# LAND REFORM IN NAMIBIA

# SPATIAL ANALYSIS AND LAND DEGRADATION

# IN THE OTJOZONDJUPA REGION

A THESIS SUBMITTED IN PARTIAL FULFILMENT

OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS (GEOGRAPHY)

OF

THE UNIVERSITY OF NAMIBIA

BY

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MARCH 2014

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## ABSTRACT

In Namibia, the land question remains high on the agenda of Government, which is implementing a land reform programme since 1995. The reform attempts the correction of inherited imbalances in the access to land in order to alleviate poverty and dependency. The research was guided by the theoretical framework known as *'decoloniality'*; and configured around the concept of *land tenure structure,* considered as a central element of any agrarian system. The subject has been widely investigated, but little attention has been paid to the spatial depiction and analysis of land tenure. Overcoming such lack of data, the thesis provides quite an accurate, contextually relevant and updated thematic map of the land tenure structure in the Otjozondjupa Region. The mapping, which is one of the pivotal goals of this investigation, facilitated enquiring about the implications of the current land tenure structure, focusing on significant social outcomes of the land reform. The spatial characterisation of the land tenure structure provided for the possibility to unfold its relationship with environmental degradation, currently a relevant concern in arid and semi-arid countries like Namibia. Outstanding results reveal that: i) access to land strongly remains racially biased; ii) the land reform is apparently benefiting (already) wealthy Namibians; iii) the benefits for the poor derived form the reform are debatable; iv) communal tenure does not imply a higher degree of environmental degradation, as it is often argued. The concluding discussion suggests strengthening communal rights and powers over land, as well as reconsider the suitability of privatization programmes as means to combat desertification, rural poverty and social inequalities.

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AALS – Affirmative Action Loan Scheme.

AVHRR – Advanced Very High Resolution Radiometer.

CC – Closed Corporation.

CODESRIA – Council for the Development of Economic and Social Research in Africa.

CSICI – Consejo Superior de Investigaciones Científicas.

EIS – Environmental Service of Namibia.

ETM – Enhanced Thematic Mapper.

FAO – Food and Agriculture Organisation of the United Nations.

GDP – Gross Domestic Product.

GIMMS – Global Inventory Modelling and Mapping Studies.

GIZ – Deutsche Gesellschaft für Internationale Zusammenarbeit.

GTZ – Deutsche Gesellschaft für Technische Zusammenarbeit.

HIC – Halifax Initiative Coalition.

IMF – International Monetary Fund.

LAC – Legal Assistance Centre.

LTDR – Long Term Data Record.

MAWF – Ministry of Agriculture, Water and Forestry.

MET – Ministry of Environment and Tourism.

MLR – Ministry of Lands and Resettlement.

MODIS – Moderate Resolution Imaging Spectrometer.

MRLGH – Ministry of Regional Local Government, Housing and Rural

Development.

NACSO – Namibian Association of CBNRM Support Organisations.

NASA – National Aeronautics and Space Administration.

NAU – Namibian Agricultural Union.

NDVI – Normalized Difference Vegetation Index.

NGO – Non Governmental Organization.

NOAA – National Oceanic and Atmospheric Administration.

PAR - Photosynthetically Active Radiation.

PTY – Proprietary Limited Company.

RON – Republic Of Namibia.

RS – Remote Sensing.

SPOT – Satellite Pour l'Observation de la Terre.

WB – World Bank.

## ACKNOWLEDGEMENTS

Firs of all, I would like to thanks my supervisor, Prof. Fritz Becker, for being always available and prompt to help me in the course of this research, and to my uncle and counsellor in the development of the study on land degradation, Agustín Lobo, for teaching me so much and orientating my work to make it certainly scientific. Without them, this paper would not exist. Secondly, I would thank two people who offered their inestimable help expecting nothing in return. These are Fransina Kamenjono, who made possible that the field work achieved its objectives, and Nathan Vyklicky, whose English editing in a record time improved greatly the quality of this paper. I would also like to thank all the people that offered their help and their assistance as sources of information: Rina Hough, from the Namibian Agricultural Union, Xoa//an /ai!ae, M. Heindrich, M. Katjivery and E. Kavetuna from the different Otjozondjupa communal areas and Communal Conservancies, as well as V. D. Mahaherero from the Royal Kambazembi family. Without them there would not be data to analyse in this thesis. Finally, I would like to appreciate here the help always offered by the personnel of the Spanish Embassy in Windhoek, and to the Spanish Cooperation Agency for International Development which funded my two years in Namibia, and all the staff of their OTC in Windhoek: Roelof Kunst, Candice Zimny, and very especially to Carmen Sendino.

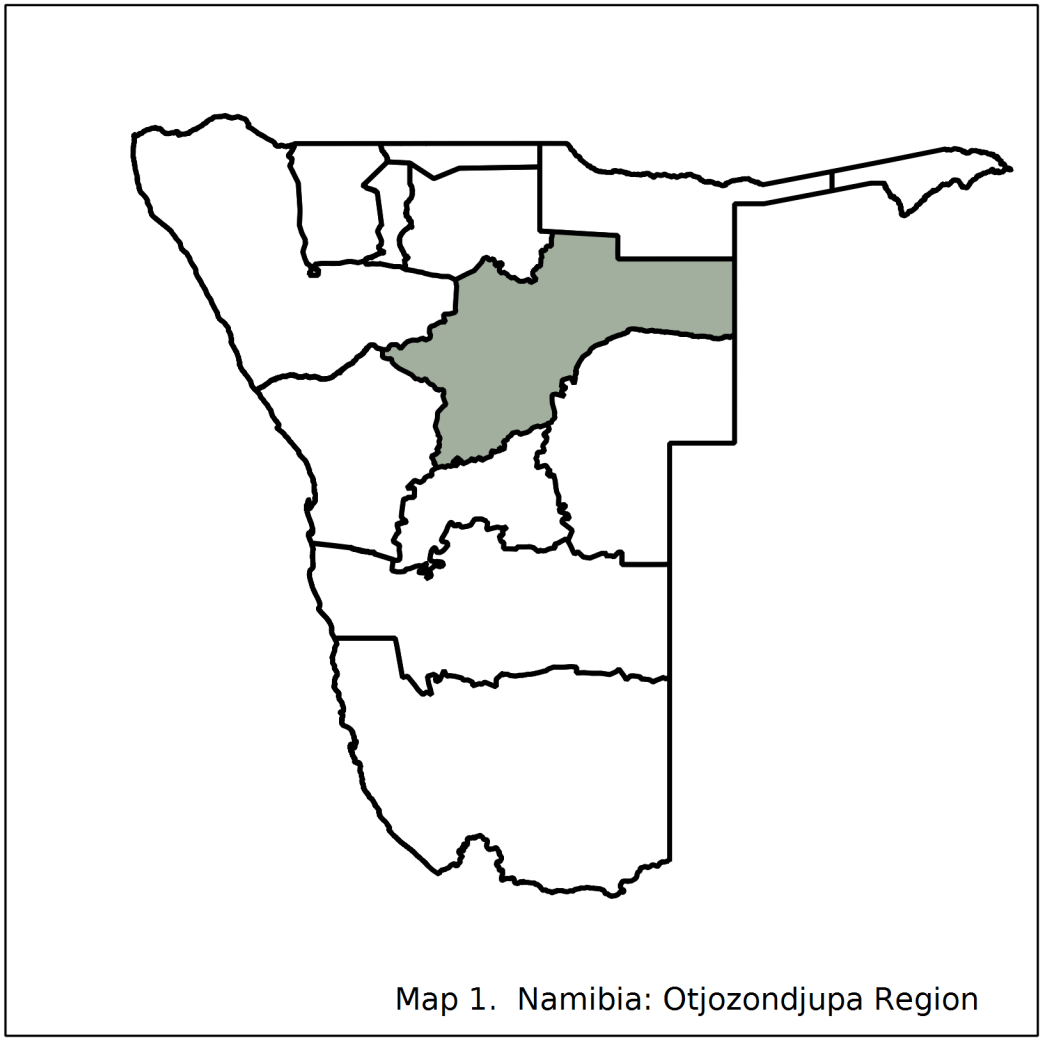
*A mis mpadres*

## DECLARATIONS

I, Pablo Gilolmo, declare hereby that this study is a true reflection of my own research, and that this work, or part thereof has not been submitted for a degree in other institution of higher education.



Pablo Gilolmo 06 March 2014



Map 1. Namibia: Otjozondjupa Region

# I. INTRODUCTION

The land question in Namibia is a sensitive one. An important portion of the Namibian population depends on land, in one way or another, for their survival (Mendelsohn, 2006 p. 7). At the same time, the exponential growth of urban slums is causally connected to the lack of opportunities to develop a dignified livelihood in rural areas (Niikondo, 2010). This incapacity to support the lives of rural inhabitants indicates that the Namibian agrarian system does not function adequately. The problem is inherited from the pre-independence political situation, which favoured one sector of the population in detriment of the rest. As some argued, the liberation struggle was also a struggle for the land (Tapscott, 1994).

In order to deal with the situation, the Government has implemented a land reform programme since 1995. As shall be shown below, rural livelihoods are organized around the *agrarian system*, of which *land tenure structure* is a primary element. The land reform programme in Namibia focuses on mechanisms to assist in access to land by 'previously disadvantaged Namibians'. Therefore, it aims to induce changes in the land tenure structure in particular. The desired outcomes include poverty alleviation and correction of socio-economic imbalances (MLR, 2001, p. 1; Gargallo-Sariol, 2009 p. 64) that depend on the agrarian system in general.

However, after 18 years, not even the Government claims success in the task (see Hilukilua, 2013, in press). The concern is social as well as academic, as

indicated by the great attention it captures in the media and the large amount of publications about it (see Werner, 2012). Most of these publications focus on evaluating the process of land reform and finding the reasons of such lack of success. The evaluation necessarily depends upon the characterisation of the agrarian system, the land tenure structure, and the results of the changes that land reform has achieved since its inception.

### I.1. Statement of the problem

However, despite all the creativity that researchers have demonstrated, it has proven difficult to carry out a quantitative evaluation of land reform in Namibia and characterize the current land tenure structure. The reason is the absence of a comprehensive, systematic, updated and reliable data set on which to base the evaluation. As shall be shown, once this data are available, the progress and shortfalls concerning land reform become self-evident. Furthermore, relevant questions about the implications and social meaning of the current land tenure structure (and its changes since independence) become available for objective enquiry.

### I.2. Objectives

(i) Fill the gap in empirical data regarding the land question in general and land

reform in particular, for the research community and the society in general (progress, trends, goals, failures and implications for the socio-economic and environmental well-being of rural areas).

(ii) Characterize the land tenure structure in the Otjozondjupa Region, as a fundamental step in order to characterise the whole regional agrarian system.

(iii) Analyse the land tenure structure with regard to its social implications.

(iv) Enquire about the relationship between land tenure structure and environmental degradation.

## I.3. Theoretical frameworks

### a) Agrarian Systems

Agrarian systems are the whole set of circumstances, practices, agreements, impositions and mental dispositions upon which rural societies organise and develop (Kuhnen, 1995). For the sake of simplicity, they are conceptualised as *elements* of agrarian systems. A particular agrarian system is characterised by two properties: i) the concrete nature of the elements in that system; and ii) the nature of the relationships between those elements (Fig. 1, p. 5).

- **Elements**

The elements of agrarian systems can be defined as all aspects –material or immaterial, natural or artificial– of reality that play an important role in the configuration of an agrarian society and as such any list of elements is somewhat arbitrary, rather than a representation of absolute facts. It is important to note that Figure 1 is not a classification in the strict sense of the term, but a schematic way to organise and clarify complexity.

As it can be observed, the number and variety of elements of an agrarian system is vast, even when presented in a simplified, manageable manner. Nonetheless, the relations between them are usually bi-directional rather than hierarchical, and the organisation does not attempt to depict the relative importance of some elements over others. The schema depicted in Figure 1 would become more and more complex the more it was to zoom into any part of it.

There are some elements that are the result of negotiation or conflict between human beings, and are fixed (more or less strictly) either as unwritten social convention or as a consistent body of rules codified in written laws. These elements are the ones which provide the different actors involved with a common set of concepts and understandings, so it becomes possible to coexist with each other. The main characteristic of these elements is that they are a result of human agency and decision-making. In Figure 1, they are grouped under the tag “socio-legal elements.”

