enough food for future consumers?* A rapid population growth combined with limits for expanding cultivated land obviously strengthens the imperative to intensify agricultural production. The discussion about agricultural intensification is also concerned with whether it is associated with negative or positive effects on the environment. The debates concerning the effects of the green revolution in Asia and genetically modified crops are typical examples. In a major volume edited by Lee and Barrett (2001) on the development potentials and environmental impacts of agricultural intensification in a global perspective, it is debated whether agricultural intensification can indeed satisfy the three critical development goals of: (1) agricultural growth, (2) poverty alleviation, and (3) sustainable resource use. The conclusion put forward in this volume is that “agricultural intensification is a necessary condition” to be able to move toward the realisation of these goals in most developing countries, “but it is by no means sufficient”.24 Hence, agricultural intensification may help to satisfy both development and sustainability goals. But because it is a process that is always part of a local reality, it feeds on a complex set of interrelating factors thus making simple models of cause and effect rarely applicable.

As a development goal agricultural intensification is often viewed in terms of a need to invest in capital inputs. But for many poor farmers intensive farming practices mainly represent a great deal of hard manual labour. During the 1980s a critique emerged within rural development studies, which challenged grand solutions to rural development problems by asking questions such as: *whose reality counts and whose voice is heard?*25 Such a “farmers first” perspective became a standard approach in rural development and related studies in the 1980s and 1990s.26 Following this critical approach indigenous technical knowledge or local knowledge became an inspiration for concerns about sustainability and environmental conservation. This paved the way for a more empirically oriented and diverse discussion of agricultural intensification.

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24 Lee and Barret 2001, pp. 1–2.
26 Chambers 1983; Chambers et al. 1989; Richards 1985; Reij et al. 1996.
change and development, as compared to more standardised and macro-oriented theories of agrarian change.\textsuperscript{27}

Another strand of critical research with implications for landscape and environmental studies in Africa that also gathered momentum during the 1980s and 1990s emphasised the need to regard ecosystems as unstable rather than stable.\textsuperscript{28} Under the umbrella of non-equilibrium ecology a whole range of research initiatives began to challenge received wisdom concerning natural resource management in Africa and elsewhere. Basically, researchers asked the question of why environmental catastrophes, predicted decades ago, never seemed to reach catastrophic dimensions in many places but merely lingered as potential threats, despite an ever-increasing pressure on natural resources. Desertification, soil erosion and depletion of forest cover are environmental problems that have been examined and critically reviewed during the last couple of decades, primarily on the basis of historical research.\textsuperscript{29} Hence, this body of research has clearly pointed out the need to understand the local, as well as the wider historical processes, environmental and political contexts of agricultural development and change.

Development studies and politics, by default, focus on present problems and the needs of future generations. One implication of this is that the concept of sustainable development is mainly used in a normative way, i.e. what we should or have to do in order to avert threats to sustainability. However, and as Goldman has shown in the African context, such normatively identified threats to sustainable development are different from those factors which empirical studies have shown as the major threats to sustainable development.\textsuperscript{30} Based on African case studies and by taking a historically and geographically specific approach to sustainability as a point of departure, Goldman argues that extreme biophysical and social perturbations (e.g. major pest and disease outbreaks, extreme climatic and hydrologic events, earthquakes and volcanic eruptions, major price and marked changes, as well as social, economic and political upheavals) are more important causes of agricultural unsustainability than are more gradual processes of land degradation due to over- or misuse of natural resources by farmers or herders. But despite this, shocks or extreme

\textsuperscript{27} Netting (1993) for example, uses a host of empirical material for a discussion on various theories of agrarian change and their relevance to smallholder farming. In particular, he points at the merits of the Boserupian theoretical framework for understanding agricultural adaptations by smallholders.


\textsuperscript{29} See for example Anderson and Grove 1987; Fairhead and Leach 1996; Leach and Mearns 1996; Niemeijer 1996; Johnson and Anderson 1988; Maddox et al. 1996; Broch-Due and Schroeder 2000; McCann 1995, 1999a; Mortimore and Adams 1999; Mortimore 1998; Lindblade et al. 1998; Carswell 2002; Bassett and Crumme 2003.

\textsuperscript{30} Goldman (1995) discuss the plethora of various definitions of agricultural sustainability and sustainable development in general (i.e. economic, ecological and social notions of sustainability). See also Rocheleau et al. (1995), and Carswell (2003), for empirical historical examinations of various degradation narratives and policies for sustainable development during the nineteenth century, based on case studies from Kenya and Uganda.
events have largely been overlooked in common conceptions and policy-oriented literature on sustainable development. Instead, the focus has concerned the need for appropriate soil management practices, despite the fact that soils are a comparable predictable resource in agricultural production and that farmer knowledge about soils are usually extensive. Resource degradation, i.e. fertility and land use stresses, due to overuse of agricultural technology or insufficient use of soil conservation practices is, according to Goldman, not the paramount threat, at present or in the near future, in most of sub-Saharan Africa. Instead, crop and income diversification strategies employed by farmers as well as interventions by national and international bodies have acted as sources of resilience and buffered against threats to sustainability. This mismatch between policy recommendations and empirical reality implies an important challenge when setting agendas for initiatives to support sustainable agricultural development.

“What threatens the sustainability of African crops, agricultural practices, and productivity”, claims Goldman, “is more commonly the insufficient use of modern technology”.31 He thus challenges the large body of studies which have promoted energy-efficient land management strategies of small-scale labour-intensive farming, or so-called low external input agriculture, in contrast to the resource-exploiting character of mechanised high external input farming.32 Further, in concert with Goldman’s scepticism towards policies promoting sustainable agricultural practices, concerns about the relative decline in African agricultural production in recent decades have raised calls for green-revolution policies in Africa, based on more external inputs and capital intensive measures.33

The current debate on African agriculture thus points in two opposite directions; is it in need of more energy efficient and “sustainable” or “ecological” farming practices, or of an increased industrialisation of agricultural production in order to satisfy demands for food and to boost development? No answer will be ventured here, but one may perhaps attempt a concluding remark. The prospects for small-scale labour-intensive agriculture, as strongly advocated by for example Netting (1993), are indeed compelling, for social as well as for environmental reasons. However, too strong an emphasis on low technology small-holder farming is also problematic in a development perspective, particularly if threats to sustainability come in the form of unpredictable shocks that lie beyond the realm of the strategies employed by small farmers.34 Hence, many of the

32 High-external input farming is primarily based on capital inputs such as machinery, modified crops, pesticides, and industrial fertilisers, as compared to high inputs of primarily labour in low-external input farming. Netting 1993, Reijntjes et al. 1992, Mortimore and Adams 1999, Brookfield 2001a, for example, discuss the benefits with smallholder farming in terms of their adaptive capacities and sustainable resource use.
policies associated with normative approaches to agricultural sustainability that focus on soil quality management may be of limited benefit to those farmers whose fields, crops or markets are ruined by extreme weather events, pest outbreaks, warfare, or other severe social, political, economical or environmental events. The environmental problems associated with much capital intensive or high external input agriculture must thus be set against the limitations of small-scale low technology farming to tackle the challenges of sustainable intensive agricultural production in Africa.

It is not the purpose of the present study to engage in a discussion about how to meet the future challenges of agricultural production in Africa. But the issues raised above concerning agricultural sustainability do raise the question of the usefulness and role of historical and local empirical studies as a means to find solutions to current problems of sustainability and agricultural productivity. In a recent article aimed at debating the needs for promoting green revolution policies in Africa, Djurfeldt et al. (2003) argues that using historical examples of low technology agriculture as blueprints for future sustainable agriculture is not viable, and that such propositions are coloured by myths about the benefits of pre-industrial, as compared to green revolution agriculture.35 Clearly, all solutions to the problems of low yielding African agriculture can not be found in history. But, it may also be problematic to depend too heavily on imported knowledge and technology. It is important to draw knowledge from comparative examples, but knowledge about African agriculture and its development must also be sought in Africa and in African history. History provides no straight road for solving current problems, but historical knowledge is needed as a reference in planning and development initiatives, and is crucial for facilitating empirically grounded discussions about sustainability and productivity in African agriculture.

1.3 Agricultural intensification – definitions and terminology

Theoretically, the concept of agricultural intensification has so far not been discussed. In this section we will take a closer look at how this process has been defined and what its key components are.

Basically, there are two ways of intensifying agricultural production: by increasing inputs of capital or of labour. Capital intensive agriculture is dependent on high inputs of capital such as machinery, energy and biotechnology, while labour intensive agriculture is primarily dependent on high inputs of manual labour. Land, the third major factor of production in classical agrarian economics, is treated as a constant in a process of agricultural intensification. Agricultural intensification is thus a process whereby inputs of capital or labour are increased in order to raise the yield

35 See also Drechsel et al. 2001.
(output) of a fixed land area over a fixed period of time (see Figure 1.2). If high inputs of land are used in an agricultural system, while capital and labour inputs are kept at a minimum, this is referred to as extensive agriculture – i.e. indicating its character of being the opposite strategy to that of intensive agriculture. Hence, a farming system with long fallow periods that encompasses a relatively large land area is more extensive than a system based on permanent tillage of the same amount of land. Levels of agricultural intensity are thus commonly graded on a scale from “extensive” to “intensive” systems. The farming system, which constitutes the subject of this book, is characterised by relatively high inputs of manual labour on rather small arable fields, i.e. a labour intensive system.

![Figure 1.2. Schematic illustration of the process of agricultural production, as measured against constant units of land area and time.](image)

Intensity, when employed as a concept relating to production, is a way of defining the productivity of a given resource base or production factors. Accordingly, intensification applies to a situation where the productivity is increased. More generally, intensity is used to define frequency or events per time unit. In the case of agricultural intensification the given resource base or production factor is land, implying that the critical measure of agricultural intensification is areal productivity.

Ester Boserup in her classical book on *The Conditions of Agricultural Growth* (1965), defined agricultural intensification as: “… the gradual change towards patterns of land use which make it possible to crop a given area of land more frequently than before”. With this definition she criticised what she referred to as the “usual definition of intensification”, which is based on

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36 I find this general and simple definition useful. Other more specific definitions are discussed further below.
37 See for example Ruthenberg (1971, 1980), and Netting (1993) for further discussion and examples of these concepts.
38 According to Black’s agricultural dictionary 1981. Extensive farming is “a method of farming in which a large amount of land is used to raise stock and produce crops, yields usually being about average, as distinct from intensive farming”. While, intensive farming is defined as “a method of farming in which the aim is to produce the maximum number of crops per year, of high yield from the amount of land available and to maintain a high stocking rate for livestock”.
39 If nothing else is specified, the type of agricultural intensification processes discussed in this study is concerned with labour intensive production.
40 Based on the Swedish National Encyclopaedia’s definition of intensity.
41 Boserup 1965, p.43.
the use of additional labour input per unit of land, as a too narrow definition that creates a pessimistic view concerning the potentials of agricultural intensification. According to her argument, there is more scope to increase output and employment by increasing cropping frequency compared to what increased labour investments to a given crop generates.\textsuperscript{42}

Her concern here was of course to work against the pessimism of the Malthusian doctrine. But, what she criticised more specifically, was in fact the failure of classical economists to deal with the complexity of population pressure and agricultural change because of their too narrow a focus on the Western Hemisphere and the expansion of European settlement and agriculture. The problem, she argued, was that they made “a sharp distinction between two different ways to raise agricultural output: the expansion of production at the so-called extensive margin, by creation of new fields, and the expansion of production by more intensive cultivation of existing fields.”\textsuperscript{43}

The fundamental starting-point of her attack on Malthusian theory, was the observation that it is impossible to draw a sharp distinction between cultivated and uncultivated land and, thus, between expansion and intensification, due to the fact that agricultural expansion seldom occurs on purely virgin land.\textsuperscript{44} Consequently, she redefined intensification in terms of increasing \textit{cropping frequency}, and thus translated agricultural intensity into a continuum of land use types, including all kinds of land use and agricultural practices.\textsuperscript{45} She also criticised the view which perceived natural condition as exogenous and unchangeable conditions for agriculture, and argued that soil fertility is a variable associated with population density and agricultural methods, and thus included in the agricultural totality defined by the measure of cropping frequency.\textsuperscript{46}

As observed by Turner and Doolittle (1978), cropping frequency is a surrogate for a more precise measure of “production data against constant units of land area and time”.\textsuperscript{47} Using input variables as a proxy for the usually impossible task of acquiring data on output is in many cases a necessity. The question is how to measure and what surrogate to use? Turner et. al (1993), based on Turner and Doolittle (1978), points to the importance of measuring output, but includes agro-technologies as an alternative surrogate measure.

The measure of agricultural intensification has taken on a rather precise meaning as the total production per unit area and time (typically per hectare and year). Its obvious measure, therefore,

\begin{itemize}
\item\textsuperscript{42} Ibid. pp.43–44.
\item\textsuperscript{43} Boserup 1965 p. 12.
\item\textsuperscript{44} She uses the example of shifting cultivation with extensive areas of fallow land as a case where this dicotomy is not valid, but also mentions pastures and hunting grounds (pp. 12–14).
\item\textsuperscript{45} In his study on tropical farming systems, Ruthenberg (1971, 1980) also grounds his classification of farming systems by cropping frequency, for which he has developed the concept of R value.
\item\textsuperscript{46} Boserup 1965, p. 13.
\item\textsuperscript{47} Pp. 297–298.
\end{itemize}
should be that of total output. Owing to several complications and to the paucity of data at the local level, surrogate measures are commonly employed. The most common two are the frequency of cultivation and the type and number of agrotechnologies.\(^{48}\)

Although it is clear that total production per unit area and time is a fundamental measure of the process of agricultural intensification, it is in relation to inputs of labour and capital that it gains its analytical potential. Natural endowments such as soil fertility and climate obviously affect yields, making agricultural production more or less efficient in relation to inputs of labour and capital. Hence, if we want to understand how and why it happens that farmers intensify agricultural production, we can not simply rely on measures of output, but must also consider their use of inputs, i.e. their practices, technologies, labour and skills. Farmers practices (or agrotechnologies) are not just an indicator of production or total output, they are the fundamental actions of agricultural intensification, and a crucial factor for analysing intensification as a process rather than as an effect (i.e. as increased output). In an influential article from 1972, Brookfield observed the importance of studying both inputs (c.f. agrotechnologies) in relation to frequency of cropping:\(^{49}\)

> The primary purpose of intensification is the substitution of these inputs [capital, labour and skills] for land, so as to gain more production from a given area, use it more frequently, and hence make possible a greater concentration of production.\(^{50}\)

While the other definitions cited above are mainly concerned with the effects of intensification in terms of raised output, Brookfield discusses intensification as a process. Although Brookfield in his most recent work on agricultural change is critical to the emphasis he and many others have conferred on labour and technical skills, and thus neglecting farmers’ own capital investments, his definition of intensification remains valuable as it captures the basic logic of an intensification process.\(^{51}\) What this definition makes clear is that intensification is about two things: (1) making land more productive and (2) investing in labour and capital. But, even if the causal relationship between these two aspects seems obvious, i.e. investments are made to increase output, there are also more complex situations where cultivation practices produce productive capital, which in turn may facilitate and motivate increased labour investments. Hence, there are cases where intensification is not a simple response to external driving forces (i.e. economic, political and demographic),

\(^{48}\) Turner et al. 1993, p.10.
\(^{49}\) C.f. Turner and Doolittle (1978), for a discussion of the benefits of a combined measure of agrotechnologies and cropping frequency.
\(^{50}\) Brookfield 1972, p. 31.
\(^{51}\) Brookfield 2001b, pp. 182–183.
but a more indeterminate and incremental process.\textsuperscript{52} The Iraqw intensive farming system is one such case.

The definition of agricultural intensification by Boserup and many of her followers is essentially concerned with intensification from a macro-level perspective. It was not the details of farmers activities, or “what happens in the cultivated field”, but “the whole group of activities that are needed in a given system of agriculture” that was her focus. In fact, her definition is more or less a result of this macro-perspective.\textsuperscript{53} The definition of agricultural intensification as a gradual change towards an increasing cropping frequency, was thus adapted as a device for analysing the effects of population change on an agricultural totality, including technology, economic factors, all kinds of land use types, soil fertility as well as land tenure.\textsuperscript{54} By focussing on a macro analysis and the concept of cropping frequency, emphasis is also laid on areal productivity (i.e. output) rather than specifying intensification in relation to inputs and the details of farming practices.

Even if Boserup addressed the problem of isolating processes of intensification and expansion, her work has mainly been used in a more rigid way, i.e. as a theoretical model where agricultural intensification is driven by pressure on resources, which implies that the process of intensification only begins when access to land and ecosystem services are limited.\textsuperscript{55} In effect, this type of population pressure theory implies that restrictions to areal expansion or other alternatives for meeting food demands must exist prior to intensification. It may of course be questioned how late or early farmers perceive and act upon such limitations, but the general assumption of this theoretical model is that natural resources are exploited as long as this is possible or economically viable. In this view agricultural intensification is initiated by a process of environmental degradation.\textsuperscript{56}

Scholars have both verified and falsified this theory on the basis of case studies that have assessed the degree of correlation between population growth and agricultural intensification. However, the problem with this type of population pressure theory is not the lack of cases demonstrating a correlation between concentrations of population and intensive agriculture, or the demonstrated exceptions to the rule, but rather that its fundamental assumptions are based on a deterministic and linear vision of historical change. One example is the view that agricultural change, as a rule, progresses from extensive to more intensive forms of production, i.e. as part of an

\textsuperscript{52} See Doolittle (1984), for a discussion on incremental change, and Morrison (1994, 1996), Leach (1999) for further references to such cases. Brookfield (2001b, p. 183) makes a similar point as he notes that the aim of providing more security in production should perhaps be added to his former definition of agricultural intensification, even if security is problematic to include as an attribute of intensification.

\textsuperscript{53} Turner and Doolittle argue in a similar vein that Boserup’s definition of agricultural intensity was influenced by her method of measuring intensity (1978, p. 297).

\textsuperscript{54} Boserup 1965, pp. 13–14.

\textsuperscript{55} Lee et al. 2001, p. 4.

\textsuperscript{56} Ibid, pp. 4–5. See also Lipton 1989, pp. 221–222.
evolutionary process. According to this view labour intensive forms of agricultural production are the result of pressure on resources, and thus never a first hand choice by farmers who are not under pressure. This conclusion is in turn based on the assumption that a process of agricultural intensification invariably entails a reduction in labour productivity. However, as Morrison (1994, 1996) and Leach (1999) have for example shown, the notion of agricultural intensification as an uneconomic or irrational option employed when other alternatives (e.g. expansion of cultivated land) are also available, is in many cases invalid.

Intensity and productivity

Regardless of whether intensity of agricultural production is measured by inputs or outputs, it is closely related to the concept of productivity. Productivity describes the relation between inputs and outputs, and is an essential measure when assessing agricultural intensification.\(^{57}\)

Productivity is usually measured as marginal or average productivity. Marginal productivity describes by how much the last invested unit of any production factor increase the output, while average productivity indicate how much an average production unit yields. Brookfield (1984) presents a diagram in order to illustrate an example of how the productivity of labour changes when farming is intensified through increased labour inputs (See Figure 1.3).

In discussing the incentives for agricultural change we need to consider both marginal and average productivity. If intensification continues beyond the point of maximum marginal productivity, individual farmers who intend to invest more labour will experience diminished returns from labour. The group optimum may however differ from the individual optimum, and it is not until the intensification process continues beyond the group optimum, which is when the whole system is most efficient, that the addition of more inputs becomes truly uneconomical. The total production, i.e. output, will however increase as long as the marginal productivity remains above zero. By plotting hypothetical curves of marginal productivity, Brookfield makes a comparison of intensification under different circumstances, based on Boserup’s theory and Clifford Geertz’s (1963) studies on swidden and wet rice agriculture in south-east Asia.\(^{58}\)

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\(^{57}\) In economics productivity is defined as a measure of productive efficiency, i.e. the ratio between output and input. Thus, it is a concept for describing and comparing the economic efficiency of an enterprise (see for example the Swedish National Encyclopaedia’s definition of productivity).

\(^{58}\) See also Lipton 1989 for a comparative discussion.
The classical pattern of changes in labour productivity in intensification by labour inputs. (Brookfield 1984, p. 19.)

The marginal productivity curves for swidden and wet rice indicate that the conditions for agricultural intensification can be radically different. Cultivation of paddy rice is, for example, usually associated with a slowly
declining marginal productivity of labour beyond the maximum point, which means that inputs of labour will yield considerable amounts of output even long after the point when marginal productivity has started to decline. In contrast to this, Brookfield uses swidden agriculture as an example of farming systems characterised by an initially rapidly increasing but then rapidly falling productivity curve, implying a limited scope for increasing outputs by additional labour inputs. Thus different types of farming systems in different types of environments correspond to very different opportunities for agricultural intensification, which makes it quite problematic to picture a standard case of intensification. Furthermore, the figure above suggests that the process of intensification is also dynamic in the sense that farming systems change as new practices and technologies develop or are adopted by farmers. This is basically what Boserup argued would happen under population pressure (see Figure 1.4). But, as Brookfield notes, there is also the possibility that a farming system may develop in such a way that the marginal productivity of labour is prevented from declining due to changes in practices, technology and capital inputs.\textsuperscript{59} Brookfield uses the green revolution as a case in point. Figure 1.4 thus includes the possibility that intensification can be sustained without giving rise to diminishing returns to inputs, even if the main message of the standard type of production function used in the figures above is the contrary.\textsuperscript{60}

The Figures (1.3 and 1.4) discussed above illustrate the standard economic assumptions that lie behind most discussions pertaining to agricultural intensification. In the next section I make some further comments on the process of agricultural intensification that are of importance to the study of the Iraqw intensive farming system.

1.4 Population pressure, determinism and synergies

This section discusses some specific problems associated with population pressure theory and the process of agricultural intensification that are central to the present study.\textsuperscript{61}

\textsuperscript{59} Brookfield makes a distinction between innovation and intensification, where innovation is illustrated by the shifts from one curve to another. But, as the figure illustrates, such clear “jumps” of development are not necessarily noticeable. In the present discussion innovation is incorporated into the concept of intensification.

\textsuperscript{60} Cf. Morrison 1994, pp. 132–135.

\textsuperscript{61} A relatively recent and comprehensive discussion of these matters, based on analyses of agricultural change in pre-industrial settings and in a long-time perspective, can be found in Morrison (1994, 1996) and Leach (1999). These studies have been a primary source of inspiration to the analysis of Iraqw intensive agriculture, and the theoretical issues discussed in this section. See also Lipton 1989 for a more policy oriented discussion about various population pressure theories.
The importance of space

In theory the spatial component in the analysis of intensification needs to be fixed, but in practice the spatial limits of intensification are usually problematic to define. The situation is further complicated by the fact that farmers tend to be connected with a multitude of places, both physically in the sense of their being itinerant and migrating individuals, and through various kinds of networks and contacts. The fact that people travel, migrate, expand their settlements and exchange goods, renders agricultural intensification a slippery concept. For example, when people migrate from a dry plain to a wetter mountain region, and in the process intensify production, this can not be defined as intensification in a strict sense. Similarly, the observed abandonment of intensive farming practices, in association with the expansion of Iraqw agriculture to drier areas during the twentieth century, or indeed other similar cases, is better understood as local adaptation rather than a process of de-intensification. Agricultural intensification must therefore be understood in a local context, and studied in situ over time in relation to an analysis of its wider, regional, social, economic and political geography.

In cases where intensification has been induced by increasing population pressure, a fundamental criteria is that the people under pressure must necessarily be confined to a specific geographical area with limited economic opportunities besides agricultural production. Population pressure and land scarcity are thus primarily defined by a spatial constraint imposed on the farming system due to a lack of rights to land, an unfavourable physical geography, hostilities or other social and political factors. A theory that expressly articulates the role of spatial constraints in historical change is circumscription theory as developed by Caineiro (1970). This theory argues that state formation, or political evolution, have taken place in areas that were circumscribed either by environmental (or geographic) barriers such as mountains, seas, deserts or infertile and undesirable land, or where land was unavailable due to prior occupation by other groups of people (i.e. socially circumscribed). Hence, when using population pressure as an argument for agricultural intensification one has to be certain that other opportunities such as out-migration or agricultural expansion are lacking, or that they are less attractive than investments into local agricultural intensification. Consequently, it is common to find arguments about confinement in historical

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64 The same basic logic is usually applied as a standard key note in introductions to the challenges of contemporary and future global food security, which emphasise the need for agricultural intensification. Typically, these depart from the observation of an increasing numbers of humans sharing a limited amount of land suitable for agricultural production (see for example Lee and Barrett 2001).
65 See special issue of American Behavioral Scientist (1988, vol. 31, 4) edited by Roscoe and Garber, which is devoted to Carneiro’s circumscription theory.
narratives of agricultural intensification that emphasise the role of population pressure as a driving force. The case of the Iraqw being just one case in point.

The importance of history

Although deterministic and evolutionary interpretations of agricultural change have been heavily critiqued they do remain influential. This is true both for historical cases of agricultural intensification and as a means of associating contemporary agricultural practices with a particular stage of development.\(^{66}\)

A contemporary system of shifting cultivation is not simply a relic preserved from the past; it is a system that is reproduced in the present and, accordingly, constitutes a part of present day economical, social and political structures.\(^{67}\)

Likewise, intensive farming systems do not always represent secondary or “more evolved” stages in a temporal sequence of agricultural change that dawned with the practice of extensive shifting cultivation.\(^{68}\)

Another problem with deterministic interpretations of historical change and the role of population pressure in agricultural intensification is that areas of high population density are often automatically characterised as places with high population pressure on natural resources. As was noted in Figures 1.3 and 1.4 above, population pressure is usually associated with a situation of declining average labour productivity. However, we must also consider the possibility of an intensification process that precludes or keeps pace with population growth and which sustains a level of productivity that does not imply in an \textit{a priori} manner an increasing pressure on resources.

Michael Lipton (1989) has discussed the theoretical foundations for various population pressure theories in terms of their relevance to development policy and found that they, despite usually being regarded as opposed “in logic and policy implications, are in fact parts of a single approach”, grounded in the work by Malthus.\(^{69}\) Apart from the Boserupian approach he also discusses the “induced innovation” approach developed by Hayami and Ruttan (1985) and Binswanger and Ruttan (1978). While Boserupian theory focusses on the necessity of more food, the “induced innovation” theory suggests that it is the availability of more labour, due to population growth, that is the crucial factor in motivating farmers to invest in labour intensive farming practices. Lipton concludes that the pessimism in Malthusian approaches and the optimism of Boserupian and “induced innovation” approaches “often share a deterministic flavour”, which make them inadequate as tools for understanding the role of population growth in agricultural development.\(^{70}\)


\(^{67}\) Cf. Wilmsen 1989, p. 1ff.

\(^{68}\) See cases discussed in Morrison (1994, 1996) and Leach 1999.

\(^{69}\) Lipton 1989, p. 215.

\(^{70}\) Ibid., p.234.
Hence, it is important to complement the documentation of synchronic patterns of correlation between population densities and levels of intensification with diachronic studies of intensification processes. A positive correlation between high population density and intensive farming, does not necessarily provide evidence of a situation of pressure on resources.

In contemporary African environmental history, the role of conjunctures and contingency are frequently emphasised as being of key importance in understanding processes of change.\(^71\) This implies that it is important to apply a historical perspective when considering processes of change such that processes are not seen as determined but as open. In fact, as Massey notes, an ontology that is genuinely historical has become quite well established both among natural and social scientists, in contrast to theoretical models that claim absolute validity, i.e. in which contexts of time and space do not matter.\(^72\) This increasing awareness in analyses of environmental change and its underlying processes provides us with the potential to develop better and more empirically grounded theories for understanding and promoting sustainable development. A shared interest in the history of things also provides a common ground for interdisciplinary collaboration between social and natural scientists, which remains one of the basic shortcomings in research on the environment.\(^73\) However, empirical data on African social and economic history are often relatively scarce. In part, this explains why local historiographies have often remained rather deterministic and based on assumptions. In depth studies of local or regional historical change are thus important, not only in order to explain the particularities of historical change, but also as a means to better inform theoretical discussions about the driving forces and conditions of change.

Questioning the principle of diminishing returns

As I have noted above, it is normally assumed that intensification reduces the marginal productivity of labour, thus resulting in diminishing returns on invested labour.\(^74\) Agricultural intensification by means of increasing labour power is therefore generally regarded as a laborious process, which farmers are forced into by necessity. However, there are also documented cases, which suggests alternatives to this principal assumption.

In his discussion of some of the economic modelling and analyses that have attempted to formalise the Boserupian hypothesis of population pressure induced agricultural intensification, Jeffrey Krautkraemer (1994) has pointed at the possibility “that average labour productivity increases with agricultural


\(^{72}\) Massey 1999.

\(^{73}\) Ibid.

\(^{74}\) E.g. Morrison 1994, pp. 130–135; Bronson 1972; Bilsborrow and Carr 2001, p. 36; Boserup 1965.
intensification”, and that “it is possible to reconcile the greater labour requirement of intensive farming with an increase in average labour productivity”. In addition, several case studies have also demonstrated how labour-intensive farming is associated with high labour productivity and has frequently been able to compete with more extensive forms of production, such as swiddening and long-fallow cultivation.\textsuperscript{75} In a study from Indonesia, Padoch (1985) has shown, for example, that intensive permanent rice cultivation is a more efficient and more reliable subsistence strategy than extensive shifting cultivation, despite a low population density. As a result of the particular interaction of social and natural factors in the area, intensive farming practices were adopted at an early stage in the colonisation process when land was available for expansion and extensive shifting cultivation. In fact, Padoch envisages the possibility that increasing population densities may result in greater levels of dependence on shifting agriculture as more marginal areas needs to be appropriated for agriculture.\textsuperscript{76}

Diminishing returns to labour provides a basic explanatory framework for discussions concerning the process of agricultural intensification. The problem in some cases, such as the historiography of the Iraqw intensive farming system, is that this has contributed to the retention of deterministic conclusions about past agricultural processes, thus acting as an underlying factor in producing misguided historiographies of agricultural change.

Population pressure, market forces and urbanisation

As urban populations have grown rapidly during the last century, market demand has become an outstanding driving force for agricultural intensification. Alongside this change people in African rural areas have also increasingly become involved in off-farm incomes and alternatives to agricultural production.\textsuperscript{77} However, many African farmers are still to a large extent subsistence farmers, often for the reason that the opportunities and infrastructure for market-oriented agriculture are relatively poor.\textsuperscript{78}

Population pressure, as an analytical concept in studies of African agricultural intensification, has primarily been analysed as a driving force behind subsistence oriented agriculture.\textsuperscript{79} The growth of marked-oriented agriculture has, however, prompted a discussion about the mutually reinforcing nature of growing markets and increasing population densities in the wake of the rapid urbanisation.\textsuperscript{80} What is a little surprising is that the

\textsuperscript{75} Bronson 1972. Morrison (1994, 1996) and Leach 1999. See also Bray 1986, and her analysis of the historical development of the intensive rice cultivation in Asia.
\textsuperscript{76} Padoch 1985, p. 287.
\textsuperscript{77} E.g. Bryceson and Jamal 1997.
\textsuperscript{78} See for example Liwenga, 2003.
\textsuperscript{79} Turner et al. p. 8.
\textsuperscript{80} See for example Larsson 2001, and Tiffen et al 1994, for two East African case studies of such processes.
observed correlation between population concentrations and intensive agriculture, and the increased attention paid to market forces, have also reinforced the argument which sees population pressure as a principal driving force for agricultural intensification. Supposedly, if population pressure is defined as a pressure on natural resources for subsistence uses, which it should be, we may indeed question to what extent it is relevant to discuss population pressure as a driving force in processes of agricultural intensification that are strongly associated with urbanisation and growing markets?

In a major study by Turner et al. from 1993 on Population Growth and Agricultural Change in Africa, the impact of population pressure on agricultural change is examined. The objective of this study was to use a number of African case studies to test the validity of Boserup’s population pressure theory. In line with this aim, areas with high population densities (preferably 200 people per square km or more) were chosen as case studies or “natural experiments”. All agricultural areas that were discussed were at least partially dependent on commercial production, and in most cases cash crops represented a major or a significant share of the total production. Hence, most cases examined in the study clearly demonstrated the connection between market demand and population growth. Further, in selecting areas with high population densities, priority was given to places where both market demand and population pressure were anticipated to have had an impact. Thus we may question to what extent the methodology used in this case has left a bias in the result. This is an issue that can only be resolved by a diachronic study of the mechanisms of change and their causal relationships.

The study concludes on a positive tone, arguing that Boserup’s theory holds up under scrutiny and that the high population growth rate can, and probably will, be accommodated by high levels of agricultural intensity. They also observe the ability of farmers to cope with pressure on production through economic diversification, i.e. off-farm activities, land expansion and dietary change. But, the main coping strategy they observe is “through increased labour directed mainly to indigenous land and plant improvements”. Overall, they conclude that their study supports the theory of population pressure as a major driving force behind agricultural intensification.

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81 A case in point is the now famous study on Machakos, Kenya, by Tiffen et al. (1994), which has been an instrumental reference in most analyses of the positive effects of population pressure for agricultural development in Africa (as well as in more general debates on rural development) that have been pursued during the last 10 years. However, as shown by Murton (1999), investments in agricultural intensification and land have mainly been carried out by households with access to urban derived non-farm incomes, while those who were only engaged in agricultural work did not benefit from population growth.

82 Cf. Lipton 1989.


84 Here they argue in favour of the “induced-innovation theory” (see Hayami and Ruttan 1985 andBinswanger and Ruttan 1978) but conclude that this theory requires modification and perhaps needs to be merged with the “indigenous induced innovation” inherent in Boserup’s scheme and its elaborations (Turner et al. 1993, p. 429)
have clearly confronted the difficulty of separating market demand from population pressure as driving forces for intensification, a problem that they comment upon briefly, they choose instead to focus on the importance of population pressure.85 Hence, in their ambition to defend Boserupian theory they largely fail to address the issue of how population growth is interrelated with other factors, e.g. growing market opportunities.

The study by Turner et al. (1993), as well as others that have engaged in a similar discussion on population pressure and agricultural change, have cumulatively been crucial in debunking Malthusian theory, and thus of contributing to a better and in fact less deterministic theoretical foundation for development policy and research on agricultural change. The chief achievement of this positive population pressure theory is the observation that high densities of population can be sustainable, and thus that farmers can cope with scarce resources. What is somewhat more problematic, on the other hand, is that the spatial correlation of high population densities with intensive agricultural practices has tended to be taken as evidence that the process of agricultural intensification, producing this pattern, has necessarily been caused by rising population pressure. However, as I have noted above, to explain how and why intensification has occurred requires a study of the actual process. It can of course be theoretically hypothesised that an observed pattern is the result of a specific process. But an observed pattern cannot be said to prove that a particular process has occurred unless one also assumes that the process follows a unilinear and unidirectional trajectory.

The direction of causation in population pressure theory

Turning the conventional assumption of population pressure around, we may ask to what extent the intensive agricultural practices, and the social, economic, political and environmental circumstances under which they have emerged, attract people and result in high densities of populations. The question here is whether the line of causation in population pressure theory may in fact work backwards. Agricultural intensification would in this respect be regarded as an attractive option, with the potential of increasing livelihood security and living standards, and thus in turn of stimulating population growth, including in-migration.86 Such a reversal of the direction of causation in population pressure theory may be particularly relevant for assessing the role of population growth caused by in-migration.87

85 “There is clearly some positive density feedback between the two – market access invites immigrants to an area, and high population density encourages the development of a marketing infrastructure” (Turner et al. 1993, p. 17).
87 McCann 1995, emphasises the importance of population dynamics due to migration in African history. The importance of rural-rural migrations in contemporary studies of agricultural intensification is also pointed out by for example Bilsborrow and Carr 2001, p. 54.
A Malthusian version of this argument is the idea that by promoting agricultural intensification, such as the example of the green revolution in Asia, problems with overpopulation and famine have been created.\textsuperscript{88} Although, this particular standpoint is quite extreme, we may still inquire about the direction of causation in this matter. Does more food result in more people or do more people stimulate food production? Without doubt the green revolution in Asia contributed to alleviate famine, and it is clear that agricultural intensification is a key factor in development.\textsuperscript{89} To blame agricultural intensification for causing overpopulation and famine appears to be a rather misplaced argument. The question raised here, however, concerns itself more with the possibility that agricultural intensification in fact at least partly represents its own driving force. According to this analytical approach, explaining the process of agricultural intensification would be a matter of identifying synergies, self-reinforcing processes, and incremental changes, rather than any one primary independent or external driving force.

Self-reinforcing and cumulative processes of change have since long been a central issue within economic geography.\textsuperscript{90} For example, it is well known that the growth of towns or industrial centres is not simply the effect of external driving forces, i.e. as they grow they also become attractive sites for the location of people, business and industry. To take but one example here, in his study of the history of urban-industrial growth in the United States, Alan Pred (1966) discussed the dynamics of growth in terms of Gunnar Myrdal’s “principle of circular and cumulative causation”. In particular Pred emphasised the aspect of “initial advantage”, which accounts for the influence that an initial concentration of urban-industrial activities has on the growth process, e.g. in affecting subsequent plant location decisions and in creating a self-perpetuating momentum. Basically, his idea is that “some centres, through the medium of rapid industrialisation, generate their own conditions for growth”.\textsuperscript{91}

There are good reasons to think along the same lines when trying to explain agricultural intensification. In fact, it may not be the same driving forces that initiate a process of intensification, make it gather momentum or sustain it at a later stage. However, except for the relation between market demand and population density, surprisingly little attention has been paid to synergies and the dynamics in processes of agricultural intensification.\textsuperscript{92} Before turning to a description of the specific place and problem that this study is concerned with (see the following two sections) I wish to sum up the discussion in this section by quoting Alan Pred:

\textsuperscript{88} Hopfenberg and Pimentel 2001.
\textsuperscript{90} Krugman, 2000.
\textsuperscript{91} Pred 1966, p. 15.
\textsuperscript{92} One illustrative exception is Bebbington’s (1997) studies of “islands of sustainable intensification” in the Andes, South America, where he considers the importance of a conjuncture of several different factors.
... the problem of developing geographical location theory remains one of being more precise and explicit in interpreting previous and ongoing empirical observations and field studies, and of synthesising and conceptually embellishing these observations so as to identify those spatial processes that yield an ever-dynamic, ever-fluid, geographic organization of economic activity.93

1.5 Iraqw’ar Da/aw – the study area

– *Sinik!* (Here is a riddle!)
– *Geerankáy!* (Open it up!)

– *Hiriki ‘Umbiuuru?* (The undulating of Mbulu?)
– *Doosla.* (Agriculture.)

– *I /iif ku gagaara ‘úr?* (It is very big and too heavy to carry?)
– *Kunti.* (The granary.)94

The geographical area and landscape that together comprise the object of this study, has variously been described as the homeland, cradle area, heartland or historical core area of the agro-pastoral Iraqw, whose historical geography revolves around their settlement in the Mbulu Highlands in northern Tanzania. The study area roughly conforms to Kainam and Murray wards in Mbulu District, Manyara Region, and covers about 180 square km.95 In the Iraqw community, the area is referred to as Iraqw’ar Da/aw or Mama Issara, but the name Kainam has also been used. In the following, I will use the name *Iraqw’ar Da/aw* when referring to this area, but I also use the more neutral phrase the *Iraqw’ar Da/aw area*, in order to emphasise its geographical extent rather than its cultural significance. Hence, I will largely avoid the terms “homeland” or historical “core area” that have been commonly used to distinguish between Iraqw’ar Da/aw and other areas occupied by the Iraqw. The main reason why I have avoided these terms is because of their close association with the historiography that I aim to examine.

95 Manyara Region was designated as a new region in Tanzania when Arusha Region was split into two regions in July 2002. See further discussion on the size of the area in section 4.2.
Figure 1.5. The Mbulu Highlands and Iraqw’ar Da’aw (based on Meindertsma and Kessler 1997, pp. 2, 98).

The name Iraqw’ar Da’aw, meaning the eastern Iraqw land or the eastern Iraqw people, is of particular interest since it indicates a spatial relation. Lawi suggests that the first Iraqw settlement in the area was simply named Iraqw following the common practice of using the same name for places and
peoples.\textsuperscript{96} Hence, the name Iraqw’ar Da/aw implies a migration or expansion process, but the actual direction of this movement of people (in or out from the Iraqw’ar Da/aw area) or when it took place is more difficult to ascertain. Since Iraqw’ar Da/aw is regarded as the homeland of the Iraqw, it suggests that the first Iraqw settlements in the Mbulu Highlands were concentrated to the present Iraqw’ar Da/aw area. We may thus speculate that the name Iraqw’ar Da/aw is either related to the more recent late nineteenth and twentieth century expansion of Iraqw settlement, or associated with an older migration to Iraqw’ar Da/aw and the Mbulu Highlands. However, considering that the formation of the Iraqw as an ethnic group and the designation of the area as a homeland may be a relatively recent process, it probably lies closer at hand to associate the name of the area with the expansion of Iraqw settlement in the Mbulu Highlands during the nineteenth and twentieth centuries.

In the nineteenth century, the Iraqw population was mainly concentrated in and around the Iraqw'ar Da/aw area. The remaining areas of the Mbulu highlands were dominated by pastoralists and were more sparsely populated. During the twentieth century the settlement pattern has changed drastically, particularly as a result of the rapid expansion of Iraqw settlement in the Mbulu Highlands and beyond during the middle of the century. In the wake of this settlement expansion the Iraqw’ar Da/aw area has become economically marginalised. In 1988 the population of Iraqw’ar Da/aw was estimated at just over 19,000 people, compared with the total of about 500,000 Iraqw living in Mbulu and neighbouring districts. Population growth in the Mbulu district in 1988 was as high as 3.8 per cent, one of the highest rates in the country. The rate of population increase in Iraqw’ar Da/aw during the twentieth century has generally been lower because of the continuous out-migration from the area to the more expansive parts of the Mbulu Highlands.\textsuperscript{97}

Physical geography

Travelling southward from Mbulu town, there are two roads leading to the area, one to Kainam ward and one to Murray. After a few kilometres each road leads through a passageway high up on a hillside, and as one passes this point one also crosses the border of the Iraqw’ar Da/aw. From this point onwards the character of the landscape changes. The wider stretches of agricultural land around Mbulu Town are left behind and the narrow ridges and valleys of Iraqw’ar Da/aw stretch out in all directions like large waves on a rolling sea, until the horizon is broken by the silhouette of a hilltop or forest. Looking closer one can see clusters of houses on the ridges surrounded by grazing fields, cultivated slopes and valleys, tree groves and patches covered with bush and ferns.

\textsuperscript{96} Lawi 1992, p. 47.
\textsuperscript{97} Snyder 1996, pp. 318, 324.
The elevation within the area ranges from 1500 to 2300 metres above sea level and the main cultivated land is found at around 1800 metres above sea level. The area is bounded by a fringe of hills and higher lying terrain, which in the south-west, west and east are covered with mountainous forest in two forest reserves. In the south-east, the area is delimited by the Manyara Rift escarpment. Between the cultivated area in the centre and the surrounding higher hills lies a zone of extensive grazing land, which is mainly covered with bracken. The landscape is completely dissected into narrow ridges, with elongated valleys in-between that branch of in different directions. From the forested hills encircling the area a number of permanent rivers meander through the larger valleys. Small springs are found in nearly every valley creating a network of smaller streams, many of which are permanent. The bedrock is of deeply weathered soft gneiss with varying mineral composition, and the soils are of moderate to low fertility on the slopes, varying from low to high in the valley bottoms. Due to farming practices such as manuring and mulching, the topsoil generally has a relatively high content of organic matter which is beneficial for crop production. The mean annual rainfall is high, up to 1000 mm or more, but varies greatly. Furthermore, evaporation is relatively low.

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98 All photographs are taken by the author, if nothing else is indicated.
99 According to the National Soil Survey (NSS 1994) soils on the ridges and slopes are described as well drained dark reddish brown and red clays with thin or moderately thick (10–35cm) clay loam topsoil (Dystic Cambisols and Haplic Alisols according to the FAO/Unesco classification). Soils in the valleys are often poorly drained, dark brown in colour and based on alternating layers of sand, loam and silty clay (NSS 1994, III, pp. 13–14, 63–64). In a survey done by the Mbulu District Office, soils in the upper parts of ridges are described as shallow and of low to occasionally very low fertility, while lower-lying slopes and reasonably well-drained valleys contain clay soils of moderate fertility (Meindertsma and Kessler 1997, p. 9).
100 Tengö and Hammer 2003a, p. 147.
101 One recent figure, based on six years of rainfall data from the eastern parts of Iraqwar Da’aw, gives a clear indication of this variation. The rainfall varied from 529mm in the driest year to 1849mm in the wettest. Based on these measurements the mean annual rainfall was approximated to be 500–1500mm, with and average of 1028mm, for this part of the area (Meindertsma and Kessler 1997, p. 37).
and cool, and foggy conditions are common especially in the mornings. June to September are usually the driest months with little or no rain. These natural endowments, particularly the availability of water, make the area suitable for intensive agricultural production, despite the limits imposed by the dissected topography, the leached soils and the variability in rainfall.

Agriculture

The agricultural landscape and practices in Iraqw’ar Da/aw differ from those of its surroundings i.e. in most other agricultural areas in Mbulu, Karatu, Babati and Hanang districts. Within the area, labour-intensive hand-hoe cultivation, including wet- and dry-season cropping, erosion prevention, water control, manuring, composting and mulching, together with cattle rearing and tree-planting, are the main activities shaping the landscape. Outside the area, the landscape is generally more gently undulating, the soils are more fertile, and precipitation is less. Farming is also more capital-intensive and market-oriented in most surrounding areas and ploughing by oxen or tractor is widespread, as is the use of other capital inputs such as chemical fertilisers and pesticides. Farm holdings outside Iraqw’ar Da/aw are usually larger, and social stratification is more pronounced than is the case inside the area.

In the Iraqw’ar Da/aw area farming is a year-round undertaking. In every season there are crops to be planted or harvested and fields to be prepared, not to overlook all the necessary weeding, thinning, pruning and other crop management practices. Cultivation is done by hand as the use of both draught animals and tractors is made difficult by the dissected landscape. Land is divided into four major categories: crest (dindirmo), eastern slope (intsì), western slope (geneì) and valley (khatsa), which have different qualities in terms of agricultural production. Fields facing towards the east are usually more drought resistant than fields on the crest or western slope, because of a higher frequency of cloudy mornings and sunny afternoons. Hence, the western slope receives more sun than slopes facing towards the east. On the slopes crops are frequently rotated, and on the western slopes in particular, two crops per year are commonly harvested. The western slopes are also planted with the highest diversity of crops. The wetter valleys may produce

104 Cf. Tengö and Hammer 2003a.
105 As the objective of this study is not to describe or analyse the current diversity of farming practices in the Iraqw’ar Da/aw area, the following presentation is relatively brief. More details about farming practices in the area can be found in Lawi 1999; Snyder (1996, 1993); Tengö and Andersson 2000; Tengö 1999; Tengö and Hammer (2003a, 2003b); Loiske 1995; Börjeson 1998; Meindertsma and Kessler 1997.
crops even during prolonged droughts. Various crops are grown; maize, beans, sweet potatoes and Irish potatoes, sorghum, finger- and bulrush-millet, wheat, cassava, various vegetables and fruits, tobacco and coffee. Maize is the main staple, and cash crops like coffee and tobacco are grown in small quantities and are partly used for home consumption. Valley-bottom fields are mainly inter-cropped with maize and beans, while crop diversity is greater on the slopes. Fields are small, 0.1–0.3 ha, and an average farm-holding is about 1.4 ha, including a small home-grazing area. Cattle, goats and sheep are kept and many farmers also raise pigs to be sold locally or at urban markets. Only a few improved cattle are found in the area. The local Zebu are usually grazed during the day and kept inside the houses during the night. Wet dung from the night is dried in the courtyard during daytime and returned to the house as bedding, i.e. to help absorb urine and the wetness of fresh dung. This method of processing dung may have a positive effect on the nitrogen content and thus enhance its quality as manure before it is applied to the arable fields. But as nitrogen is also lost when the dung is dried the effect of this practice is uncertain. Apart from cow dung, various types of compost and green manure are used to restore the fertility of arable fields, as well as short- and long-term fallow. The input of organic fertiliser is not only a means of restoring nutrients that are lost through cultivation, it is also an active interference with the soil formation processes. Farmers in Iraqw’ar Da’aw can thus be said to manufacture soil, and thus contribute to produce favourable conditions for agriculture in the area.

109 Urban Emanuelsson, head of the Swedish Biodiversity Centre, first pointed out the potential benefits of this practice during a visit to the area in 1996. See also Tengö and Andersson 2000, p. 20ff; Tengö and Hammer 2003b, pp. 13–14.
Figure 1.7. Preparing a field, situated along the crest of a ridge (*dindirmo*) in Iraqw’ar Daaw, for planting.

Figure 1.8. House platform on top of the ridge in the mapped area. To the right dung is laid out to dry in the sun.
Figure 1.9. A pile of manure in the mapped area.

Figure 1.10. Field in the mapped area, with manure laid out in piles.
While hoeing the slopes in the area, farmers move soil downhill. After many years of cultivation, slopes therefore become gently terraced as cuts develop on field boundaries (see Figures 2.14 and 2.15). The upper parts of the cuts, or the terrace edges, are frequently enhanced with grasses, trees, bananas or bushes, and storm drains are sometimes dug to lead off excess water. Crops are usually planted in ridges across the slope. Frequently, crop residues are dug into the ridges or distributed between ridges as mulch. Lines of crop
residues (trash lines) are also laid out to prevent erosion. Many valleys have been drained for cultivation and ditches are often needed to prevent waterlogging. When planting takes place during dry conditions, seeds are often watered by hand to facilitate germination. Occasionally, plants are also watered as a protection against crop damage by cutworms (*Agrotis ipsilon*).

The measures of yields that have been made in the Iraqw’ar Da/aw area suggest that they are moderate or relatively low compared to other parts of Mbulu District. Estimates of maize yields range between 0.7 and 2.7 tonnes/ha. Local farmers claim that yields have declined in the last few decades, especially on the slopes, due to droughts, insufficient availability and use of organic fertilisers, increased frequency of pest and disease attacks on crops, and less labour resources. According to the estimated yields of agricultural production in various parts of the Mbulu district, agricultural productivity in Iraqw’ar Da/aw was found to be relatively low in terms of output per hectare. But because of the difference in soils and climate as well as farming practices in the different part of the district, these measures of maize yields can only be used as rough estimations. However, in a recent study by Tengö of the nutrient flows in Iraqw’ar Da/aw, yields were actually found to be relatively high when compared with other farming systems based on low external inputs, rather than with the more mechanised and commercial agriculture in other areas of the Mbulu Highlands. Her estimates of nutrient flows showed negative net balances for nitrogen and phosphorous, based on an assessment of 17 households living within relatively close proximity of each other. This nutrient balance assessment indicates that farmers’ practices of manuring, at present, are not enough to compensate for losses in the form of crop harvest.

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111 In the surveys done by Snyder in 1992 and 1994, the average maize yield per household was estimated at around 6.2 bags each year, and an average farm-holding at 1.23 ha of arable land (Snyder 1996). This means that, if half this area is cultivated with maize, which is probably a quite high figure, the maize yield would be around 10 bags per hectare, which equals approximately 1.25 tonnes/ha. Tengö and Hammer (2003b), give the figure of 1.8 tonnes/ha for average maize yield, based on estimates by local farmers in one particular neighbourhood of Iraqw’ar Da/aw. In a planning document produced for the Mbulu District Council, maize yields are estimated at 0.7–2.0 tonnes/ha for the eastern part of the district, which includes the Iraqw homeland and areas with a similar farming system (Meindertsma and Kessler 1997, p. 42). In a national soil-survey study from 1994, yields on gneiss and schist soils in the district (the bedrock in the homeland area is gneiss) are said to vary between 1.1 and 2.7 tonnes/ha (NSS 1994, Vol I, p. 31). In other parts of the district, the maize yields are estimated at 1.7–3.7 tonnes/ha in the north, 0.7–2.5 tonnes/ha in the central parts and 1.5–2.7 tonnes/ha in the south (Meindertsma and Kessler 1997, p. 42). According to the National Soil Survey, the highest yields in the district (4.4–5.5 tonnes/ha) are reported from relatively humid areas with volcanic soils (NSS, Vol I, p. 31). In a study made by the Institute of Resource Assessment (IRA) at the University of Dar es Salaam in 1996, similar figures for yields, but a lower figure for household plots (less than 2 acres = 0.8 ha), are presented (Lyimo and Liwenga 1996).


Houses are generally located on the upper part of the ridges and each household has its own small and well maintained home-grazing area around the homestead. Groups of households, moreover, share additional grazing land nearby, both in valleys and on ridges, that to a variable degree are managed in order to ensure grazing throughout the year. Common management practices include small-scale and seasonal rotation, occasional burning of pastures and weeding. Larger areas with communal grazing land are also available outside the main settled zone, including forest glades, but in these areas less or no effort is expended in regulating and managing the grazing resources. Wet meadows are also common. These are valley-bottom fields with evergreen vegetation where grazing is usually not allowed and the grass is cut and fed to the animals by hand. The main function of these meadows is for the production of fodder reserves for cattle with special needs, such as sick animals, calves and brood cows.

Roads to the area are often in a poor condition, as they are regularly damaged during heavy rains, and there is no reliable car or lorry transport. Goods are transported on foot, by bicycle or on donkeys. This makes the area relatively isolated from major markets, even though Babati and the busy road between the major towns of Arusha and Singida are not very far away (see Figure 1.5). What effects the establishment of the new regional administration in Babati in 2002 may have, in terms of infrastructural investments and the opportunities for agricultural production in the Iraqw’ar Da/aw area, remains to be seen.

As in most parts of the world, agricultural production and the landscape in Iraqw’ar Da/aw have changed quite substantially during the twentieth century. The introduction of pigs and a number of crops such as potatoes, wheat, coffee and various fruit and timber trees, and equally the increasing reliance on maize as a staple, together with the spread of more effective iron hoes and a general growth of agriculture at the expense of cattle rearing, have all affected the appearance of the Iraqw’ar Da/aw landscape and created new opportunities for production. However, not all current farming practices in the area are new to the twentieth century. Indeed, practices such as manuring, mulching and construction of ridges and storm drains, have a longer history in the area.

History

The existence now … of Southern Cushitic-speaking cultivators with cattle (Iraqw, etc.) should not be seen as a simple relic of the situation before the expansion of both Nilotes and Bantu…. The emergence of the Iraqw as such and their successful agricultural

adaptation to the hills of Mbulu district are very recent developments.\textsuperscript{116}

The Iraqw are the descendants of a multitude of ethnic groups now living in the region around Mbulu District.\textsuperscript{117} As part of the Southern Cushitic language group, the Iraqw are associated with a long history of agro-pastoralism in the region of the eastern Rift Valley going back several thousand years.\textsuperscript{118} However, ethnic identities are not fixed, and as new economic, political and religious opportunities develop and others are marginalised, ethnic relations may also change. Among the Iraqw this is particularly evident in the wake of their territorial and cultural expansion during the twentieth century.\textsuperscript{119}

Although one can discern an expansion of Iraqw culture during the twentieth century, at the same time one comes to appreciate how that culture has also transformed and become diversified in the process, and come to encapsulate a range of what may be variously labelled as modern and traditional values. The sense of being Iraqw can be a very different experience depending on the background of the person and in which context the identity is claimed. For example, a person belonging to the Datoga ethnic group may aspire to an Iraqw identity in order to promote his or her business in the towns of Mbulu or Karatu. This Iraqw identity is quite different from that of an Iraqw elder, who is expected to make long journeys from his home area to Iraqw’ar Da/aw to promote clan and ritual relations.\textsuperscript{120}

From the evidence of genealogies as remembered by Iraqw elders, the time for the first Iraqw settlement in Iraqw’ar Da/aw has been estimated to no later than the end of the 18\textsuperscript{th} century.\textsuperscript{121} However, to what extent other groups of people have utilised this part of the Mbulu Highlands in earlier times is not known. What we do know with certainty from Iraqw oral history is that people migrated into the area during the nineteenth century.

The Iraqw oral tradition tells of a move caused by warfare or drought (or both) from a place lying to the south of the Mbulu highlands. However, considering the multi-ethnic origins of the Iraqw, it is problematic to discuss the origins of the Iraqw in terms of a previous homeland and its location.\textsuperscript{122} In

\textsuperscript{116} Sutton 1993, pp. 51–52.
\textsuperscript{117} Thornton \textsuperscript{1980}, ch. 8.
\textsuperscript{119} Rekdal 1999.
\textsuperscript{120} Cf. Rekdal 1999, pp. 39–44; Loiske n.d.
\textsuperscript{121} Fosbrooke 1955, p. 17; Thornton 1980, pp. 193–194; Lawi 1999, p. 35. Iraqw genealogies collected by Loiske (in 1995–1996) reveal considerable uncertainty among informants about the sequence and number of forefathers that constituted their clan. One of the problems was that sons were often named after their grandfather, so that names were repeated every second generation. Frequently informants felt a need to consult others in the clan in order to offer a correct genealogy. This procedure commonly resulted in a consensus compromise that was acceptable to the clan. It was consequently difficult to distinguish between a clan and its component lineages, and also to discern the number of generations represented by these genealogies (Loiske, pers. comm.).
\textsuperscript{122} The Iraqw place their previous area of habitation in a mythical place called Ma’angwatay (Thornton 1980, pp. 196–199). Although, a number of speculations about the geographical origins
any case such speculations lie beyond the scope of this study. Indeed, the existence of an Iraqw ethnicity prior to Iraqw settlement in the Mbulu highlands may be equally uncertain as finding the place for a previous Iraqw core settlement area.

It is possible that the colonisation of the Iraqw’ar Da’aw area was a gradual process, involving clearing of highland forest, which would have started long before the Iraqw dominance as an ethnic group in the Mbulu Highlands. In other parts of East Africa, mountain forests have been used and successively colonised for a much longer period of time than that covered by Iraqw genealogies, and such forests have decreased as a result of expanding cultivation. The Mbugu, a Southern Cushitic pastoral people long resident in the Usambara mountains, is one parallel example.124

The increasing number of Iraqw clans clearly indicates the extent of cultural assimilation in the history of this ethnic group. Of the 150 or possibly 200 Iraqw clans,125 only three are regarded as being of Iraqw origin.126 Overall, the implication of the oral histories that have been collected by researchers is that an Iraqw culture and identity primarily developed during the nineteenth and possibly eighteenth centuries, and that people of Nilotic and Bantu derivation comprise an integral part of Iraqw culture and identity.127

Iraqw’ar Da’aw and the settlement expansion during the twentieth century

A number of questions have been addressed in previous studies concerning the Iraqw that deal with the issue of settlement expansion. However, the question that is most directly concerned with the intensive farming system in Iraqw’ar Da’aw is how this system survived the massive out-migration from the Iraqw’ar Da’aw area during the twentieth century? The area was marginalised in terms of economic importance, partly as a consequence of this out-migration, but, interestingly, the intensive farming practices remained in place.

In the expansion areas a different type of agricultural intensification process took place. Here more capital intensive farming practices were adopted from the mid-twentieth century onwards. Since independence, most studies concerning Iraqw agriculture have focussed on the agricultural growth of the Iraqw have been voiced, it appears as if Ma’angwatay continues to be a mythical place-name and that the Iraqw origins imply a more complex history than a migration from one homeland to another. However, in an Iraqw historical narrative discussed by Thornton (1980, pp. 160–164), a relatively complex picture of precolonial Iraqw migrations is actually described.

124 Conte 1996.
125 Rekdal (1999, p. 41) mentions 150 clans and Snyder (1993, p. 97) suggests that the number may be as high as 200. Lawi (1999, p. 47) provides a lower figure of approximately 100 clans, tracing their origins to the mythical Ma’angwatay settlement (see note above).
126 The meaning of such a statement is however unclear, since it is not known when a distinct Iraqw culture and language appeared. See also Rekdal’s discussion on Iraqw ethnicity (1999, pp. 39–44).
127 There is a widespread belief among the Iraqw that they originate from Iraq in the Middle East. See Rekdal (1998), for a discussion about this myth.
in the expansion areas, while less attention has been directed to the effects of this out-migration on the settlement pattern and agriculture inside the Iraqw’ar Da/aw area. A related question that dates back to the 1930s, is concerned with the considerable problems of soil erosion in the expansion areas, and why the Iraqw, known for their soil conservation skills in the Iraqw’ar Da/aw area, allowed these to develop.

One effect of the massive out-migration from the area and its marginalization is, however, that the rate of population growth has been relatively low in the Iraqw’ar Da/aw area during the mid-twentieth century, as compared with the expansion areas. Many agricultural areas in present day East Africa are much more intensively cultivated and densely populated than the Iraqw’ar Da/aw area. But, Iraqw’ar Da/aw still remains one of those places that stands out as an example of a persistent and sustainable intensive farming system in East African agricultural history.

### 1.6 Intensive agriculture in nineteenth century East Africa

In this section the historical geographical context of the Iraqw intensive farming system will be briefly discussed. The objective here is not to produce a review of the agricultural history of East Africa, but to identify a few points of departure or research problems that are of particular interest to the present study, and that will be tackled later in the analytical chapters.

Although processes of agricultural intensification and environmental change in Africa and East Africa have received a considerable amount of attention, recent studies and debates have primarily been concerned with the twentieth century, in some cases including the late nineteenth century. This means that the many radical changes that have occurred since the late nineteenth century, including colonialism, urbanisation, infrastructural investments, rapid population growth and globalisation, have in most cases played a crucial role in the process of agricultural intensification. The majority of such studies have consequently examined cases where processes of intensification have grown and intensified considerably during the twentieth century, together with a rapidly growing population. However, as mentioned above, Iraqw’ar

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128 One exception is Snyder 1996, but her analysis is mainly about more recent changes in the Iraqw’ar Da/aw farming system. Lawi 1999 also discusses agricultural changes in Iraqw’ar Da/aw during the twentieth century in relation to the process of expansion. Studies that focus on changes in the Iraqw expansion areas include: Raikes 1975; Loiske 1995, and Hagborg 2001.


130 In the study by Turner et al., on population and agricultural change in Africa, only areas with a population density exceeding 200 inhabitants per square km were included (1993, p. 23), as compared with a density closer to 100 inhabitants per square km in Iraqw’ar Da/aw. In northern Tanzania the slopes of Mts. Meru and Kilimanjaro are other cases in point (see Larsson 2001, Spear 1997, Tagseth 2000, Sally Falk More 1986.

131 The general lack of source material documenting earlier periods is of course one reason for this research focus.
Dawa is an area that has become increasingly marginalised as a crop producing area during the twentieth century, and an area from which people have moved out in large numbers. Its characteristic intensive farming practices have persisted, but the processes of agricultural intensification have not been as notable as in many other cases of twentieth century agricultural intensification in Africa. Furthermore, the central concern in this study is the processes of intensification during the nineteenth century, and it is this context that is addressed below.

The significance of intensive farming in nineteenth century Tanzania

In the nineteenth century, caravan trade and European explorations into the East African interior intensified. In their wake, diseases and violence spread, along with new economic opportunities for agricultural production and trade. Calamities were especially frequent during the latter half of the nineteenth century and culminated in the 1890s with the epidemic cattle plague (Rinderpest), followed by famine and human diseases including a smallpox epidemic which struck a society already suffering from slave trade and warfare. This consequently led to a contraction of settlement and an expansion of tsetse fly infested areas. The late nineteenth and early twentieth century accounts of exploring scientists and colonial officers who encountered the effects of these adversities have had a strong impact on foreign perceptions of African environments, resulting in the widespread image of Africa as a continent predominantly characterised by its pristine nature. Likewise, in African historiography, the thought of African natural environments as particularly harsh and adverse to human livelihoods has been a strong theme.

In a now classical study, Helge Kjekshus (1977) argued against this view and claimed that nineteenth century Africans had been in control of their environments prior to colonisation, and that intensive farming practices were the rule rather than extraordinary achievements under extraordinary circumstances. He also concluded that intensive farming declined radically with the turbulence following European colonisation in the late nineteenth century. Kjekshus’s study and conclusions sparked a debate about the environmental history of Tanzania and East Africa. What is of particular interest here is the discussion concerning the significance of intensive farming practices in nineteenth century Tanzania. This is interesting not only in terms

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135 E.g. Illiffe 1995.
of quantity, i.e. how much intensive agriculture there was, but also because it sets the focus on how and why intensive agriculture develops, i.e. whether agricultural intensification is to be regarded as the outcome of extraordinary or normal conditions.

Two years after Kjekshus’s book, John Iliffe’s *A modern history of Tanganyika* was published. In contrast to Kjekshus, Iliffe’s description of pre-colonial Tanganyika stressed the constant struggle against “underpopulation” and the hardships caused by an unfavourable environment. The renditions provided by these two authors of the situation in pre-colonial Tanzania were strikingly different, which further fuelled the debate on representations of African history. In his depiction of Tanzania at around 1800, Iliffe concludes that: “Men would have seemed very small [sic!] and unevenly distributed in the vast and empty land”, and that: “Men measured out their lives in famines. Chiefly due to unreliable rainfall, they and disease were the main reasons for underpopulation”. Kjekshus stated on the contrary that: “Despite the vastness of the country’s total terrain, land for agricultural uses may in fact have been experienced as a scarcity at a relatively early date”. He also found support for: “Burton’s impressions that ‘comfort and plenty’ characterised life among the major peoples of Tanganyika in the latter part of the nineteenth century”. Basically, his point was that substantial surpluses were produced owing to the relatively widespread practice of intensive agriculture.

While Kjekshus has been accused of supporting the myth of a “merry” Africa, Iliffe’s book has been associated with the contrary myth of a “primitive” Africa. To the extent that these myths are associated with agricultural production we may also refer to them as a debate concerned with “surplus” vs. “subsistence” or even “intensive” vs. “extensive” agricultural production. Indeed Koponen, in his comprehensive historical study of *People and production in late precolonial Tanzania*, largely agrees with Kjekshus in his consideration that under normal circumstances pre-colonial societies were in general able to produce surpluses for security or investment.

Iliffe develops this view further in a recent book titled *Africans: The history of a continent* published in 1995. His argument is basically that the main contribution to world history by Africans is that they have colonised an especially hostile continent, for agricultural and other productive purposes.

See for example Koponen 1988a, pp. 19–23.

Although it is not fair to reduce the works of Iliffe and Kjekshus in this way, these quotations are included here in order to point at the cause for debate that their different conclusions yielded (Iliffe 1979 pp. 12–13; Kjekshus 1977 pp. 48, 181).

The concepts of “merrie” and “primitive” Africa were introduced by Hopkins 1973. Hopkins wanted to draw attention to the tendency of depicting Africans as either incapable savages (primitive) and thus in desperate need of the benefits of Western civilisation, or as living in a state of harmony and abundance (merry), until it was disrupted by European colonisation (pp. 9–10). See also Koponen 1988a, pp. 19–23; Maddox et al. 1996, pp. 1–5.