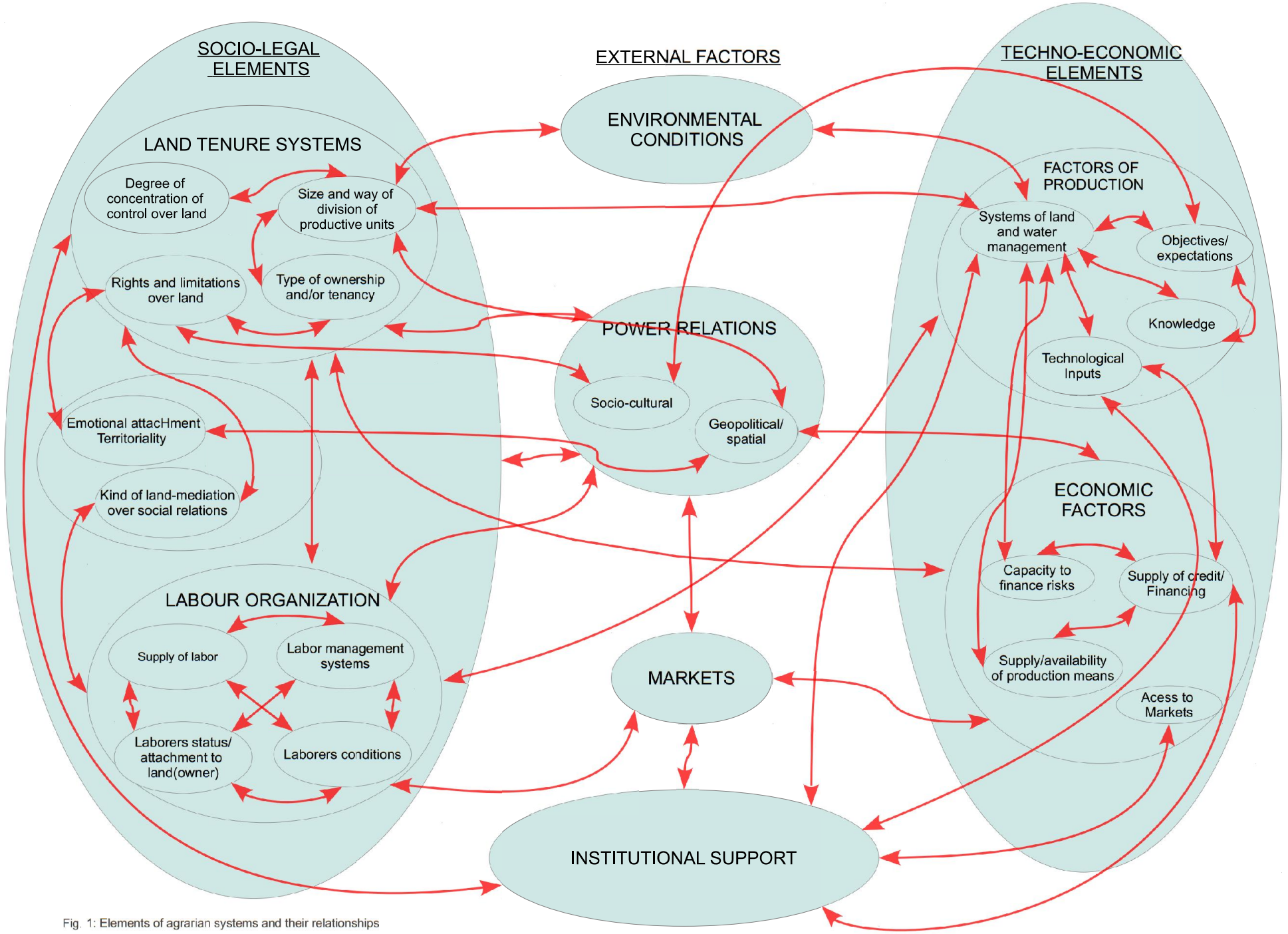



Fig. 1: Elements of agrarian systems and their relationships

The second block in which the elements of an agrarian system are grouped is tagged as “techno-economic elements.” They also arise from human agency, but in relation to parts of reality that are not completely under human control. Elements such as systems of land and water management, knowledge, and the whole set of economic factors, can be grouped here as ways in which human beings relate to a given environment (natural or not). In other words, techno-economic elements are those which humans develop in order to obtain their material welfare and to achieve social reproduction.

Moreover, there are some elements that can be referred to as external factors, in the sense that they are not at all under the control of human decision-making, such as environmental conditions, or they are very difficult to affect by the actors of an agrarian society, such as markets. In practice, people may affect elements that are classified as outside of human control. For example, although environmental conditions are not created by human action, they can be affected by it in a variety of ways (e.g. land degradation, pollution, eco-friendly management).

Institutional support is included because, under a State society, State decisions regarding agrarian communities under its control play a fundamental role in their final configuration. Finally, power relations are often argued to be a fundamental factor of any social organisation, and as such, any agrarian society is deeply shaped by them.

- **Relationships**

Most, if not all, the relations depicted in Figure 1 are dialectical. For example, the type of ownership and/or tenure of land, as well as the rights and limitations over it, are configured depending on power relations; at the same time, these power relations are configured over time as a result of the type of ownership and the character of the rights and limitations over land. There is a continuous negotiation/clash between these elements which configures and reconfigures them constantly.

The dialectical character of these relationships is an important point to take into account, because it minimises the risk of oversimplified cause-and-effect approaches. It means that the particular relations between elements are not defined by their relative position in a mechanicistic schema. On the contrary, they are defined by their relative strength (importance) and the overall conditions at a given point in time (Mao, 1968 [1937], p. 330).

- **Characterizing the Namibian agrarian system**

Agrarian systems can be classified according to different central elements (Kuhnen, 1995). Some take the producer as the central element, and thus classify agrarian systems as small-scale or subsistence, family-capitalized or agro-business. Others take tenure as the central element, focusing their analysis on leasehold and

rent formulas (share-cropping, leasing, etc.), or the degree of concentration of land ownership as the defining aspect.

Other authors, especially in the environmental sciences, focus on the way the land is used and managed, so they divide between communal, diversified uses, or monoculture and agro-industry. Still other authors, especially from an historical perspective, centre their attention on the organisation of labour, and thus differentiate between feudalism, direct producers, wage workers, labourers and rural proletariat (Murmis, 2002).

It would be relatively simple if there were a linear and invariable relation between all of these aspects of agrarian systems. Unfortunately, that is not the case and every possible combination may exist. The point of view of this researcher is that none of these elements can be considered paramount over the others, as their relative importance depends on the historical moment and circumstances (dialectics). Therefore, in order to characterise any agrarian system, all aspects should be meticulously defined and described, as well as all the relations between them.

For the limited purposes of the present research, however, the contribution to the characterisation of the Namibian agrarian system will be the depiction, at a regional level, of one of its (currently) most important elements: the land tenure structure. Furthermore, the contribution will include the unravelling of the relationship of this element with another one currently of paramount importance: environmental condition (in this case, land degradation). According to FAO (2002, p.7):

> "Land tenure is the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land. [...]. Rules of tenure define how property rights to land are to be allocated within societies. They define how access is granted to rights to use, control, and transfer land, as well as associated responsibilities and restraints. [...]".

In this thesis, land tenure will include ownership (under every possible legal formula), communal tenure, as well as the extralegal (or illegal but real) practices which also determine *the relationship among people with respect to land*. Furthermore, land tenure here will be classified according to particular criteria considered relevant for the Namibian context (see section III.2.a, p. 38). The word 'structure' implies looking at land tenure as an organised and organic reality at a regional level.

Land tenure is regarded as a fundamental element of agrarian systems in those contexts where it is so unequal that it decisively impacts the rural social organisation (Kuhnen, 1995). Given the recent Namibian history, and the considerations posed at the beginning of this chapter, this is the case in the area of study, as the Otjozondjupa Region was colonised in the strict sense of the term (i.e. settled by colonists), unlike in other parts of Namibia.

### b) Epistemic colonisation and decolonisation

Colonisation, in its most common definition, refers to the historical process by which some (European) powers came to control and rule the destinies of other parts of the world and their inhabitants. Therefore, once (formal) political independence was achieved by those peoples, through so-called decolonisation, the colonial era was over, and the post-colonial one began. However, this common historical approach is not universally accepted.

Neocolonialism is a well established concept which refers to that (mainly) Western powers continue to exert control over the resources of the former colonies. In the same line, in Namibia and other parts of southern Africa, the expression "economic independence" has become common, to emphasise the necessity of completing the decolonisation process by restoring the wealth that is still mainly in the hands of the former colonists.

Both concepts, neocolonialism and economic independence, are attempts to capture the implications and profound consequences of colonisation that remain current, beyond formal political power alone. However, both of them are limited, focusing only on the control of wealth and natural resources. Recent theoretical developments in (formerly) colonised parts of the world have approached the matter trying to uncover all the complexity involved in it.

In 1991, Enrique Dussel, an Argentinian philosopher, presented a series of conferences in Frankfurt under the title *1492. The covering of 'the other'. Towards*

*the origin of the 'myth of modernity'* (Dussel, 1994). As 1492 was the year in which America was "discovered", and its colonisation by the Spanish and Portuguese powers commenced, it is the milestone at which the colonisation era started, lasting until the independence of the African colonies in the second half of the 20th century.

Dussel is well-known among Latin American scholars for being the author who opened the way to think about colonisation as the historical process by which completely different ways of understanding the world and the social life (cosmologies) came into contact with each other, with the result of (violent) imposition of one of them over the rest. Thus, not only the control over the socio-legal corpus (State) and the exploitation of natural resources and labour (economy) were involved, but also the whole set of very basic human conceptions which define what is "good" and "bad," "acceptable" and "unacceptable," "desirable" and "undesirable," "progressive" and "regressive," etc. This theoretical approach ought not be confused with cultural relativism, which basically states that no one is in position of judging other people's cultural practices. Imposing one logic over the others and stigmatizing them as "lower," "uncivilized" or "savage" is the meaning of "*the covering of the other"* in Dussel's title.

The author, along with other contributors, refers to this outcome as *epistemic colonisation*. The approach, whose objective is to unravel this process in order to overcome the modern state of affairs by addressing the power relations between cultures, has been labelled as *decoloniality* or *the decolonial option* (Mignolo, 2008). This theoretical framework finds its roots in the writings of Franz Fanon (*Black*

*Skins, White Masks*, 1967 [1952]) and Aimé Césaire (*Discourse on Colonialism*, 1972 [1955]), and several other researchers have developed it in a variety of ways and geographical contexts.

In Latin America, Ramón Grosfoguel (2012) has explored the possibilities of deconstructing Western universalisms (as the expression of the imposition of the European culture over the rest of the world) and constructing more inclusive "pluriversalisms" which would mix contributions from different cultural frameworks and accept the difference between different locations and peoples. In *Epistemic Disobedience. Independent Thought and De-Colonial Freedom*, Walter Mignolo (2009) denounces the racist classification of knowledge systems and claims for its decolonisation as a necessary step in order to build "democratic, just, and non-imperial/colonial societies."

Certain South Asian authors have followed related routes, as in the case of Gayatri Chakravorty Spivak (India) and Ranajit Guha (Bangladesh). Together, they edited *Selected Subaltern Studies* (1988), which looks critically at the historical relevance attributed to the actions and decisions of marginalized people, for example in context of peasant revolts in India. Their argument can be summarised as the recognition of such marginal people (the subaltern) as active historical actors, instead of mere masses moved by the force of events beyond their control. Spivak has also published *A Critique of Postcolonial Reason: Towards a History of the Vanishing Present*, (1999), where she argues that European philosophy systematically excludes the subaltern from being part of the human condition.

In Africa there are also authors who reflect the same line of thought. Jeremiah O. Arowosegbe (2008) looks from this perspective into the work of Claude Ake in *Decolonising the social sciences in the global South: Claude Ake and the praxis of knowledge production in Africa*, while Sabelo J. Ndlovu-Gatsheni (2012) works on related topics in *The Importance of Decolonial Epistemic Perspective for Pan-African Unity in the 21st Century*. Another example is Francis B. Nyamnjoh (2004), who argues that "education in Africa is the victim of a Western epistemological export that takes the form of science as ideology and hegemony." Other African examples are those of Kwasi Wiredu (1995) and his *Need for Conceptual Decolonisation in African Philosophy*, or Sylvia Tambale stating that "[A]s we all know many of our countries often flag independence but our minds are still very much colonized'' (CODESRIA, 2012).

- **Decoloniality and the Namibian rural context**

Cattle breeding and keeping has been practised by all Namibian cultures (except the San), either under pastoral or sedentary lifestyles, for hundreds of years. For some of those cultures, cattle is of such paramount importance that it equals to the definition of wealth. Yet, all the knowledge, skills, management strategies and organisation systems they developed with respect to cattle keeping (and the environment) over the generations, are systematically dismissed as long as they do not follow an economic logic understood in terms of the capitalist imported (colonial) value: the business.

It has been argued that capitalism and colonialism are two sides of the same historical process, specially since the centre of European power shifted from the Iberian Peninsula to the central-north part of the continent (Belgium, the Netherlands, Germany, Britain) during the 17th and 18th centuries (Dussel, 1994, p. 164). Since then, modern capitalism, which eventually lead to the industrial revolution and the so-called developed world, expanded exponentially along with, and dependent on, the spread of colonial domination of the world (ibid. p. 167). Therefore, it is not surprising that the values (cosmologies) that this colonial-capitalism exported and imposed wherever Europeans could arrive, are the very principles of capitalist economy and society. Among them, the understanding of every human activity as a business, and its failure or success evaluated in terms of monetary profitability.

However, a main ingredient of decolonial thought is to emphasise that, today, colonial impositions still operate into the minds and life expectations of the colonised population; hence the necessity of an epistemic decolonisation (Grosfoguel, 2012). It has been remarked that some previously disadvantaged Namibians buy farms and run capitalist businesses there. Whether the business works or not, the farm, just by itself, is considered a symbol of status (Shangeta, quoted in Shigwedha, 2005, in press). Accepting the ownership of a farm as a symbol of status implies accepting the world-view imported by the Europeans. In other words, the European scale of values is accepted as "better" or more "advanced" than the local one, which becomes, at least partially, dismissed.

Obviously, no one can stand for an unrealistic return to the situation existing before the colonial era. History is the science of facts as they have occurred, resulting in the present situation. As such, it cannot be denied. The answers, unfortunately, are never as straightforward as the critiques. As Grosfoguel (2012) states, the solution should pass by re-equalising the relative value that is given by society to each cultural cosmology, and create more diverse models which accept the difference as well as the positive external contributions. The idea sounds appealing, but it is not that clear how this would look in practice.

An example can be taken from reality, nevertheless. During the course of the visit to Nyae Nyae Conservancy within the frame of this investigation (see Section III.2.d, p. 53), the San persons who offered themselves as key informants, explained that some years ago a foreign NGO tried to teach them farming methods and to introduce this activity as a way of boosting the economic capacity of the community and improve their living standards.

However, after some attempts, the community decided that they did not want to be farmers, as they considered that their way of life was "better," and they wanted to keep it. Therefore, they declined the help of that NGO, established a limit of 40 cattle per village (only for self consumption), and focused on a double strategy of traditional hunting-gathering livelihoods in combination with sources of income mainly derived from tourist activities in venture with private companies (Masweta Heinrich and Xoa//an  /ai!ae, personal communication).

The first step may be to encourage pride among the formerly colonised people about their respective cultures. This means not only the symbolic celebration of tradition, but also allowing the development of livelihoods in accordance with their cultural particularities (including the external contributions that each group considers positive). At this point, access to the necessary material means for the development of such livelihoods becomes central. And, in Namibia, such a material mean is, over all, land.

# II. LITERATURE REVIEW

Investigations about agrarian societies and land reform are extremely abundant, from general and theoretical perspectives to very concrete studies about the Namibian case. This section is a summary of the most relevant contributions, from the general to the particular, related to the area of this study. It includes an explanation on how land reform in Namibia works from an administrative point of view.

## II.1. General approaches to the agrarian question and land reform

In the introduction to *Land Reform in Zimbabwe. Myths and Realities*, Scoones et al. (2010, pp. 10-14) classify the current theoretical approaches about redistributive land reform into four groups:

(i) The shift-out-from-agriculture: Some authors (Bryceson et al., 2000; Ellis, 2000; cited in Scoones et al, 2010, p. 12) argue that the productive economy is changing so that agriculture can no longer support the livelihoods of large populations. Mechanisation and industrialisation require less human labour, and thus, most people living from agriculture must find other occupations. If other sectors of the economy are not developed, we will witness the creation of mass unemployment. Therefore, they consider that spending state resources in redistributive land reform

makes little sense, while it would be more recommended to invest in the encouragement of alternative livelihoods. By implication, this position considers that the higher efficiency and productivity of large-scale mechanised agriculture, along with the conditions imposed by globalisation, make the outcome unavoidable, and predict the "end of land reform" (Bernstein, 2004, cited in Moyo, 2008, p. 75).

(ii) The liberal market economy model: This position is proposed by the World Bank (WB), the International Monetary Found (IMF) and the Food and Agriculture Organisation (FAO), among others. These institutions are interested in developing a fully capitalist agrarian economy. As David Harvey (2010) argues, capitalism by its nature requires the continued and sustained growth of every sector, including the agrarian one. The proponents consider redistributive land reform as a necessary step in those countries where industrial transformation has not yet occurred. The underlying logic is that economic development can only be achieved with a stable and powerful rural middle class, which cannot exist if the land is too unequally distributed. They see redistribution as the first stage "in an assumed progressive development trajectory" in which "smallholder agriculture is seen as efficient and growth oriented" (Scoones et al., 2010, p. 13).

The advocators of this model argue that development must be market-led and based on private property, so they strongly recommend the formula of willing-seller-willing-buyer. Furthermore, they also consider technological input to be indispensable. This line of reasoning led to the so-called "green revolution," which these institutions have supported since the 1970s. The main goals they expect from

this model are boosting the economic capacity of poor rural areas, and thus being an instrument for poverty alleviation and reduction of inequalities, while transforming the agrarian sector into an important contributor to GDP and national economic growth.

However, after decades of implementation, this model has been strongly criticized as ineffective in dealing with poverty and marginalisation. Some authors (e.g. Borras, 2003) argue that the encouragement of agriculture as a business activity has advantaged the wealthy sectors of rural societies, while labour exploitation has actually increased under the conditions imposed by mechanisation and other technological inputs. Furthermore, the extensive use of inputs such as pesticides, and the market orientation of the production implemented under this model (such as monoculture), are blamed as the causes of pollution and environmental degradation and, thus, further incapacity of the land to support the livelihoods of its inhabitants ( La Vía Campesina, 2002, 2011).

(iii) The socialist approach to land reform has key points in common with the other two just posed above. That is, the forces of history and capitalism propel a shift from peasant agriculture to agricultural industry based on wage labour. Thus, it also assumes a higher degree of efficiency for large-scale commercial farming, and thus it argues that smallholder agriculture is condemned to disappear as capitalism and globalisation develops (Bernstein, 2010, cited in Scoones et al, 2010). In some cases, this conception has led to the transformation of the agrarian sector into large-scale State agricultural enterprises, as the only way to compete with the capitalist mode of production.

(iv) The peasant way: Finally, this approach is mostly a social movement, still developing the conceptual tools to prove itself as a real alternative to the former models. Organisations such as the Brazilian *La Vía Campesina* ('Peasant Way'), are the origin of this model. They emerged in the context of peasant struggles for land, among peoples who define themselves as victims of the social failure of the green revolution. The movement is currently growing in Africa, in countries like South Africa, Mozambique and Zimbabwe. They begin with a radical critique of the capitalist approach, as they consider that it inevitably leads to social injustice and peasant impoverishment. Furthermore, they argue that the recommendations of the green revolution, along with market-led policies, have destroyed the land, through the application of modern methods of agricultural production that are extremely aggressive towards the environment (La Vía Campesina, 2002; 2011).

In opposition, they propose an agrarian model centred on community-based production, while keeping control of assets in the hands of the peasants. They argue that keeping technological and capital inputs to a minimum, along with local, small-scale, labour-intensive agri-systems, ensure environmental sustainability of agricultural activities, as well as the socio-economic security and food sovereignty of the peasants. Therefore, they are very much in favour of redistributive land reform as a central element of a transformation that should start by resisting the supposed inviability of small-holder agriculture (Borras, 2003, 2008). To support their stance, a common argument is that, currently, 70% of the food consumed in the world is produced by small-holder peasantry, with little or no technological input (La Vía Campesina, 2011, p. 6).

## II.2. Publications about land reform in Namibia.

### a) The administrative land reform process in Namibia

The agreements of the National Conference on Land Reform and the Land Question of 1991 resolved that land reform in Namibia should take a market-friendly stance, avoiding massive expropriations or nationalisation of land, as well as claims based on ancestral rights (RON, 1991). Furthermore, the communal-commercial division should be maintained, and foreigners should not be allowed to own land. The main outcome is that the process should be based upon the willing-seller-willing-buyer approach, with the Government holding a right of first option over any farm on sale. Finally, expropriation should be limited to the properties of absent or multiple owners.

Land reform in Namibia works through two different mechanisms: i) acquisition of land by the State for redistribution among previously disadvantaged Namibians (resettlement); and ii) State financial support for the private acquisition of land by previously disadvantaged Namibians (AALS scheme) (Gargallo-Sariol, 2009, pp. 65-67).

The Agricultural (Commercial) Land Reform Act of 1995 (RON, 1995) lays out the administrative processes for the acquisition of land by Government for the purposes of land reform, including the preferential right of the State to purchase as

well as expropriate land. It also establishes the Lands Tribunal (to resolve disputes between owners and Government), and the Land Reform Advisory Commission (to advise the MLR on acquisition and expropriation of land).

In 2001, the revised National Resettlement Policy (MLR) established criteria for the selection of beneficiaries, as well as the social groups to prioritise. Beneficiaries had to be landless (or not having adequate land) Namibians, while access to other sources of income and livestock ownership are accepted. The priority groups to benefit from resettlement were, in order: i) war veterans; ii) San people; iii) residents of overpopulated communal areas; iv) war returnees or displaced people and disabled people; and v) poor and landless people (Gargallo-Sariol, 2009, pp. 63-64). In 2011, the MLR published new resettlement criteria, introducing changes which mainly concern the farming capacity of the beneficiaries and establish that applicants "must not own any land, other than for residential purposes" (MLR, 2011, p. 2).

There are two options for resettlement: i) individual resettlement, consisting of the division of a farm into several units and the allocation of each of them to one beneficiary or family; and ii) group resettlement, consisting of allocating a farm to a group of people on a collective basis. The objectives of the resettlement policy are to: i) reduce inequality inherited from colonisation; ii) boost food self-sufficiency; iii) increase the relative importance of small-holders in the economy and national commercialisation; iv) create jobs; and v) reduce demographic pressure on communal land (Gargallo-Sariol, 2009, pp. 64-65).

The AALS scheme is a system of credit at advantageous conditions for the acquisition of land by previously disadvantaged Namibians. It is implemented by Agribank, which offers this credit at low interest rates, free from payment for the first three years (ibid.). The requirements include security of mortgage and a business plan approved by Agribank. In general, the scheme is a way of supporting the creation of a previously-disadvantaged group of successful commercial farmers.

Some conclusions can be extracted from the above: i) the land reform process does not aim to transform the Namibian agrarian model inherited from the past, but only the racial patterns in the distribution of land; ii) the process can be thought of as an example of the liberal market model exposed above; and iii) the process is double-sided, aiming to reduce inequality and poverty, while at the same time encouraging business activity and market-oriented production. These two sides can be generally identified with resettlement and AALS respectively.

Finally, the Communal Land Reform Act (RON, 2002) aims primarily to fill the legal vacuum in regard to the allocation of rights to communal land. It establishes Communal Land Boards, defines the powers of Traditional Authorities in relation to communal land and lays out the administrative processes to be followed in case of conflict over the rights of the community members. The aspects of this Act that are relevant for the current research will be presented in the pertinent section (III.2.d p. 53).