Koponen 1988a, pp. 134–136, 238, 376, 386–389. A startingpoint for Koponen’s analysis of precolonial Tanzania was actually the striking difference between Iliffe’s and Kjekshus’ descriptions.
What can be concluded from this debate and the research produced on the agricultural and environmental history of pre-colonial or nineteenth century Tanzania, is that it was an agriculturally diverse landscape with large tracts of land used for extensive grazing and scattered cultivation. But there were also areas characterised by intensive agriculture, which were mainly located on or at the borders of highlands. This varying agricultural intensity was also reflected in the considerable variations in population densities which formed a clustered population distribution pattern – a pattern which raises questions concerning the underlying processes.\textsuperscript{142}

Rain-fed intensification and wet valleys

Studies of intensive farming systems during the nineteenth century or earlier in East Africa have tended to focus on irrigation agriculture and other rather conspicuous cases, such as the impressive systems of terracing usually found in remote highland areas.\textsuperscript{143} Quite naturally, less conspicuous cases, particularly of rain-fed intensive farming practices, have thus received less attention in the literature. The Iraqw intensive farming system is one such case of rain-fed intensification.

More recently, the agriculture in Iraqw’ar Da/aw has been studied by Snyder (1993 and 1996), Lyimo and Liwenga (1996), Lawi (1999) and Tengö and Hammer (2003a and 2003b). However, it is mainly Lawi (1999), in his study of local knowledge and natural resource use in the twentieth century, who has explicitly examined the history of agricultural and environmental change in Iraw’ar Da/aw.

In terms of water availability, an important feature of the Iraqw’ar Da/aw landscape are the wet valley bottoms which are able to sustain crops throughout the dry season due to high ground-water levels, i.e. almost like a natural irrigation system. The problem farmers in Iraqw’ar Da/aw have been (and are) faced with when it comes to managing water on the ground, is leading water away from, rather than on to, cultivated fields. Lawi (1999) discusses the significance of these wet valleys, in relation to the growth of intensive farming in the area, but it is mainly their increased importance for agricultural production during the latter decades of the twentieth century that has been noted in previous literature.\textsuperscript{144} A further examination of the use of this water resource in relation to the process of agricultural intensification in the area is thus of importance to this study.

\textsuperscript{144} Snyder 1996.
The siege hypothesis

In the Iraqw case, intensive agriculture has, since the early twentieth century, been explained as a consequence of high population pressure. Basically, this argument has followed the logic contained in the phrase “necessity is the mother of invention”. As has been noted above, population densities in Tanzania were on average low but varied greatly during the nineteenth century. This implies that the population pressure argument used to explain the process of agricultural intensification in Iraqw’ar Da’aw in effect translates into an argument of confinement. Hence, in explaining why the Iraqw could not simply expand their settlement and bring more land under cultivation, the crucial point has been to demonstrate what factors engendered a situation of increasing population pressure for the Iraqw in the nineteenth century. In 1936 a colonial officer wrote the following:

Excellent agricultural practices were adopted by the tribesmen [the Iraqw] before the advent of the "Pax Europea"; this was probably forced upon them as they were circumscribed by more aggressive tribes and as everybody knows "necessity is the mother of invention". Nowadays, however, there would appear to be a tendency to forget these practices due no doubt in part to relief from external pressure.

In his discussion of agricultural intensification in nineteenth century Tanzania, Koponen finds that although local cases of intensification conform to the theory that people develop intensive farming practices during times of population pressure, this theory is insufficient to explain the uneven distribution of population densities that has been a characteristic feature of Tanzanian and indeed East African settlement history in general. Instead he suggests that the “siege thesis”, as proposed by Pierre Gourou (1966) and which submits that the development of intensive cultivation systems only takes place under duress, may fit better with cases where: “(g)rain-based intensive systems had been developed in areas of local population pressure where extensive agriculture and the addition of new cultivated land which it always entailed were out of the question for ecological or historical reasons”. A common physical geographical setting that Koponen associates with a history of siege is the inaccessible mountain retreat, one of his examples being the Iraqw intensive farming system.

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145 Mbulu District Book, e.g. notes on Botany and Agriculture; Sturdy 1936, p. 53; Hartley 1938; Meek 1953, pp. 159–160; Schultz 1971, p. 93.
146 Sturdy 1936, p. 53.
148 Koponen 1988a, pp. 241; 364. Gourou 1966, pp 103–108. In the English edition of Gourou’s book *Les Pays Tropicaux* that Koponen used (Gourou 1966), the term “siege” is mentioned on page 79, referring to intensive agriculture in highland New Guinea. But, the term used in the discussion of areas of high population density in Africa is “‘refugee’ peoples”. The same term is also used in a
What Koponen’s argument emphasises is that in order to apply a population pressure theory for the Iraqw example, as well as for similar cases exhibiting historically high population densities, possibilities for expansion must for one reason or another be limited. In the Iraqw case, as portrayed in earlier literature, this criterion has been satisfied by the presence of Maasai and Datoga pastoralists, who have been seen as keeping the Iraqw more or less under siege during the nineteenth century. In fact, Iraqw intensive agriculture has been cited as a typical example of a pre-colonial siege situation. Southall (1961) relates that people inhabiting other mountainous areas in East Africa have been similarly considered to have been held under siege by the Maasai following their expansion during the nineteenth century:

There were on the mountains large tribal islands washed but not engulfed by the Masai sea: Arusha and Meru, Chagga, Pare and Sambaa, Kikuyu, Meru, Embu, Kamba and Teita.

Indeed, comparable examples of people under siege have been discussed for other parts of Africa and around the world. Koponen for example points at the example of “pit cultivation” by the Matengo people in Tanzania, which made it possible for them to withdraw to “inaccessible mountain slopes” in order to escape military and slave-trading expeditions by the surrounding Ngoni and Yao peoples. Ruthenberg (1971) provides another example. Based on Gourou’s example (1966), as well as on the principle that agricultural intensification implies a diminishing return to invested labour, he takes the example of the Ukara island in Lake Victoria, and notes the following:

(i)n traditional conditions [sic] on moderately fertile tropical soils, there must be a special emergency situation before smallholders will adopt the labour-demanding techniques that are essential features of permanent rain-fed farming with soil conservation.
Possibly one of the most classical studies of a siege-type of agricultural intensification is Netting’s (1968) study of the Kofyar in Nigeria. Netting’s discussion about why the Kofyar had settled and developed intensive farming practices in “such an inaccessible region” (i.e. the southern parts of the Jos Plateau in Nigeria) is rather nuanced, but his conclusion is basically that the Kofyar were living under siege-like conditions. Netting argues that the main reason for this was probably the need to avoid slavery or the risk of being conquered by militarily more powerful neighbouring peoples. In Netting’s reading of the situation, it is mainly the fact that the Kofyar inhabited and cultivated such a rugged hilly environment as they did, which suggests that they did not really have any other option. Another of his key observations in support of this argument is that the productivity of labour was higher on the plains than in the hills where the Kofyar lived.

Hence, as the examples discussed above have shown, it is relevant to talk of a siege hypothesis when referring to this type of historical explanation for the manner in which intensive farming evolved in cases where expansion was made impossible by coercive and constraining factors. In the case of the Iraqw, Lawi has shown that the settlement expansion during the twentieth century was largely facilitated by colonial policies and action, and not just a simple response to population pressure within the homeland. But there is still no satisfactory explanation for why and how the Iraqw intensive agricultural practices developed.

1.7 The empirical investigations

The empirical investigations that I have carried out are presented in the following three chapters. Each chapter is based on a particular method for studying landscape change. The different methods are also related to different geographical and analytical scales. This means that the study involves a process of shifting between different types of empirical data, methods, geographical scales and levels of analysis. I started my empirical investigations on the ground by focussing on the details in the landscape and the practices of farmers. In doing so I also chose to let this perspective guide my further investigations.

In chapter two the landscape and its history is analysed through a direct engagement with the physical landscape and its inhabitants. Here agricultural practices and the detailed physical forms of the landscape are in focus.

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155 See also Stone 1996.
156 Netting 1968, especially pp. 43–49; see also Stone 1996, pp. 59–60; and Djurfeldt 2001, pp. 90–95.
157 Lawi 1999. In the case of the Kofyar, British colonial rule did also put an end to the siege-situation (Netting 1968, pp. 48–52).
In chapter three the analytical perspective leaves the ground in favour of an interpretation of landscape change using aerial photographs. Without the detailed knowledge of the landscape morphology gained from the fieldwork, it would not have been possible to carry out this aerial photograph interpretation in the manner that it has been. The examination of landscape change is based on a comparison of land use and settlement pattern between two moments in time (1958 and 1988).

In chapter four, the geographical scale is expanded considerably and becomes less strictly bounded. Here the regional historical perspective is in focus. The empirical material that is explored is no longer a landscape section, but colonial and scientific explorers accounts, maps and census data, as well as the bits and pieces of the landscape that have been captured in photographs. Hence, this analysis mainly concerns my interpretation of the observations and descriptions of the Iraqw’ar Da/aw landscape and agriculture made by other outsiders or foreign observers.
2 A ridge and its landscape

In this chapter I investigate the Iraqw intensive farming system at the scale of individual farmers and their agricultural landscape. The empirical focus is on the landscape and its details, as physical forms, farmers’ knowledge, practices and oral histories. In accordance with the study as a whole, the aim with this detailed landscape study has been to find answers to the question of why intensive farming practices were adopted in the Iraqw’ar Da/aw area and how this process has developed and been sustained over time. The chapter builds on four months of fieldwork carried out between 1996 and 1998 in the Iraqw'ar Da/aw area. A discussion of epistemological and methodological aspects concerning the study of landscapes, particularly those relating to the specific fieldwork method used, is also included.

The idea of investigating the intensive agriculture in Iraqw'ar Da/aw was a product of fieldwork done in the 1990s by a colleague, Vesa Matti-Loiske, who had become intrigued by this landscape. Mats Widgren, Wilhelm Östberg and myself shared similar interests and a common research project on “islands of intensive agriculture” was drafted – the basic motivation being our shared fascination for these intensively cultivated landscapes. In February 1996, I started to map the landscape and talk with farmers. This first period of fieldwork lasted for about one and a half months, and during this time I spent most of my time in and around a few homesteads on one of the hundreds of ridges in the area. Between December 1997 and the end of March 1998 I returned and continued my fieldwork, but I was hindered by the El Nino rains and was only able to work for about two months in Iraqw’ar Da/aw. I returned again in November 1998 for an additional three weeks of fieldwork. On both of these occasions I spent most of my time in the same area on the same ridge, and with the same people as before.

The chapter begins with a presentation and discussion of the method that has both guided the fieldwork and provided the data analysed in the chapter.

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158 Loiske 1995.
159 Mats Widgren, at the department of Human Geography, Stockholm University, and has been the principal supervisor of this research project. Wilhelm Östberg is an anthropologist associated with the same department.
(section 2.1). Following the methodological considerations I present two analytical sections (2.2 and 2.3) where the empirical findings are discussed.

### 2.1 Detailed participatory landscape mapping

The method presented in this section has its foundation in field-oriented historical geographical studies, where land survey equipment is used in order to produce detailed maps of fossil landscape forms.

I was confronted with the details of an agrarian landscape for the first time during an undergraduate field-course in human geography carried out in the south-eastern part of Sweden. The task that I and another student were assigned to do was to carry out a detailed mapping of the physical traces of Medieval cultivation that lay preserved in a pasture field in the form of cultivation terraces, lynchets, clearance cairns and earthen banks. It was only after a day or two that I was ready to accept that even the tiniest shifts in the inclination and shape of the grassy ground surface could be deciphered as a particular farming practice. As my doubts disappeared, however, I became absorbed with the mapping and the puzzle that the fossil landscape presented.

This type of detailed landscape analysis, in which land survey equipment is used in order to produce a detailed map of a fossil landscape, is an established historical geographical method. The idea behind this method is that the mapping process, as well as the map, are important analytical tools when investigating past landscapes and the historical processes they are a part of. Hence, the empirical landscape is used both as a historical source and as a method for historical inquiry.

According to critical realism, all kinds of empirical data are influenced by theoretical standpoints and preconceptions, and are thus never pure representation of reality. This implies that an important challenge for scientific inquiry is to explore the relations, and non-relations, between “what we experience, what actually happens, and the underlying mechanisms that produce the events in the world”. Much of the creative effort invested in research is thus concerned with finding ways to access a useful empirical material, and through interpretation and experimentation of this material to attempt to understand and explain how the driving forces and mechanisms that produce events and change are related to the empirical observations made.

Inspired by my own previous experiences from mapping fossil landscapes, I brought an electronic theodolite with me to Iraqw’ar Da/aw. This time, however, it was brought for the purpose of confronting a living landscape. Not only would I now be able to directly ask the farmers about the landscape, it

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162 Cf. Danermark et al. 2002.
also meant mapping a landscape that was not fixed under a sheet of grass sward, but one where forms were changing, and at different paces. This was a way to experiment with the landscape and the potentials it offered as an analytical medium in an empirical investigation of processes of change and their underlying driving forces.

An important additional source of inspiration for this methodological approach has been the more recent body of research carried out by anthropologists and landscape geographers, which has attempted to use the landscape as an active part in the production of knowledge, rather than adjudicating it the role of a passive source material that we can “read” or observe. I have basically tried to use the landscape and farmers’ practices as a guide to the agricultural and settlement history in the mapped area, i.e. as a means to trigger the asking of questions and the unfolding of knowledge and memories.

Fieldwork

The Iraqw’ar Da/aw area is divided between seven villages that are more or less congruent with the traditional territorial divisions in Iraqw society. I have mainly worked in the village of Kwermusl, which is located in the eastern central part of the area. During my first visit to the Iraqw’ar Da/aw area I was guided by Vesa-Matti Loiske who had previously done research and conducted interviews in Kwermusl concerning the agricultural practices in the area. In choosing this particular village for my study I was able build on the contacts and experiences established by Loiske. I also wanted to concentrate my work in an area, such as Kwermusl, that had a relatively central location within the Iraqw’ar Da/aw area in order to avoid areas with the locational biases of either lying close to Mbulu Town or in the peripheral parts of the area located close to the escarpment or forest reserves.

In choosing a specific location for the detailed mapping, my ambition was to find a fairly representative area in terms of evidencing what I and my colleagues perceived as typical soil and water conservation practices of the Iraqw’ar Da/aw area. After having discussed the issue with some of the leading representatives of the village, I was guided to a ridge in a section called Hhay Geay.

The families that inhabit the part of the ridge that I have mapped are from the same clan but belong to two different patrilineal lineages.

\[\text{References}\]


165 In 1996 when I first visited Iraqw’ar Da/aw, Loiske lived in Babati, a nearby town, while conducting post doctoral research on the exchange networks among the Iraqw in the region. Loiske’s initial research from Kwermusl is reported on in Loiske 1995.

166 The Gorowa clan.
part of the ridge live three elderly brothers with (their respective) wives, children and grand children, and on the lower part of the slope live two elderly brothers of a different lineage with their families. The total number of people living in the mapped area is around 30, many of whom are children. I have mainly worked together and discussed matters with the adult men living in the area, and the older men in particular, as it was they who primarily engaged themselves in my work. Hence, there is a gender bias in the material, even if I have also conducted interviews with most of the women living on the ridge. On the other hand, because the women moved to the area when they married, it is mainly the men of the elderly generation who have memories of the area from their childhood. Of the three younger adult male farmers (all sons of the three brothers living on the upper part of the mapped ridge) who had their own houses and fields in the mapped area, only one was married at the time of my fieldwork. Of the other two, one was in the preparatory stages of marrying, while the other lived on his own with his three children after having lost his wife during childbirth just before my first visit to the area. I also interviewed a fourth adult male from the younger generation of farmers, a cousin to the aforementioned farmers, whose house is located just a stones throw east of the mapped area. During the course of my fieldwork and visits to the area his wife also died, and he subsequently lived alone with his three children. Hence, to some extent the gender bias in the interviews that I have conducted reflects the dominance of male farmers in the mapped area.

During all of the periods of fieldwork I was assisted by Deogratius Hillu, a man who lives in Mbulu town and who worked at the local livestock and agricultural office on matter pertaining to land use planning and agricultural extension. As he also has grown up in Kwermusl and has family there, his assistance has been very valuable, both for his knowledge about the farming practices in Iraqw’ar Da/aw in general and for his familiarity with Kwermusl and the mapped area.

**Detailed mapping**

The actual mapping was carried out with the help of an electronic theodolite and made at the scale of 1:1000. The final map covers an area of approximately 12 ha. The detailed map has been produced with an independent co-ordinate system, i.e. it has no relation to national or global systems. Both the horizontal and vertical location of all measured points were recorded and stored digitally as x, y and z co-ordinates. In order to avoid errors and to facilitate the process of interpretation, the measured points and landscape details were also successively plotted and drawn on a millimetre grid drawing film. An important aspect of drawing the map whilst in the field

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167 A land survey instrument that uses laser to measure angles and distances with high precision.
168 The coordinate system of the detailed map was approximately aligned to geographical north, by using a hand held compass (magnetic variation has been corrected for).
was that those who were interested in following the progress of my work could do so. The map shows the landscape as it looked in 1996 and 1998, when the mapping was carried out.169

During the detailed mapping and interviewing the focus was on details, but as these successively and cumulatively appear as symbols on a map these details also merge into a more coherent picture of the landscape. Fossil forms, which in the landscape may be relatively inconspicuous, appear equally distinctly as other features on the detailed map. The detailed map is thus a visual representation of historical and present local agricultural practices and their spatial relations.

Figure 2.1. A part of the detailed mapped area looking towards the south. To the right is the valley bottom and in the foreground, flanked by reed vegetation, runs the small stream that marks the northern border of the mapped area. A few drainage ditches can be seen as boundaries between arable fields in the valley bottom.

169 As only a smaller part of the area was mapped in 1996, it is mainly the 1998 landscape that is depicted in the map.
Interviews

Interviews were conducted in English and the Iraqw language with the assistance of an interpreter. Some additional direct communication was conducted in Kiswahili. In addition to the detailed mapping exercise, an enlarged orthophotograph produced from aerial photographs taken in 1988 was used as a geographical reference and to locate fields located outside of the area covered by the detailed mapping. A systematic mapping and recording of individual field histories, cropping patterns and settlement history, based on the active participation of the local farmers was made for the mapped area. Some additional enquiries about other nearby fields and households were also made.

170 I have been assisted by three interpreters during my work with the participatory landscape mapping in Hhay Geay. First of all Deogratius Hillu, whom I have already presented and who has been my main help, especially in February and March 1996 and in February and March 1998. During my fieldwork in November 1998 I was assisted by Paulo Lori a young man from Kainam with an A-level secondary school education from a catholic seminar. On my last visit to Iraqw’ar Da’aw in July 2002 I was again assisted by Deogratius Hillu, but also by Julius John Gobret, his nephew, who was about to start his third year at Sokoine University of Agriculture, studying veterinary medicine. Like Deogratius, Julius is also familiar with Kwermus village.

171 Kiswahili is the national language in Tanzania of which I have gained some rudimentary knowledge.

172 A total of approximately one hundred fields were discussed with local farmers.
Figure 2.3. Agricultural landscape of a ridge in Hhay Geay, Kwermusl, Iraqw’ar Da/aw. The highest point of the ridge is in the south-eastern part of the map (see
Figure 2.5). The location of houses follow the crest of the ridge. The field boundaries, marked as thin lines on the map, are not associated with any significant physical structure, and only represent the particular division into individual fields that existed at the time of mapping. The bolder black symbols on the map represent more significant physical structures. The detailed mapping was carried out by the author and Deogratius Hillu in February and March 1996, and in March 1998. The map has been re-drawn in MapInfo by the author, on the bases of the field-map and measured co-ordinates.

Figure 2.4. Section of field-map. Drawn with pencil on grid paper.
In addition to the fields, enquiries were also made concerning boundaries, ditches, fences, trees, wells, deserted house sites, and patches of bush and tree vegetation. (see Figure 2.3). These interviews were mainly concerned with past and present land use, farming practices and property rights. In general the interviews were conducted while visiting the different fields together with the respective farmers who were currently using the land or who the land

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173 The digital elevation model has been interpolated using Kriging and produced in MapInfo.
belonged to. In some cases, but not all, fields have been discussed with more than one of the local farmers in order to corroborate information. I conducted these interviews either by visiting farmers while they were working in their fields or by walking with them from field to field.

In addition to the mapping and field-walking interviews, interviews were also carried out with most of the adult inhabitants living in the mapped area, as well as with a few younger persons. These covered aspects about their lives, family histories, farming practices and landscape history more generally. At the village level, group discussions concerning farming practices in the area were organised. I also made visits to farms in other parts of Iraqw’ar Da’aw and also spent time acquainting myself more generally with the Iraqw’ar Da’aw landscape by walking through and driving to different parts of the area together with members of the local community.

Comments on the detailed participatory landscape mapping
The idea of connecting interviews, agricultural practices and landscape morphology can be achieved in a variety of ways, and not only through the kind of detailed mapping with an electronic theodolite described above. An important aspect of detailed mapping is that it takes time. This is of course one of the main ideas with this methodological approach as it provides opportunities for “getting a sense of” the relation between form and function of landscape details and landscape change at larger scales of analysis (see further below). Of course, the time spent on the practicalities of mapping, as in the case presented here, could have otherwise been spent talking to local farmers, doing more extensive field-walking or conducting other mapping procedures less preoccupied with establishing details. For example, an alternative approach which also makes active use of the landscape in relation to interviews on oral history and local knowledge, is to use aerial photographs or orthophotos as a basis for fieldwalks and landscape mapping. Various types of landscape mapping could also be conducted by using GPS technology or even with a compass and measuring tape. Each method, however, implies a particular kind of engagement with the landscape, at different geographical scales, and where each is associated with specific analytical constraints and opportunities.

The use of detailed mapping as a fieldwork method merits a comment about local reactions to this particular and rather conspicuous activity. Obviously, mapping could be a sensitive issue in an area where rights to land are generally negotiated locally and not registered as legal title deeds. Indeed, my fieldwork in the area gave rise to rumours that I was intending to buy land, or had bought land in the area. To what extent these rumours may have affected local perceptions about my work and intentions is not very clear to me. However, as I held several meetings in the village about my work, presenting my plans and reporting on progress made, my impression is that
most people in the village were relatively well informed about my work. Furthermore, the village and ward officials were kept informed about my plans and progress throughout the duration of the fieldwork. I was never confronted directly with these or other rumours about my fieldwork. Neither have I encountered any worries (from professional staff at the district office or from local farmers) that the detailed mapping would be used for either claiming or resisting legal rights to land, even though I have addressed the issue. Being a rather conspicuous instrument, however, the theodolite attracted some curiosity and for those who were interested we explained how it worked and what we were doing and why. My impression is that the presence of the theodolite did not influence the conditions for fieldwork in any significant way, compared to if we had used other mapping equipment, e.g. GPS-equipment, orthophotographs or a compass and measuring tape.¹⁷⁴

To some extent the theodolite certainly acted as a signpost for the work we were doing, and of our interest in the land where we worked. While my intention was most definitely not to buy the land, I was undeniably trying to intellectually and practically “capture it” by transforming it into coordinates and notes to take with me upon my departure. Thus, at least in a sense, the rumours were right. At the end of the day, the use of a theodolite in the field meant that we could not avoid communicating what we were actually doing, i.e. that we were mapping a particular piece of land. All fieldwork gives rise to rumours, for better or worse. In this case I believe it was mainly for the better, and that the theodolite helped to provide both an openness and a focus for discussions about our activities. We did not gain the impression that it made people reluctant to participate and contribute with their knowledge.

The initial intention was to allow for feedback from the local informants on the maps produced. For the detailed map in its early stages this was realised, but the maps of land use and settlement history presented in section 2.3 have not been properly presented to the local farmers who have provided the data, which means that I lack their comments on this material. Hence, corrections and discussions that most certainly would have come forward during such meetings are unfortunately missing in this analysis. This also means that an important aspect of the participatory research methodology was not fully realised. A fundamental aspect of the detailed participatory mapping approach has been to link statements to specific objects or fields in order to avoid generalised statements about landscape history. Discussions concerning the final maps would thus have been valuable as a comparison to the focus on details and specific aspects of the landscape during the fieldwork.

¹⁷⁴ Probably, the most conspicuous element of fieldwork was instead myself, i.e. as a student from Sweden, being interested in Iraqw agriculture and history.
Listening to the land

Physically, land is the oldest of all archives. ..., embedded in its earth are personal biographies, social identities and memories of previous movement. It is the most widely shared aide-memoire of a culture’s understanding of its past and future and is, ..., the “memory bank” of society.175

In this section I will clarify the different theoretical considerations which inform the method of detailed participatory landscape mapping. The first part is a general reflection on the methodological challenge embedded in theories of practice, or the study of the non-representational, which is related to the general concern with non-binary and relational thinking in contemporary geography. After this follows some more concrete reflections on the analytical potential of the method in comparison with other mapping techniques and some of the practical constraints and opportunities that it is associated with.

In a detailed mapping process the surveyor establishes a familiarity with the studied landscape and its morphological details. One of the arguments pursued below is that the social and practical experiences and activities that lie embedded in the physical forms of the landscape can be explored by coupling the experiences gained from detailed mapping, with interviews with local farmers on landscape history and agricultural practices. In his essay on the temporality of the landscape, Ingold points to the relations between activities (e.g. movement and practices of work), which he discusses in terms of a taskscape, and the visible forms of the landscape:176

My conclusion that the landscape is the congealed form of the taskscape does enable us to explain why, intuitively, the landscape seems to be what we see around us, whereas the taskscape is what we hear. To be seen, a thing need do nothing itself, for the optic array that specifies its form to a viewer consists of light reflected off its outer surfaces. To be heard, on the other hand, a thing must actively emit sounds or, through its movement, cause sound to be emitted by other objects with which it comes into contact.177

Moreover, Ingold notes that in performing tasks (or practices) people “attend to one another”, which means that the temporality of the taskscape is social.178 Using Ingold’s terminology it could be argued that instead of simply mapping the visible forms of a landscape, the detailed participatory landscape mapping discussed here is also an attempt to map a taskscape. Similarly, the metaphor

175 Quoted from Jenny Iles (2003, p. 234) who in turn quotes texts by Christopher Tilley and Rob Shields.
176 Ingold 2000, p. 189ff.
177 Ibid., p. 199.
178 Ibid., p. 196.
of “listening to the land”, has the intention of specifying the relations between activities (cf. the sounding of the taskscape) and landscape forms, as well as to the participatory aspects of the methodology. What Ingold also points to in his discussion is the potential of studying the solid forms of the landscape as a representation of the taskscape and the movements and practices it entails.

Although, his main point is that the landscape, like an organism, is constantly transforming itself, he also points to the fact that there are solid forms in the landscape that are durable, and thus particularly useful for historical inquiries. “Thanks to their solidity, features of the landscape remain available for inspection long after the movement that gave rise to them has ceased”.

Whether a landscape feature is to be regarded as fixed and solid or as undergoing transformation is, in the final analysis, of course a matter of the length of time under which the object is observed. However, instead of simply pointing to the certainty that landscapes do change, i.e. as a result of biological, technological and geomorphological and geological processes, it can be useful to pay attention to the somewhat paradoxical conclusion that the landscape is a solid medium made up of enduring features that are simultaneously interlocked with the unceasing transformations and flows of life. Thus, historical processes are intrinsic parts of the landscape.

Woven like a tapestry from the lives of its inhabitants, the land is not so much a stage for the enactment of history, or a surface on which it is inscribed, as *history congealed*.

One advantage of taking the landscape as the object of study is that in the time perspective of much historical studies many processes are actually observable as more or less stable landscape forms.

Documenting the landscape in all its complexity of relations and processes of change may be desirable but is often untenable in empirical research. It is much easier to study historical change when it appears as an observable pattern. The forms of a landscape present an accessible concrete source for enquiries about historical processes of various dates, paces and character. To use the words of Ingold again, this time from his concluding remark concerning the solidity of landscape features: “… the landscape as a whole must likewise be understood as the taskscape in its embodied form: a pattern of activities ‘collapsed’ into an array of features”.

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179 Ibid., p. 198.
180 Cf. Ibid., pp. 200–201.
181 Ingold 2000, p. 150.
182 Ibid., emphasis in original.
Non-representational and non-binary reality

In addition to Ingold’s discussion about the taskscape and its relation to form, there is a large body of contemporary landscape research that similarly concerns itself with the landscape as practice and as a dialectic. A common theme of such research initiatives is to try to avoid a conceptualisation of empirical realities in terms of binary oppositions that separate the material from the immaterial. There are a host of different concepts used and various theoretical standpoints on this theme that have come to constitute an important theme in geographical and related social science and humanistic studies. What these concepts and theoretical positions aim to achieve is basically to find alternatives to dualisms such as nature/culture, mind/body or other material/immaterial divisions that have structured much scientific thinking on humanity and nature. We should, according to these theoretical positions, instead think in terms of relations.

By thinking relationally, non-representationally or in a non-binary manner, the study of the complexities of reality, as part of an “irreducible ontology”, is favoured above the study of pure imaginations or representations or of realist or essentialist perspectives of independent events in a “real-world”.

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183 Some examples are “hybrids” (Whatmore 1999), “non-representational theory” (Thrift 1999), “actor (actant) networks” (see Whatmore 1999 for discussion and references), and “dwelling” (Ingold 2000).
184 Massey et al. 1999.
186 See for example contributions by Whatmore and Thrift in Massey et al. 1999.
Emphasis thus lies on a concern with practical or performative aspects of human experiences and on historical process as contingent and emerging. The idea with paying attention to the non-representational is basically an attempt to make sense out of those aspects of reality that lie beyond the realm of the cognitive mind, i.e. embodied knowledge.

These theoretical contributions could perhaps have more impact on the way problems are perceived and tackled within academia, but to date, their importance mainly seems to lie in the theoretical inspiration they provide for scholars in social science and the humanities. The aspect that I wish to draw attention to here is the range of methodological challenges that these theoretical ambitions raise. Thus far relatively little advice about how these should be tackled have been offered. Indeed, methodologies employed to operationalise relational thinking in practical fieldwork and landscape studies, remain rather conventional. Compared with the theoretical advances that have been made, methodological considerations have been much less accentuated.

Indeed, much has been done and can be done by simply paying attention to the questions that are asked and to the aspects of reality that are observed and reflected upon during fieldwork and subsequent analyses of empirical data. However, without corresponding methodological advancements some of the inspiration that is currently drawn from concerns with relational approaches in geographical research and with theories of practice in general, may not bear the fruit that it promises. A standard phrase used to express this dilemma is that thinking relationally is “more easily said than done”.

Nash (2000) also senses a danger that too strong an inclination toward phenomenological notions, as a response to this methodological challenge, may also lead to a retreat from political and empirical awareness:

> How can the precognitive body practices be known, or is the effort to understand and communicate abandoned in favour of abstract theorising of the non-representable? Are ethnographic research

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188 One example of this is the general lack of interest in thinking along the lines of a more integrated (physical-human) geography, which would be a logical step to take if anti-binary theoretical standpoints were to be set into practice by geographers (Whatmore 2003, Spencer and Whatmore 2001, Massey 1999).
189 Thrift (2002, pp. 296–297) suggest that various methods based on large-scale computing, interactive media, performance and alternatives to textual forms of communication, such as film and animation, will become of increasing importance in geographical research. Likewise Ingold (2002, see note below) also suggest that film maybe a way tackle this challenge, and in the case of ethnographic fieldwork he points to the importance of not only noting what people say, but to use all senses and being attentive to do contexts and surroundings. Another thing he comments on is the potential of learning through apprenticeship, i.e. by including practical training in ethnographic research.
190 Ingold notes this problem in a recent interview (Ingold 2002, pp. 17–20). See also Thrift (2000, p. 3). Whatmore (1999, p. 3) also notes the need for new and inventive methodologies within the social sciences in general.
methods as redundant as textual or visual sources, since they invite people to speak and therefore cannot access the preverbal? What happens to the project of ‘giving voice’ to the marginalised, if the concern is with what cannot be expressed rather than what can? If the body-subjects of ‘non-representational theory’ are no longer living, as in most historical geography, what other sources can be drawn upon to understand their pre-discursive practices? How does the focus on non-cognitive everyday practices position the academic? The energy spent in finding ways to express the inexpressible, …, seems to imply a new (or maybe old) division of labour separating academics who think (especially about not thinking or the non-cognitive) and those ‘ordinary people’ out there who just act.192

Discussing the same problem Tim Ingold points out that “we’ve got to find ways of moving beyond the sorts of phenomenological accounts … of what it felt like to be there [i.e. while doing fieldwork]. We ought to get further than that”.193 The question then is how this can be done? My argument here is not that conventional methods of landscape research, e.g. interviews and observation, are unable to live up to the challenges of non-representational and relational epistemologies, but rather that conducting research on and communicating results according to principles of relational and non-binary realities presents some fundamental difficulties.194 Perhaps this dilemma is best tackled by using unorthodox combinations of epistemologies and methodologies that are not based on purely relational approaches, but instead on a kind of pragmatic eclecticism, inspired by relational and phenomenological as well as constructionist, realist or structuralist approaches.

This discussion could also be approached from a wider perspective. As has been noted by for example Macdonald (2003), the current concerns with relational epistemologies can be described as part of a more general paradigmatic shift from a mechanist paradigm to an organicist paradigm, that has been ongoing since the 1970s and which is engaging natural as well as social scientists.195 While the former was based on reductionist thinking and had its analytical focus on objects, hierarchies and linear logics of cause and effect, the latter takes on a holistic world-view that instead focuses on relations, networks and complex processes that are sensitive to feedback and uncertainty. Hence, contrasting these paradigms is a matter of replacing the metaphor of the predictable machine with that of the emergent organism.