### b) Research on land reform

The number of publications about (or related to) land reform in Namibia is so vast that it would be impossible to review all of them here. Just as an indicator of this abundance, the reference list compiled by Wolfang Werner (2012) in *Land Reform in Namibia. A Bibliography*, extends for 31 pages. Here, the aim is to include the works of the authors who have made the most important contributions to the investigation of land reform in Namibia, paying special attention to those works that have influenced the current research.

The Legal Assistance Centre (LAC) (one of the most active pro-poor organisations in Namibia), has published a series of works that cover a wide range of aspects of land reform. The authors look into the implications and outcomes of land reform in Namibia from a socio-legal perspective, under titles that try to capture the social concern regarding these aspects, such as: *Our Land We Farm. An Analysis of the Namibian Commercial Agricultural Land Reform Process* (LAC, 2005), *"One Day We Will Be Equal." A Socio-Legal Perspective on the Namibian Land Reform and Resettlement Process* (Harring & Odendaal, 2002), *"What Has Happened Has Happened" The Complexity of Fencing in Namibia's Communal Areas* (Werner, 2011), and *"No Resettlement Available" An Assessment of the Expropriation Principle and its Impact on Land Reform in Namibia* (Harring & Odendaal, 2007).

These works often focus on the living conditions of the beneficiaries of land reform, as in *Livelihoods After Land Reform in Namibia* (Werner & Odendaal, 2010),

and they always pose poverty reduction and development of the rural areas as a main concern. They also analyse legal aspects, as in the case of *Kessl. A New Jurisprudence for Land Reform in Namibia?* (Harring & Odendaal, 2008), where the authors dissect the reasons for and future implications of the court case that the MLR lost against three private farmers in 2006. They conclude that the court resolved that expropriation is constitutional, but the Ministry did not follow the appropriate administrative actions that guarantee the rights of every party involved in the process.

Wolfang Werner, outside his collaboration with LAC, has also developed a huge amount of research regarding land reform for different organisations. Much of this work consists of reports and assessments on different aspects of the land reform process made for the MLR, in collaboration with GTZ. These works uncover, for example, the shortcomings and administrative problems in the procedure of land acquisition by Government (Werner, 2009a), the outcomes of the resettlement process (Werner, 2010), the post-settlement support strategy (Werner, 2009b), the capacity of the Communal Land Reform Act to effectively protect the rights of women (Werner, 2008a), and several aspects related to the management of natural resources and the share of rights over them (Werner, 2008b; 2007), as the administrative approach developed to deal with such matters (Werner, 2004). He also relates land reform to wider issues, such as labour conditions, poverty alleviation and democratic development (Werner, 2003).

Ben Fuller has focused mainly on the economic implications of land reform.

He has examined the Namibian market in a variety of ways, from its capacity to provide land for the purposes of the reform (Fuller, n.d.), to the outcomes of eleven years of the post-independence legal framework (Fuller & Eiseb, 2002). In that paper, the authors disclose some practices that farm owners use to overcome the legal constraints imposed by the Agricultural (Commercial) Land Reform Act of 1995 when selling their farms on the free market or to avoid the risk of eventual expropriation (see section III.2.c, p. 51). Fuller also analyses the possibilities of economic success of communal areas, and he explores methods to calculate the economic returns of communal farming activities (Fuller & vanZyl, 2004). He has paid attention to the question of the rights to land (Fuller, 1999) and, finally, he has presented the Namibian case in wider publications about the land question (Fuller, 2004).

The geographer John Mendelsohn has contributed to the studies of land reform in three ways. First, he is a collector of geographical data, which include aspects of land tenure and use. This general knowledge is published in *Atlas of Namibia* (Mendelsohn et al., 2009). Further details on this work will be given in section III.1.b (p. 32) and III.3 (p. 64). His *Farming Systems in Namibia* (2006) also details one of the most important aspects of the agrarian system. Second, the author has served as a consultant for the MLR, for which he has audited the information systems used at the Ministry (Mendelsohn et al., 2006), and he has elaborated an inventory of the farms distributed by Government for resettlement purposes (Brown & Mendelsohn, 2008). Finally, in collaboration with other researchers, he has investigated the communal areas of Namibia, looking at their economic potential

(Mendelsohn et al., 2012) and the rights registration process (Mendelsohn, 2008), and he has published an extensive work about the eastern communal areas of the country, in collaboration with Selma el Obeid (2002).

Henning Melber's work focuses on issues which go far beyond land reform, enquiring about more general processes involved in the Namibian transitions to and since independence (Melber, 2007). But some of this research has included important work on the land question (Kaapama, 2007). Furthermore, the author has contributed to the studies of land reform from a perspective that inserts it in wider debates about Namibian political processes and conflicts (Melber, 2002; 2005).

Furthermore, many other scholars have contributed to studies of land reform in Namibia and related topics. Nico Horn (2005) has enquired about the possible relationship between pre-colonial land rights and the current land reform process, while Barnes (1995) has investigated about the possibility of alternative land uses apart from farming in communal areas. Ingrid Emmy !hoaës (2009) has examined the role of post-settlement support for the success of land reform, while Adams & Deviit (1992) were among the early investigators to think over possible land reform options in Namibia, given the importance of pastoralism. Verheye & Coetzee (2003) have developed a method to asses the value of farmland on the basis of natural resources, in a key contribution to calculate just compensations in the process of acquisition of land by Government.

Students have also contributed to the topic, as is the case of Phillipus Geingob

(2005), who studied the impact of land reform on the beneficiaries of the study area, or Ndala (2009), who broke new ground in Namibia by investigating the effects of the market-based reform on the agrarian system. Finally, the work of Becker (1997) is an example of a gender-based perspective.

The most important gaps that can be pointed out in the literature about land reform in Namibia are: i) the lack of a precise empirical data base onto which base an evaluation on the progress of land reform in the Otjozondjupa Region; ii) the development of an argument to unravel some social implications of the process based on such a precise data base. Both of them will be covered in this thesis at a regional level. Furthermore, a case study on the process of land degradation or desertification comparing its trends in different tenure statuses will cover another gap which, if not yet, will be soon regarded as one of the most important factors pertaining to the land question in Namibia.

# III. METHODOLOGY

This chapter deals with obtaining, selecting, organising, depicting and analysing the data needed to build a clear picture of the land tenure structure in the Otjozondjupa Region, as a central element to understand the agrarian system as a whole. It will explore some social implications of the land tenure structure and its changes since independence, both in the commercial and communal areas of the region under study. Furthermore, as it is one of the most urgent concerns pertaining to the land question in Namibia, it will investigate the relationship between land tenure structure and environmental degradation, trough a methodology that uses satellite images to derive annual sums of plant productivity and a statistical treatment to calculate its trends at the different tenures during the period 1982-2000. This part of the study, both because its orientation and the different kind of data used, needs to be addressed separately from the rest of the chapter. Thus, it is written in an article-like format in section III.3 (p. 64).

## III.1. Description of the research data.

### a) Selection of data

Land tenure structure may seem a simple concept, but it is rather complex in reality. It comprises who owns or controls land, the nature of the units of land owned or controlled, in what manner such ownership or control is held and exerted (both

legally and on the ground), entitling which rights and limitations, for which purposes (in terms of land use, but also in terms of livelihood), and, as a result of all the previous, how other elements of the agrarian system are affected and organised (see Introduction. pp. 3-9). Therefore, there is no simplistic manner of approaching land tenure structure. The range of categories can be as wide as the degree of detail one wants to look into the matter, and often two or more different categories overlap within the same piece of land. The important point is that the categorisation must be relevant for the specific context in which it is applied.

It must be noticed that the historical context of the land question in Namibia is key to designing these categories. In Namibia it would be of little significance to categorize land tenure only as private, communal and Government, as this would shed no light on whether land is under the control of previously advantaged or disadvantaged Namibians. Reference to the historical context is explicit in the purposes of the Agricultural (commercial) Land Reform Act of 1995, which reads:

> "[...] for the allocation of such land to Namibian citizens who do not own or otherwise have the use of any or of adequate agricultural land, and foremost to those Namibian citizens who have been socially, economically or educationally *disadvantaged by past discriminatory laws or practices*" (RON, 1995, p.2, the italics are mine).

The legal formula by which the control over land becomes effective is also of great importance, as it has serious consequences for the capacity of implementation

of the land reform programme by the State (Fuller & Eiseb, 2002). Finally, the way in which land is acquired is relevant when enquiring about the meaning of the changes in the land tenure structure since independence. Thus, the data about land tenure must ideally make it possible to:

(i) Differentiate which land is controlled by previously advantaged and previously disadvantaged Namibians, due to obvious historical reasons;

(ii) Define under which legal form the control becomes effective (e.g. private, communal, leased by the state, under a company's title);

(iii) Know how that control is exerted on the ground. In private areas, fencing the land and running an individual business is the typical way in which control is exerted. But in communal areas, there might be different forms of control over land (despite the fact that all of it has the same legal status);

(iv) Differentiate the means by which such control over land is obtained, especially when it comes to analysing the progress and implications of the land reform process. If poverty and dependency reduction are to be assessed, it must be noticed that it is not the same to access land by buying it (whether with a subsidised loan or with private funds) than as a beneficiary of a resettlement scheme;

(v) Establish the precise spatial distribution of every category. The geographical approach of this study makes this indispensable.

These are the aspects of the land tenure structure which were selected to focus on, but they by no means cover entirely the complexity involved. If possible, a complete depiction of the land tenure structure should, at least, also allow to know the use of each piece of land, the management strategy followed on it, and the purposes of using it in terms of livelihood. It was not possible to obtain accurate and reliable data about these aspects within the framework of the current study.

### b) Data sources

Those researchers who have tried to quantify the progresses of land reform in Namibia commonly state that access to reliable and precise data about land ownership and tenure is an impossible task. This section is a summary of the agencies, institutions and organisations that have been approached in order to obtain information during the course of this research.

(i) Ministry of Lands and Resettlement: It should be the primary source of information regarding the progress of the land reform process. But according to, for example, Gargallo-Sariol (2009, p. 68), there is neither an updated, systematic record of farms acquired by Government for resettlement purposes, nor of farms already resettled. Harring and Odendaal (2002, p. 47) present a list up to the beginning of 2001 that they state is obtained from the Ministry, but this data is too old for the objectives of the present study.

For this research, the Ministry was approached without positive answer on the availability or existence of such a list updated for 2012. A further attempt was made at the Office of Deeds, where the records for each farm can be obtained. Unfortunately, a deed record contains information about the legal owner of a farm, but does not provide any information about the previously advantaged or disadvantaged status of the owner, nor about the resettlement process. Resettlement farms would appear in the record as Government ownership, along with all those Government-owned farms that are not included in the resettlement programme. Finally, the Map Office of the General Surveyor was also approached to check if their records on farm boundaries included ownership data. This turned out not to be the case for the two shapefiles they possess. Nevertheless, the newest of these shapefiles serves as the only reliable source on the official existence and spatial distribution of every farm. Thus, while this last information is useful, no systematic set of data regarding present and past ownership and/or tenure could be retrieved from the MLR.

(ii) Environmental Service of Namibia (http://www.the-eis.com)**:** This web-based information service offers several useful shapefiles (among other materials) on different topics about Namibia, many of them taken from Mendelsohn's (2009) *Atlas of Namibia*. The EIS provides a shapefile on *'land ownership'* dating to 2002, which is not close enough to the present to be the main data source. The categories in which it classifies land ownership also do not apply to the purposes of this study (see Table 1, p. 37).

The EIS also provides a shapefile depicting Communal Conservancies, which proved entirely consistent with the information obtained at the Ministry of Environment and Tourism. A third shapefile is titled *'control over land'*. The categories in which it is divided (see table 1) do not in principle fit the needs of this study, but one of them was found rather interesting for the characterisation of the communal areas: *'private on communal'*. It refers to communal areas that are in fact under the control of individuals for their private use. Although the data provided by the EIS dates from 2002, information gathered at the Map Office and, most importantly, through personal visits and interviews has completed and updated it, allowing the mapping of two categories of private use of communal land. Finally, the area covered by the Waterberg Plateau National Park was also retrieved from the EIS.