What I find particularly intriguing, however, is the often inexplicable or at least deeply complex ways in which stability, structures and determinacy seem

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192 Nash 2000, p. 662.
194 See for example Whatmore 2000, p. 266.
195 Macdonald 2003 summarises some aspects of this discussion.
to be combined and interrelated with processes of change, fluidity and contingency.\textsuperscript{196} Taking on the challenges of holistic and irreducible ontologies, thus provokes the question to what degree we must put aside concerns for stability in details and structures in order to succeed in the unmasking of relations? Macdonald notes that, “(t)he current paradigm shift might, of course, be considered as simply a change of emphasis rather than a rejection of the modernist [i.e. mechanist] world-view”.\textsuperscript{197} This opens up the attractive possibility of combining approaches that are often positioned as mutually exclusive (i.e. mechanist vs. organicist). The variety of conceptualisations of the landscape, as David Matless proposes, provides one possible starting point for such a methodological and epistemological eclecticism:

> Attention to the different claims to and definitions of landscape allows and demands a movement across physical and epistemological space, past and present. Landscape thereby carries a relational hybridity, always already natural and cultural, deep and superficial, … . Landscape, in cultural geography and elsewhere, might serve as … a delicate shuttle [in the words of Latour], weaving through matters often held apart.\textsuperscript{198}

It is a demanding task to develop methodologies that integrate these theoretical insights, and in this sense the notion of \textit{listening to the land} is but one limited attempt to take up this challenge. This, in short, is my defence for bringing an electronic theodolite into a discussion about landscape perceptions.

My main concern with the landscape as a study object is with its materiality. What I find compelling is that the material landscape represents a tangible and concrete manifestation of the often confusing complexity of temporal and spatial relations (including the immaterial), that historical studies are faced with. Writing in favour of the potentials of archaeology as a discipline engaging with the material landscape as a study object, Ingold is critical to the notion of the landscape as made up of multiple layers of symbolic meaning and cultural representation, which has been influential in humanistic oriented landscape studies. Instead he argues that:

> (m)eans is there to be discovered in the landscape, if only we know how to attend to it. Every feature, then, is a potential clue, a key to meaning rather than a vehicle for carrying it.\textsuperscript{199}

\textsuperscript{196} This is inspired by Macdonald (2003, p. 331) who discuss and quotes the work of Fritjof Capra. Cf. also James Lovelock (1979) and Ingold (2000).
\textsuperscript{197} Macdonald 2003, p. 330.
\textsuperscript{198} Matless 2003, p. 231.
\textsuperscript{199} Ingold 2000, p. 208.
Getting a sense of the landscape and its details
As has been noted above, detailed participatory landscape mapping is not simply a method for producing a detailed map of an agricultural landscape based on exact measurements and with the potential for digital cartographic visualisation. Ignoring the participatory aspect for the moment, there are two principal ways in which the practice of detailed mapping in itself functions as a method for landscape interpretation and analysis.

First, fieldwork in general is not only about collecting material, it is also about trying to get a “sense of the game” through practical experiences.\textsuperscript{200} In the case of detailed mapping, this is done by a slow walking around in the landscape, observing, mapping and making enquiries about details and morphology.\textsuperscript{201} To map form, is a way to confront past activities, processes, movement and social relations in the landscape.

The other aspect is the actual drawing of a map. Lilley points out how: “By bringing together pen and paper, and actually tracing out a map of a particular landscape, ideas are formed about the landscape itself”.\textsuperscript{202} To draw a map of a particular landscape is to engage in a process of interpretation of the morphology of that landscape.\textsuperscript{203}

By incorporating interviews with the detailed mapping, the empirical and analytical frame of detailed mapping is widened considerably. Cultivating with a hand-hoe is a time consuming job, as is weeding and most other tasks in

\textsuperscript{200} The phrase is taken from Simonsen (2003, p. 161), who in turn has borrowed it from Pierre Bourdieu.
\textsuperscript{201} See Widgren 2001. The term he uses is literally “to walk oneself into the landscape” (“att gå sig in i landskap”). Cf. Simonsen 2003, for a discussion on embodied and practical knowledge.
\textsuperscript{202} Lilley 2000, p. 373.
\textsuperscript{203} See Lilley 2000 for an informative discussion on mapping and map drawing as an analytical tool.
a labour intensive farming system. Although the practice of detailed mapping has a different objective than that of manual farm work, the tempo and its focus (on details) is aligned with the practices of labour intensive farming. The detailed mapping of an agricultural landscape is thus a way to explore and engage with a landscape at a scale that corresponds to farmers’ work-tasks.\textsuperscript{204} The idea behind this mapping approach is that landscape details, as material representations of farmers’ practices, are key components in farmers’ knowledge about their landscape.

According to Nancy Duncan: “situated knowledge is knowledge that is ‘located’ by researchers who self-critically attend to the cultural, geographical and historical specificity of the conditions of production of those knowledge claims”.\textsuperscript{205} Situated knowledge is thus concerned with the specific contexts of knowledge claims.\textsuperscript{206} Agriculture is a physical engagement with the land, and farmers maintain an embodied knowledge of their farming practices and landscape. This is an important specific context to consider for landscape historians.\textsuperscript{207} In a farming system based on hand-hoe cultivation, the physical forms of the agricultural landscape are an extension of the hands and minds of the farmers and are loaded with meaning and memories. Mapping these physical forms, in detail, is thus a way to reach for those hands and minds.

The landscape is not an objective reality, but it is an empirical fact that can be shared and experienced simultaneously, for example in an interview situation. Apart from helping to avoid simple misunderstandings in interviews about particular processes, practices and places, the physical landscape can be used as a stimuli and starting point for both questions asked and answers given.

\textsuperscript{204} Cf. Widgren 2001.
\textsuperscript{205} Duncan 1996, pp. 3–4.
\textsuperscript{206} My ambition here is not to delve into a debate about myself as a specific context, but focus on the landscape and its inhabitants.
\textsuperscript{207} Cf. Hansen 2001; Setten 2002; Setten 2003.
Figure 2.8. Discussing agricultural practices with a farmer, just outside the mapped area, while he was busy thinning his young maize plants.

Mapping as politics and method
In the hands of ruling elites, state bureaucracies and empires, maps have throughout history been tools for executing power and control. Thus, under the pretext of being a scientific objective representation of a geographic reality, maps and cartographic conventions have been exposed to much critique and deconstruction from radical and postmodernist theoretical positions. Consequently, within development work and research it has become popular to try to reverse this legacy and to use maps and map-making as a tool for the empowerment of poor and disadvantaged groups. For this purpose, methods for participatory mapping and counter-mapping have been developed in order to expand and explore the use of maps and mapping, addressing both their political and epistemological dimensions and potentials.

Since the methodological approaches of Participatory Rural Appraisal (PRA) and Rapid Rural Appraisal (RRA) became established within development work and research in the 1980s, participatory mapping has been included as a standard method. A strong emphasis in participatory mapping

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208 E.g. Harley 1998 and Wood 1993. See also Borén’s discussion on the intricacies of the politics of maps and map-making in the Soviet Union and its consequences for the society and peoples everyday activities (Borén 2003)
209 For a discussion about counter-mapping see Hodgson and Schroeder 2002.
techniques is usually placed on the idea that it is the local inhabitants’ perspectives on reality that should be captured in maps. Maps produced according to this ideal, e.g. drawn on the ground or on paper on the basis of experiences and perceptions of those who participate in making the map, are therefore as a rule made without the help of technical survey equipment. Consequently, this means that in many cases participatory maps do not show geometries and distances according to a defined scale.

Producing these types of maps is an important tool for identifying and tackling problems in development, planning and research, as they put a premium on the perspectives of local inhabitants. However, it can be questioned if a participatory map is necessarily more participatory if it is made as a sketch-map that is not to scale, than if it is made with the help of survey equipment and drawn at a defined scale. Another characteristic of the standard methods of participatory mapping is that they are usually aimed at representing perceptions, ideas and values, rather than concrete and specific everyday practices of local inhabitants.

The detailed participatory landscape mapping discussed here is aligned with the ambitions of the standard methods for participatory mapping discussed above, but there are also differences. Instead of inviting inhabitants of a landscape to draw, for example, sketch-maps of geographical realities according to their views and experiences, the detailed mapping method means that participants are encouraged to discuss particular physical forms in the landscape with the surveyor. In this case, the mapping was lead by myself, but facilitated by the knowledge and experiences of the local farmers and the persons who assisted me with the mapping and interpretation. We may thus ask in what sense this is in fact an example of participatory mapping, and to what extent it represents an outsiders’ perspective on the mapped landscape?

A quite different study, but one which is useful as an example of the complex relations between surveyors (i.e. as outsiders) and local participants, is Angèle Smith’s study of the nineteenth century British Ordnance Survey maps of Ireland. This colonial mapping project meant that “an army of soldier-surveyors was unleashed into the local landscape”, so that, “the colonial presence dressed in bright red coats could not be ignored”. But as she also points out, despite primarily being colonial tools of domination and control, the Ordnance Survey maps are also products of contested realities, negotiations and interaction. It was also a mapping project that had important qualities attached to its colonial ambitions:211

This mapping project was unprecedented for its detail and for its systematic process of documenting the landscape. Field boundaries, roads, villages, isolated houses, even individual trees were included in this national cartographic artefact. It was an act of domination –

211 All quotes are from Smith 2003, pp. 71–72.
mapping was a means for Britain to maintain colonial control over Ireland, making the landscape, its people and past known and quantifiable. … But landscape representations are not uncontested. Maps are the sites of interaction – in the case of nineteenth-century Ireland, between the surveyors in the field and the Ordnance Survey officials in Dublin; and among the surveyors, the local Irish population and their Anglo-Protestant landlords. There are multiple ways of perceiving and understanding the landscape as well as the social memories and meanings that are encoded in the landscape. Therefore maps are also the sites of cultural negotiations in which competing perceptions and experiences of the landscape and its social history are manipulated. … The mapping project is a colonial tool of power initiated to know and control the local landscape and the people. But, it is a process that involves social interactions and relations that are contested … . The contested nature of documenting the landscape and the social memories and histories embedded within it, is part of the mediation that constructs and is represented on the final map.212

This quote points at the potential for negotiation and co-operation between surveyor and inhabitants in producing a map of a landscape that is more than a representation of either the inhabitants or the surveyors intentions and perceptions. This observation supports one of the fundamental theoretical preconditions on which the method discussed here is based. A map of a landscape surveyed and drawn by an outsider on the basis of an active participation by the local inhabitants of the mapped landscape, does allow for insiders perspectives to be included, even if cartographic decisions about scale, symbols, and generalisations are not in the hands of the local inhabitants. The fact that a map is always political, always social, and always based on contested representations of the landscape, implies a methodological opportunity, as exemplified by various methods for participatory mapping. The method of detailed participatory landscape mapping also tries to make use of this opportunity.

In the following two sections the experiences and results from this particular fieldwork methodology are analysed.

2.2 Landesque capital, labour intensity and incremental change

As I have noted in the introduction, this study endeavours to follow Stahl (2001), and her use of “upstreaming” as a method for historical inquiry. In her description of this method she concludes that it is:

212 Ibid.
an attempt to capture the logic of contemporary practices, a view of culture-in-the-making, which is a process that looks to history to create advantage and meaning in the present. This view of culture-in-the-making provides a comparative lens through which to view longer term history… .

In my case, however, the focus is rather on landscape-in-the-making, and on the local agri(culture). The concern here is primarily an analysis of land use, landscape forms, farming practices and settlement patterns. This is done without engaging in a detailed discussion of the complexities and interaction of political, economic and climatic (e.g. rainfall) factors and their effects on local land use practices during the twentieth century. Hence, in my case the empirical “baseline”, analysed in following two sections (2.2. and 2.3), as well as in chapters three and four, consists of a relatively narrow focus aimed at addressing the question of changes in land use intensity, settlement and agriculture since the nineteenth century.

Accumulation of landesque capital, i.e. investments in terracing and other physical landscape structures, is a commonly used indicator for agricultural intensity. In order to understand the role of such capital formation in the farming system, we need to analyse the costs (in terms of labour input) that are involved. High costs would suggest a high level of motivation to intensify production, e.g. because of population pressure, while low cost, no costs or even benefits associated with labour input are more difficult to reconcile with a situation driven by coercive force.

The tyranny of monuments

One problem associated with the study of fossil farming systems is the tendency to focus on “(t)he wet, the dry and the steep”, i.e. the more peripheral situations and the more elaborate and “visual” systems rather than those which were once most common. The legacy of this bias, which has been referred to as the “tyranny of monuments”, is perhaps also applicable to the study of living farming systems and their history. As noted above, conspicuous physical structures have inspired much investigation and theorisation of agricultural intensification and intensive farming systems, as well as debates about indigenous soil and water conservation practices. The practice of

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214 Farrington 1985. See also Leach 1999, pp. 312–313.
215 John Sutton (1989b, p. 112), for example, uses this phrase with reference to Ian Farringtons discussion on “the wet, the dry and the steep”. I am not sure if this phrase has also been used in other contexts. I use it here in accordance with Farringtons observations on the archaeological and geographical bias in studies of past agricultural intensification, and as a more general metaphor for the tendency to focus on conspicuous aspects of intensive farming systems.
terracing is a typical case in point. However, it appears as if this monument has, at least in some cases, stood in the way of an accurate analysis of East African farming systems. In particular, several historical descriptions of terraces have upon closer inspection been interpreted as systems of cultivation ridges. The “tyranny of monuments” is not only a matter of studying peripheral agricultural locations, it is also a product of an analytic tradition that celebrates feats of engineering and muscle power.

When I first discussed the location of the detailed mapping with local farmers and officials, I pointed out that I was interested in the soil and water conservation techniques, and that we wished to map an area that was representative for these practices. In deciding upon where to start the mapping, my attention was caught by a couple of infiltration pits and water channels that I associated with water harvesting. Later, I found out that they were in fact dug in order to mix clay (by blending the local soil with water) to plaster houses with, or simply for getting rid of excess water. Pits that were dug for mixing clay in were located in places where the soils were of a suitable quality for use as a building material, and a water channel was consequently dug in order to lead water to the pit from a nearby place where it could easy be collected, e.g. from a house platform or a field.

Another set of physical structures that was initially misinterpreted as an indigenous soil conservation measure was a number of contour lines (marked as positive lynchets in the central part of Figure 2.3, see also Figure 2.10 below) where grass had been planted to stabilise the contour and prevent erosion. But, as I was later to find out, these contour lines were measured by local soil conservation advisors in 1993 and 1994, and the farmers had been provided with grass to plant along the contour lines. According to the farmer who had dug the contours, only a few of the contour lines that had been laid out in the village in 1993 and 1994 were still being maintained five years later. These initial misconceptions serve to illustrate the point made by Östberg and Reij (1998), that “things are seldom what they seem”, when observed by outsiders, and that an understanding of natural resource use in local settings thus requires the co-operation of the local inhabitants.

216 Obviously, the present study is a perfect example of this. See also Sutton 1989a; Widgren and Sutton 2004; Bookfield 2001, p. 184; Turner et al. 1993 (see “terracing” in index). See also Blakie and Brookfield and their discussion on the labour costs required for terracing (1987, pp. 9, 93–95).


218 Lawi notes that the relatively few crop fields that include contour lines planted with exotic grasses, are the remains of a former US-supported rural development program that was launched in 1979 (1999, p. 370).

In their influential book *Land degradation and society*, Blakie and Brookfield (1987) made a distinction between land management in relation to the current crop and land management designed to secure future production. They focused particularly on the creation of physical field structures that have a clear purposive intent of creating capital “for the future maintenance of land capability”, such as terraces, stone walls, field drains, water meadows and irrigation systems.
Investments of this nature have a long life and are sometimes described as *landesque capital*, which refers to any investment in land with an anticipated life well beyond that of the present crop, or crop cycle. The creation of landesque capital involves substantial ‘saving’ of labour and other inputs for future production.\textsuperscript{220}

The presence of visible landesque capital is therefore often used as an indicator for agricultural intensity and the physical forms of the Iraqw’ar Da/aw landscape is no exception.\textsuperscript{221} In the following it will be discussed more precisely how work-processes have contributed to the formation of landesque capital in the landscape of Iraqw’ar Da/aw. The main question pursued is to what degree labour has been invested in order to produce the typical forms of agriculture in the area? The discussion takes as its starting point two characteristic physical forms that have been associated with the local intensive farming practices, i.e. terraces and ditches. Three interrelated issues are examined. First, how and why these physical forms are made. Second, if and to what degree additional labour has been required to construct them. Third, to what extent they represent input-saving investments (i.e. landesque capital).

**The morphology of the Iraqw intensive agriculture**

Apart from the various practices of manuring and crop treatment, attention has also been paid to the physical landscape forms associated with the intensive farming system in Iraqw’ar Da/aw. In particular, terraces, ditches (i.e. drainage channels, including so-called storm drains) and cultivation ridges have been observed as typical local soil and water conservation practices.\textsuperscript{222} While the first two forms in most cases last for more than one cropping season, cultivation ridges must be reconstructed for each cultivation season.

Another physical form that is persistent over several cropping seasons are clearance cairns. In the detailed mapped area only a few clearance cairns of moderate size were present, usually around 0.5 to a 1 metre in height and diameter (see Figure 2.12). Most of the cairns that have been mapped are clustered in a few locations, suggesting a patchy distribution of stones in the soil or the different practices of individual farmers. Obviously, the fields that have been cleared of stones represent a form of landesque capital, even if the labour investment involved is quite small in this case, as is shown by the limited size and number of cairns. Further, as clearance cairns are not at all as prevalent as terraces and ditches, they are on the whole a feature of less importance to an analysis of the Iraqw intensive farming system.

\textsuperscript{220} Blakie and Brookfield, 1987, p. 9.
\textsuperscript{221} Cf. Widgren and Sutton 2004.
In the detailed map a couple of trash lines are also mapped. These are crop residues laid out perpendicularly to the slope in order to hinder soil erosion and to produce mulch. But, like cultivation ridges, they do not represent a formation of landesque capital according to the definition cited above. Lastly, the fences and hedges mapped should be mentioned. These also represent a landesque capital, but like the clearance cairns they are a rather insignificant
form of capital as they are not so frequent. The fences are made of wooden materials (sticks, twigs and bark), are usually about a one metre in height, and are mainly used to avoid crop damage by cattle (see Figure 2.13). Hedges vary in form and can have a similar function as fences, but overall hedging is not a systematic and characteristic practice in Iraqw’ar Da/aw agriculture.

Figure 2.13. Fence in Iraqw’ar Da/aw.

Terracing
In the literature on agriculture in Iraqw’ar Da/aw, the process of terracing has rightly been described as the result of successive tilling, i.e. they are not constructed as separate investments in landesque capital. Making a distinction between terraces “developing” out of successive tillage rather than being “built” using additional labour inputs is crucial for the discussion about intensification and labour investments. But instead of discussing the implications of this distinction, terracing in Iraqw’ar Da/aw has generally been noted as being one of the typical soil conservation methods practised in the area, giving an impression that they are constructed for the purpose of supporting an intensive land use. However, if terraces are merely a bi-product of tillage, the process of terracing is better described as a result of a high permanency of cultivation rather than as an intentional soil conservation method.

Figure 2.14. A typical cut (approximately 1 m high) in the mapped area.

Figure 2.15. Illustration of a slope with cuts. When a sloping field is cultivated with a hoe, soil is successively moved down the slope, resulting in a terrace-like structure. In the upper part of the field a negative lynchet or cut (>0.5 m in height) is formed. At the lower end of the terrace a positive lynchet is formed, where soil and nutrients accumulate. The positive lynchet or terrace edge is usually enhanced with grass, bushes, bananas or trees. (Illustration by Anna Hedberg.)
The manner in which terraces are formed is illustrated in Figure 2.15 above. Horizontal terraces are actually a rare sight in the area. The terraces discussed here are mainly fields that are sloping at an angle that is less than that of the slope prior to cultivation. In many cases it is thus more relevant to discuss the process of terracing in the area in terms of the cuts that are produced through cultivation, as the term terrace may be misleading. When a slope is cultivated with a hoe, soil is moved from the upper part of the field downwards along the slope. In this way the field is successively dug into the slope and a terrace slowly takes form. The cut in the upper part of a terraced field is called a Geay (sing.), by the local Iraqw farmers, if it is larger than about half a metre in height. Large cuts can be several meters in height. A small cut, that is not considered to be a proper Geay by the farmers, has been mapped as a negative lynchet, which is a technical term for a field boundary from where soil has been removed through tillage, creating a distinct step-like structure. A positive lynchet, on the other hand, is the same as the lower part of a terrace or a field boundary where soil has accumulated as a consequence of tillage on sloping ground (see Figure 2.15).

When farmers were asked about the construction of terraces they did not speak of cuts as a method for soil conservation, or that cuts were dug prior to cultivation, but confirmed that that they were an effect of repeated tillage. Consequently, as one farmer commented, cuts mainly appear on field boundaries that are also property boundaries. This pattern is also evident if we look at the detailed map. Cuts in the mapped area are mainly located at stable
boundaries in the landscape (e.g. property boundaries and boundaries between different types of land use). One effect of this slow and continuous process of terracing in the area is that water and nutrient flows are affected, which can be assumed to have positive effects on agricultural productivity.

The effects of terracing, or levelling of fields, are also often clearly marked on the land as cuts that develop at the edges of valley bottoms. This process makes valley bottom fields both wider and more level as compared to the situation prior to cultivation (see Figure 2.17). As valley bottom land is the type of land that is under most pressure, due to its multiple functions in the farming system (e.g. as dry season grazing, meadows, reserves for thatching grass and cultivation), this piecemeal enlargement of valley bottom fields has a positive effect on the agricultural production in the area, which means that a relatively important landesque capital is created through this process.

Figure 2.17. Valley bottom field in the mapped area. The work of breaking the grass sward has started after a short fallow period. Cows are grazing in the background. Note the cut to the right.

In answering the first question posed above about how and why physical forms appear on the land, my conclusion is thus that cuts and terraces in the area have not been constructed for the deliberate purpose of preventing soil erosion, i.e. they are not primarily a soil conservation method. Instead, they are the result of successive tillage and, accordingly, are related to the intensive land use in the area. This implies that a slope with many deep cuts, i.e. one that is quite intensely terraced, bears witness to a more frequent cultivation, as compared to a less terraced slope. This also suggests that cuts are physical manifestations of field boundaries that have, for some time at least, remained fixed in the landscape. Typically this includes property boundaries or stable
boundaries between different types of land use (e.g. between grazing and arable land).

Hence, rather than being thought of as a soil conservation measure, even if the positive effects on agricultural productivity are also considered, the cuts and the process of terracing in Iraqw’ar Da/aw primarily seem to reflect continuity in land use and land rights. Naturally, the longer a boundary remains fixed, the deeper the cut can become. Of course, the sloping gradient and the frequency of cultivation are also factors that must be considered when assessing the relation between the depth of a cut and the duration of its existence. To measure the age of a field by the height of a cut is only possible in a very crude sense. A cut of about one metre in height is formed over several years of cultivation. Factors such as the frequency of tillage and possibly even variations in soil quality complicate the picture further.

As both land use and property rights change over time, and moreso in some places than in others, the history of cuts depends on the nature of the field boundary on which the cut is formed. In addition to relatively permanent property and land use boundaries, cuts may also develop according to an individual farmers decision to divide a piece of arable land into two fields, and indeed be removed as field boundaries are rearranged. The removal or breaking of a cut is sometimes used as a method for releasing nutrients into the soil. As nutrients accumulate in the lower part of a terrace these are spread out over a larger area when a cut is levelled out. In fact this soil improvement method is quite common among small-scale farmers. In a study of soil conservation in Burkina Faso, Mazzucato and Niemeijer (2000) discuss the importance of accounting for farmers needs and preferences for flexibility when conducting studies of soil conservation measures and agricultural technology, and how social networks and cultural factors are decisive factors in farmers decision making. Hence, it is important to take into account the variety of factors that affect farmers decisions about cultivation and soil management, in relation to their outcome as short or long-term effects on areal productivity. As has been discussed above, in the case of the cut or terrace edge, and its removal, the accumulated nutrients are clearly a landesque capital. The paradox is, however, that a part of the accumulated productive potential of this landesque capital can only be released by removing the physical structure to which it has been bound. However, this type of soil conservation method has been more the exception than the rule in the mapped area.

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224 See for example Östberg and Reij (1998, p. 1355). Årlin (2001, p. 28) also reports a similar case from a highland area in western Kenya.
225 See also Jones 2002.
Ditches and drainage channels

In this section we turn our attention to another characteristic form in the agricultural landscape of Iraqw’ar Da/aw, i.e. ditches and drainage channels. Ditches vary in size and function. They include drainage ditches in wet valleys, so-called storm drains or cut-off drains on slopes designed to lead off and trap water during heavy rains, and other minor drainage channels (see Figures 2.1, 2.9, and 2.18). All are dug for the purpose of leading water away from fields, grazing areas and house platforms in order to create better conditions for cultivation and other activities performed in and around fields and homesteads. Ditches clearly represent a form of landesque capital in the sense that they are labour saving and productive investments. But, how are they constructed and how much additional labour input is required to produce and maintain this landesque capital?

Like the cuts discussed above, ditches are also field boundaries, except for small ditches that are dug to drain house platforms. Some ditches, especially those in valleys, can be rather substantial but they are not usually larger than about one metre wide and half a metre deep. On the slopes, ditches are often smaller, measuring less than half a metre in width and only a couple of decimetres in depth. In general, ditches are dug and maintained concurrently with the preparation of arable fields, which means that much of the work involved in digging ditches forms an integral part of the work of hoeing fields prior to planting. In the case of the larger ditches, additional labour must be invested in digging and maintenance, but as many ditches are relatively insubstantial structures the amount of labour input needed is small in comparison to that used for hoeing arable fields. Furthermore, smaller ditches are in many cases seasonal structures that, like cultivation ridges, are re-made each time a field is cultivated.

There is therefore a difference between the digging and maintenance of ditches as part of ordinary cultivation procedures, and the digging of ditches as separate investments, e.g. to drain wet valleys. In the latter case, a substantial amount of labour input is made prior to cultivation activities, while in the former case it is much more difficult, and in many cases almost impossible, to separate the work of digging ditches with the hoeing of fields. Many valleys in the Iraqw’ar Da/aw area have been drained in order to facilitate cultivation, and it is a common sight to see ditches in valleys. The landesque capital that such drainage systems represent is the result of both the digging of ditches and the subsequent cultivation of the land. It is not only the ditches that represent a landesque capital, but also the cultivated fields that they are associated with.
Incremental investments

In the area, farmers co-operate in mobilising labour in more or less organised ways, either within the family, among neighbours, friends and as work parties. Usually, these types of labour co-operation are used for carrying out tasks involved as part of normal procedures of ground-preparation, i.e. hoeing of fields, and other tasks related to the cultivation of arable fields as well as for non-agricultural work such as repairing or building houses or roads. What is noticeable here is that while the literature on labour intensive farming systems in Africa usually associates different types of labour co-operation with the construction of durable field structures, such as terraces, irrigation channels and ditches, which are made prior to cultivation, this is not the case for the Iraqw’ar Da/aw farming system.

Doolittle has discussed the difference between what he calls systematic and incremental change of agro-ecosystems, and argues that the systematic view has been prioritised, particularly in interpretations of past agro-ecosystems. According to his definition, “systematic change involves the addition of new fields and associated features that are constructed completely prior to cultivation”, while “incremental change involves gradual transformation of fields and features in conjunction with cultivation”. Thus, incremental change is a result of the “cumulative actions of individual farmers”.226 Landesque capital that is formed through an incremental process is a product of tillage and cultivation practices, and does not involve additional labour inputs designated to the construction of field structures such as terraces and ditches.

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Cuts and the process of terracing that are such characteristic features of the Iraqw intensive agriculture are formed incrementally. This means that cuts are an expression of a relatively permanently cultivated landscape, and only indirectly related to the investments made in agriculture. For the same reason it becomes problematic to regard terracing in Iraqw’ar Da/aw as a measure employed in order to cope with population pressure, since this would require that terraces were constructed prior to cultivation for the specific purpose of raising area productivity, rather than appearing as an effect of intensive cultivation. Terraces, cuts and ditches are indicators of agricultural intensity in the area, and they represent an important (form of) landesque capital. But, they are not the kind of systematic and labour intensive investments (apart maybe from more substantial drainage projects) that we usually associate with strong incentives to intensify production, e.g. population pressure or market demand. More importantly however, this landesque capital has successively changed the conditions for agriculture in the area, and in so doing also stimulated the further intensification of agricultural production.

Many valleys in Iraqw’ar Da/aw have been converted from more or less permanently waterlogged and swampy land to arable or grazing land. As Lawi points out, oral history suggests that the lower parts of slopes were the preferred location for cultivation in the late nineteenth and early twentieth centuries. Partly, these locations were chosen for more or less the same reason that valleys are cultivated today, i.e. the moist conditions during the dry season, but there were also other advantages with choosing this part of the terrain for cultivation. Cultivating the wetter valley bottoms would have required more labour both to drain and to work the heavier soils, but arable fields in valley bottoms were probably an important part of the production system since at least the late nineteenth century.

When farmers in the area cultivated the lower parts of slopes they also gradually moved soil downwards (cf. Figure 2.15). As soil accumulated lower in the terrain, it may have contributed to improve the conditions for cultivation further down slope and in the valley bottom. We can thus imagine a swampy and narrow valley bottom that, through incremental change caused by cultivation, is transformed into a successively wider and more levelled valley floor and thus made more suitable for cultivation (see Figure 2.19). Many valley bottoms in the area bear the imprint of such a process (e.g. Figure 2.17).

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Another form of landesque capital that has to be taken into account is the “manufacturing of soils”. In addition to visible forms of landesque capital such as cuts and ditches, the movement and mixing of soil through cultivation as well as the use of manure and compost to boost soil fertility, is effectively a way to alter soil properties and thus to manufacture soils.\textsuperscript{230} The studies conducted by Tengö on the nutrient balances in the Iraqw’ar Da/aw farming system clearly point to the importance of manuring and composting of organic material in creating soils that are more suitable for agriculture.\textsuperscript{231} As has been mentioned earlier, the amount of productive capital that cuts and ditches represent are relatively low compared to many other farming systems that have become known for local investments made in terracing, drainage or irrigation structures. In the Iraqw’ar Da/aw area, it is instead the inconspicuous alterations of soil properties and the cultivated valley bottom fields that seem to be the most important productive landesque capital.

However, it is not only relevant to discuss the visible landesque capital in terms of its relatively insignificant impact on areal productivity. In fact, as cuts and ditches are mainly formed on field boundaries, they also serve as markers of property rights and the spatial organisation of agriculture, and thus also constitute a symbolic (judicial) capital. The landscape is an important means of communication, not least in a society where no written records have been kept on properties and land use history. Making visible imprints on the land may have served as an inscription or documentation of property rights and agricultural activities, and contributed to the governance of the system, e.g. in negotiations of land disputes, or transfers by inheritance and loans. In other words, the landesque capital represented by the many cuts and ditches in the area, may in fact be, and have been, important both as a symbolic capital, i.e. as means to reduce transaction costs in the local farming system, and as productive capital.\textsuperscript{232}

\textsuperscript{230} Brookfield 2001b, p. 184–186.
\textsuperscript{231} Tengö and Hammer (2003a, 2003b).
\textsuperscript{232} Cf. Sheridan 2002; Earle 2000, p. 51; Mazucato och Niemeijer 2000.
The discussion above suggests that the incremental build up of landesque capital in the area may successively have changed the conditions for agricultural production and stimulated a more permanent cultivation and intensification of production. Cultivation, in itself, thus becomes a driving force in intensification, as capital is slowly accumulated in the land. Any agricultural activity, extensive or intensive, implies changes in the physical landscape. Depending upon the nature of these changes and the social, political and economical contexts, their impact on prevailing farming practices will vary. However, just as farming systems undergo systematic changes, so too do agricultural practices also create their own logic of change. By cultivating a landscape, farmers not only become emotionally attached to the land, but they may also change local opportunities for agricultural development. As Brookfield remarks, “field systems as a whole” are a form of landesque capital that have received relatively little attention compared to more monumental forms of discrete capital investments such as terraces, drainage and irrigation works.233 This is particularly worth noting as the role of African smallholders in depleting environments and soils have received much attention over the years, partly due to misperceptions of the complexities and adaptability of their farming systems.234

From this discussion, it can be concluded that the physical structures discussed above, i.e. cuts and ditches, are not primarily monuments of labour investments made for the purpose of intensifying land use. Instead, they together with the overall morphology of the Iraqw’ar Da’aw agricultural landscape, are the products of a long history of cultivation that has partly produced its own incentives for intensification. In general, studies of agricultural intensification as well as studies on indigenous technological knowledge, exhibit a quite understandable, but also it seems a typically male, interest in technical skills and heavy labour tasks. Another problem concerns the bias of the “wet, the dry and the steep”. As is shown for the Iraqw case, the steep slopes and the wet valley bottoms, have indirectly contributed to make agricultural practices visible as structures on the land. It is therefore important to examine the historical and geographical contexts of conspicuous agricultural landscapes before drawing conclusions about the significance of their respective characteristic physical forms.

2.3 Land use and settlement history

The main objective in this section is to document the changes in land use and settlement that have occurred during the last one hundred years in the detailed mapped area.

233 Brookfield 2001b, p. 184.
234 See discussion in chapter one.
Mapping oral history

As I have noted above, interviews were conducted while standing in, or looking at, the particular field or other physical object that constituted the focus of each respective interview. The questions asked have primarily been concerned with simple facts about land use, property rights and settlement change. For example, when, by whom and with what crops has this field been cultivated? Who lived in this deserted house site, during which time period, etc. On those occasions when I discussed the landscape history of the area in more general terms, at group meetings or with individuals at their homes, answers mainly corroborated the established oral histories, traditions and legends of the area, which are often more difficult to pin down as events in time and space, as compared to statements given about specific landscape details.

The main means of dating historical events has been to use the statements that refer to the persons who were involved in the event. For example, I received answers such as: “it happened when my father was still a small boy”, or “it was my grandfather who first cultivated this field”. More recent events were connected with persons presently living in the area or who had moved away. Naturally, the degree of accuracy of the interview data decreases as one moves further back in time. The data for the 1900–1920 period and the pre-1900 period are both vague and patchy. But by analysing physical field structures and geographical patterns in relation to the interview data, I have also endeavoured to reconstruct the landscape for these early time-periods.

In order to produce an approximate landscape history of the mapped area, the interview data have been structured according to a set of time-periods. Eight time-periods have been used (see Table 2.1). The period from 1960 and up to 1998 has been divided into four periods of varying lengths (15, 15, 6 and 3 years respectively). For the pre-1960 era another four time-periods were established, all of 20 years in duration. To some extent, the varying lengths of the time-periods reflect the higher accuracy of the interview material pertaining for the more recent periods. The time periods have also been associated with a rudimentary division into different historical periods. The land use and settlement history presented in this chapter is partly based on my estimates and analysis of the oral history accounts, and is thus not always directly supported by local farmers’ statements (see Appendix for further comments on the interview data).

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235 As a rule, names of the persons referred to have been provided, thus avoiding unnecessary confusion about which generation the statements concerned.
236 In Figures 2.20 and 2.21, this uncertainty is also indicated by the category of uncertain land use (i.e. when I have no indication about whether grazing or cultivation dominated land use in a certain field at a particular time period).
237 Except for the most recent period, the years indicated refer to an approximate point in time.
Table 2.1. Time periods that have been used to structure interview data. In the upper section information is mainly based on the informants own lived experiences, while information for the two earliest periods relies on accounts of the lives of past generations in the area, as remembered by the farmers in the area.

1975–1990: Post villagisation
1940–1960: Late British colonial period (W.W.II and after)
1920–1940: Early British colonial period
1900–1920: German colonial period
Pre 1900: Before German rule

Land use change

The sequence of maps, shown in Figures 2.20 and 2.21, is based on the detailed participatory landscape mapping and the oral histories recorded for each different field. The mapped area is located neither in the most central nor in the most peripheral parts of the Iraqw’ar Da/aw area. Hence, there were probably areas that were more intensively cultivated and densely settled in some of the most central parts of Iraqw’ar Da/aw during the early twentieth century. In more peripheral locations, land use practices were much more extensive than in the mapped area. The maps discussed here can thus be taken to be fairly representative of the average situation of landscape change in the Iraqw’ar Da/aw area as a whole.

In Figures 2.20 and 2.21, land use data is divided in two main types; cultivated fields and grazing land. The areas of grazing land depicted in the maps include smaller patches of trees, scattered bush vegetation, houses and house platforms, as well as fields that have mainly been associated with fallow during the time period. Scattered trees and banana plants are not indicated on the maps, and fields where coffee and Grevillea trees are inter-cropped are marked as cultivated land. Thus, the maps do not show the full extent to which trees have become more prevalent in the landscape during the latter part of the century.

During the last couple of decades, for example, many of the terrace edges have been planted with trees (e.g. Grevillea) and banana plants. Cultivated land includes fields that have for the most part been cultivated, but in some cases also includes one or more shorter fallow periods. If the amount

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238 This rural resettlement scheme in 1974 is well remembered locally.
239 See chapter three
of time under fallow and cultivation is more equivalent, the field has been marked as *fallow and cultivation*.

Apart from grazing land and cultivation, *meadow land*, *reeds* (used for roof thatch) and larger patches of *bananas* and planted *Grevillea trees* are also indicated.

In cases where I have not been able to find any indication of the land use for a particular field and time period, this has been marked as *uncertain* on the map. However, despite the lack of solid data for the early time periods, the general picture provided by the sequence of maps may still provide a fairly good approximation of the local land use history. The landscape history, as presented in Figures 2.20 and 2.21, also corresponds relatively well with the general statements made by local farmers about land use changes during the last century, i.e. that there were less cultivated areas and more grazing land in the past. Farmers also stressed that although there were fewer and smaller arable fields in the past they were more productive.

Comparing the maps for the different time periods, it is also evident that while many cultivated fields are shown to have been more or less continuously cultivated since they were first opened up for cultivation, both longer and shorter periods of fallow are evident.

If we look at the detailed mapped landscape for the late 1990s as shown in Figure 2.3, we see that in substantial parts of the present grazing land there are physical traces from previous cultivation or other activities, such as clearance cairns, earthen banks, and lynchets. More precisely, three separate areas with such physical marks on the land can be identified. First, a cluster of several positive and negative lynchets has been mapped in the most northern part of the mapped area close to the small stream. These are traces of cultivation by the grandfather of the three older brothers who now live in the upper part of the mapped ridge. As is indicated on the land use maps, the area was probably cultivated during the early twentieth century, or around the turn of the century. Secondly, there are some physical structures, marked as lynchets and an earthen bank, to the east of the group of houses in the central area of the map. The origins of these structures are uncertain, but they may at least partially be the remains of cultivation. Lastly, a positive lynchet and a few clearance cairns have been mapped in the grazing area west of the middle group of houses. As is shown in the land use maps, this area was cultivated in the mid-twentieth century. In fact, at that time a person who did not live on the mapped ridge cultivated the field. Later, however, this particular field was borrowed by one of the three older brothers living on the upper part of the ridge, and is now used as a common grazing area. This is mainly used by one of his sons and his younger brother who also live close to the field. Taken together, these physical traces of cultivation in the present-day grazing land reveal that nearly all parts of the mapped area have been brought under cultivation, even if only for a short period of time.
Figure 2.20. Estimated land use changes (pre-1900 to 1960), based on oral history.
Figure 2.21. Estimated land use changes (1961 to 1998), based on oral history.
The most conspicuous change that we can trace from this sequence of maps is that the amount of arable land has increased in the area over the last century. This suggests that cultivation of crops has become increasingly important during the time period, while livestock production has diminished in economic importance. This is a process that has been occurring generally in the Iraqw’ar Da/aw area.²⁴⁰

Looking at the land use changes in more detail we see that there was an increase in cultivated land from c. 1900 to the period 1920–1940, while there was little change between the 1920–1940 and the 1940–1960 periods. This pattern of change was anticipated when set in the context of the large scale out-migration from Iraqw’ar Da/aw between the 1940s and 1960s. It is notable, however, that cultivated land expanded during the early decades of the twentieth century, at the same time as the process of out-migration from Iraqw’ar Da/aw was gathering pace. This was a time-period when population numbers in Tanzania started to increase more rapidly after a long period of slow growth or even decline from at least the mid-nineteenth century.²⁴¹ Hence, the increase in cultivated land in Iraqw’ar Da/aw and the expansion of Iraqw settlement outside Iraqw’ar Da/aw probably reflect a situation where population growth and settlement expansion occurred both inside and outside Iraqw’ar Da/aw. That little, if any, expansion of cultivation appears to have taken place in the 1940–1960 period, suggests that out-migration from the mapped area had by then grown in momentum. Judging from the maps, it was not until the 1970s and 1980s that a more rapid expansion of cultivated land had occurred. During the 1990s, however, there were no significant changes in land use, except that more land has been put under fallow in the latter half of the decade (see Figure 2.22).

Lastly, if we consider the relief of the landscape in the mapped area (see Figure 2.5 and Figures 2.20 and 2.21), it is apparent that the expansion of cultivated land has followed the slope downwards. A large part of the upper valley bottom, i.e. the southern part, was drained and cultivated already at the beginning of the twentieth century, but it was not until the latter half of the century that cultivation on the lower (northern) part of the ridge and the lower (northern) valley bottom had become well established. As is shown in the next section on settlement change, this expansion of cultivation on the lower parts of the ridge is related to the establishment of two new homesteads.

²⁴⁰ See further chapters three and four below.
²⁴¹ Koponen 1996.
Settlement change

Houses in the Iraqw’ar Da/aw area are built on horizontally levelled platforms that are dug out in the slopes. In the detailed mapped area the houses are located along the crest of the ridge. In the landscape there are also physical remains of former house sites, which have been abandoned due to out-migration, the villagisation campaign, illness or death. Some of the abandoned house sites have been brought under cultivation, which has removed most or all of the physical structure of the former house platform. However, through interviews some of these now indiscernible house sites have also been located, discussed and marked on the detailed map. New houses are not usually built on old house sites, which means that the settlement history lies relatively well preserved in the landscape.\(^{242}\) Further, in a number of cases abandoned house sites have been planted with tobacco in order to make use of the nutrients that remain in the soil on the former house platforms.

As most abandoned house sites are associated with memories and stories about the persons who had once inhabited them, these physical remains and

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\(^{242}\) One reason for this is probably that it during the twentieth century has become common to bury those who lived in a house on their house platform (Lawi 1999, pp. 81–83). In those cases when an abandonment of a house is associated with illness it is also regarded to be connected with bad fortune to settle on the same site.
sites in the landscape are important fix-points in the local settlement history. Most of these abandoned house sites are clustered close to the highest point on the ridge in the mapped area, suggesting that this is where many of the previous farmsteads had been located and that the farmsteads lower down along the ridge are more recently established. In this section I will discuss the history of this settlement pattern, based on the detailed participatory mapping and the oral histories that I have collected in association with houses and abandoned house sites.

Figure 2.23. Settlement change (pre-1920 to 1960), based on oral history (the colour of the house symbols indicates different families, while the shape of the symbols indicates different types of houses).
About the maps and the settlement data
Figures 2.23 and 2.24 present the data that I have gleaned from interviews conducted in association with the detailed participatory mapping of the ridge. The data is grouped into the same set of time periods as I have used for presenting land use changes above. The land use data is reproduced as a background in the map, which makes comparisons possible as well as providing points of reference in the maps.243

243 Data on land use and settlement change have been collected separately. In a couple of cases houses appear to be located in cultivated fields, which of course they were not. The reason for this mismatch is that the sizes and shapes of the mapped fields reflect the situation in the late 1990s, which means that for earlier time periods they represent the approximate location and size for different land use categories.
The sequence of maps showing settlement change starts with a diffuse period beginning sometime around the late nineteenth century and lasting until 1920. As with the land use data, the settlement data presented in these maps contain uncertainties, particularly for the earlier time periods. The oral accounts about past settlement have mainly been collected independently from different persons, and most deserted house sites have been discussed with more than one person.\textsuperscript{244} In a few cases I encountered very different stories about the same house site, but as the data has been generalised into the maps in Figures 2.23 and 2.24, these inconsistencies have largely become redundant. In some cases, different statements did not provide a clear picture about exactly which house site a certain person or family had lived in.\textsuperscript{245} In other cases there was uncertainty in specifying when a certain homestead had been established or abandoned. However, the approximations inherent in the rather rough time-periods used has also reduced the effects of temporal uncertainties to some extent. The main problem with the data on settlement change is the lack of information for a number of abandoned house sites that are physically present in the landscape, but which I never enquired about or was able to get any information on. It should also be noted that interviews on settlement history have primarily been made with male informants, who in turn have referred to deserted house sites mainly in terms of the men who lived there.

The colour coding in the maps represent different families.\textsuperscript{246} As is shown in the map, no members of the M-family (green symbols) or E-family (yellow symbols) have lived in the mapped area during the last two decades. The information about land use and settlement history in the mapped area is based on interviews with those who today live in the mapped area. This means that no historical accounts from representatives of the M- and E-families are included in the reconstruction of this local settlement history.\textsuperscript{247} Interviews with members of these families would have provided important additional information, both on settlement and land use during the first half of the twentieth century. The land use data for the early part of the twentieth century is thus almost entirely provided by members of the A-family.\textsuperscript{248} In the map of

\textsuperscript{244} Only on one occasion was small group of men engaged in a discussion about the history of the deserted house sites on the top of the ridge.

\textsuperscript{245} In those cases I have noted the site that I believed to be most likely in the map.

\textsuperscript{246} The term family is used to refer to what has been expressed to me as close kin relations (e.g. children, parents, siblings). I use the term household for the person or persons who live in the same house. The terms farmstead or homestead is used for the location of a house or a group of houses that lie grouped together or on the same house platform.

\textsuperscript{247} Only on one occasion was a knowledgeable elder (a man) not living in the immediate neighbourhood, and belonging to a different clan, asked to come to the mapped area and discuss the history of deserted house sites.

\textsuperscript{248} It should be noted, however, that in the early decades of the twentieth century and late nineteenth century, members of the A-family lived less than 100 metres to the east of the mapped area, on an adjacent ridge, and that much of the land in the mapped area at this time was used by the A-family. Since the 1970s most members of this family have lived in the mapped area except for one household which still lives on the adjacent ridge.
the earliest time period (–1920) the occupants of the houses have not been identified (white symbols), except for one household of the M-family. This means that making direct comparisons of settlement patterns and land use in the maps for the early twentieth century is problematic, even if the distribution of fields and the location of houses appears to match relatively well. Furthermore, those house sites where the occupants remain unidentified have not been included in Figures 2.23 and 2.24 (see Figure 2.25).

In the map sequence I have indicated the first house to which a person, couple or family moved, with a black dot i.e. after leaving the parental house and farmstead, thus indicating when a new farm, or household was established on the ridge. Houses that appear in new locations on the maps, but which are not marked with a dot, represent a shift of house and the location of a farmstead by one of the households present on the ridge.

The house-symbols also depict different types of houses, even if information on house types is incomplete for the period prior to 1975. The most recently built house (denoted by a dot in the map for the 1996–1998 period) has a corrugated iron sheet roof. All other houses have or formerly had thatched roofs, except for the few no longer standing tembe houses (see below). The relation between different types of houses in the mapped area is fairly representative for the general situation in Iraqw'ar Da/aw, i.e. the majority of houses in the area are rectangular with thatched roofs.

Figure 2.25. Abandoned house sites (1996–1998).

Figure 2.25 shows the abandoned house sites that have been mapped and discussed with the local inhabitants. The map differentiates between house sites that are represented by a physical form in the landscape and those that are not visible or difficult to distinguish as abandoned house sites. The latter category therefore relies exclusively on inhabitants knowledge. Abandoned house sites about which I have no information, but which are present as
physical forms in the landscape, are also shown in the map in order to indicate the total number of house sites documented in relation to those that I have discussed in interviews. Lastly, the map indicates which house sites were also said to be gravesites. According to Lawi, the practice of burying people at the site of their houses became increasingly common in Iraqw’ar Da/aw during the twentieth century.249

In Figure 2.25 it is apparent that a concentration of deserted house sites is located in the upper part of the ridge, which testifies to a continuity of settlement at this place. What is notable with this site is that it is just at the top of the ridge. The highest point of the ridge is only a stone’s throw to the east of the main cluster of house sites. This particular ridge top is also slightly higher than the adjacent ridges. The name of this ridge top and its nearby surroundings, which appears to be of some age, is *Hhay Tlooma*, which refers to a hill (**tlooma** = hill) or a person with that name who has become associated with the area.250 Hence, this indicates that elevated points in the landscape have been preferred as settlement sites in the Iraqw’ar Da/aw area, and that people in the area have lived in clusters of houses on ridge tops, rather than in dispersed locations.251

**Changes in styles and construction of houses**

Despite the fact that the data is incomplete, it does indicate that round houses were more prevalent before the villagisation campaign in the mid-1970s. All the houses shown in the map for 1975–1990 are newly built rectangular houses. Thus, a major effect of the villagisation campaign was that people had to build new houses in slightly different locations. This, however did not have any significant impact on the farming system in the mapped area, as farmers were not separated from their fields, as they were in many other places in the country.252 In one case a round house has reappeared in the landscape. The reason for this given by the farmer living in the house was that he was dissatisfied with the rectangular house that he was forced to build during the villagisation campaign. Instead of repairing the rectangular house, which he regarded to be of inferior quality as compared to round houses, he thus built a new round house when villagisation policies were no longer enforced.

Another type of house that is not present at all on the ridge today is the *tembe*. This is a building that was partly dug into a slope and which had a flat

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250 The different place names and their meaning and origins in the Hhay Geay section of Kwermusl village were investigated by Naomi Mason, a graduate student in archaeology affiliated with the British Institute in Eastern Africa, during a couple of weeks fieldwork in November 1998 (Mason n.d.). Her fieldwork was carried out in cooperation with my own investigations.
251 Cf Lawi 1999.
252 The villagisation campaign was only partially implemented in Iraqw’ar Da/aw. In some parts the effects were quite dramatic, while other parts were much less affected (Lawi 1999, p. 333ff). See also Loiske 1995, and Liwenga 2003 for comparative examples.
earthen roof. What is interesting with the tembe houses is that they have been directly associated with the siege hypothesis, as they have been primarily interpreted as a defensive measure taken by the Iraqw in Iraqw’ar Da/aw against attacks by Maasai warriors and cattle raiders. However, when discussing the abandoned house sites that were specifically claimed to have been tembe buildings, informants associated these with stables or ancillary buildings such as kitchens, rather than houses.

Discussion
Both the H- and A-families have lived in or just adjacent to the mapped area since at least the late nineteenth century. The two brothers from the H-family who moved to the mapped area in around 1960 previously lived with their parents approximately 400 meters to the north-east of the mapped area, just across one of the main river valleys in Iraqw’ar Da/aw. Furthermore, and as has already been noted, members of the A-family lived on the ridge lying immediately to the east of the common grazing land in the north-eastern part of the mapped area during the late nineteenth and early twentieth centuries. The father of the three old brothers of the A-family whose houses are situated in the mapped area, moved from the adjacent ridge to the mapped area when he married (c. 1920). His house is represented as the first red house, a round house, in the series of maps in Figure 2.23. His father and grandfather, in turn, also lived on the adjacent ridge. The close relationship between the neighbouring H- and A-families is manifested in the common usage of the grazing land in the valley with the old tree (see Figure 2.3, and Figure 1.12 where this valley is depicted, looking towards the southeast, with the old tree in the background), as well as in the use of the tree itself. The history of the tree (a mango tree) is a bit unclear to me as I was told different stories about its origins. Some claimed that representatives of the two families planted it sometime in the early twentieth century, while one elderly man insisted that it merely grew there naturally. In any case, this valley appears to have a long history as a common grazing land, of which the mango tree is both a symbol and part of the common resources. Branches of the tree are cut regularly, and used as building material by the two families.

Returning to the sequence of maps in Figures 2.23 and 2.24, we can see that during the period 1990 to 1995 a number of new households were established on the ridge, as some of the younger adult men married or established their own separate households. This increased number of houses and households is also reflected in the expansion of cultivated land on the ridge. Looking at the earlier time periods, we see that several new households were established between 1920 and 1940, as well as during the two following

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253 Fosbrooke 1954. See also Lawi 1999 for a discussion about changes in house types in the area, and chapter four below for further comments on the history of tembe houses.
periods (1940 to 1960 and 1960 to 1975). Basically, the maps indicate a sequence of three generations that started with the people who established new households in the area between 1920 and 1940. The next, and middle, generation of households is represented by the two following periods (1940 to 1960 and 1960 to 1975), and the last generation by the households established after 1990.

Of the men from the middle generation who established households in the mapped area, approximately half of them later moved out to settle in areas outside Iraqw’ar Da/aw (as indicated by the arrows). Indeed, all of the men who established households in the area during the 1940 to 1960 period moved away, while those who established households in the later period (1960 to 1975) have stayed or returned after a period of wage labour. Of the men from the middle generation who established households in the mapped area, approximately half of them later moved out to settle in areas outside Iraqw’ar Da/aw (as indicated by the arrows). Indeed, all of the men who established households in the area during the 1940 to 1960 period moved away, while those who established households in the later period (1960 to 1975) have stayed or returned after a period of wage labour. 254 From 1975 onwards, the houses and households that were established in the area have remained in place during the remainder of the study period (i.e. at least until 1998).

The most important conclusion that the data on land use and settlement allows us to make is that there were fewer people and less pressure on land resources during the early decades of the twentieth century than was the case towards the end of the century. In most cases this would seem to be something of a trivial statement, but in the light of the siege hypothesis, which suggests a much higher density of population and level of agricultural intensity during the latter half of the nineteenth century in the Iraqw’ar Da/aw area than seems to have been the case in the early twentieth century, it becomes a quite challenging finding.

Many of the older farmers that I have talked to, both in the mapped area and from other parts of Iraqw’ar Da/aw, claim that there were indeed more people living in the area in past times, i.e. during the late nineteenth and early twentieth centuries. Hence, oral history that addresses Iraqw’ar Da/aw settlement history in general as well as the historiographies of foreigners both tell a quite different story than that which has come out of the local and specific settlement history discussed above. However, as will be discussed further in chapters four and five, Iraqw oral history and tradition also contains much evidence to support a critique of the siege hypothesis.

The sequence of maps presented above illustrates a process of increasing settlement density and land use intensity, as well as an expansion of settlement to the lower parts of the ridge. These changes have also been paralleled by a process of out-migration, especially during the mid-twentieth century, that counteracted agricultural and population growth in the area for a few decades. The maps show that it was mainly members of the M-family who moved out, while members of the A- and H-families stayed. We may thus ask what

254 The maps do not account for those women and men who left the parental farm to settle outside the mapped area.
happened to the land that belonged to the M- and E-families who moved away from the area?

**Negotiating land rights**

The process of expansion of Iraqw settlement in the Mbulu Highlands, including the out-migration from the Iraqw’ar Da/aw area during the mid-twentieth century, has been analysed and commented upon in a number of studies.\(^{255}\) The effects of this expansion and out-migration on the local farming system in Iraqw’ar Da/aw have, however, not as yet been analysed in any detail.

One thing that has been noted is the persistence of the intensive farming system in the face of settlement expansion, and the rapid growth of more commercially oriented agricultural production in present day Mbulu, Karatu, Hanang and Babati districts. Clearly, out-migration may pose a threat to sustaining labour intensive farming practices, but as the preceding analysis has shown, the levels of land use intensity never seem to have declined during the century.

The land that was vacated as a result of out-migration was, in many cases, a valuable resource for those farmers who remained in Iraqw’ar Da/aw. An interesting question to pursue is thus what happened with the land belonging to farmers who moved away from the area.

**Comments on local rights to land, inheritance and fragmentation**

Rights to land in the Iraqw’ar Da/aw area are generally customary rights. In the mapped area three basic types of rights to land were observed.

1) **Individual (or family):** land that is held by the head of a household or family (usually a man) and used by the family or household members.
2) **Common property:** land that is shared between households and families as a common property.
3) **Borrowed land:** land that is borrowed from the person who has the formal rights to the land. A special case concerns land that is lent between members of the same family (e.g. from father to son), usually implying that the son will eventually inherit the land.

\(^{255}\) E.g. studies by Loiske 1995; Raikes 1975; Hagborg 2001 and Rekdal 1999.
As has been observed, land is as a rule inherited by the sons of the parental farm. Thornton noted that the youngest sons usually remain closest to the parents in their old age, and that if there is an inheritance system in the area it is one of “ultimogenitor-by-default”. Winter, in turn, observed that the parental farm “in theory” is inherited by all the sons, usually when their father is still alive. In the mapped area, two or more sons have inherited land during the last two generational shifts.

Farmers in the mapped area have a major part of their land close to their houses, and most of the fields are clustered together in blocks of land belonging to the same household or family. Thus land holdings belonging to farms in the mapped area are not especially fragmented. However, during the last two generations a marked sub-division of the land among an increasing number of land holders has occurred in the mapped area. (see Figure 2.26 A)

**Whose right? Histories of borrowed land**

When I interviewed farmers about land rights I was informed in a number of cases that some of the land that they were cultivating did not belong to them but was instead held on loan (see Figure 2.26 B). Several of these loans had

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256 Thornton 1980 pp. 7; Winter 1968, p. 26; and Snyder 1993, pp. 64–65.

257 Similarly, Loiske has observed that nearly all of his informants in Iraqw’ar Da/aw borrowed land from relatives or neighbours, in order to get access to more land (Loiske, n.d.). Winter has also described the common practice of borrowing land in the Iraqw’ar Da/aw area (1968, pp. 25–28). In my case the Iraqw term used during interviews was *firoo*. In a quoted interview in Lawi 1999 (p. 353), *firoo* is translated as “grant”, while the Iraqw term used for borrowing is *kirkimee*. The exact meaning and difference between these terms is unclear to me. However, the cases of land loans that
actually been inherited and were accordingly more than a generation old, i.e. they had been negotiated by the father or grandfather of the person who was now cultivating the land. In most cases the reason for making agreements about borrowing land was that the land owner had moved out from the area. In a study on mechanised commercial wheat production among the Iraqw in their northern expansion areas (present day Karatu District), Philip Raikes comments that the practice of lending out land has been an important factor in facilitating out-migration from the Iraqw’ar Da’aw area, as those who moved out could maintain land in Iraqw’ar Da’aw as a security measure. Whilst I judge this to be a correct observation, the specific effects of this practice on the local farming system in Iraqw’ar Da’aw also need to be addressed. If the vacated land had mostly been left idle, e.g. retained as security by absent land owners in case they wished to move back, the farmers remaining in Iraqw’ar Da’aw would most certainly have faced a problematic situation.

It has been debated whether informal rights to land such as borrowing constitute a hindrance to intensification and sustainable land use. Given the fact that farming in the homeland is characterised by high labour inputs, conscientious measures to conserve soil fertility, and an incremental build up of landesque capital, it is worth particular consideration that a sizeable proportion of the cultivated area is held on loan.

Another argument that has been ventured is that borrowing land can be an efficient means of redistributing land within a local community, while also providing security of tenure for farmers. Loans in Iraqw’ar Da’aw can be negotiated on the bases of different kinds of agreements, e.g. as temporary loans of a specified duration or as loans with no specified duration. It is common for loans to start with a fixed period, usually three years of cultivation, and if the loan is to continue, it has to be renegotiated, either for a second fixed period or for an indefinite period.

Regarding the borrowed land that I have investigated, it turned out that the parties who had originally negotiated agreements had in many cases long been dead and that loans had been transferred by inheritance to sons or grandsons. Indeed, all the borrowers agreed that even the grandchildren of original landholders could come and claim their land back at any time. This in turn testifies to the high level of tenure security associated with the customary property rights in the area.

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261 See also Hagborg (2001, pp. 66–67), and Winter (1968) for a discussion on permanent and temporary transfers of rights to land (loans), and other aspects of land loans among the Iraqw.
In the 1950s, during the British colonial period, the anthropologist Edward Winter commented upon a suggestion that the Native Authority should prohibit the lending of land:

… the practice of lending land gives great flexibility to the system, permitting a family whose needs are expanding to obtain land from families whose needs are contracting or remaining static. The prohibition of land lending … could easily lead to a much less effective pattern of land utilisation and to certain land standing idle (Winter 1968 [1955], p. 28).

Thus, through loans, productive land is kept under cultivation, while at the same time it serves as a security for those who have moved away. According to Winter, a negative aspect of the practice of borrowing land is the resulting fragmentation of land holdings, although he notes the positive effects of having a diversified production.264 However, considering that land loans appear to be mainly settled between neighbours or former neighbours whose land holdings are adjacent or at least in relative proximity to each other, fragmentation does not seem to be a serious threat to the farming system.265 As was mentioned above, land holdings in the mapped area are not strongly fragmented, even if processes of fragmentation are present. Indeed, as the practice of borrowing land redistributes resources between farms and families, it may in fact also counteract fragmentation to some extent, for example by adding land to a farm that would otherwise risk being subdivided through inheritance.

From the discussion above we can conclude that even if the recognition of the original landholders rights to the land is preserved over generations, because the loan is inherited, it does not necessarily imply an undisputed right to the land by a distant heir to the lender.266 In those cases where long-term loans are not disputed, the continued cultivation of the land by the borrowing families acts to augment and manifest their rights to the land. Thus, a long-term loan that has been inherited over a number of generations does in practice acquire a status that gradually assumes more parity with that of a customary right, even if the memory of the lender is kept alive through generations. This tendency was also noted by Winter in the 1950s.

When a man moves to another area and dies, his sons in their turn have the right to return to the original holding. In theory these rights go on through the generations forever, but in fact they are extinguished relatively quickly, since grandsons seldom know the precise location of their grandfathers’ holdings. In this way of course people whose holdings were originally obtained on a loan basis convert these claims to the status of original rights, since the

265 Farmers in the mapped area were primarily interested in borrowing land close to their own farms.
land is theirs unless someone else can prove that the land they are occupying was in fact lent to their ancestors by his forebear.\footnote{Winter 1968 [1955], p. 26.}

Hence, not only have farmers been able to access land through temporary rights, but rights to land have in this way also been redistributed on a more permanent basis.

**Recent changes**

In recent times, with the rise of a modern system of government, new means for claiming land have followed, which in turn have complicated the land tenure situation, as well as giving rise to an increased amount of land disputes.\footnote{Lawi 1999, pp. 352–354; Snyder 1993, pp. 91–95; Snyder 1996; Lyimo and Liwenga 1996. See also Hagborg 2001.} No cases of land disputes between borrower and lender, or for other reasons, have however been observed in the mapped area.

While I was discussing land tenure issues with one of the elderly men living in the mapped area, he said that even though he had heard a rumour that it was now possible to claim permanent rights to any field he had cultivated for more than ten years, he would still respect the lenders rights to the land he had borrowed, including loans that his father had originally negotiated.\footnote{As Hagborg has noted, farmers in Karatu District, north of Mbulu District, also claim that a person who has cultivated a piece of land for more than ten years now has the possibility of attaining permanent rights to the land from the village council. According to Hagborg’s informants, this has been possible since the 1980s, and is one of the two main factors behind land disputes in Karatu. The other main reason for land disputes, they claim, is the redistribution of land rights that were made during the villagisation campaign (Hagborg 2001, p. 68).} However, a contrasting reality was voiced during interviews with a few of the younger farmers living in the mapped area. They claimed that small payments to the landholder have usually accompanied land loans, e.g. as a share of the harvest, and that cash payments in more recent times have paved the way for a system based more on renting land.\footnote{According to Winter’s observations in the 1950s, temporary loans were usually not associated with payments, as was the case with permanent transfers of land (Winter 1968, p.25).}

To sum up this discussion on the transference of land rights, we note that the stable but slow population increase, as indicated by the settlement and land use history in the mapped area, combined with the out-migration since the 1930s, created a need for a redistribution of land rights. The practice of borrowing land can be seen as an answer to this need, and it has acted as an effective means of balancing supply and demand for land in the Iraqw’ar Da/aw area. Hence, the practice of borrowing land has not only been a means of facilitating out-migration, as noted by Raikes, but it has also been important in sustaining the labour intensive agricultural production in the area. In many cases loans have been sustained over generations and thus turned into more permanent transfers of rights to land. Over time, loans have thus acted as a
means for redistributing customary rights to land which have been abandoned as a consequence of out-migration.
3 Land use and settlement pattern in 1958 and 1988

On the basis of the empirical data discussed in chapter two, it has been suggested that population numbers and areas of cultivation expanded in the Iraqw’ar Da/aw area during the course of the twentieth century. It was also shown that this growth slowed during the middle of the century due to out-migration from the area. Provided that population density and agricultural intensity did not decrease in the area during the latter half of the nineteenth century, this observation implies that population numbers and agricultural intensity in the mid- and late nineteenth century were more or less equal to, or less than in the early twentieth century. Hence, in order to sustain the siege hypothesis a significant decline in population numbers and land use intensity during the late nineteenth century must have occurred.

This chapter has two main purposes. The first is to corroborate the landscape history analysis performed through the detailed participatory landscape mapping described above. The second is to place this within a larger geographical frame of analysis in order to make more general estimates of the landscape changes that have occurred in the Iraqw’ar Da/aw area during the second half of the twentieth century.

3.1 Starting points

In this chapter land use in 1958 and 1988 will be compared based on interpretation of black and white aerial photographs. The area that is analysed is c. 1540 x 1700 m (i.e. c. 2,6 square km) which covers about 1,4% of the total Iraqw’ar Da/aw area. It is centred on the ridge discussed in the previous chapter.271

271 The size of this area is roughly based on the area covered in stereographic vision in one pair of aerial photographs from 1988. For this area I have also acquired an orthophotograph, based on the same pair of aerial photographs. In delimiting the area I have sought to make it a reasonably representative sample of the Iraqw’ar Da/aw area by including different types of land use categories, i.e. a major river valley, peripheral extensive grazing land and intensively cultivated areas close to Kwermusl village centre.
The land use in 1958 and 1988 captures the situation well before and after the villagisation campaign of 1974. The pattern of land use in 1958 shows the situation at the end of the British rule and thus the effects of British colonial policies, such as afforestation, and campaigns aimed at de-stocking and promoting valley bottom cultivation. Another major factor that needs to be considered is the strong out-migration from Iraqw’ar Da/aw during the 1940s and 1950s. The picture from 1958 captures the situation after at least a couple of decades of strong out-migration and a stagnating population in the area. In effect, this means that aside from the effects of British campaigns for agricultural modernisation, there is little reason to expect significant changes in land use during the 1940s and 1950s due to the relatively stable population numbers.

Thirty years later in 1988, more than 10 years after the villagisation campaign, the landscape is basically the same as that of the late 1990s when I carried out my fieldwork. On the whole, there appears to be little difference in land use and agricultural practices in 1988 and in the late 1990s, at least in comparison to the changes that took place between 1958 and 1988.

3.2 The aerial photographs

I have obtained aerial photographs from 1958, 1982, 1988, 1989 and 1990. All are in black and white, but they are of varying quality and depict the landscape at different scales. The photographs from 1988 were obtained first and used to produce an orthophotograph based on a stereo-pair which included the studied ridge. As there is little difference between the aerial photographs from 1988, 1989 and 1990 in terms of either quality, scale or content, there was no evident reason to include the photographs taken after 1988 in the analysis.

The 1988 (and later) aerial photographs are by far the most detailed. For the 1988 photographs the scale is 1:20,000 and objects down to a single square meter can be observed (e.g. small sheds and cattle) when enhanced and studied in an advanced stereoscope. The series of aerial photos from 1982 are of a much smaller scale and are thus less detailed (c. 1:60,000). On these

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273 See Lawi 1999, for a detailed discussion on British colonial policies in relation to agriculture and environment in Iraqw’ar Da/aw.
274 As noted above, the effects of the villagisation campaign varied substantially between different areas of Iraqw’ar Da/aw. Furthermore, as Lawi notes, in those areas that were most heavily affected by the campaign, people were allowed to move back to their old settlement sites in 1981, i.e. just a few years after they had been forced to move in accordance with the villagisation policy (1999, p. 334). Hence, the aerial photographs from 1988 do not capture the immediate effects of the villagisation campaign.
275 My intention was to cover the whole of the Iraqw’ar Da/aw area for as many years as possible.
276 Aerial photographs have been bought from the Surveys and Mapping Division, Ministry of Lands in Dar es Salaam and from a commercial company, PhotoMap, in Nairobi.
photographs individual houses and cultivated fields can be identified, but they can not be interpreted with the same degree of accuracy or reliability as those from 1988. Because of their much smaller scale, the photographs from 1982 have also been excluded from the analysis. Lastly, the 1958 aerial photographs are at a scale of (c. 1: 40,000). These are not as sharp and are of much lower quality than the other series of photographs, but houses, individual fields and broad land use categories (e.g. grazing, trees, bush, cultivated fields) are for the most part visible. The main quality of these photographs is obviously their value as historical documents.