(iii) Ministry of Environment and Tourism: Information about Communal Conservancies and Community Forests was obtained through the web page of this Ministry. It was indispensable in order to complete the picture of the Otjozondjupa Region by characterizing the status of its communal areas. The information from the Ministry was contrasted with that from the EIS, and both were totally consistent. Nevertheless, personal visits and interviews (see below) were needed to find out the status of the communal areas on the ground (see section III.2.d, p. 53 and maps 2 and 4, pp. 44 and 60).

(iv) Namibian Agricultural Union: The Research Unit of the NAU keeps an updated database on all commercial farms in Namibia since at least 2006. The

database, stored in a shapefile, is updated as far as 2012. They keep all kinds of information in this database, including the most important aspects for this research, namely the ownership status of each farm, categorised according to previously advantaged/disadvantaged, and also according to the way it was acquired (private funds, AALS scheme or resettlement) and to the legal formula of ownership (individual deed, CC, Trust, PTY). Details about this categorisation will be presented in the next section (III.2.a, p. 38).

NAU builds its database on information provided by its members, who directly report on the farms in their respective areas, ensuring a high degree of reliability. This is further completed with information from deed titles, as well as other sources such as official documents and printed press (Rina Hough, personal communication). Hough indicated that the database was cross-checked with the one held by Agribank (access to it was denied to this researcher), and they found almost total consistency between them. Still, a margin of error is assumed.

Finally, it is necessary to clarify that NAU did not provide access to the entire database, because of reasons regarding confidentiality. Thus, only the tenure status by 2012 (in terms of the categories shown in Table 2, p. 38) was obtained, while the owners' names and all other information was erased before any work was made by the researcher. This work was always conducted in NAU premises under supervision of their staff.

(v) Personal visits to the study area and associated interviews: During the week from 27 June to 5 July 2013, a field research in the communal areas of the

Otjozondjupa Region was conducted, with the assistance of Fransina Kamenjono, who acted as translator and interpreter regarding the local culture. The objectives of this field work were: i) to clarify the actual status of the pieces of land on communal areas that were allocated to previously disadvantaged Namibians by the previous administration; ii) to enquire, and if possible to delimit geographically, the extent of illegal fencing; and iii) to find out how control over the land is effectively exerted on the communal areas, as from the study of the legislation concerned it is difficult to understand how it works, on the ground, the combination of powers and rights of the different actors involved (see section III.2.d, p. 53).

The field work covered the N=/=a Jaqna, Nyae Nyae, Otjituuo, Okamatapati, African Wild Dog and Ozonahi Communal Conservancies. Key Informant Interviews were held in the course of this trip with Xoa//an /ai!ae and M. Heindrich (chairwoman and officer of the Nyae Nyae Communal Conservancy, respectively); M. Katjivery and E. Kavetuna (chairman and Traditional Authority of the Otjituuo Communal Conservancy and area, respectively); and V. D. Mahaherero (from the Royal Kambazembi family, representative of all the Herero Traditional Authorities of the Region and member of the regional Communal Land Board). During this field work, all the required information was obtained, and even some which was not on the agenda.

Table 1: Main data sources investigated in the course of this research. The ones finally used are indicated by " √ ".

| SOURCE | DATE | CATEGORIES of land tenure | COMMENTS |
|---|---|---|---|
| **MLR (old shapefile)** | 1996/ 2006? | - None | Not applicable for the purposes of this study. |
| **EIS (land ownership)** | 2002 | - Individual<br>- Government<br>- Companies (PTY, LTD, CC ,Trust)<br>- Municipal<br>- Others | Categorisation does not apply for the purposes of this study. |
| **EIS (control over land)** √ | 2002 | - Central Government<br>- Local authority<br>- Private on communal land<br>- Private on freehold land<br>- Traditional authority | Categorisation does not apply for the purposes of this study, except in the case of *'private on communal land'*. |
| **MLR (new shapefile)** √ | 2010 | - None | No information about land tenure, but it is the only secure source for the officially demarcated plots and farms. |
| **MET (conservancies map)** √ | 2011 | - Registered Conservancies<br>- State protected area<br>- Concessions<br>- Registered communal forests | Only used to map conservancies and forests. Need to cross-check with other sources to clarify the actual status of communal. |
| **NAU (farms database and shapefile)** √ | 2012 | - **Previously Advantaged Namibians (PA)**, specifying ownership (either individual or under a company's title)<br>- **Previously Disadvantaged Namibians (PD)**, specifying ownership and, if applicable, the land reform scheme (either AALS or Resettlement).<br>-Other | Most reliable and updated, with all the categories needed for the commercial area. Need to combine with a reliable source for the communal area. |
| **Visits and interviews** √ | 2013 | - N/A | |

## III.2. Analysis of the research data

### a) The categorisation of the land tenure structure for the Otjozondjupa Region

Table 2: Categorisation of land tenure structure. Central columns show categories and subcategories used in this study. Side columns (1 and 2) show alternate ways of categorisation.

| 1 | CATEGORIES | SUBCATEGORIES | 2 |
|---|---|---|---|
| OUT OF LAND REFORM | Previously Advantaged **(PA)** | **PA.IND** | PRIVATE OWNERSHIP (FREEHOLD TITLE) |
| | | **PA.CC** | |
| | | **PA.PTY** | |
| | | **PA.TRUST** | |
| | Previously Disadvantaged, through private funds **(PDPF)** | **PDPF.IND** | |
| | | **PDPF.CC** | |
| | | **PDPF.PTY** | |
| UNDER LAND REFORM | Previously Disadvantaged, through Affirmative Action Loan Scheme **(PDAA)** | **PDAA.IND** | |
| | | **PDAA.CC** | |
| | | **PDAA.PTY** | |
| | Previously Disadvantaged, through resettlement schemes **(PDRES)** | Individual** | GOVERMENT OWNERSHIP |
| | | Group** | |
| VARIOUS | **COMMUNAL** | Communal Conservancies* | |
| | | Pre-independence allocations * | |
| | | Illegally fenced * | |
| | Government **(GOV)** | n/a | |
| | **OTHER** | Park* | |
| | | Other (Namwater, Nampower, servitude, municipal, etc.) ** | |

**Subcategory codes:** (IND) individual; (CC) closed corporation; (PTY) proprietary limited company; (TRUST) trust company.

* Subcategories included on Map 2.
** Subcategories not depicted on any map. It was not possible to find out which resettlement farms are under group or individual schemes.

Sources: NAU, NAU and other sources, MET, EIS, MLR, EIS and interviews, visits and interviews.

PA, PDPF, and PDAA: All of these categories were taken directly from the database provided by NAU, and no further processing was required. The only specification is that they are all under the same form of tenure: private farms under a freehold title. PA refers to farms owned by previously advantaged people (whites), PDPF refers to farms owned by previously disadvantaged people who acquired them through private funds, and PDAA refers to farms owned by previously disadvantaged people who acquired them through a loan subsidized by the state under the AALS scheme. All of these categories are subdivided according to legal entity which holds the deed title: either individual or various forms of company ownership (closed corporation, proprietary limited company or trust).

PDRES: Resettlement farms are those acquired by the Government for land reform purposes and resettled by beneficiaries through different schemes (individual or collective). In both cases, they are named just as PDRES, as information regarding the scheme for each farm could not be obtained. The ownership of resettlement farms remains on the hands of Government, but the tenure of the land is in the hands of the beneficiaries. This is an official status if the process of delivering leaseholds to the beneficiaries is completed, or only de facto if this process is not yet completed, even if the beneficiaries are already on the land. The process of delivering leaseholds is slow and problematic (Mendelsohn, Robertson & Jarvis, 2006), and there is no available systematic information about its progress. Hence, the actual presence of the beneficiaries on the land is the only criteria for categorising a farm as PDRES.

Communal: This category is the one which presented most problems for its definition and depiction. The reason is that there is that the official status of the land

does not fully correlate with the actual situation on the ground. This is most clearly manifested by the overlap of statuses observable on Maps 2 and 4 (pp. 44, 60). Three subcategories have been created in an attempt to capture this complexity:

(i) Communal Conservancies: The entire communal area of the Region is registered under one or another Communal Conservancy. Thus, to avoid confusion this is the label for all the land that is officially communal. Communal land is owned by the State, and falls under the control of Traditional Authorities and Communal Land Boards, while Communal Conservancies and Community Forests hold some rights over it. In theory (or officially), this is the case for all the communal land of the Otjozondjupa Region.

(ii) Pre-independence allocations: There are areas which were allocated to non-whites before independence, and today are not effectively controlled by Traditional Authorities, while Communal Conservancies do not hold rights over them, despite the fact that they fall within their official demarcation. Thus, while they are officially communal, they are not in practice: the two categories overlap at these spaces. This is an inherited situation from the previous administration (see section III.2.d, p. 53). Their spatial distribution was obtained from MLR, while their situation at ground level was provided by the interview with V. D. Mahaherero.

(iii) Illegally fenced: the practice of illegal fencing also results in a private-like use of the land, regardless of who legally holds the rights over it. Thus, as this practice factually alters the relationship among people with respect to land (FAO,

2002, p. 7), in this study it is included as an additional and differentiated form of land tenure; despite the fact that it is not legally sanctioned, as it is officially communal. Overlapping of categories also occurs in this case.

GOV: Government farms are defined here as those that are owned *and* under the full control of Government. It must be noted that resettlement farms and communal land are also Government-owned, but these have their own categories. Government farms can be farms acquired for resettlement purposes but not yet resettled, farms owned by the army, Government research stations, farms used by agricultural extension services, etc. There is no comprehensive way to know which farms are used by Government for which purpose, so they are not sub-categorised. Their spatial distribution has been taken from the NAU database, with a minor modification. In the NAU database, Government farms are coded as PDGOV (Previously Disadvantaged - Government). In this study, they are labelled simply GOV, as the Government of Namibia is not a racial entity and as such cannot be classified as previously advantaged or disadvantaged.

Other / Unknown: This category includes all the land that has been excluded from the analysis: municipal land, servitudes, church land, Namwater and Nampower properties, etc., as well as those few farms whose status remains unknown or unclear.

Eliminated categories: There are two categories in the NAU database that have been eliminated in this study: PAFOR (Previously Advantaged - Foreigners), and PDOD (Previously Disadvantaged Odendaal Plan, also referred as Second Tier

farms). PAFOR has been eliminated here because it did not serve to any purpose of this research. In the case of PDOD, all the farms except one are currently part of the communal areas, belonging to the category *'Communal Conservancies'*, and/or to the category *'pre-independence allocations'*. The remaining farm was eliminated, as the creation of a whole category for a single farm was considered an unnecessary complication.

### b) Mapping the land tenure structure at the Otjozondjupa Region

The development of Map 2, *Otjozondjupa Region. Land Tenure Structure. 2012* (including the acquisition of the necessary data) consumed much of the time and effort invested in this research, as this allowed the study to fill an important research gap about the land question in Namibia, for one region. The data gathered at the various sources has been collated and mapped to allow a quick insight into the details of the land tenure structure in the Region.

For clarity and ease of use, Map 2 (p. 44) depicts only the most important categories (central-left column of table 2, p. 38) and only those subcategories pertaining to communal land. Subcategories (central-right column of table 3) providing deeper detail into other particularities are treated separately on Maps 3, 4, 5 and 6 (pp. 52, 60, 77, and 78 respectively).

Table 3: Area covered by each category and subcategory.

| ZONE | CATEGORY | AREA (ha) | % 100=zone (100=region) | SUBCATE-GORY | AREA (ha) |
|---|---|---|---|---|---|
| COMMERCIAL | PA | 4,525,228 | 73.728 % (43.1 %) | PA(ind.) | 2,879,323 |
| | | | | PACC | 793,485 |
| | | | | PAPTY | 646,919 |
| | | | | PATRUST | 126,295 |
| | | | | PAFOR * | 79,206 |
| | PDPF | 386,046 | 6.3% (3.7%) | PDPF?? ** | 143,667 |
| | | | | PDPF(ind.) | 176,925 |
| | | | | PDPFCC | 19,169 |
| | | | | PDPFPTY | 46,285 |
| | PDAA | 1,030,738 | 16.8% (9.8%) | PDAA(ind.) | 1,010,094 |
| | | | | PDAACC | 13,556 |
| | | | | PDAAPTY | 7,088 |
| | PDOD * | 1,326 | 0.02%(0.01%) | N/A | |
| | PDRES | 194,350 | 3.2% (1.8%) | | |
| | **(Subtotal PD)** | **1,612,460** | **26.3% (15.4%)** | | |
| | **(Subtotal commercial)** | **6,137,688** | **100 (58.5%)** | | |
| COMMUNAL | Communal | 4,129,980 | (39.4 %) | Allocated by prev. admin. | 367,654 (8.9 %) |
| | | | | Under CCs *** | 3,762,326 (91.1 %) |
| OTHER | GOV | 156,849 | (1.5%) | N/A | |
| | Other | 67,381 | (0.6%) | PARK | 40,478 |
| | | | | OTHER | 26,903 |
| **GRAND TOTAL** | **10,491,898 - (99.73 %) ****** | | | | |

**NOTE:** All areas calculated from the shapefiles used to build Map 2.

*PAFOR is not depicted in any map, but its area must be included here. PDOD represents only the area of the farm which is not currently part of the communal area.