All of the photographs have been briefly studied, and all those which cover the studied ridge have been studied in detail and used to corroborate oral data. I have also used enlargements of the orthophotograph, based on the aerial photographs from 1988, as a reference map during fieldwork.

In this chapter two pairs of aerial photographs from February 1958 and one pair from February 1988 are analysed.

3.3 The interpretation

The interpretation of the aerial photographs has been carried out in three steps. The first step involved the use of an advanced stereoscope (Wild Aviopret), which allows the landscape to be studied in stereoscopic vision (i.e. as a 3D image) by using a pair of overlapping photographs. In this type of stereoscope the photographs can be magnified up to fifteen times. This has been important in this case because some of the mapped structures (e.g. small fields and houses) are otherwise hardly distinguishable. The interpretation was drawn with coloured marking pens on a transparent plastic film overlaid on an enlarged copy of the orthophotograph for the 1988 aerial photographs and on an enlarged copy of an aerial photograph from 1958. As soon as a structure was identified in the stereoscope, the same structure was identified and drawn on the enlarged copy of the aerial photograph (or orthophotograph).

When the manually drawn interpretation was completed it was digitised, and the 1958 aerial photograph was rectified according to the 1988 orthophotograph, using Idrisi (a raster based GIS). It was rectified with some difficulty but with a reasonably good result. The digitisation was carried out

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277 The photographs that I was able to get hold of from 1958 were reproduced from old prints (i.e. not from negatives), which is one reason why the quality of these photographs was not the best possible.

278 These are: Mbulu District (J877), 1:20,000, February 1988, Film no. 6, Run 31, photographs No. 5885 and 5886; and 35TN14, February 1958, 25,000ft. A.S.L., photographs no. 048, 049, 115, and 116.

279 Although, this method may sound a bit cumbersome, it was in fact quite effective. It was also relaxing for the eyes to get short but frequent interruptions from the stereoscopic viewing.

280 In some parts of the rectified photograph the error may be up to 20 metres or perhaps even more, but the overall error is less. In order to avoid a bias from this error I have not presented figures from the overlay analysis that was made in Idrisi, and only present the data as separate images of the interpretation of 1958 and 1988 respectively.
manually in MapInfo (a vector based GIS). Analytically, the digitisation provided the opportunity for a second take on both the landscape and the interpretation, and thus a chance to reconsider the first interpretation. In those cases where I felt uncertain about how to class a certain object or pattern in the picture I saved these dilemmas for a last look in the stereoscope.

Three general classes of land use were mapped: cultivated fields, stands of trees and reeds. The cultivated fields were in turn separated into three classes: valley cultivation, upper-valley cultivation and slope cultivation. Areas of cultivation on the crests of ridges (*dindirmo* in local terminology) were mapped as slope cultivation in order to simplify the process of interpretation. Basically, with the exception of the fields identified as upper-valley cultivation the main distinction made between different types of cultivated fields is between dry and wet fields, i.e. between fields that can (valley cultivation) and can not (slope cultivation) support crop growth throughout the dry season. The fields classed as upper-valley cultivation are fields that are more or less horizontal, like the valley bottom fields, but situated higher up in the terrain.

The remaining land has been classed as grazing land, based on the assumption that most of the land that is not cultivated or covered with trees is used for grazing. This residual category is of course very heterogeneous and includes patches of land covered with ferns and bush vegetation that are of little or no significant value as grazing land, as well as managed and intensively used grazing areas. It would have been interesting to differentiate between intensively and extensively used grazing land, but this has not been possible because of the poor quality of the 1958 aerial photograph.

Apart from land use, houses, the main road and a river have been mapped. These features obviously provide an important context to the land use data. Furthermore, the number of houses also gives an indication of the extent of settlement and the density of population in the area.

As was noted above, my interpretation is neither free from uncertainties nor errors. The main problem here is whether I have made a correct interpretation of the aerial photographs or not. This is a type of error that can not be confidently measured, but it can be discussed and evaluations can be made concerning whether this is likely to have a critical impact on the result or not. As I mentioned above, the interpretation was conducted in three steps and incorporated a number of different interpretation techniques. This helped to avoid some unnecessary mistakes, and provided the possibility to rethink previous classifications.\(^{281}\) After the second step in the interpretation process, i.e. the digitisation of the manually drawn interpretations, a cross-tabulation was made in Idrisi whereby the changes between 1958 and 1988 were calculated for all possible combination of classes. When plotting the results of

\(^{281}\) There is no guarantee that this results in a more correct interpretation. It only means that a little more work and thought has been put into the interpretation of the photographs.
this cross-tabulation a few obvious mistakes and some uncertainties in the interpretation were revealed and double-checked in the stereoscope. While this cross-tabulation helped to detect mistakes and provide some confidence in the classification of land use, the interpretation of houses could not be checked in a similar way.

The main uncertainty in the interpretation derives from the poor quality of the 1958 photographs. In most cases cultivated fields, houses and the other classes were clearly distinguishable in the stereoscope, but in many cases the identification of land use and houses was relatively uncertain. Hence, in the following analysis of the results of the aerial photograph interpretation, I am cautious about making detailed statements about the land use and settlement changes that have occurred, and focus instead on the dominant patterns of change.

Before the resulting maps are discussed, a few remarks on the land use classification should also be made. It is often easy to see where cultivation has taken place, but it can be difficult to discern whether certain fields are under fallow or under cultivation. All open land that shows signs of relatively recent cultivation has been classed as cultivated land. Thus, the cultivated land shown in the maps below also includes land that was under fallow when the photograph was taken. However, I have tried to distinguish the short-term fallows from fields that have not been cultivated for several years or those that have been abandoned. Although, this change is gradual and may look different from field to field, the intention has been to include cultivated and recently cultivated fields in the classes of cultivated land.
Figure 3.1. Land use in 1958. The detailed mapped area is outlined in the centre of the figure.
Figure 3.2. Land use in 1988.

Figure 3.3. Diagrammatic representation of land use in 1958 and 1988.
3.4 Analysis and results

Looking at the two maps (Figures 3.1 and 3.2) and the pie diagrams (Figure 3.3) above it immediately becomes clear that land use is more intensive in 1988 than in 1958. There are more houses, cultivated fields and trees in 1988, which suggests a higher population density. The landscape in 1958 is open and dominated by grazing land, indicating that livestock herding was an important part of the local economy. In 1988 grazing land is still the dominant land use category, but taken together all other types of land use have increased in extent and cover nearly half of the interpreted area. Patches of reeds are present in both 1958 and 1988, although some stands of reeds have grown and others diminished in extent. Considering the uncertainty in mapping reed vegetation in the photographs it is perhaps sufficient to observe that no drastic changes in the total amount of reeds grown in valley bottoms appear to have taken place. Taking into account the increased pressure on the valley bottom land in the latter half of the twentieth century, this limited change is of note but can not be considered surprising as the need for roof thatch has also increased.\footnote{There are a number of major and smaller reserves of roofing reeds in the area that have been regulated by local authorities. In recent years these reserves have also become protected through village by-laws (see Lawi 1999 for a discussion about the history and regulation of such reserves).}

The detailed mapped area discussed in the previous chapter is marked in the maps. North of the detailed mapped area lies one of the main river valleys that meanders through this part of Iraqw’ar Da’aw, from Nou forest reserve to the escarpment edge, where the river cascades down. Following the road heading west, in the lower left corner of the maps, it is a ten minutes walk to the centre of Kwermusl village where the church, primary school, mill and shops are located.\footnote{See the 1: 50,000 topographical map of Tanzania, sheet 69/3 for further geographical reference.} In the lower right corner the maps extend beyond the main settled parts of Iraqw’ar Da’aw where extensive grazing lands dominated by ferns and bracken stretch out towards the escarpment edge, forests and the higher hills on the periphery of the Iraqw’ar Da’aw area. Both the detailed mapped area and the larger area used for the aerial photograph interpretation discussed in this chapter thus lie within, but on the edge, of the main settled area.

Land use changes

The maps below (Figures 3.4 and 3.5) show that the increase in cultivation has mainly occurred in connection with previously cultivated fields. In total the increase in cultivated land is about 80\% from 1958 to 1988, but as shown in Figure 3.3, slope cultivation shows a larger increase than valley bottom fields. This suggests that valley bottom cultivation may not have become relatively more important during this 30 year period, which has been proposed by Snyder (1996). She argues that a dominant process in recent decades has been an abandonment of intensive farming practices, in particular related to
cultivation on the slopes in the area, in the face of more tree planting (on slopes) and increased cultivation of valley bottoms. As she observed, this change occurred despite availability of labour, mainly due to changing attitudes towards farming and access to resources outside Iraqw’ar Da/aw through exchange networks and commercial opportunities.

Figure 3.4. Slope cultivation in 1958 and 1988.

Figure 3.5. Valley-bottom cultivation in 1958 and 1988. Upper-valley fields are marked in grey.

What the aerial photograph interpretation presented here suggests is instead that grazing land has decreased at the expense of both increased tree cover and slope cultivation. Further, the relatively low increase in valley bottom cultivation may well be a result of the higher pressure on valley bottom land, as this is a particularly valuable resource, not only for cultivation, but also for dry season grazing and reserves for reeds (i.e. roof thatch). There is no significant change in the amount or location of upper valley cultivation. The area with tree cover is more than twice as large in 1988 as it was in 1958, and it is mainly the same patches that were present in 1958 that have grown in size (see Figure 3.6).

The virtually treeless landscape of the late nineteenth and early twentieth centuries appear to have been related to the dominance of livestock production at that time. In any case, the expansion of trees and cultivation in the area during the twentieth century, coincided with a reduced importance of livestock production. The increase in tree cover, is thus part of a general shift from a mainly livestock based economy to one increasingly based on crop production.

Settlement change

Figure 3.7, below, shows that there are more houses in the area in 1988 than there were in 1958, which suggests an increase in population density. 71 houses were identified in the 1958 photograph and this number had grown to 126 in the 1988 photograph, i.e. an increase of 55 houses or roughly 80%. In the 1988 census the population of Kainam and Murray ward was estimated to 19,048 inhabitants and in the 1957 census to 17,800 inhabitants (see Table 4.1 below), which represents a 7% increase. Hence, the number of houses has increased at a much higher rate than population numbers during this 30-year period.

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285 See Lawi 1999; Snyder 1996, p. 16; and chapter four below.
period. Even if it is possible that I have made a low count of houses in the 1958 photographs, I find it unlikely that this uncertainty can account for the large difference between the increase in the number of houses and of people. I also find it unlikely that the area analysed on the bases of aerial photographs has had a very different settlement history compared to the Iraqw’ar Da’aw area as a whole. One important factor that may have contributed to this difference is the villagisation scheme from 1974. But it may also reflect changing preferences as well as increased living standards and means to build houses. For example, it has become more common in recent decades to build separate stables for animals. The building of separate houses for kitchen facilities, or investments in second homes by people living in urban areas may also be contributing factors. It may be possible, however, that the increasing number of houses also indicates that a more substantial growth in population has occurred than that recorded in the census counts referred to above.

Figure 3.7. Houses in 1958 and 1988.

According to the aerial photograph interpretation, both houses and cultivated land have increased at similar rates (roughly 80% for houses and 80% for cultivated land). Considering the hand-hoe based agriculture in the area it is likely that an increase in cultivated land is linked to an increase in population, rather than being a matter of technological change. However, the expansion of cultivated land since the 1950s is also related to a general shift from a more cattle and livestock based economy in favour of agriculture.

The extent to which my count of houses indicates a more significant population growth between 1958 and 1988 than that recorded in the census data is difficult to say, but the large difference between these estimates in relation to the considerable expansion of cultivation is worth noting. What is clear,
however, is that while land use intensity has increased substantially between 1958 and 1988, population numbers have not increased at the same rate.

Another observation we can make is that the location of houses on the crest of ridges is clearly seen in Figure 3.7, as the distribution of houses form a pattern of more or less linear clusters. What is particularly noticeable about the pattern is that it is basically the same for both years, suggesting that the villagisation campaign had little influence on the settlement pattern in this part of Iraqw’ar Da/aw (see comments in chapter two).286 Further, the increase in houses during the 30-year period is mainly contained within areas, i.e. on ridges, that were already settled in 1958.

Hence, what the aerial photograph interpretation of houses indicates is both an increase in the density of houses and an expansion of settlement in the area. This in turn coincides with a similar pattern of increase in cultivated land. While large areas of grazing land are still present in the area, the main change that has been noted in this chapter is that substantial areas of grazing land have been either planted with trees (including natural re-growth) or cultivated. This evidence in turn strengthens the conclusion drawn in chapter two above, that the land use intensity and population density have increased substantially during the twentieth century in the Iraqw’ar Da/aw area, and that grazing land was by far the most dominant land use in the early twentieth century. However, in order to examine the history of agricultural intensification and settlement change in the area during the nineteenth century and the early twentieth century, we need to expand the analysis both geographically and historically.

286 The impact of the villagisation campaign on settlement patterns varied between different parts of the country. One contrasting example can be found in Emma Liwenga’s study of the Mwumi area in central Tanzania, which documented a radically different settlement pattern before and after the villagisation campaign (Liwenga 2003, pp. 70–71). One reason for the continuity of this pattern in Iraqw’ar Da/aw is also the dissected topography of the landscape.
4 The regional context and colonial source material

In this last empirical chapter the geographical perspective is widened, from a focus on the individual and the local, to an analysis of the regional historical context. The analysis is primarily based on colonial literature, documents, maps, census data and landscape photographs and drawings, with a focus on the period from the late nineteenth century to the middle of the twentieth century.

4.1 Questioning the siege hypothesis

The landscape photographs published in reports from German scientific expeditions conducted in the late nineteenth and early twentieth centuries provide an unexpected picture of Iraqw agricultural and settlement history, as they do not display any major difference in land use intensity and settlement density inside and outside Iraqw’ar Da/aw. Similarly, when reading the landscape descriptions by the German scientists and later British colonial officials, I noted that some statements and observations did not fit with the established historiography of the area. This realisation caused me to question the historical narratives and the explanations given in the literature concerning the development of intensive agricultural practices in the area.

The extent of Iraqw settlement in the late nineteenth century

The identification of Iraqw’ar Da/aw as the homeland of the Iraqw can be traced to the expansion of Iraqw society mainly during the twentieth century, which gave rise to a division of Iraqw territory into homeland and expansion areas. Since the notion of a homeland is mainly related to twentieth century cultural and political representations of Iraqw history, it has little value for understanding nineteenth century Iraqw settlement dynamics.

The early historical source material indicates that in 1900 the Iraqw settlement in the Mbulu Highlands lay broadly to the south and east of where Mbulu Town now stands, including the site of the town itself (see map of the
Mbulu Highlands, Figure 1.5). Certainly, large parts of Iraqw settlement were located outside the Iraqw’ar Da/aw area at this time. Iraqw settlements may have been more concentrated earlier in the nineteenth century, but it is by no means certain that the Iraqw’ar Da/aw area ever constituted the limit of Iraqw settlement. Datoga and Maasai pastoralists dominated the rest of the Mbulu Highlands during the nineteenth century, and the Iraqw settlement was on the whole only a minor enclave of agro-pastoralists bordering the lands controlled by these two pastoral societies. This political geography is reflected in Iraqw oral tradition and history as well as in colonial historiography. In both colonial and Iraqw historical sources there is an emphasis on the threat and pressure exercised on Iraqw society by its pastoral neighbours, which in turn has led to the conclusion that coercive force was an effective barrier to Iraqw expansion. Confronted by this barrier, this view proposes that the Iraqw were essentially enclosed during the nineteenth century, and that they lacked the opportunity to expand until the power of the pastoralists was weakened and their territorial extent contracted at the end of that century. However, recent research concerning the Iraqw as well as a body of comparative studies demonstrate that East African pre-colonial societies depended on connectedness and versatility, and that hostilities between groups of people were usually intermittent and only partially disruptive.

Coercion or cohesion?

Iraqw’ar Da/aw lies between the two main caravan routes which linked Lake Victoria and the coast in the nineteenth century. These routes passed approximately 100 km to the south and north of Iraqw’ar Da/aw respectively. Although the transport and trade networks were more complex and wide-reaching than this, Iraqw’ar Da/aw appears to have been, if not isolated, then at least certainly situated on the margins of late pre-colonial economic development in Tanzania. Aside from connecting the East African interior more directly with a global economy, the long-distance caravan trade also carried new infectious diseases, slave-raiding and warfare. The livelihood insecurity and turmoil experienced in badly affected areas stimulated people to move towards more remote places. It may be assumed, therefore, that most of these calamities did not affect Iraqw’ar Da/aw in as direct a manner as was experienced in many other areas. In the 1920s Bagshawe noted that the Iraqw suffered from famine and smallpox prior to a

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289 Koponen 1988a, map 9, p. 82.
291 Koponen 1988b.
period of settlement expansion, which suggests that disease and hardship were not absent in Iraqw’ar Da’aw in the late nineteenth century. Overall, however, it is likely that the Iraqw’ar Da’aw area was a place where people sought refuge at this time. There is also a belief among the Iraqw that the slave trade was successfully kept at a distance by means of ritual power.

The troubles of the late nineteenth century intensified with the spread of the Rinderpest epidemic in the early 1890s. Waller (1988) describes the effects of this and other epidemics that struck the Maasai communities in Kenya and Tanzania during this time. In 1891 the Rinderpest reached southern Maasailand in northern Tanzania, and by the end of the year most of the Maasai cattle had died. The immediate response among the Maasai was to raid neighbouring societies for cattle, but as Waller notes, due to the unprecedented severity of the disaster these raids also initiated a wave of violence.

There were fewer cattle available and more societies were affected. Raids grew more violent and the Maasai in turn were attacked by others. ... Some Maasai left to find food and shelter among agricultural communities, while others hung on the plains. Inevitably, the struggle for survival turned inwards. ... Open warfare broke out within Maasailand as stronger sections preyed on the weaker. It was not the epidemics in themselves which struck hardest at the Maasai but the period of civil war and turmoil which followed....

Waller does not explicitly mention the Iraqw, but it is likely that Maasai refugees would have also migrated to the Mbulu Highlands, as it lay just at the border of late nineteenth century Maasai territory. When the Maasai society gathered strength again, after some years, many refugees moved back to rebuild their society, while others stayed and were assimilated into agricultural communities that had received them.

Waller also suggests that the impact of Rinderpest was geographically uneven. Agricultural and agro-pastoral communities were naturally better off than pastoral ones such as the Maasai. For example, Waller notes that some of the misery and destitution described by Baumann (1894) on his way through Maasailand may not have been typical for the whole of Maasailand. For those pastoral groups that had regular contacts, by way of trade and exchange, with agricultural communities the situation was also more hopeful. Further,

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293 Bagshawe c. 1920, p. 37; Bagshawe 1926.
294 Snyder 1993, p. 17. In this study she discusses several aspects of the “moral ideology and construction of community” among the Iraqw in Iraqw’ar Da’aw. Her documentation clearly shows that Iraqw elders notions of their community and settlement history include narratives of seclusion as well as openness in relation to neighbouring areas and peoples.
295 Waller 1988, pp. 85, 104.
296 Ibid., p. 103. Baumann was in fact the first German exploring scientist who also travelled through the Iraqw’ar Da’aw area, and like his followers he described the Iraqw farming practices and landscape in a relatively positive manner (see further below).
depending on, for example, geographical conditions and herding practices, some areas, e.g. mountains and highland areas, also appear to have been relatively protected from the spread of disease. The fact that these cattle resources helped the Maasai to replenish their stocks, relatively quickly by raiding, also indicate that many cattle indeed survived in some places, both within and bordering to the Maasailand.\textsuperscript{297} According to Waller, the Maasai stock economy was functioning again already by the mid-1890s, and may have reached pre-Rinderpest levels a decade or so later.

On the basis of these observations it can be assumed that the Iraqw'ar Da/aw area and surrounding parts of the Mbulu Highlands, were not so badly affected by the Rinderpest, or the other epidemics of the late nineteenth century. Accordingly, it is likely that the Iraqw'ar Da/aw area suffered serious losses in cattle from Maasai raids in the 1890s, but with the rapid recovery of the Maasai economy and society, the frequency of raids would probably have declined substantially already around the turn of the nineteenth century. The Iraqw are likely to have been regularly raided by pastoralists also prior to the 1890s, but probably not with the same intensity as during the years after the Rinderpest.\textsuperscript{298}

As is indicated by the growing number of Iraqw clans (see section 1.5), immigration and settlement expansion also occurred during the early nineteenth century. In other words, the Iraqw'ar Da/aw area was probably a relatively safe and healthy place to live throughout most of the nineteenth century. However, the extent to which this immigration was driven primarily by coercion (as assumed in the siege hypothesis) or cohesion remains to be discussed.

Two primary explanations have been given in the literature for why the Iraqw could not expand their settlements and agriculture during the nineteenth century: (1) the character of the physical geography, where mountainous terrain, forests and an escarpment acted as a barrier, and (2) the supposed hostility of the Maasai and Datoga pastoralists who occupied and controlled the majority of the Mbulu Highlands. These two arguments contradict each other to some extent. First, the Iraqw culture, as it developed during the nineteenth century, was mainly consolidated through the amalgamation of people from surrounding ethnic groups, including Datoga and Maasai.\textsuperscript{299} Secondly, the physical geography not only acted as a barrier by keeping cattle raiding pastoralists at a comparatively safe distance, but also provided favourable opportunities for both agriculture and trade.

There are frequent references to Maasai and Datoga hostilities in Iraqw oral history and tradition.\textsuperscript{300} Presumably these mainly reflect the period of demographic turbulence and increased frequency of hostilities and cattle raids.

\textsuperscript{297} Ibid., pp. 101–102.
\textsuperscript{298} Cf. Lawi 1999, pp. 51–52.
\textsuperscript{299} Lawi 1999, p. 47.
\textsuperscript{300} Berger and Kiessling 1998, pp. 146–187; Lawi 1999; Snyder 1993, pp. 23–32.
in the decades around the turn of the nineteenth century. During most of the
nineteenth century cattle raids probably occurred intermittently rather than
continuously. Further, such hostilities appear to have varied in intensity
between seasons. It is said that the Datoga negotiated for peace with the Iraqw
every dry season in order to obtain food, for instance by trading cattle skins
for millet. Some attacks ended in friendship and the creation of new Iraqw
clans and, indeed, many clan histories describe how Maasai happened by
chance to stay in Iraqw’ar Da/aw (Loiske, pers. comm.). A typical clan history
may tell of a Maasai boy coming to Iraqw’ar Da/aw to steal cattle, but who,
while spying on one of the neighbourhoods, saw an Iraqw girl with whom he
immediately fell in love and therefore decided to stay in the area. It would be
naive to interpret such stories as evidence that interaction and exchange
between the two people were consistently peaceful, but their mere existence
suggest that Maasai and Iraqw interaction was more complex than that of
attacker and attacked.

The view that Iraqw society had been isolated and confined by coercive
external force has drawn support from an argument formulated by Fosbrooke
in the 1950s, to which subsequent accounts of Iraqw settlement history have
frequently referred. Fosbrooke contended that the Iraqw changed their style of
housing, from round houses with high conical thatched roofs to low and
partially subterranean and earthen-roofed tembe houses, as a defensive
measure against Maasai raids during the early nineteenth century. By this
view, these tembe houses were thought to have been in use for a limited period
only, after which the round-house style was readopted (Fosbrooke 1954).
However, as indicated by Baumann, Werther and Jaeger at the end of the
nineteenth century and beginning of the twentieth century, tembe houses were
normally constructed in the areas around the periphery of Iraqw’ar Da/aw,
while round, high-roofed houses were common within the Iraqw’ar Da/aw
area. In fact, Jaeger refers to a particular “area of round houses” (Rundhüttengebiet) within Iraqw territory (see below). But even if this does
not strictly disagree with Fosbrooke’s argument that tembe houses were
constructed in Iraqw’ar Da/aw earlier in the nineteenth century, there is no
substantial evidence to suggest that tembe houses were adopted on such a
grand scale and for defensive purposes as he proposes. The differences in
house styles inside and outside Iraqw’ar Da/aw, as noted by the German
explorers, have possibly been a more persistent pattern in the pre-colonial
settlement history of the area, a difference which may be explained by
variations in local climate and availability of suitable building materials.

303 Baumann 1894, pp. 118–121; Jaeger 1913, pp. 53–54; Werther 1898, p. 365. See also Thornton
As mentioned in chapter two, the deserted house sites of tembe buildings in the mapped area, were
associated with stables or kitchens rather than living quarters.
Fosbrooke’s argument seems to have been overly influenced by his assumption that the Iraqw were under attack by the Maasai, which in turn makes it inseparable from the siege hypothesis itself.

Instead, the formation of an Iraqw society during the nineteenth or possibly eighteenth century appears to be more related to processes of social and political cohesion than to external coercive pressure. A more valid picture of Iraqw’ar Da/aw during the nineteenth century is as a cultural melting pot, where immigrants adopted and created an Iraqw way of life through adherence to local authorities and a particular mode of production, and not as an isolated ethnic enclave. Welcoming and inviting immigrants is a common theme in Iraqw oral history, and a principle which may well be considered successful from an Iraqw point of view considering for example the labour-intensive farming practices that developed in the area and the rapid expansion of Iraqw society during the twentieth century. Immigrants could also quickly achieve important positions within Iraqw society, e.g. as ritual leaders. It is also likely that some members of the growing Iraqw population migrated and were assimilated into Datoga, Maasai or other ethnic groups in the nearby region. In particular, their relation with the Datooga involved marriages and much personal and cultural exchange between the two groups.

In the pre-colonial era, Iraqw society was by and large undifferentiated, but ritual leaders and respected elders (mainly men) held dominant social and political positions as well as economic power. Acceptance of such authority probably contributed to cultural cohesion. The presence in the surrounding area of dominant groups of pastoral peoples, i.e. Maasai and Datoga who represented both mutual enemies and partners, may have been another factor for cultural cohesion among the Iraqw. Environmental factors may also have contributed to the shaping of an Iraqw identity and culture, and also to have stimulated settlement concentration.

Relief and opportunity

In the context of its being a well-watered highland area, Iraqw’ar Da/aw has been able to assist surrounding communities with relief during periods of sustained crop failures or lack of fresh grazing. Broadly speaking, the situation has been similar to that of the Usambaras, Pare and Kilimanjaro
mountains in north-east Tanzania, which have for millennia attracted human settlements that have been able to expand during times of drought. The natural endowments of Iraqw’ar Da/aw – high rainfall, moist and cool climate, steep slopes, wet valleys and nearby forests – would, moreover, have played a crucial role in influencing the organisation and structure of agricultural and animal production. The high groundwater table in the valleys provides a kind of natural irrigation if excess water can be drained. This has assured supplies of fresh grass close to homesteads on a year round basis, and thus opportunities for intensive livestock production. Cattle were also kept at home during night-time for protection (mainly from wild animals) and convenience. Keeping the cattle indoors at night also increased warmth and comfort during damp and cold weather. Manure was hence readily available in the household compound and could easily be spread on the nearby fields to enhance fertility and boost production. The altitude also provides relief from mosquitoes carrying malaria parasites.

Despite the distance to major market places and caravan routes, the Iraqw were engaged in trade and exchange with neighbouring peoples during the nineteenth and early twentieth centuries. This trade was most intense with the Mbugwe and Gorowa living below the Rift wall. The Iraqw also exchanged goods with the neighbouring Datoga, Nyaturu, Nyiramba, Isanzu, Rangi and more lately also with the Gogo. Regardless of whether or not this is labelled as trade, exchange or as some other form of socio-economic relation, such networks spanned the region and connected dry and wet and high and low areas into a regional economy that is still of great importance to the Iraqw. Hence, the economic and agricultural opportunities provided by the location and environment of Iraqw’ar Da/aw render the siege argument superfluous to the analysis of Iraqw settlement history.

A gendered historiography

In assessing the role of coercive external force in Iraqw history, one must also consider the gender bias of the primary historical sources. Colonial accounts of Iraqw history are entirely written by men. Within the Iraqw society, political and public affairs, as well as historical interpretations, have been dominated by men, and the emphasis on conflicts (i.e. Maasai and Datoga aggressions) in Iraqw historiography must be analysed in this context. For

311 An indication of this intensity is provided by the labour invested in the systematic removal of unwanted vegetation by hand in the nearby and most frequently used grazing areas. Frequently, work parties were also organised to remove ticks manually from all cattle in a neighbourhood (Lawi 1999, pp. 177–190).
312 Lawi 1999, p. 189.
313 Lawi 1999, pp. 43, 62–64, 75–76, 112–113. See also Snyder 1993, chapters two and three.
example, the protection of land, livestock and people from external threat, by means of both ritual power and military defence, are mainly associated with male activities. Men have also been responsible for the governance of natural resource utilisation, thus holding much of the formal economic and political power in Iraqw society. But, there is also evidence of women’s active involvement in political affairs within Iraqw society, revealing significant but less formal means of exercising power.

Furthermore, it is not only the source material that evidences an inherent gender bias. The study of labour-intensive forms of agriculture has in itself been problematic in this respect, as illustrated by the many vivid descriptions of physical hard work and monumental investments in landesque capital. These clearly echo a male bias in the research focus, concerned with feats of engineering and muscle power, which has consistently overshadowed the more incremental and everyday work tasks contributing towards intensified land use.

4.2 Population and landscape change

In the analysis of historical data on landscape and population change presented in the following section, my ambition has been to be careful when accounting for the locational and geographical relevance of the data. For this purpose I have for example included population data from dot-distribution maps. The main part of the section is devoted to a discussion of landscape photographs and the written eye-witness accounts of foreign visitors to the Iraqw’ar Da/aw area and its surroundings.

Agricultural intensity in the late nineteenth and early twentieth centuries

No archaeological or palaeo-botanical/environmental evidence specific to the early settlement history of Iraqw’ar Da/aw is available. Furthermore, aside from local oral accounts, eye-witness descriptions dating from the late nineteenth century are few. The available early historical material is thus quite meagre, but at least some clues about the character of the landscape and its utilisation can be found in the accounts of early travellers and in later colonial reports. Three German expeditions passed through the area around the turn of the nineteenth century; those led by Baumann (in 1893), Werther (in 1896–7) and Jaeger (in 1906–7). These descriptions of the landscape and agriculture

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316 Snyder (1997, 1999), Loiske n.d.
317 I have not been able to make use of all historical and archive material that is available on the history of the Iraqw. Missionary archives, the Tanzania National Archive in Dar es Salaam and other German scientific documents than those used here, are some examples where more information is available. There is also a book written in French by Fouquer (1955), which I have only briefly browsed through, about the history of the Iraqw and the White Fathers mission station in Tlawi, c. 10 km to the south west of Mbulu Town, i.e. outside the Iraqw’ar Da/aw area, during the early twentieth century.
are accompanied by photographs and drawings (in Baumann and Jaeger). A later article on the agriculture of Iraqw’ar Da’aw (Hartley 1938) also includes landscape photographs. By analysing the landscape shown in these pictures in relation to the written descriptions, the extent and character of Iraqw settlement and agriculture from the late nineteenth century can be outlined.

Both Baumann and Jaeger were impressed by Iraqw agriculture. Jaeger describes the Iraqw country as a friendly “cultural oasis” (Kulturoase) with an idyllic landscape scenery. Baumann, likewise, admired the wide stretches of open land with its nicely kept arable fields, shining like red rectangles in the midst of the grass-covered slopes. It is important to keep in mind that the 1890s, when Baumann travelled through the area, was a decade of extraordinary hardships. The devastating Rinderpest, discussed above, was followed by famines and smallpox epidemics. Smallpox had come with the intensified caravan traffic, but also spread as people migrated in search of both food and security. Later in the decade droughts and locust invasions further contributed to this demographic and human catastrophe. The coastal areas were the first to suffer, but people died in large numbers throughout the country. In the 1905–1907 period the country suffered another demographic catastrophe during the suppression of the Maji Maji rebellion. Subsequently, the First World War lead to not only deaths of soldiers and porters but also to more famine and disease. The admiration that Baumann and Jaeger express over the Iraqw’ar Da’aw landscape thus intimates that this place was peaceful and rich in agricultural produce as compared to the exceptionally harsh conditions that prevailed in most parts of the country at the time of these German explorations. The similarity of Baumann’s and Jaeger’s descriptions of the agriculture and landscape in Iraqw’ar Da’aw also suggests a continuity in settlement and agricultural practices. This is remarkable as the impact on settlement patterns and land use arising from the series of calamitous events during the 1890s, as well as in the following decade, would have been evident in many other areas of the country.

318 The drawings and photographs discussed here comprise one of the few sources available that provide glimpses into the landscape history of the area. Baumann’s use of drawings of landscapes, as a complement to photographs, might have had a practical reason, i.e. that characteristic landscape features would have been indistinct in black-and-white photographs (cf. pictures below). The drawings are based on either photographs or sketches (see Baumann 1894, title page), suggesting that their reliability as documentary illustrations is probably fairly good.

319 Hartley’s purpose was to illustrate the “indigenous system of soil protection” in the area, which he considered to be based on labour-intensive practices such as terracing, storm drains, deep tilling with digging poles, contour ridging, intercropping and green manuring. His pictures may thus be assumed to have a bias towards the intensively cultivated parts of the landscape, but as discussed below the intensity of cultivation is not particularly striking in the pictures.