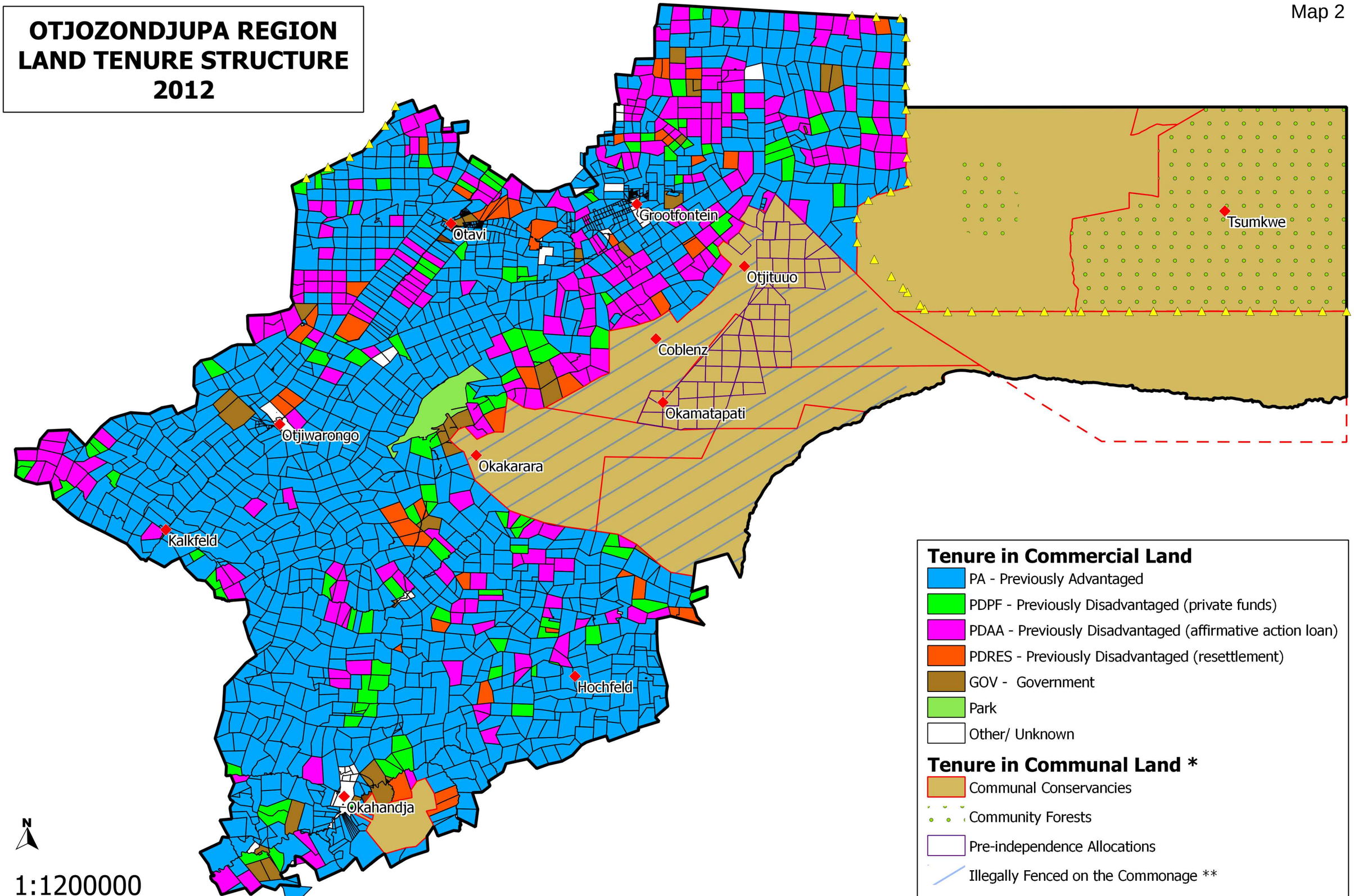
** In the NAU database, it is unknown if some PDPF farms are owned individually or under any other legal form.

*** As the depiction of the illegally fenced area is an estimation, its area is not available, nor the area for 'open communal'. Both are undifferentiated here with the label “CCs.”

**** According to the shapefile from EIS, the Otjozondjupa Region covers 10,520,320 ha, leaving a difference with this sum of 28,422 ha. Thus, the sum leaves an error of a 0.27%.

# OTJOZONDJUPA REGION
# LAND TENURE STRUCTURE
# 2012

Map 2




1:1200000

Sources: NAU, ME&T, MLR, EIS, this research.

* Several statuses overlap on communal areas. See main text.
** According to personal visits and interviews. See main text.

**Tenure in Commercial Land**

- PA - Previously Advantaged
- PDPF - Previously Disadvantaged (private funds)
- PDAA - Previously Disadvantaged (affirmative action loan)
- PDRES - Previously Disadvantaged (resettlement)
- GOV - Government
- Park
- Other/ Unknown

**Tenure in Communal Land ***

- Communal Conservancies
- Community Forests
- Pre-independence Allocations
- Illegally Fenced on the Commonage **
- Veterinary Fence
- Towns and Villages

Cartography: Pablo Gilolmo

### c) Analysis of the land tenure structure of commercial farmland

- **Progress in the correction of inherited imbalances**

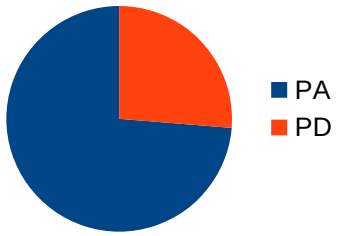
The first and most evident characteristic observed on Map 2 is the still very unequal relation between categories with regard to commercial farmland. This zone covers 6,137,688 hectares, excluding the categories *Other/unknown* and *Park*. Absolute predominance of the category *Previously Advantaged* (4,525,228 ha, which represents 73.7 % of commercial zone, and 43.1 % of the total size of the Region) clearly indicates that racial inequalities inherited from previous administrations remain strong in the Otjozondjupa Region. This is nothing surprising for the Namibian reader, but it is important to notice that, in this study, it is reliably quantified. At this point it might be useful to remember that the white population of Namibia represents only the 6% of the total (CIA, 2013).

Although it is probable that before independence some non-whites started to acquire farms and other properties, the likely little significance of this fact at a regional scale allows the analysis to assume that before independence all the so-called commercial farmland was owned by whites. Thus it is possible to measure how much the racial imbalances in the access to land have been corrected by looking at how much commercial land does not belong to whites in the present. It is worth stating that this is not exactly the same as assessing the progress of land reform, as there are farms acquired through private funds without the intervention of the land

reform programme. However, this measurement does represent how much the Namibian rural society has advanced in the correction of racial imbalances, whether with the aid of Government or not.

Table 4: Ownership of commercial land by previously advantaged/disadvantaged.

| | Ha | % |
|---|---|---|
| **PA** | 4,525,228 | 73.7 % |
| **PD** | 1,612,460 | 26.3 % |




As shown in Table 3 and summarized in Table 4, previously disadvantaged Namibians own or control today 1,612,460 ha of commercial farmland in the Otjozondjupa Region, which represents 26.3% of commercial farmland. This figure represents the extent to which the racial imbalances in the access to land have been corrected by 2012. The progresses of land reform are easily obtained by subtracting PDPF from the PD figure. The result is 1,225,088 ha (20% of commercial land), of which 1,030,738 ha (16.8%) are PDAA, while 84,350 ha (3.2%) are PDRES. However, socio-economic imbalances, regardless of race, cannot be measured only through the amount of land.

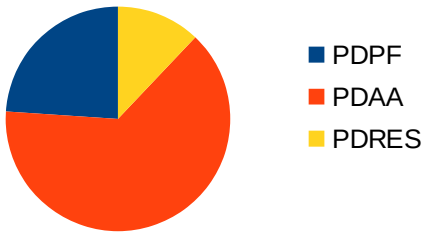
- **Progress in regard to socio-economic inequalities**

So which are the intrinsic properties of the changes occurred? Categories PDAA (1,030,738 ha, 63.9% of PD land) and PDPF (386,046 ha, 24% of PD land),

sum a total of 1,416,784 ha, meaning an 87.9% of PD land, and a 23.1% of the total commercial zone. There is also a very little spatial significance of the category PDRES (194,350 ha, 12.1% of PD land, and 3.2% of the total commercial zone). Such a strong contrast between PDAA and PDPF in comparison to PDRES suggests questions not only about the spatial extent of redistribution, but also about its nature and meaning. Borrowing the subtitle of Melber's (2007) instructive publication, these concerns can be expressed as *which changes for whom?*

Table 5: Areas of farms owned by Previously Disadvantaged Namibians in the commercial zone.

| | **AREA ha. (sum)** | **% (100='PD') (sum)** |
|---|---|---|
| **PDPF** | 386,046 | 24% |
| **PDAA** | 1,030,738 **(1,416,784)** | 63.9% (87.9%) |
| **PDRES** | 194,350 (1,611,134) | 12.1% (100%) |




On 14 June 2013, *The Namibian* published the following headline: *"50% of commercial farmland redistributed - GIZ"* (Nampa, 2013, in press.). Sometimes we witness these expressions of optimism in regard to land reform in Namibia. But what is the precise meaning of such a strong word, "redistribution"? According to GIZ, (and according to the Namibian legislation regarding land reform), it seems that as long as land passes from previously advantaged to previously disadvantaged, we can always talk about redistribution. Here, this assumption will be questioned, and a different understanding proposed. Redistribution is more a political claim than a concept. And it is a recurrent one wherever a social struggle concerning land takes place (Borras, 2010).

The typical situation in which these struggles take place are those in which there exist a high degree of concentration of control over land, normally by a small and privileged social group. Redistribution, in such situations, is claimed as the way to change this relation, shifting it from a *land-for-the-few* distribution to a *land-for-the-many* model. This was the case in those places where land redistribution did actually take place, in a variety of political environments, such as those of Cuba, Mexico, South Korea, Vietnam, China, etc. (Griffin, Khan & Ickowitz, 2002).

The case of South Korea is specially interesting, as the initiative was not a result of a socialist political environment, but pushed by interim governments supervised by the US (Griffin, Khan & Ickowitz, 2002). Tackling land concentration is also the meaning of redistribution in the ongoing struggles for land, for example in Brazil and South Africa (Borras, 2003; 2008; Vía Campesina, 2002; People's Assembly, 2013).

Following this widely accepted understanding of the term, the amount of land changing hands is not enough to talk about "truly redistributive" (Borras, 2003) reform, "based on the twin foundations of economic development and social justice" (ibid.). The proportion of people, and, if possible, the socio-economic status of these people, must also be taken into account. In other words, according to the previous argument, the proper question to ask about the extent of redistribution is not how much *land* has been redistributed, but rather how many *people* have been redistributed with how much land. Furthermore, it must be enquired if these people *needed* the land to dignify their living, or if they were already wealthy enough without that land.

The Government's objective is to supply land for 240,000 previously disadvantaged Namibians (Gargallo-Sariol, 2009, p. 191). It is difficult to understand why GIZ provides the figure regarding the amount of land that has changed hands, but not the figure regarding the number of beneficiaries, as it would be much more instructive.