320 Baumann 1894, p.118.


322 As noted above Baumann described other parts of the country as being severely struck by famine and disease (see Waller 1988, p. 103).

323 See for example Waller 1988, Koponen 1988a, and Maddox et al. 1996.
Figure 4.1. *Landschaft in Iraku* (Iraqw landscape) (Baumann 1894, p. 119). This drawing shows the mountain of Guwangw, which lies just beyond the northern border of Iraqw’ar Da/aw and a few kilometres east of Mbulu Town. It is an eye-catching mountain, looking more or less as depicted above, when viewed from Mbulu Town and its outskirts (cf. Figure 4.2 below showing a recent photograph of the mountain). There is no direct reference in Baumann’s text to this mountain, but since he writes about a “proud/prominent mountain top” while passing through the very area, the identification is reasonably certain.\(^{325}\) (A part of the original print, that shows people harvesting grain in the lower left foreground, is not included above).

\(^{325}\) Baumann, 1894, pp. 118–119.
After climbing the Magara escarpment from the Mbugwe plains south of Lake Manyara, Baumann’s expedition entered Iraqw territory south of the Marang forest, passing through present-day Gehandu ward to the north of Iraqw’ar Da/aw. His journey continued around the Guwangw mountain massif to the area where Mbulu town now stands, and then south through Iraqw’ar Da/aw to a place called Meri, which lies about 10 km to the south of the Iraqw’ar Da/aw area, overlooking the escarpment (see Figure 4.3).

Judging from the number of houses and the extensive patchwork of fields stretching up Guwangw Mountain, as illustrated by Baumann (Figure 4.1), it seems that this side of the mountain was experiencing quite intense land pressure, and that this agricultural landscape was of some age when Baumann passed by in the early 1890s. Although the area depicted lies outside the borders of Iraqw’ar Da/aw, Baumann perceived it as a typical Iraqw landscape that was kept open by agro-pastoral activities and dotted with low rectangular, flat-roofed tembe houses. It is worth noting that although Baumann passed through Iraqw’ar Da/aw, he did not clearly differentiate between this area and the rest of the Iraqw country as Jaeger was to do a few years later (see below).\textsuperscript{326} Baumann apparently did not consider Iraqw’ar Da/aw to be a core area of Iraqw settlement, and his description of the Iraqw landscape is mainly concerned with areas lying outside of Iraqw’ar Da/aw.

\textsuperscript{326} However, Baumann refers to the “Iraqw village area” \textit{(Dorfgebiet von Iraku)}, but what this represents is uncertain. It may have included the area depicted above, and thus most of the area settled by the Iraqw, or it could be more synonymous with Iraqw’ar Da/aw.
Figure 4.3. *Ausblick von Meri (Iraku) gegen Nord* (View from Meri looking towards the north (Baumann 1894, *Tafel XVI*). Note the *tembe* houses, arable fields and open grass vegetation. Apparently, Baumann considered Meri as part of the Iraqw (*Iraku*) settlement in the Mbulu highlands.

- Land under cultivation (or short term fallow, when that is not specified)
- Fallow field
- Uncertain whether cultivated, fallow or grazing
- Grazing land
- Bush vegetation
- Unidentified field structure
- Cut / terrace edge
- Round house, with high conical thatched roof
- *Tembe* house, with flat earthen roof

Figure 4.4. Legend to interpretations of photographs in Figures 4.5–4.8.
Figure 4.5. Nordöstlichstes Iraku, bei Dafi’s. Die hinteren Berge bilden die Oberkante der Grossen Bruchstufe, daher hier schon stärker zerschnittenes Land. Felder und zerstreute Tembenhütten bedecken die Abhänge. (North-eastern Iraqw, at Dafi’s. The mountains in the background form the crest of the great escarpment, hence the markedly dissected landscape. Fields and scattered tembe houses cover the slopes) (Jaeger 1913, Tafel V.). The area shown in this photograph, taken in 1906/7 on Jaeger’s expedition, is clearly outside Iraqw’ar Da/aw. (On Jaeger’s map the place called Dafi’s is about 8 km north-east from Mbulu Town, on the northern side of Guwangw mountain in present-day Gehandu Ward.)
Northeast of Guwangw mountain, i.e. further north of Iraqw’ar Da/aw, the land appears to have been equally densely settled and intensively cultivated as on the slopes of Guwangw at the beginning of the twentieth century. According to Jaeger, this place lay close to the escarpment and the plains below (see Figure 4.5 and legend in Figure 4.4).\(^{327}\) It is questionable whether this settlement is the result of an early Iraqw expansion that had been prompted by population pressure in Iraqw’ar Da/aw, or was rather a settlement founded in a favourable location for both agro-pastoral production and the potential it afforded for trade and exchange. In any case this area must have been settled well before the time of Jaeger’s journey (1906/7).

A small section of the Iraqw’ar Da/aw landscape in 1906/7 is pictured in Figure 4.6. What Jaeger calls South Iraqw probably corresponds to Iraqw’ar Da/aw. The main purpose of the picture appears to have been to illustrate the distinct house type (round houses) in Iraqw’ar Da/aw, by contrast with the tembe houses in other parts of Iraqw territory. We may also assume that the landscape shows a scenery typical of the central Iraqw’ar Da/aw settlement in the early twentieth century. Jaeger describes this southern part of Iraqw land as an enclosed area with no tembe houses but only round houses with conical roofs. Only at the outer perimeter of this area were people living in tembe houses.\(^{328}\) He also notes that this “area of round houses” (Rundhüttengebiet) stretched out along the main road through the mountain pass between Nou forest and the Guwangw mountain, and into the area of tembe houses (i.e. into what is now the southern outskirts of Mbulu Town). Thus the borders of this “area of round houses” correspond fairly closely with the present north-western and eastern borders of Iraqw’ar Da/aw. Jaeger thus identifies Iraqw’ar Da/aw, contrary to Baumann, as a place with a particular physical geography and characteristic settlement.

\(^{327}\) See also Jaeger 1913, Map 6.
\(^{328}\) Ibid., p.54.
Süd-Iraku. Rundhütten bei Issara's. Vorn Adlerfarnbusch. (South Iraq. Round houses and ferns at Issara's) (Jaeger 1913, Tafel V.) Picture taken at a place in east-central Iraqwar Da'aw, somewhere around the present border of Kainam and Murray wards (if the name “Issara's” is correctly plotted on the map by Jaeger). In the foreground there is a stand of ferns, then a valley field followed by a gentle slope with fields and patches of grass leading up to the home-grazing area around a cluster of four houses. In the distance the landscape is open with no trees.
Of equal importance in Jaeger’s description is the territorial extent of Iraqw settlement.³²⁹ He portrays it as a well populated basin surrounded by mountains and wilderness. In the centre of this confined area stands the conspicuous Guwangw mountain, around which the cultural landscape stretches out in all directions. Nowadays this area would approximately encompass the lower-lying areas around Mbulu Town, to the west, north and north-east of the Guwangw mountain massif, up to the Marang forest, and the Iraqw’ar Da/aw area on the other side of Guwangw mountain. In addition there was an area settled by the Iraqw around Lake Tlawi.³³⁰ Hence, Jaeger’s reference to the Iraqw land as a densely populated, agro-pastoral landscape, appearing as an oasis surrounded by wilderness, applies not only to Iraqw’ar Da/aw. This means that his observations of intensive agricultural practices among the Iraqw, such as manuring, irrigation and crop rotation,³³¹ also pertain to areas outside Iraqw’ar Da/aw, implying that the intensity of cultivation and population density may also have been relatively high in these areas in 1906/7. As Jaeger’s account leaves room for speculation in these matters, it should not, however, be taken as evidence that the same type of intensive farming practices were in use in all Iraqw settlements during the late nineteenth century.

Accordingly, both Baumann’s and Jaeger’s accounts intimate a relatively high density of population, not only in the Iraqw’ar Da/aw area, but also in a much larger part of the Mbulu Highlands. It can thus be concluded that not merely Iraqw’ar Da/aw alone, but a larger part of the Mbulu Highlands, was permanently settled by agro-pastoralists (although not necessarily the Iraqw) during the late nineteenth century. Considering that this was a period of general turmoil and population movement, it seems unlikely that the concentration of population in the Mbulu Highlands was primarily the effect of an outward expansion of Iraqw from a small formerly enclosed enclave (i.e. Iraqw’ar Da/aw). A more likely scenario is that this settlement concentration, including the Iraqw’ar Da/aw area, was a result of a general in-migration to this part of the Mbulu Highlands during the nineteenth century.

Jaeger’s observations suggest that farming took up a large proportion of the land in the Iraqw enclave. In favourable places up to half of the land area consisted of arable fields. However, south of Mbulu, he claims to have seen several square kilometres covered almost entirely by arable fields, apart from the tembe houses and roads. Significantly, Jaeger here appears to be speaking of the area just south of the German headquarters at present day Mbulu Town, north of Iraqw’ar Da/aw. In more peripheral areas, closer to the surrounding mountains, settlements are said to have been less concentrated with cultivated

³²⁹ Jaeger 1913, p. 53.
³³⁰ Lake Tlawi is marked as “Bassoda Merka” on Jaeger’s map, 1913, Karte 6. See also Figures 4.1 and 4.5.
³³¹ Jaeger 1913, p. 54.
areas covering only about a tenth of the land. Although the small portion of Iraqw’ar Da/aw shown in Figure 4.6 is largely covered with arable fields and located close to a group of houses, this can not be used as evidence that a large part of the Iraqw’ar Da/aw landscape was covered with arable fields, as most arable fields would have been located near the houses. Outside of the frame of this photograph there would certainly have been large tracts of uncultivated grazing land. However, it is clear that the landscape is being sculptured to some extent by the farming practices, notably the levelling of fields and the cuts developed on field boundaries in the slopes. The lower field, for example, appears to be shaped by this process. Accordingly, although Jaeger’s account suggests that there is evidence of labour-intensive farming practices in Iraqw’ar Da/aw, some of the most densely populated and intensively cultivated area in the first decade of the twentieth century was located north of Iraqw’ar Da/aw in the lower lying hinterland of Mbulu Town.

Furthermore, the drawings in Baumann (1894) and the photographs in Jaeger (1913) and Hartley (1938), (see Figures 4.1, 4.3, 4.5–4.8, and captions to Figure 4.7 and 4.8), show the existence of plenty of houses outside Iraqw’ar Da/aw, while the landscape within Iraqw’ar Da/aw itself appears to be more sparsely populated (an observation consistent with the other pictures presented in Hartley 1938). Accordingly, cropping intensity, i.e. the amount of cultivated land in relation to fallow and grazing land, was similarly high in the areas outside Iraqw’ar Da/aw. In fact, the cropping intensity does not seem to be higher inside Iraqw’ar Da/aw. This impression may of course result from the selection of panorama’s and the photographers’ intentions, notwithstanding that Hartley specifically set out in the 1930s to illustrate the labour-intensive farming practices in Iraqw’ar Da/aw.

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332 Jaeger 1913, p. 54. The figures of percentages of cultivated land mentioned by Jaeger must be treated as rough estimates. They most probably mean cultivated areas, including fallow field, in relation to grazing land.
Figure 4.7. “An Iraqw field landscape” (Hartley 1938, p. 65). This photograph illustrates a wider stretch of the Iraqw’ar Da/aw landscape, with large parts of the exposed hillside covered with arable fields, of which at least some were being cultivated in the year the photograph was taken. A number of cuts, visible as darker lines, show the extent of arable fields. Just above the valley the vegetation seems rougher, with a patch of long-standing grass, which might imply a relatively low grazing pressure or a system of rotational grazing. Below this grassy area are a couple of cuts or negative lynchets, demonstrating that at least parts of the valley had been cultivated previously. The hill from where the picture was taken seems to be mainly covered with grass and bush. A stand of trees, most likely of quite recently planted exotic species, is also visible. Note the absence of houses.
Figure 4.8. “Fields in the Kainam area, with crops planted in contour lines of field terraces” (Hartley 1938, p. 64). This photograph shows fields with young crops appearing as patches in a landscape predominantly used for grazing. The roof of one round house is visible, but otherwise this landscape consists of open grassland with a few scattered bushes. A few fallow fields can also be seen.
Beside the general contrasts already noted between the Iraqw’ar Da/aw landscape and that of the areas outside, in both physical geography and house style, further differences are illustrated in the pictures, notably in terms of land-use patterns. In both areas houses are surrounded by grazing land as well as by arable fields, but in Iraqw’ar Da/aw houses appear to be clustered in smaller groups with plenty of space between the clusters. This pattern, in turn, is linked to the organisation of agriculture, and to the same processes by which the intensive farming practices of the area has developed. The tembe houses outside Iraqw’ar Da/aw are more evenly spread throughout the landscape. So there seem to have been particular reasons for settlement concentration in Iraqw’ar Da/aw, which are not related to a typical Iraqw culture. Instead, the settlement pattern of Iraqw’ar Da/aw, as well as the development of the specific local intensive farming practices, appears to be an adaptation to the conditions and opportunities provided by the physical environment and various processes of social cohesion and interaction with other peoples through migration and regional exchange systems. As was shown above, the intensity of land use may not have differed much between the Iraqw’ar Da/aw area and its surroundings around the year 1900, even if the settlement pattern, organisation of agriculture and farming practices did. Thus the noted difference in appearance of these landscapes may actually hide their similarities in terms of historical processes. In other words, this may be a case where similar driving forces of change have produced different landscapes.333

Physical field structures are visible in the pictures of Iraqw’ar Da/aw, but it is difficult to determine if similar structures are present in the other pictures. The evidence of soil erosion (Figure 4.5) outside Iraqw’ar Da/aw is similarly difficult to interpret, but it appears to be of a quite limited extent and related to some local factor, possibly livestock trampling, and is thus of little help in assessing the character of farming in the pictured area. It is mainly from the impression of settlement density and land use that we may comment upon the intensity of production, based on the drawings and photographs from areas outside Iraqw’ar Da/aw. Nevertheless, these pictures and the written accounts indicate that labour intensity (investments in soil conservation) was probably higher in Iraqw’ar Da/aw, but that cropping intensity may not have differed significantly between areas inside and outside Iraqw’ar Da/aw. One must, however, be careful of interpreting the differences in land-use and farming practices between Iraqw’ar Da/aw and its surroundings as a difference in settlement age, i.e. as a process of settlement expansion out from Iraqw’ar Da/aw. In fact, there is no evidence in these pictures that settlement in Iraqw’ar Da/aw was considerably older than in those areas depicted from surrounding areas. Terms such as core and periphery or, indeed, homeland and frontier or

expansion areas are not as self-evident in the way they have commonly been used in the literature on Iraqw agricultural and settlement history.

The evidence of these historical eye-witness accounts and photographs agrees with the oral testimony collected by Lawi (1999) indicating that the cultivated areas in Iraqw’ar Da’aw were on the slopes and towards the lower parts of the landscape, including valley bottoms, while ridge tops were reserved for grazing. Obviously, many valleys would have been reserved for grazing and thatching reeds, especially larger and wetter valleys with permanent streams or rivers. But some were most likely cultivated even before iron hoes became widespread in the twentieth century. Indeed, Lawi mentions that according to local narratives and written sources, valley bottom or “swamp farming” may have been in place even before 1850.334 In the pictures published in Hartley (1938), the Iraqw’ar Da’aw landscape is still essentially open, but bushes and stands of exotic trees are present. Hence, the impression one gets from the pictures of Iraqw’ar Da’aw is of a fairly sparsely populated landscape, parts of which were intensively cultivated. Pockets of intensive land use (both cultivated fields and grazing areas) lay close to the homesteads. More extensively utilised areas, mainly for grazing, were interspersed between clusters of homesteads, and even more extensive communal grazing areas dominated on the peripheries of the settled area. In the late nineteenth and early twentieth centuries there would have been only a few relatively densely populated areas in Iraqw’ar Da’aw,335 thus concurring with the following observation made by Fosbrooke in the 1950s:

The area of Iraqw proper [Iraqw’ar Da’aw] could obviously be more heavily populated; the grazing in particular could be greatly increased in value by eradication of wire grass, a fact appreciated by the diviners who, with access to free labour, have cleared their holdings of this pest.336

Furthermore, as Fosbrooke’s comment indicates, labour was not only mobilised from within households, but was also a matter of power relations which meant that the capacity to intensify agriculture varied between households.

Estimates of population density

The siege hypothesis is founded on the assumption that population pressure increases in the area under siege. In order to evaluate the validity of the siege hypothesis in the Iraqw case, it is necessary to discuss the historical estimates of population, which have provided empirical support to the siege argument.

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334 Lawi 1999, p. 192.
335 See also Lawi 1999.
336 Fosbrooke 1955, p. 53.
The data discussed here are estimates. Most figures are official colonial census data, but some alternative estimates are also included, which makes a certain comparison and corroboration of the data possible.

Excluding surrounding mountains, forests and escarpments, Iraqw’ar Da/aw covers about 180 square km, while the two existing wards of Murray and Kainam cover a slightly larger area. In the 1950s Fosbrooke reached a similar estimate, 170–180 square km, for what he regarded as the true cradle area of the Iraqw. If one follows the siege hypothesis, this area would have been settled and cultivated to its full capacity sometime around the mid- to late nineteenth century, whereupon the Iraqw would have started to overflow into the surrounding areas.

Another source which indicates the extent of Iraqw settlement and farming activities around the year 1900 is a vegetation map published in Jaeger (1913). In Figure 4.9 this map is compared with two other vegetation maps of the same area, showing the situation in the 1960s and early 1990s. There is much uncertainty attached to this comparison, particularly relating to the data from Jaeger’s observations in 1907, but as Jaeger’s map provides an opportunity to attempt a comparison of vegetation change it is worth considering. The open grass vegetation, as classified on each respective map, does more or less indicate the extent of the intensively used land (both arable and grazing). This vegetation change may thus be used as a rough measure of the extent of agriculture and grazing activities. From this series of maps it is evident that the central area of “open grassland” in Iraqw’ar Da/aw has expanded into areas that were formerly more extensively utilised and covered with bush, ferns or forest, during the twentieth century. This change indicate an expansion of settlement and agriculture. Hence, it appears as if there was plenty of room for expansion within the boundaries of Iraqw’ar Da/aw in the first decade of the twentieth century. This corresponds with the descriptions by Snyder (1993) and Lawi (1999) of the early settlement history (i.e. roughly prior to 1850) in the Iraqw’ar Da/aw area. Based on oral history they contend that the Iraqw settlement gradually expanded, from a small settlement close to one of the bordering forest reserves, until the whole of Iraqw’ar Da/aw was settled, supposedly around the mid-nineteenth century.

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337 This figure has been reached by tracing the extent of Iraqw’ar Da/aw (based on various oral and written sources) on the 1: 50,000 topographical map of the area.
338 Fosbrooke 1955, pp. 28, 51.
340 The comparison was made by manually overlaying the interpretations of three different maps after having reduced the two most recent maps to the same scale as Jaeger’s map, which has the smallest scale (1:1000,000) in the original print.
341 There are no land use classes for arable land in these maps, so I presume that the areas mapped as open grassland includes grazing land as well as cultivated areas.
On Jaeger’s vegetation map from 1907 (see Figure 4.9), the open grass areas (interpreted here as cultivated and intensively grazed land) of Iraqwar Da’aw cover approximately 75 square km.\textsuperscript{342} On Schultz’ map from the 1960s the central open grassland covers about 120 square km, and on the most recent vegetation map of the area, central Iraqwar Da’aw is clearly visible as a mixture of crop- and grassland, which covers about 135 square km.\textsuperscript{343}

The growth of Iraqw population during the twentieth century is thus paralleled with a settlement expansion both inside, as the above data indicate, and outside the boundaries of Iraqwar Da’aw. The projection of a fixed homeland boundary back in time thus appears to be one of the main weaknesses of the siege hypothesis.

Apart from the “Iraqw cradle area”, Fosbrooke also refers to the Iraqw homeland as the Kainam area (see quotation below). However, on his map of the region, the area marked as Kainam covers nearly twice the Iraqwar Da’aw

\textsuperscript{342} Although, the figures taken from Jaeger’s map should be regarded as rough estimates, the trend is probably correct.

\textsuperscript{343} These figures are based on a manual count of the size of areas on the original maps.
area, including most of Gehandu Ward north of the present Kainam Ward (see Figure 1.5). In fact, this area corresponds fairly well with the area of grassland mapped by Schultz in the 1960s and with the extent of Iraqw settlement observed by Baumann and Jaeger around the turn of the nineteenth century (excluding the settlements around present Mbulu Town and Tlawi). This further suggests that the various references to the Iraqw homeland in colonial literature may in fact refer to areas of varying extent, and not necessarily to what is here delimited as Iraqw’ar Da/aw. One implication of this confusion is that in earlier literature the Iraqw’ar Da/aw area was often equated with the total area of Iraqw settlement during the mid- or late nineteenth century. Presumably, the historiographical tendency to view the Iraqw as a people under siege, may account for much of this inconsistent spatial references to the extent of Iraqw settlement.

Alternatively, we may consider the possibility that a larger area in the Mbulu Highlands, than that of Iraqw’ar Da/aw, was suffering from population pressure as a consequence of siege-like conditions. This would also be consistent with the observations made by Jaeger and Baumann of Iraqw settlements outside the Iraqw’ar Da/aw area. The problem with this interpretation, is that in addition to the general weaknesses of the siege hypothesis, it implies a much more loosely defined and larger homeland territory which is even more difficult to envisage as being a circumscribed enclave (both due to physical geographical conditions and hostilities).

Population figures and attempts to estimate density at various dates in the twentieth century are tabulated below. Densities are based on an area of 200 square km (unless otherwise indicated). The reason for this compromise figure is both the uncertainty of the actual areas pertaining to the population figures below and the difference between the area of Iraqw’ar Da/aw and the two present wards.

From the figures in Table 4.1, it seems that the rate of out-migration from Iraqw’ar Da/aw did not gather full momentum until the 1950s and 1960s, when it appears to have kept a more or less steady pace with population growth in Iraqw’ar Da/aw. However, in the 1930s and 1940s, as well as from the 1970s and onwards, the population of the area most likely increased. Out-migration from the area thus appears to have stagnated some time after 1970. Three approximate stages of demographic change can be identified since the 1930s: (1) c. 1930 to 1950, a period of population increase, (2) c. 1950 to 1970, stagnation due to out-migration, and (3) c. 1980 and onwards, a second phase of population increase. These population estimates are in accordance with the land use and settlement changes discussed in chapter two.

344 Fosbrooke 1954, Fig. 2.
Table 4.1. Population data for Iraqw’ar Da/aw

<table>
<thead>
<tr>
<th>Year</th>
<th>Inhabitants</th>
<th>Density (per square km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988</td>
<td>19,048 1</td>
<td>Kainam: 112, Murray: 66 2</td>
</tr>
<tr>
<td>1978</td>
<td></td>
<td>Kainam: 101, Murray: 58 2</td>
</tr>
<tr>
<td>1967</td>
<td>16,000 3</td>
<td>80</td>
</tr>
<tr>
<td>1957</td>
<td>17,800 1</td>
<td>89</td>
</tr>
<tr>
<td>c. 1955</td>
<td></td>
<td>77 (part of Murray) 4</td>
</tr>
<tr>
<td>1948</td>
<td>17,529 1</td>
<td>88</td>
</tr>
<tr>
<td>1947</td>
<td>≥ 48 5</td>
<td></td>
</tr>
<tr>
<td>1934</td>
<td>c. 10,000 6</td>
<td>50</td>
</tr>
</tbody>
</table>

Bold figures indicate data gleaned from the literature.

Notes to Table 4.1
1 From Snyder 1996, based on census data.
3 Schultz 1971, Map 22: Population distribution in 1967. The figure is derived from the dot-distribution map, which in turn is based on census data.
4 Based on a survey by Fosbrooke in one section of Murray village (1955, p. 53).
5 Estimates made in 1947, i.e. just before the census in 1948, over an area of c. 680 square km on the central Mbulu Highlands (including Iraqw’ar Da/aw) yielded a figure of 48 inhabitants per square km, but with significantly higher densities in some areas (Rowe 1947).
6 Dot-distribution map in Gillman 1936. In stark contrast to this Snyder (1996, p. 323) cites a report from the 1930s, which estimated the local population density to be at a much higher level, i.e. 125 people per square km, which however seems to be a quite unlikely average estimate for the Iraqw’ar Da/aw area at the time. It should be noted, however, that Snyder puts forward too low a figure (102 square km) for the extent of the Iraqw’ar Da/aw area (1996, p. 318).

A few further comments on the figures in Table 4.1 are necessary. The higher density in Kainam Ward reflects its relative proximity to Mbulu town, while the southern part of Murray Ward is the most remote and least populated part of Iraqw’ar Da/aw. The figures for 1967 and for 1934 are based on dot-distribution maps, where dots within present-day Iraqw’ar Da/aw have been counted. The other figures are estimates of the total population of Iraqw’ar Da/aw (Kainam and Murray Wards). The figures derived from the dot-distribution maps (1967 and 1934) are comparatively lower than those of the published census data. It is, therefore, not certain that the 1967 figure marks a decline in population in that decade but more likely reflects the different methods and data used. The figure for 1934 is even more conspicuous. As Winter and Molyneaux (1963) point out, the first house-to-house census in 1948 demonstrated that previous population figures for Tanganyika as a whole had been underestimated by approximately a quarter. We may thus assume
that the 1934 estimate errs on the low side, but in any case it seems that the Iraqw’ar Da/aw population increased during the 1930s and 1940s. The estimated figures for population distribution, used by Gillman in his population map of Tanganyika Territory, were compiled at the Mbulu District Office, and reflect normal colonial procedures in estimating population figures. Gillman regarded the 1934 population figures as reliable, on the grounds that the assessment of administrative information was of sufficient quality and that he had personal knowledge of the area. The population figures presented in Gillman (1936) for the Mbulu District as a whole, were 96,500 in 1934 (i.e. the figure upon which the population map is based), and 98,800 in 1931. The close agreement of these two figures encourages one to use Gillman’s dot-distribution map with some confidence and, tentatively, to compare it with later census data for Iraqw’ar Da/aw (as in the table above).

In earlier estimates of population change in Iraqw’ar Da/aw the possibility of population increase during the early half of the twentieth century has not been recognised. Instead it has been assumed that the size of population in Iraqw’ar Da/aw remained stable from 1890 to 1948, again as a consequence of out-migration. Fosbrooke makes a similar observation about the period 1850–1950:

… about 1850, the Iraqw were pushing out from Kainam [sic], either carving out forest land (Gihandu), or settling amongst the Tatog in Central Mbulu …. Now at present the Kainam area holds about 4,800 tax payers and is more or less full to capacity: it is unlikely that the tribe would have expanded into outlying areas while there was still room in the cradle area, therefore one can deduce that the population about 1850 must have been about 4,800 adult males or, allowing for the unmarried men (25%) say 3,600 families.

In one sense the statement given special emphasis here demonstrates Fosbrooke’s belief that maximum carrying capacity was reached for Iraqw’ar Da/aw around 1850, after which territorial expansion was the most rational reaction to population growth.

It is doubtful whether the population of Iraqw’ar Da/aw in 1890 was as high as 17,000, the figure estimated by Winter and Molyneaux (1963), or 21,000 in 1850 as suggested by Fosbrooke (see footnote to the quotation.

345 Gillman 1936, appendix.
346 Gillman 1936, inset on map and appendix.
347 Based on census data, Gillman 1936, p. 371.
348 Winter and Molyneaux 1963.
349 Fosbrooke 1955, p. 26; italics added. Fosbrooke states that according to census figures one adult male represents 4.45 people, suggesting a total population of more than 21,000 people in the mid 1950s (1955, p. 53). One explanation for this high figure could be that Kainam in this case covers a larger area than Iraqw’ar Da/aw, but in any case there is too much uncertainty related to this figure for it to be reliable.
above). Instead, the population in the latter half of the nineteenth century was probably much lower and perhaps not more than 10,000 inhabitants, or 50 inhabitants per square km (the population estimate of 1934 probably being an undercount, see above). In his analysis of pre-colonial irrigation in the North Pare highlands in north-east Tanzania, Sheridan estimated that the population density in the 1880s would have been 40–49 inhabitants per square km in the most densely settled areas and an overall density of 13–16 inhabitants per square km. These figures are also consistent with Håkansson’s estimates of the population density in South Pare highlands (16–23 and 14–19 inhabitants per square km), which was another area of irrigated intensive agricultural production during the nineteenth century. Hence, intensive farming practices in nineteenth century Pare highlands was sustained at even lower population densities than those that I have suggested for the Iraqw’ar Da/aw area during the latter half of the nineteenth century. Sheridan also notes that according to Netting’s correlation of population density and agricultural systems, most of North Pare should have been used for shifting cultivation, except for in the high density areas where short-fallow practices should have been present. Comparing these tentative figures of population density, as well as correlating them to general farming system classes, is associated with much uncertainty and simplification. However, two things do seem to be reasonably clear. First, population density in Iraqw’ar Da/aw in the mid-nineteenth century was much lower than previously estimated. Second, a figure not exceeding 10,000 inhabitants in 1850, or even 1890, is not necessarily a low figure in a comparative perspective and would be consistent with the conclusion that the IRAQW population increased during the nineteenth century and early twentieth century as a consequence of in-migration and cultural assimilation. Thus, what has previously been regarded as an early expansion from a crowded homeland area (i.e. IRAQW’AR Da/aw), into the surrounding parts of Mbulu Highlands, may perhaps be more aptly described as a result of in-migration.

Intensification and expansion

From the evidence of photographs and other historical sources it has been argued that intensively cultivated areas have expanded during the last hundred years in IRAQW’AR Da/aw. Cultivation of crops has also become gradually more important relative to livestock production in the agro-pastoral production system of the IRAQW.

Population growth has clearly been linked to agricultural intensification in IRAQW’AR Da/aw. But as in-migration and the incorporation of people from other ethnic groups contributed to expand the labour force during the

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350 Sheridan 2002, p. 84.
351 Permanent cultivation, or annual cropping, according to Netting (1993, p. 264), occurs at population densities between 64 and 256 inhabitants per square km and multicropping, i.e. two crops or more per year, at densities above 256 people per square km.
nineteenth century, population growth cannot be regarded as an independent driving force in Iraqw settlement history. The gradual expansion of the area of settlement in the nineteenth century in the Iraqw’ar Da/aw area, and possibly also in its surroundings, thus bears much similarity to the later settlement expansion in the twentieth century. What differed were mainly the speed and magnitude of the process and the relation to colonial rule. Hence, agricultural intensification in Iraqw’ar Da/aw occurred while the cultivated areas were expanding. Lawi comes to a similar conclusion in the context of the transition from wooden to iron implements in the early twentieth century:

The expanded cropping described by Jaeger is probably as much an outcome of this introduction of a new agricultural technology as it is of increased human population; the latter bringing into the equation both increased labour power and food needs. From these clues one may infer that in the pre-colonial times land under crop cultivation gradually expanded with the introduction of iron technology and as a result of population increase. It is however evident that this expansion went hand in hand with intensification.353

Some decades after the supposed Maasai siege had been resolved, during the height of British colonial administration in Mbulu, the Iraqw were again thought of as being more or less under siege, in the eyes of the British, but this time by pressure from the tsetse-fly. Vast areas of bush were cleared in the Mbulu Highlands in order to make more land accessible for settlement and cultivation. The colonial argument motivating these clearings was that tsetse was invading the district from the west, resulting in settlement congestion and land degradation.354 Lawi has, however, demonstrated how this observation was part of a degradation narrative, i.e. mainly a misapprehension, rather than a real threat to the environmental sustainability of the area.355 Nevertheless, in British colonial reports Iraqw’ar Da/aw was described as crowded and congested, when in fact it was not (see discussion above). It should also be noted that the Iraqw’ar Da/aw area, on Gillman’s map (see Figure 4.10), is significantly more sparsely populated than its immediate surroundings to the west and north, which suggests that the supposed congestion applied more specifically to areas outside Iraqw’ar Da/aw. This persistent tendency to associate an Iraqw homeland (i.e. the Iraqw’ar Da/aw area) with congestion, even if other areas surrounding this area were equally or even more densely settled, stands as testimony to the strong impact that the siege hypothesis has had on descriptions of Iraqw agricultural and settlement history.

353 Lawi 1999, p. 43; italics added.
355 Lawi 1999, chapter four.
Figure 4.10 "Population map of Tanganyika Territory 1934" (section reproduced from Gillman 1936; place names added).
Summing up this discussion it is clear that the lack of empirical data has given ample room for hypothetical explanations of contemporary and historical processes in Iraqw society, guided by theoretical assumptions (i.e. population pressure theory). In fact, the concern with high population pressure has resulted in contradictory interpretations, both Malthusian (degradation) and Boserupian (intensification). While the supposed nineteenth century siege by the Maasai was assumed to have forced the Iraqw to develop sustainable intensive farming practices, the twentieth century siege and congestion caused by tsetse was thought to result in degradation of the environment. Hence, the Malthusian scenario was applied to current developments and prognostications about the future, while the Boserupian argument has been used to explain the past.356 These contradictory theories may also have reinforced each other, in that the assumption of a nineteenth-century siege may have been influenced by the British colonial descriptions of the central parts of Iraqw territory as an essentially overpopulated and crowded enclave in the 1930s and 1940s.