There is an unfortunate lack of reliable data on how many people have benefited from resettlement schemes in the Otjozondjupa Region, so a precise analysis on this matter cannot be offered. Although evidence cannot be provided, however, at least an argument can be developed far enough to obtain some strong indicators. The number of units belonging to the categories PDPF and PDAA is 398 (1,416,748 ha), which implies a similar number of owners, although not exactly the same, as farms can be owned by more than one person (e.g. a married couple). Even doubling the number of owners, the figure would still remain low. In comparison, 50 farms (194,350 ha) have been resettled under individual or collective schemes.

The number of beneficiaries of these schemes is unknown, but according to the Legal Assistance Centre (2005 p. 27), “1,526 families or 9,156 persons (with an average of 6 persons per family) have been resettled on 142 farms of some 843,789 ha. in total”, leaving an average of 64.4 persons per farm. In any case, whether these figures are accurate or not, since farms acquired by Government for resettlement purposes are subdivided into smaller portions averaging 1,200 ha each (Harring & Odendaal, 2007 p.8) for individual beneficiaries, or allocated to groups of people, usually too large (ibid. pp. 24-26), it can be assumed that the number of people per unit of land is much larger in PDRES than in PDPF and PDAA. Therefore, there is a

relatively large number of people on resettlement farms, and a relatively small amount of people in PDAA and PDPF farms.

There is no quantitative data regarding the socio-economic situation of these two groups of people, but it is obvious that people who buy land (either through private funds or through a AALS-subsidised loan), are not poor. In the case of PDPF this is clear since the buyer needs to be able to pay the farm's price (usually several millions of Namibian dollars), or, failing that, to get a loan from a commercial bank for such amount. It goes without saying that commercial banks do not grant loans to people who cannot pay them back.

In the case of AALS, loans are granted against the security of fixed property (collateral), and the requirements include a business plan and an income and expenditure statement. This means that the applicant would not be in any case 'the poorest of the poor,' nor even an 'average' poor person. Hence, even though there are no precise figures for this reasoning, the following can be concluded:

A relatively large number of *poor* people obtained a relatively small amount of land, while a relatively very small number of *wealthy* people have obtained a relatively large amount of land.

Thus the degree of concentration of land ownership is a characteristic of the commercial land tenure structure that has not been much affected by land reform in the past 18 years, despite the fact that ownership and tenure has to some extent shifted from previously advantaged to previously disadvantaged. If this is the case, it

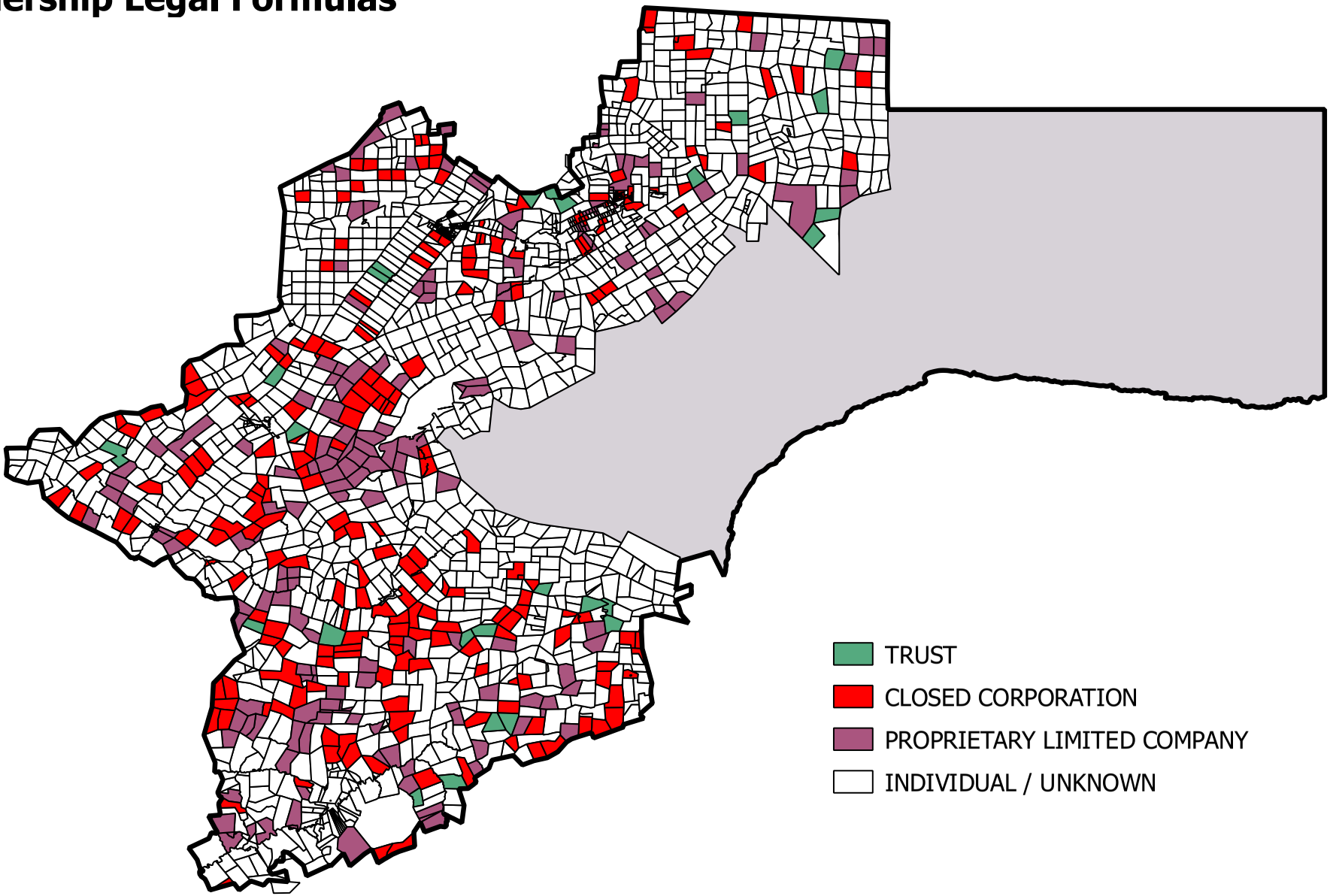
is at least questionable to accept the use of the term redistribution in reference to this scenario. The Discussion chapter will come back into this question.

- **Legal formulas of ownership of commercial farmland**

To ensure Government's preferential right to purchase land, farm owners are obliged to obtain an official waiver before selling their properties on the private market. Furthermore, farms owned by people who have more than one property (or very big ones) are considered priority Government acquisitions, either under the willing-buyer-willing-seller model or through eventual expropriation. Fuller & Eiseb (2002) uncover some practices that farm owners have developed in order to avoid these legal impositions.

These practices consist mainly of the registration of farms under different models of companies (such as Trust, PTY, LTD, etc.), so that the real owner is not registered as such in the MLR files. By the time Fuller & Eiseb's research was published, The Agricultural (Commercial) Land Reform Act (RON, 1995) did not consider the acquisition (by any mean) of land owned by companies, but only of farming land (as such, owned by farmers as individuals). Therefore, these practices have impeded the capacity of MLR to implement its Land Reform Programme. Although Fuller & Eiseb have written extensively on the topic, the contribution here is to map the phenomenon (Map 3) as the data needed is now available.

# Ownership Legal Formulas




Source: NAU

Cartography: Pablo Gilolmo

### d) Analysis of the land tenure structure of communal farmland

Turning to the communal zone, there is a relatively high complexity in the spatial distribution of the different categories, and a superimposition of statuses over some areas. This complexity very likely translates to a complicated situation on the ground.

According to the legislation (RON 1996; 2000; 2002;), there are at least three parties holding rights over communal land in Namibia: the State, Traditional Authorities, and Communal Conservancies and Community Forests. Communal land is owned by the State, but administration rights regarding allocation belong, in principle, to Traditional Authorities, though always under the supervision and approval of the pertinent Communal Land Board.

At the same time, Communal Conservancies (which in the case of Otjozondjupa Region cover the totality of communal land) and Community Forests hold rights on the use, conservation and exploitation of natural resources and wildlife. Furthermore, different tenure statuses on the ground not always allow this governance system to operate. Or, rather, the inoperative governance system on the ground may sometimes allow these tenure statuses to override it.

- **The status of communal land: Governance**

Communal Land Boards are appointed by the MLR with the objective of administering communal land in agreement with the other stakeholders. They are

composed of representatives of the MLR, MET, MLRGH, MAWF, Regional Council, concerned Traditional Authority(ies), Conservancy(ies) and "organised" farming community (RON, 2002 p.5). Also four women must be part, two engaged in farming activities, and two "who have expertise relevant to the functions of a board". According to the Communal Land Reform Act (ibid.), the competences of Communal Land Boards of interest here are: "a) to exercise control over the allocation and the cancellation of customary land rights by Chiefs or Traditional Authorities under this Act; b) to consider and decide on applications for a right of leasehold [...]."

Traditional Authorities are the power from the side of the communities. They have the prerogative to allocate land for homesteading and crop farming (up to 20 ha). They also resolve disputes between members of the community, and are the first level to carry out hearings about illegal fencing. If they resolve to do so, they are the ones in charge of submitting the cases to the Communal Land Boards for further resolution.

Communal Conservancies and Community Forests: The Ministry of Environment and Tourism allows communities living on communal land to register as Communal Conservancies (RON, 1996). Their goals are to promote sustainable use and conservation of natural resources and wildlife through community-based management systems, whilst promoting rural development and community empowerment (NACSO, 2011). Registered Communal Conservancies gain rights on the use and management of wildlife. In 2001, the Forestry Act introduced

Community Forests, in order to concede similar rights over vegetation resources. As community-based organisations, Communal Conservancies and Community Forests are beholden to fully democratic governance. This means that (in those cases where they operate well) they are a model in which control by community members can be effectively exerted.

It can be easily concluded that Communal Conservancies and Community Forests have, in practice, rights over exactly the same spaces as Traditional Authorities and Communal Land Boards. According to M. Heindrich and V. D. Mahaherero (personal communications) Communal Conservancies, Community Forests and Traditional Authorities exercise decision-making in agreement with each other and also in close contact with the community members. But some researchers have pointed out that the role of Traditional Authorities and Communal Conservancies (and thus the capacity of the communities to effectively manage their land) remains weak (Millennium Challenge Account Namibia, 2011, pp.14-15; Mendelsohn, 2008, p. 4).

The main reasons are: i) the excessively complicated administrative process by which Traditional Authorities recognise the rights of their community members to portions of land for household purposes; ii) the overlapping of competences, which precludes Communal Conservancies from implementing their land use strategies (Millennium Challenge Account Namibia, 2011, pp.14-15); and iii) the absence of a legal framework detailing the ways of controlling and managing the commonage, and the resulting confusion regarding who is in charge of it (whether Government or Traditional Authorities) (Mendelsohn, 2008, p. 4).

The "resulting vacuum has allowed influential people with substantial non-farming incomes to acquire and privatise large areas of commonage, and to over-exploit grazing in commonages shared with permanent residents who depend largely on stock farming for their livelihoods" (ibid.). This statement connects closely with the existing on-the-ground phenomenons that are examined below.

- **The statuses of communal land: De facto control over land**

Overlapping with these legally sanctioned systems, two phenomenons complete the definition of the communal zone: i) the remaining existence of land allocated to non-whites by the previous administration; and ii) illegal fencing. Both these phenomenons imply a form of "individualisation or privatisation" of communal land (Millennium Challenge Account Namibia, 2011 p. 10). In other Namibian regions, the existence of land allocated to individuals after independence is another way of individualisation of control over land. This phenomenon does not occur at Otjozondjupa, so it is not analysed in this study. Furthermore, if the governance system described above is in itself prone to conflicts of competence, these phenomena add major constraints and yet more uncertainty in regard to its good functioning (V. D. Mahaherero, personal communication).

(i) Farms allocated to non-whites before independence: In the 1980s (according to MLR farm diagrams, in 1988) the previous administration transferred this land to individuals who, subject to farming success, would be able to register a

title deed after 15 years (Werner, 1997 p. 18). This never transpired, as independence came only two years after. However, the new administration maintained the *status quo*, and this land remains an accepted exception to the system explained above.