The European experience of Iraqw settlement expansion occurred at a moment when it was quickly gathering momentum along with population growth and increasing political stability after the 1920s. In a similar manner to their concern with soil erosion, colonial officials misinterpreted the expansion as a new process. The Iraqw, no longer hemmed in by external forces, were imagined as moving out from their crowded homeland, like water rushing from a breached dam. But, as demonstrated above, the history of settlement expansion and migration in the Mbulu highlands is both longer and more complex. In the twentieth century it was the weakening of pastoral peoples by the Rinderpest, followed by the European pacification of the same people and British colonial policies to promote agricultural expansion, including tsetse clearings, that provided opportunities for a rapid expansion of Iraqw settlement and out-migration from Iraqw’ar Da/aw. Hence, Schultz’ observation in the 1960s that the Iraqw expanded to new areas while plenty of land was still available in the older settled areas, seems to hold as a general rule in the history of Iraqw settlement in the Mbulu Highlands.357

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356 The same pattern is evident in much of the recent debate on colonial (i.e. Malthusian) narratives of environmental change. Accordingly, while the colonial narratives express a concern for impending environmental problems and escalated poverty, present-day analysts of historical change clearly have more sympathy for the Boserupian approach as an explanation to agricultural and environmental change in the past (see chapter one above).

357 Schultz 1971, p. 98.
5 Final discussion

In this book the local landscape has been used as an analytical starting point. In adopting this approach to agricultural intensification I have kept to a relatively narrow analytical frame, addressing mainly issues of population dynamics, land use change and farming practices. The study lays weight on agricultural intensity and intensification as an expression of a particular historical conjuncture in a particular local setting. It also stresses the importance of grounding such an analysis in a detailed understanding of the morphology of the agricultural landscape. However, despite this focus on a specific case, the aim with this final chapter is also to widen the analytical perspective, and point at the general lessons about processes of agricultural intensification that we can draw from this case study.

5.1 Misreading agricultural intensification

For the case of the Iraqw intensive farming system, the siege hypothesis has been shown to be a historical narrative that is a manifestation of population pressure theory, rather than being based on historical investigations. A part of this historical narrative is the notion of an Iraqw homeland that has had a quite distinct and separate settlement history as compared to its surroundings. Much in the same way as the colonial territorial division into discrete “tribal” areas had little relevance to pre-colonial ethnic relations, the historiography of an Iraqw homeland may thus be regarded as historical myth. A more nuanced interpretation of this historical and geographical area, in a regional context, is thus required. In this section I aim to discuss why the siege hypothesis has been such a dominant narrative in Iraqw historiography, despite the fact that the empirical material that I have made use of does not lend any clear support to this historical interpretation.

The chain of causation in the siege hypothesis is basically the following. In the first stage there are limits to expansion, which leads to the second stage characterised by mounting population pressure, which is followed by the third stage of agricultural intensification. However, previous understanding of Iraqw pre-colonial intensification have, due to a lack of empirical evidence,
been based on observations of the last stage only, i.e. intensive farming practices. The preceding two stages have thus been merely assumed. This chain of explanation is summarised below. Numbers indicate the direction of causation (i.e. 1 leading to 2, leading to 3), which follows the flow of time, and indicate the assumed historical process that is associated with the siege hypothesis. The direction of explanation is, however, based on a retrospective analysis (3 leading to 2, leading to 1), and thus endeavours to write a history on the bases of theory.

3. Intensive farming practices.
   *(Empirically observed)*

2. High population density, population pressure, land scarcity.
   *(Weak empirical evidence. Mainly assumed on the basis of population pressure theory, with some support from Iraqw oral history accounts)*

1. Inability to expand settlement and land use.
   *(Weak empirical evidence. A fundamental criteria for population pressure theory. Ambivalent support in Iraqw oral history accounts)*

0. Siege
   *(Historical event that explains the development of intensive farming practices in the Iraqw’ar Da’aw area. Assumed on the basis of the chain of causation above)*

As was mentioned in chapter four above, the siege hypothesis is also imbricated with the gender bias in Iraqw historiography and the study of agricultural intensification in general. The emphasis placed on aspects of defence and hostility and the tendency towards a “tyranny of monuments” in earlier descriptions of Iraqw agricultural history are examples of this. A consequence of this misreading of historical processes and landscape morphology is that it neglects or bypasses the possibility of incremental change in agricultural intensification.

The majority of recent revisions of colonial (agricultural and environmental) historiographies have demonstrated the flaws of Malthusian degradation narratives. Adams describes the situation in the following manner:

> Faced with a predominance of labour-saving extensive agricultural systems and lacking historical insight, observers of agriculture in Africa during the twentieth century reacted in two ways. The first was a Malthusian concern about an incipient sustainability crisis. The second was a productivist concern about farmer conservatism. The turnaround in demographic fortunes, and the high population growth that became so prominent in the twentieth century,
persuaded many observers to make a stark Malthusian analysis of the possibility of African agricultural production keeping pace with population and to emphasize the likelihood of severe environmental degradation. … Both the Malthusian analysis of impending disaster and the developmental analysis of the urgent need for production increase presented African agriculture as resistant to change. Underlying both these attitudes there was the broader assumption that African societies had been relatively unchanging over time. … The dominant view was of African agriculture being almost everywhere locked in a cycle of low-input and low-output, and African farmers being resistant to change – uninnovative, unspecialized, uninterested in economic relations and unresponsive to economic and environmental change. … To most twentieth-century observers, intensification was therefore something novel for African farmers, and something into which, moreover they needed to be persuaded or indeed forced through development projects, technologies, incentives and fiscal pressures. Intensification was something inherent to modern states and capitalist economies, and a process that had to be driven by outsiders, against farmers’ wishes but for their own good. … Farmers have a very acute sense of what return they may obtain from different kinds of technologies, and they innovate rapidly if the new ideas and the technologies they offer actually work. It is a matter of record that, through the second half of the twentieth century, many did not. Despite decades of development planning, much agriculture remains dependent on local knowledge and capacity. 358

As is indicated in the title of this book, the historiography of the Iraqw has been constrained by the siege-hypothesis, which in turn has been fabricated on the basis of the notion that population pressure is a fundamental prerequisite for initiating and perpetuating a process of agricultural intensification. To the proponents of the siege hypothesis, the intensive agricultural practices observed in the Iraqw’ar Da/aw area could only be explained as the result of an extraordinarily demanding situation that impelled the Iraqw to take measures. The siege hypothesis affirms that farmers are capable of coping with scarcity if needed, but it retains the notion of African farmers as being inherently resistant to change and development.

Sustainable development is a delicate and important political issue and we can not afford to build our understanding of such processes on outdated and fictitious historical accounts. The tragedy, in the Iraqw case, is that a

successful system of sustainable agricultural production that has expanded and intensified both during the catastrophic events of the late nineteenth century and early twentieth century in Tanzania as well as in more prosperous times, has not been associated with farmers’ unconditional capacities to intensify agricultural production, but merely with an ability to cope with adversity. Hence, in the wake of degradation narratives, African farmers have not only been repeatedly and wrongly accused of mismanaging natural resources, but so too have their documented achievements in increasing livelihood security and generating growth by intensifying agriculture often also been misunderstood as extraordinary measures taken in the face of coercive pressure. The lesson that the history of the Iraqw brings to policy making and studies of rural development in Africa, is that empirical examinations of environmental and agricultural historiographies must scrutinise the theoretical and ideological foundations of success stories and narratives of sustainable development, as well as those of degradation.

The critique of simplistic degradation narratives has improved our understanding of development processes and provided us with hope in the midst of all the gloomy accounts of failed development in Africa. Naturally, in doing so it has also set out to reinforce the positive, or Boserupian, version of population pressure theory. However, we must avoid the dangers of replacing one deterministic theory of historical processes with another. Whether we turn to Malthus or Boserup, there is always the risk that tainted claims about history are produced. Hence, much more attention has to be spent on finding alternatives to this simplistic theoretical duel. By taking stock of the by now generous literature and research on farmers capacities for contributing to sustainable development of African agricultural systems, and the growing body of work on local environmental histories, theoretical approaches to agricultural intensification that make determinist models redundant are in fact at hand, and perhaps also growing in importance.359

5.2 Explaining Iraqw intensive agriculture

It have argued that intensive farming practices were probably used at an early stage of settlement in the Iraqw’ar Da/aw area, and hence that intensification has not followed an evolutionary path. Instead, it has occurred alongside the expansion of cultivation. Some of the characteristic intensive farming practices associated with Iraqw’ar Da/aw agriculture (such as stalling and manuring) may thus have been practised in the area for a long period of time, but the frequency and extent to which these were put to use during the nineteenth century are not known. Further, it is difficult to find any clear shifts

in farming technology which would have affected agricultural intensity and expansion, apart from the wider use of iron, instead of wooden, hoes during the nineteenth and early twentieth century.

We know that the Iraqw economy in the nineteenth century and early twentieth century was to a large extent based on cattle and smaller livestock herding. The intensive farming practices were thus a complement to a more extensive utilisation of the land. However, what drew the attention of foreign observers, German and British alike, were the intensive farming practices and the parts of the landscape that were marked by more or less permanent tillage. This bias has strongly affected previous discussions concerning the causes for the growth of intensive agriculture in Iraqw’ar Da/aw.

As Loiske, writing about the Iraqw’ar Da/aw area, Håkansson and Sheridan discussing pre-colonial agricultural intensification in the Pare Mountains in north-east Tanzania, and others have shown, there are good reasons to emphasise the importance of exchange and trading networks as a motivation for nineteenth century agricultural intensification in Tanzania.360 The Iraqw’ar Da/aw area is relatively remote from the major nineteenth century trading routes in Tanzania. Hence, in this case we are dealing mainly with local exchange networks within the Iraqw community, and contacts between the Iraqw and neighbouring ethnic groups (regional exchange networks). Kiessling (1998), Berger and Kiessling (1998), Snyder (1993) and Lawi (1999) have all pointed to the importance of contacts between the Iraqw and their neighbours, including exchange of agricultural produce.

Furthermore, Loiske has demonstrated the importance of exchange networks within the Iraqw community in more recent times, and argued that this may be one important reason for the growth of intensive agriculture in the Iraqw’ar Da/w area.361 We must, however, ask whether the development of intensive farming practices in the Iraqw’ar Da/aw area can be explained by such local and regional exchange systems or if there are also other factors involved? Unlike the examples of pre-colonial intensive agriculture in other highland areas in north-east Tanzania (Kilimanjaro, Pare, Usambara), Iraqw’ar Da/aw and the Mbulu highlands were more remote from the influences of caravan trade, which provided a strong incentive for local and regional trade and exchange activities in other areas. Neither do the scattered pockets of intensively cultivated fields in the predominantly pastoral landscape of nineteenth century Iraqw’ar Da/aw suggest that demands for grain export, out of Iraqw’ar Da/aw, was a dominant driving force behind these intensive farming practices. Regional exchange was certainly of importance to the local Iraqw’ar Da/aw economy, but this does not necessarily mean that it was the


361 Loiske 2004. See also Snyder 1996.
most prominent incentive for agricultural intensification in the area. Instead I find that it is of critical importance to take into account the possibility that Loiske’s (2004) argument offers, i.e. that local exchange may have been an important driving force. The Iraqw farming system was an agro-pastoral production system, where some individuals and families would have relied more on livestock production and others more on grain production. Sheridan notes the importance of this for the case of another nineteenth century agro-pastoral production system with intensive agricultural practices (irrigation), under low population density, in the North Pare highlands (Sheridan 2002). Among the people of North Pare, as well as in most other nineteenth century East African societies including the Iraqw, livestock production was the most prestigious activity because livestock were central to both production and reproduction.\textsuperscript{362} It was also predominantly a male privilege and more associated with power and politics than was the case with food production. Hence, livestock constituted the prime form of capital of the time, and wealth and power were often counted in livestock. For the case of North Pare in the nineteenth century, Sheridan shows how the intensive agricultural practices (predominantly performed by women, but also by men) were not at the centre of local politics and took place largely without the involvement of chiefs or other men with formal political power. Instead, the investments made in irrigation reflect more localised social processes and individual initiatives, and were basically a way to promote ones position, in particular for those with few or no cattle.

North Pare was, like Iraqw’ar Da/aw and the Mbulu highlands, an area which attracted a great many immigrants during the nineteenth century, and for newcomers investments in irrigation represented a means of acquiring a position in the society. Sheridan concludes that the main point with investing in irrigation was to attract new settlers, or “as a way to accumulate wealth in people”.\textsuperscript{363} By constructing irrigation works security of tenure was increased and the land was made attractive for other settlers. Hence, the irrigation intakes and channels were important both as productive and symbolic landesque capital. Furthermore, both Lawi (for the case of Iraqw’ar Da/aw) and Sheridan (for nineteenth century North Pare) conclude that there were advantages to be gained from cultivating and living close together.\textsuperscript{364} In many respects these highland settlements were expanding frontier areas positioned at the borders of large forests. Living and farming close together increased the possibility for labour co-operation, surveillance and the protection of crops from pest attacks by birds, monkeys and other animals. Thus the increased ecological and social security gained from forming residential clusters, rather than dispersed settlements, was an important reason for attracting people and

\textsuperscript{362} See Lawi 1999, p. 74ff.
\textsuperscript{363} Sheridan 2002, p. 79.
\textsuperscript{364} Lawi 1999, pp. 48–49; Sheridan 2002.
assimilating them into these communities. In North Pare the accumulation of people was of prime importance to the local economy and agricultural growth:

Alongside the regional economy and localized social relations of livestock clientage, the need to attract people and compose them into communities was a major catalyst for agrarian change. By managing the three basic factors of production in agrarian systems – labour, land and water – in particular ways, elderly men in Pare could maximise their status, control of labour, and prospects for accumulation even if they lacked livestock. Because the extent of cultivation was limited more by the availability of labour than by that of land, investing in the land was a strategy for accumulating people and binding them into the local production process.365

Payments associated with investments in irrigation structures in North Pare were usually received in the form of beer, and the prospect of getting such payments was a major reason for people to initiate the construction of irrigation works. As one of Sheridan’s informants notes about the attempts to attract more settlers by constructing irrigation structures: “It was like a business … water flowed down and beer flowed up”.366

Although Iraqw’ar Da/aw intensive agriculture was different from that in Pare, Sheridan’s analysis provides important clues to how we may approach the history of Iraqw intensive agriculture. For example, as I have shown, people in nineteenth century Iraqw’ar Da/aw had good reason to attract people to the area.367 They also lived in clustered settlements, as a means to enhance livelihood security and boost investments in agricultural production.

My discussion of cuts, ditches and terraces in Iraqw’ar Da/aw, as examples of both productive and symbolic capital, is also akin to Sheridan’s analysis of irrigation structures in North Pare. An important difference is, however, that farmers in Pare made systematic investments in landesque capital (i.e. irrigation works), while landesque capital in Iraqw’ar Da/aw mainly appeared as a result of incremental change, i.e. through successive tillage by farmers on permanent fields, even if systematic investments where also made, e.g. digging of drainage ditches. Because the logic of incremental change fails to provide any direct link between farmers strategies and the successive and piecemeal accumulation of landesque capital, we must find different approaches to address the question of why Iraqw farmers developed intensive farming practices.

One explanation for the incremental build up of landesque capital in the area is the clustering of settlements and arable fields. Newcomers and people with no or few cattle may, like those in North Pare, have been able to gain

status and security of tenure, and thus also social and ecological security, by maintaining agricultural production on permanent fields by means of soil conservation practices, rather than by engaging in more extensive forms of cultivation, even if the latter would have been possible. We do not have direct evidence to confirm these assumptions, but I believe it is well motivated to point out the possibility of a similar type of process in Iraqw’ar Da/aw as in North Pare. Since the process of accumulating wealth in people in nineteenth century Iraqw’ar Da/aw was more incremental, as compared to the strategy of making systematic investments in irrigation structures by farmers in Pare, we should also expect to encounter a more vague representation of these processes in the Iraqw oral history material. Understanding the evidence of the landscape, its morphology and agricultural practices, have thus been of crucial importance, and provided a possibility of analysing the role of permanent cultivation and incremental built up of landesque capital in relation to the process of agricultural intensification.

Another reason for the establishment of permanent cultivation in Iraqw’ar Da/aw, disregarding population pressure and regional marked demand, is the importance of local exchange systems. As I have only conducted interviews with a few old people in Iraqw’ar Da/aw about Iraqw settlement and agricultural history in general, I have little oral history material to contribute with on this matter. However, an elderly woman whom I interviewed in 2002 about the landscape in the early twentieth century in Iraqw’ar Da/aw, pointed out, while commenting that there were more livestock when she was young, that as some families mainly depended on livestock while others mainly engaged in cultivation, these resources were commonly exchanged between families. At this time there was also a more strict division of labour between men, who took care of the livestock, and women who did most of the agricultural work. In particular she claimed that it was the families within the local community (Aya), who were engaged in these exchange activities.

Loiske presents an analogous case of an Iraqw family in the 1990s living in an area outside Iraqw’ar Da/aw, where the diversity in the Iraqw agro-pastoral production system and the institutionalised exchange networks between Iraqw households is clearly demonstrated, and concludes that a strategy of diversification also means connectedness.368

While Sheridan (2002), and even more so Håkansson (1995), point to the impact of regional trade and exchange networks as a major incentive for agricultural intensification in Pare, the impact of such market incentives were probably weaker in nineteenth century Iraqw’ar Da/aw. The regional exchange networks of the nineteenth century that connected different areas and peoples and provided opportunities for specialisation (e.g. in agricultural or livestock production), formed a diversified regional economy and in places gave rise to

368 Loiske 2004, p. 109. See also Östberg 2004 for a similar argument about connectedness and intensification in the history of the Marakwet in western Kenya.
a relatively polarised and mutual co-existence between agriculturalists and pastoralists. In the Iraqw case, their close contacts with Datoga pastoralists is an example of such a co-existence based on comparative advantages between two groups of people with different production systems, forming a regional system of labour division. For nineteenth century Pare, Sheridan notes that even if regional markets were of importance to the local economy and a basic driving force behind intensification, most of the surplus produced from the intensive farming practices did not feed into regional exchange networks or the caravan trade, but was traded locally, mainly by women, at market places in the highlands. The main function of the agricultural surpluses produced in Pare was to retain a high degree of food security, which allowed for investments in livestock rearing and craft production.

Although the existence of regional exchange networks is an important factor in the history of Iraqw agriculture, it is too much of a simplification to replace the siege hypothesis with this kind of market hypothesis as the major explanation for agricultural intensification in Iraqw’ar Da/aw. In the first place, the importance of livestock production in the nineteenth century agro-pastoral production system in Iraqw’ar Da/aw, suggests that the Iraqw were not dependent on regional exchange systems. Secondly, it would require more substantial evidence of the importance and frequency of grain export from the Iraqw’ar Da/aw area. Thirdly, there are, as noted earlier, other factors that have contributed to the development of intensive agricultural practices in the Iraqw’ar Da/aw area. Hence, if we take into account that the incentives for regional exchange were probably weaker in Iraqw’ar Da/aw than in Pare due to its more peripheral location in relation to the major caravan routes and major economic and political centres, it seems unlikely that intensive agriculture in Iraqw’ar Da/aw mainly developed as a consequence of a regional demand for grain.

In order to avoid the dilemma of forcing grand, but incomplete, explanations onto the history of the Iraqw, it may be fruitful to follow the analytical approach suggested by Sheridan. Consequently, in conjunction with a macro-oriented discussion in the search for a general and overarching driving force affecting a local system of production, we must also be attentive to the political, social and economic situation at the local level, i.e. within the local system of production, as well as to its physical manifestations on the ground. This implies a focus on individual farmers’ strategies and the particular historical conjuncture of events that lead to the investment in intensive farming practices.

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369 Håkansson 1995; Widgren and Sutton 2004 (in particular the article by Östberg). See also further references in chapters one and four above.
370 Sheridan 2002
Iraqw’ar Da’aw and the synergies of agricultural intensification

The discussion above shows that it is problematic to insist on one prominent driving force that acted as a catalyst for the process of agricultural intensification in Iraqw’ar Da’aw. Instead a number of interrelated factors contributed to create favourable conditions for intensive farming practices. The importance of synergistic processes is a relatively underestimated aspect in historical studies of agricultural intensification. Taking on this more dynamic analytical perspective provides an opportunity to treat historical process as open and contingent, as it allows for a more relational analysis of social, political, economic and environmental factors of change. Moreover, landscape change, in this perspective, is in itself analysed as an active part in the process of change, rather than simply as a passive response to a particular set of driving forces.

In every case of agricultural intensification it will be a particular historical conjuncture of processes and events that initiates the process. It will include driving forces that are commonly mentioned as motivations for agricultural intensification (e.g. population pressure, market forces, political and social coercion). But it will also incorporate less frequently mentioned factors such as social and political cohesion and local institutions for exchange, labour division and natural resource management. A problem with analysing agricultural intensification (or other processes of agrarian change) is often the difficulty of balancing the particularity of a specific historical setting with a set of general driving forces. I believe that this problem mainly derives from the tendency of treating the process of agricultural intensification as a passive response to independent forces, which are often seen as acting as a constant and lingering incentive without which a process of intensification would cease. Another problem is that the deeper we dig into the historical origins of a process of intensification the more likely we are to find less evidence for why it started. In many cases we will not be able to find a clear starting point or event in history that acted to convince a particular group of farmers of the benefits to be gained by intensifying their farming practices.

The problem of describing details of causation in histories of agricultural intensification is also pointed out by Sheridan in his example of North Pare:

The indigenous irrigation system of North Pare, … , demonstrates how African land use links farmers’ material interests and symbolic systems. Trying to determine which has causal priority in African agriculture may be futile because intangible symbols may act as economic forces and the hard facts of dirt, seed, and water may assume cosmological significance.\(^{371}\)

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What he addresses here is the importance of considering landesque capital as both a symbolic and physical manifestation, which requires a combination of materialist and hermeneutic analytical approaches. As I have pointed at in previous chapters, such a methodological and epistemological eclecticism (Sheridan refers to his method as a mixing of oil and water) can be a way to avoid economic or political determinist approaches to agricultural intensification.

The relational analytical approach suggested here implies that we cannot reach a perfect understanding of how a process of agricultural intensification develops. What we can do, and indeed what most analysts have always done, is to point at the social, ecological, political, demographic and economic contexts that act as incentives for farmers to intensify agricultural production. However, as soon as any of these particular contexts are translated into a static principle of cause and effect, we must be aware that the analysis has become detached from historical processes in favour of abstract theory.

An analytical step that can be taken, where a higher level of generality is combined with a genuine historical perspective, is to consider the effects of self-reinforcing aspects of agricultural intensification. When a process like agricultural intensification takes off, or gathers momentum, it is in many cases more relevant to search for various positive feedback loops, rather than isolated driving forces, when trying to explain the process. I am not suggesting that there is a fundamental difference between this approach and the conventional focus on more or less independent driving forces in the study of agricultural intensification. The point is simply that it is important to avoid using driving forces as static and unchanging catalysts for intensification. By definition, a catalyst is a substance that is not affected by the reaction it sets off, and this is seldom or never the case in processes of agricultural change, or in processes of development and growth in general.

From the analysis conducted in this study it is possible to sum up the various factors that have contributed to the development of agricultural intensification in the Iraqw'ar Da/aw area.

- *The physical geography and climate* in the area were well-suited to an early adoption of intensive farming practices (e.g. stalling of cattle, permanent cropping and manuring). In particular, the abundance of dry-season grazing and possibilities for year round cultivation, owing to the dissected highland topography, have influenced the organisation and development of agricultural practices in the area.

- The fact that people of various ethnic identities were assimilated into Iraqw society and culture points to the importance of social and political cohesive forces in mobilising labour and increasing food and livelihood security.
• Pre-colonial Iraqw society shows few signs of a marked social and economic differentiation, but the power and authority of ritual leaders may have contributed to facilitate the process of in-migration by providing a sense of security and protection. As Thornton has argued: “Iraqwar Da’aw absorbed large numbers of peoples of diverse ethnic origin who accepted the leadership and supernatural protection of the qwasläre [ritual specialists]”. But, as some of the most powerful ritual leaders were themselves immigrants to Iraqw society (see chapter four), the political and social structure of the society is also a product of immigration. The immigration into Iraqw’ar Da/aw and the Mbulu highlands during the nineteenth and early twentieth centuries indicate that the area was a relatively secure and hospitable place to settle in.

• The physical and economic geography of the region stimulated trade and exchange between highland and lowland regions, providing an additional economic reason for the concentration of Iraqw settlement in the Mbulu Highlands, which would have existed even at low population densities. In addition to regional exchange networks, the agro-pastoral system of the Iraqw also provided an incentive for local exchange networks between families and neighbours in the local community, which are likely to have played an important role in sustaining the local production system.

We need also to address the issue of incremental change in relation to the standard assumption that agricultural intensification implies a declining marginal return to labour inputs. Was a decline in labour productivity a restraining factor to the development of intensive farming practices in the area, or not? What about possible economic benefits in terms of increased labour productivity? One clear advantage with having permanent fields was that labour co-operation in looking after crops, e.g. guarding from pest attacks, would have reduced the need for labour inputs and thus increased labour productivity. To sustain production levels on permanently cultivated fields manure was needed. But, as cattle were kept in the houses during night time, animal dung was readily available at the nearby homesteads, implying that the act of manuring may not have been associated with a significant decrease in labour productivity. Today, most farmers in the area feel that they have a shortage of manure, and that the fertility of their fields is not as good as they could have been. In the nineteenth century, however, livestock production dominated over cultivation, and even if not all farmers had large herds of livestock, manure was not a scarce resource in the area. Furthermore, by cultivating on permanent fields farmers contributed to an incremental build up of landesque capital, which also counteracted a decline in labour productivity.

None of the various forms of landesque capital in Iraqw’ar Da/aw requires large maintenance costs, as compared with most pre-colonial systems of irrigation, where much more elaborate structures were maintained. Hence, investing in permanent cultivation or in the draining of a valley bottom in Iraqw’ar Da/aw has been associated with a relatively low level of labour input over time. By cultivating the lower slopes and valley bottoms (including the digging of necessary drainage ditches) farmers in Iraqw’ar Da/aw have been able to access a permanent supply of ground water for crops, grazing, reeds or meadows, without the elaborate constructions required for irrigation.

There may thus not have been a labour-efficiency threshold, i.e. no significant reduction in labour productivity, holding back intensification in Iraqw’ar Da/aw. Having rejected the possibility of finding a dominant reason for agricultural intensification in Iraqw’ar Da/aw, we instead arrive a situation, or a historical and environmental conjuncture, that includes the following factors:

1. Building wealth and security (ecological, nutritional, social and economical) in people.
2. Little or no decline in labour productivity.
3. Local and regional exchange networks.
4. Social cohesion (clustering of settlement and arable fields).
5. A refuge area for people struck by the calamities of the late nineteenth and early twentieth centuries.

These different factors provide answers to the question of why agricultural intensification has developed in the area.

**Agricultural intensification as its own driving force**

From the different factors discussed above it is possible to identify a set of self-reinforcing processes, or positive feed-back loops, providing further insights into how the process of agricultural intensification has progressed in the Iraqw’ar Da/aw area. As the details of these processes have already been discussed they are summarised here as a general set of processes that are crucial to the understanding of agricultural intensification in this area and the Mbulu highlands during the nineteenth century or perhaps even earlier depending on the when this highland area was settled by agro-pastoralists. Four intertwined self-reinforcing processes can be identified:

1. Intensive (permanent) cultivation – landesque capital (both symbolic and material) – intensive cultivation.
2. Landesque capital (symbolic and material) – attracting people – landesque capital.

The processes above should be considered as loops or synergistic relations, without any clear start or end. All of these processes develop as relational and intertwined processes and are not possible to divide into causes on the one hand and effects on the other. I will not try to rank these processes according to their relative importance, as this would probably have changed during the history of agricultural intensification in Iraqw’ar Da/aw. Further, as these processes are not really possible to separate, I believe it is better to treat them as an explanatory package.

The argument I have pursued here is that agricultural intensification in Iraqw’ar Da/aw has to a large extent been *its own driving force* and that this process is characterised by incremental rather than systematic changes. There are at least three good reasons for discussing agricultural intensification as a process that produces its own mechanisms for change and development. First, standard theoretical models in economics and economic geography, which in recent years also have become accentuated with the debate about a new economic geography, stress the importance of cumulative and self-reinforcing processes in relation to various processes of development and economic growth.373 Second, the call for relational epistemologies in geography and other disciplines is a reason for challenging simplistic cause and effect explanations. A third reason is the by now large body of local and regional environmental histories, which, inspired by non-equilibrium models within ecology, have destabilised much received wisdom of cause and effect in population and environment interactions.374 When attempting to explain processes of agricultural intensification it can thus be fruitful to examine how different factors are interrelated and how the process of intensification may feed on itself as a virtuous circle.375

In the case of the Iraqw intensive farming system this analytical perspective has allowed for a reinterpretation of the earlier dominant explanation for why we find intensive farming practices in the Iraqw’ar Da/aw area, in the Mbulu highlands. During most of the nineteenth century this particular geographical area, and the surrounding areas, was a frontier settlement to which people from all over northern central Tanzania moved, and not a fully populated and secluded homeland from which people could not move out.

373 Krugman 2000.
374 See Scoones 1999, for a discussion about the “new ecology” and the social sciences.
375 The wording in the last phrase of this sentence is borrowed from Adams (2004, p. 138).
Returning with results

In July 2002 I returned for a short visit to Kwermusl village and Hhay Geay in order to disseminate and discuss my main findings. For this purpose I had produced a small booklet in Kiswahili that summarised my argument about the general historical geography of Iraqw’ar Da/aw (i.e. what I have discussed in chapter four above). Apart from presenting and discussing the contents of the booklet with some of the farmers on the ridge in the mapped area, I held a meeting with a group of male elders and farmers in Kwermusl village. The booklet was also distributed to individuals and institutions outside Iraqw’ar Da/aw who have been involved in the research project.

In the meeting I held, I was accompanied by Deogratius Hillu, whom I have worked with both as an interpreter and mapping assistant, and who knows my work well. Together we addressed the contents and arguments of the booklet, and in particular we used the photographs (Figures 4.1, 4.5–4.8) as a basis for discussions. By commenting on the landscape in these photographs, I explained my conclusions about the settlement and agricultural history of Iraqw’ar Da/aw and its surroundings. I stressed that many Iraqw lived outside the Iraqw’ar Da/aw area in the late nineteenth and early twentieth centuries as shown in Figures 4.1 and 4.5, and that a much larger area than Iraqw’ar Da/aw was settled by the Iraqw during the late nineteenth century. I also commented on the significance of immigration to the Mbulu highlands and the Iraqw’ar Da/aw area during the nineteenth century.

As most of the Iraqw in Iraqw’ar Da/aw trace their origins to some of the surrounding ethnic groups, my conclusion about immigration was not a matter of discussion. However, what was intensively debated at the meeting, as well as in discussions with individual farmers on the mapped ridge, was the pictures of Iraqw settlement outside Iraqw’ar Da/aw. The general view of the Iraqw elders and farmers was that most Iraqw lived inside Iraqw’ar Da/aw in the late nineteenth and early twentieth centuries and that I was wrong in concluding that there were more or less equally densely settled areas outside. However, when the discussion about the pictures at the meeting had come to an end, I was told that it was indeed possible that areas outside Iraqw’ar Da/aw would have been settled at this time. As one of the elders explained, the early settlement in present day Gehandu ward (as shown on Figure 4.5), outside Iraqw’ar Da/aw, was facilitated by the strong powers and military skills of the Iraqw leaders who had settled there. As these leaders could defend the Iraqw community from hostilities and cattle raids, it was possible for the participants at the meeting to reconcile the pictures of Iraqw settlement outside Iraqw’ar Da/aw with their own knowledge about Iraqw settlement history.

376 Unfortunately, this last visit to Iraqw’ar Da/aw was cut short due to a malaria infection, and I had to leave the area after only three days.
Hence, I was introduced to oral histories and traditions among the Iraqw that tell of early settlements outside Iraqw’ar Da/aw, which exist parallel with the dominant narrative of Iraqw’ar Da/aw as a confined settlement and homeland. For example, I was told that the place called Dafi’s in Figure 4.5 is named after a leader called Dafi Matoh who lived there, apparently before or at the time of Jaeger’s expedition. This acceptance of the landscape evidence shown in the pictures does, however, not imply that the Iraqw whom I discussed the issue with fully accepted my critique of the siege hypothesis. But, in any case, it was quite encouraging that during that last moments of my fieldwork in Kwermusl village, I received a nuanced critique rather than a total rejection of my conclusions.
Appendix

Comments on the use and processing of interview data on settlement and landscape change in the mapped area

For the purpose of creating maps using MapInfo, the interview data was entered into two databases, one on land use and rights to land and one on settlement. In the first database each row represented a field. In the database on settlement each row represented either a house or a deserted house site. In other words, the mapped details were divided into different rows, while the columns were set up according to the different time-periods as defined above. The maps on land use have thus been pieced together from data on individual fields. Since the database is set up according to the mapped fields, the present day field pattern is used as the basic spatial frame for all time-periods, which means that the maps of past time-periods include a spatial bias. However, this is a minor problem as long as the maps of past time periods are not interpreted as exact representations of historical situations, but as approximations of the local landscape history.

The main problem with the temporal framework of the databases, i.e. the different time-periods used, has been to adapt the interview data to this predefined structure. In most cases this has been uncomplicated, but in some cases it has been more difficult to align the interview data with the time-frame of the database. Some of the information in the database may thus be slightly misplaced chronologically. This however, has not affected the sequence and overall pattern of change.

In the analysis of the interview data, the databases have been used as a kind of filter, where information has been successively reduced and generalised. For this purpose most of the detailed information about land use and property rights has been included in the database in additional columns, with references to the original notes taken during interviews. The process of adapting the interview material to the database structure was thus kept transparent in the database throughout the analysis. Information on crop rotations and more detailed information concerning vegetation and oral histories on property rights have, for example, been excluded in this process.

By displaying the spatial and temporal contexts of individual fields and oral accounts, the database and the maps also provided an overview of
inconsistencies and gaps in the interview data, and have been used as analytical tools for addressing such problems. To some extent aerial photographs from 1958 (February), 1982 (December) and 1988 (February) have also been used to corroborate and complement the interview material. The aerial photographs and the oral history accounts matched each other well, and the aerial photographs have primarily been used to fill in gaps in the oral accounts on land use history. A few inconsistencies were noted in the interview data, but these have all been of minor importance to the overall analysis.
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