Both at the Map Office and the Office of the General Surveyor they do not appear as "consolidated" (a technical term used at the Ministry to indicate that a demarcated plot or farm has disappeared or has been integrated into another demarcation). Therefore, they are still recognised and sanctioned by the Ministry of Lands and Resettlement. They are still exploited on a private basis; Communal Conservancies and Traditional Authorities have no rights over them. Instead, the MLR retains the administrative powers (V. D. Mahaherero, personal communication).

Furthermore, they remain allocated to *"the very same people"* that received them from the previous administration (ibid.), which implies a continuation of the pre-independence strategy of creating a middle class of non-white farmers (Werner, 1997 pp. 15-18). Furthermore, the existence of these farms reduces considerably the amount of land that can be regarded as "communal", and it divides community members in "higher" and "lower" classes (V. D. Mahaherero, personal communication).

(ii) Illegal fencing: This form of tenure in communal areas is against the law, but it still has a great impact at the ground level. Fencing off land is prohibited on all communal land in Namibia (Werner, 2011, p. 26), although this matter is

controversial. Fencing can be approved if traditional authorities agree to it for the purposes of Government projects only. Furthermore, some Traditional Authorities claim their right to allow fencing in their controlled areas (ibid). In any case, the practice implies a private-like exploitation of the land, and has an exclusionary effect on the majority of the community members (i.e. those who do not have the resources for fencing, or those who would graze livestock in the commonage). Despite its impact on communities, illegal fencing is a widespread phenomenon rarely contested (V. D. Mahaherero, personal communication).

One of the reasons is that it is difficult to detect and to assess its emplacement with precision. Another reason is that, often, the offenders are well-connected and prominent people (ibid; Mendelsohn, 2008, p. 4). In the study Region, the problem occurs mainly in the area formerly known as Hereroland West, which today comprises Ozonahi, Otjituuo, Okamatapati and African Wild Dog Communal Conservancies. This study could not measure the extent of illegal fencing through testable methods, but only through the statements of Mahaherero.

When the Chief was asked “approximately how much of the communal land is illegally fenced at present”, he simply answered “all of it.” Enquired about this strong statement, he argued that there might be “small portions, here and there” that are not fenced yet, but they were of little significance. He also specified that he was referring to the area under his control (not to the San areas), and that the problem was not present in the Herero eastern areas (i.e Ondjou Communal Conservancy), nor in Ovitoto Communal Conservancy, which is “too small” to fall uncontrolled.

At the time, while conducting this field work, the media published that illegal fencing was also detected in Tsumkwe West (constituency coincident with N=/=a Jaqna Communal Conservancy) (Simiyasa, 2013, in press). However, this case is not mapped because: i) it happened during 2013, while maps in this thesis represent the situation by 2012; ii) its extent and location are uncertain, although some estimations have been provided by the media, suggesting it is a sporadic problem; and iii) it is not an entrenched situation, as it looks that the police and the MLR are taking care of the issue, and it might be soon solved.

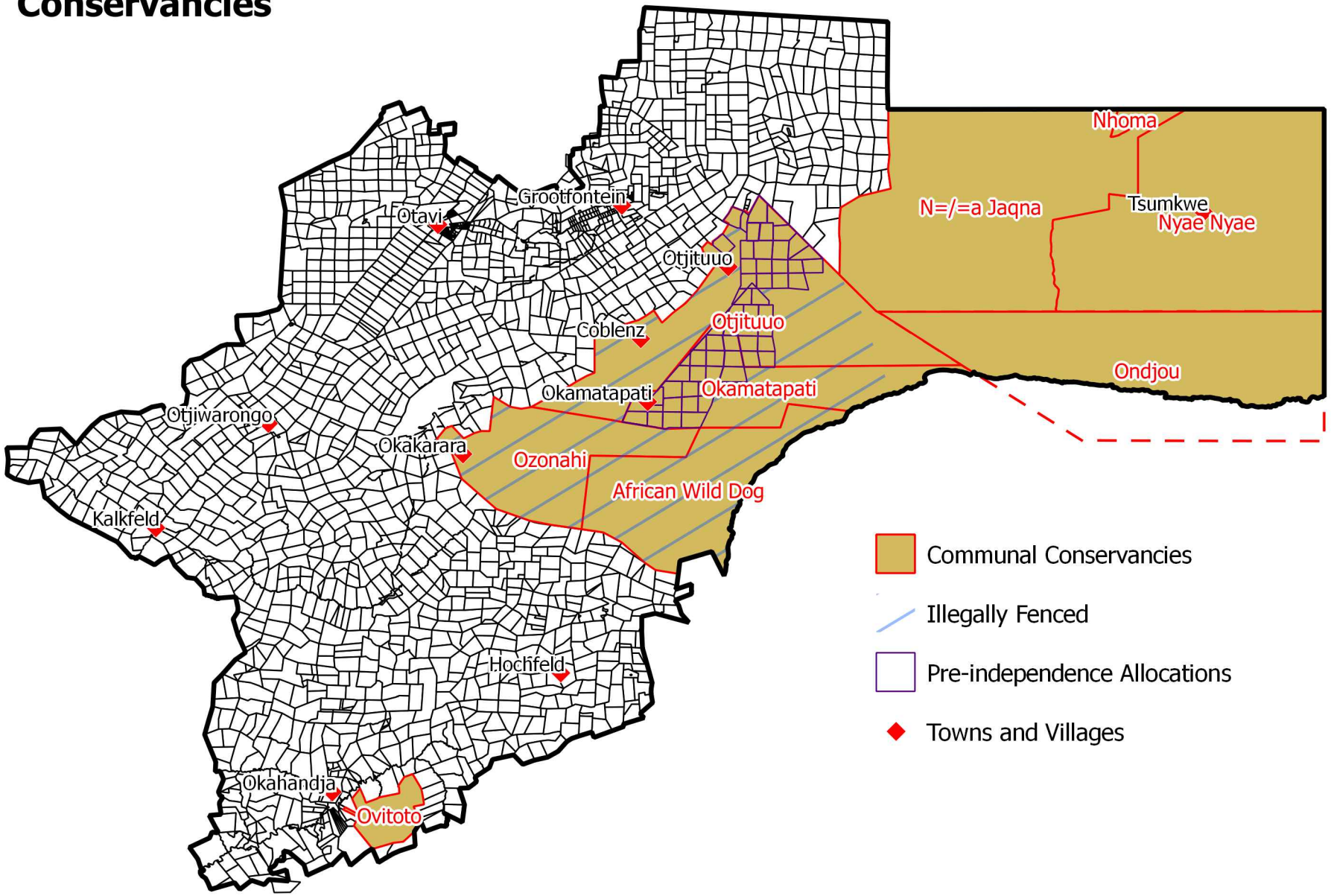
Taking together all the circumstances explained in this and the previous section, a concern may arise about the future of communal land in the Otjozondjupa Region. This concern exists among the inhabitants of the areas visited, as it was expressed as follows by Otjituuo Traditional Authority:

"Our view is that all this land will be private in 5 or 10 years".

(E. Kavetuna, personal communication).

Map 4

# Otjozondjupa Communal Conservancies




Sources: MET, MLR, EIS, this research

Cartography: Pablo Gilolmo

- **Ethnic lines and livelihood options**

Finally, there are differences in administration and livelihood options in different areas of the communal zone. It is interesting to note that these differences match the dominant ethnic distribution of the population. In N=/=a Jaqna Conservancy and Nyae Nyae Conservancy, for example, only San people who are born or have been living in the area for at least 10 years can be members of the Communal Conservancy (Xoa//an /ai!ae and M. Heindrich, personal communication).

In contrast, no such requirements exist in Ovitoto, Ozonahi, Otjituuo, Okamatapati, African Wild Dog and Ondjou (the traditionally Herero areas). This contrast can be interpreted as a manifestation of tribalism at the San Conservancies (as some farmers from the surrounding areas claim [M. Heindrich, personal communication]), but it is a logical strategy for the San, as they wish to maintain a traditional way of life, for which they need control over the land. Farming activities, historically practised by other tribes, would disrupt the traditional livelihoods of the San. On the other hand, in the Herero areas, control over land is mainly related to farming activities, with the objective of boosting farming as a business for community members (V. D. Mahaherero, personal communication).

At former Bushmanland, this researcher visited Nyae Nyae Conservancy, and conducted interviews with some of its members in charge of management (the following is derived from these interviews, held with Xoa//an /ai!ae and M.

Heindrich). As they explained, the Conservancy is oriented to manage the communal resources in order to keep the land as an open space where traditional cultural practices can be the livelihood basis for its members. Systems of fair sharing and periodical meetings are established. They combine these activities with "modern" income sources, such as ventures with tourist companies, mainly dedicated to trophy hunting. In order to organise their space, they have elaborated a land-use plan, in which different zones are reserved for different activities. Allocations of land are restricted to villages, and farming activities are limited to 40 cattle per village for self consumption purposes only.

They claim to have no problems of illegal fencing, but complain about the invasion of cattle owned by the inhabitants of the town of Tsumkwe, as the Communal Conservancy does not control it because it is under the administration of MRLGH. In that sense it can be defined as a conflict of land use, rather than of land control, which is not exactly the same. N#a-Jaqna Conservancy was not visited, but the main difference would come from the occurrence of illegal fencing (as it can be deduced from press, referred above), while livestock invasions are also a recently increasing problem (Graig, 2013, in press).

In regard to former Hereroland, this text refers only to Ozonahi, Otjituuo, Okamatapati and African Wild Dog, as Ovitoto and Ondjou were not visited. At these locations, rural livelihoods evolve around farming activities (both cattle and goats), which is understood as a business activity. Land allocations are for individual (family) households (up to 20 ha), while the communal system of land use is

currently being designed. Two options are to be discussed between community members, Communal Conservancies and Traditional Authorities (V. D. Mahaherero, personal communication):

(i) 70-30 option: Allocating 70% of the land in portions between 2,000 and 3,000 ha, leaving the remaining 30% as commonage (as security for times of drought and a reserve for future allocations).

(ii) All commonage option: Leaving the 100% of the grazing land as commonage.

The first option would imply individualised control over the 70% of the land, and perhaps to fence it off, which could be legally doubtful in terms of the Communal Land Reform Act (Werner, 2011 pp. 26, 38-44). The second option does not have any legal constraints, but would certainly mean a change in the management system, most likely implying herding as a necessary practice. In any case, as long as most of the land is either illegally fenced or already allocated since before independence, the practical implementation of any of these options would entail the removal of all existing fences. This makes it extremely difficult to achieve the overall aim, which is to establish “fair land distribution, both for the present and the future” (V. D. Mahaherero, personal communication).

## III.3. Land tenure structure and environmental degradation in the Otjozondjupa Region.

This section is a study of plant productivity temporal trends (1982-2000) using Normalized Difference Vegetation Index (NDVI) by Global Inventory Modelling and Mapping Studies (GIMMS) (The data for 1981 were not yet reliable, while GIMMS is still working to make available the period 2001-2006). It is written in the format of a standalone article. The nature of the data used and the divergent methodology followed, if compared to the rest of the thesis, make this the best option for clarity and comprehensiveness. Thus, introduction, background, data description, analysis, results and discussion are all included here in what concerns environmental degradation. The study has been executed under the counselling of Agustín Lobo, from the Institute of Earth Sciences (CSIC), Spain.

### a) Introduction

Desertification or land degradation is regarded as one of the most serious challenges faced by societies living in arid and semiarid environments (Eswaran, Lal & Reich, 2001). Namibia is the driest nation south of the Sahara, and according to the Food and Agriculture Organisation of the United Nations (FAO) (Nana-Sinkam, 1995), it is one of the most prone countries to suffer from this problem worldwide.

Major institutions often argue that communal land tenure risks more hazard

for the environment, implying higher degrees of degradation due to the lack of efficiency and rationality derived from commonality (e.g. World Bank, 2003; Deininger, Selod, & Burns, 2012). Such a current of thought utilizes this argument to advise formulas of individualisation of land rights or privatisation in order to improve economic rationale and, in consequence, to attain better preservation of the land and its associated resources (i.e. vegetation) (HIC, 2003).

On the other hand, privatisation of communal land has great impact on the livelihoods and cultural practices of the communities attached to their territories. These impacts are frequently regarded as profoundly negative, and even considered causes of increased poverty and dependency, social clashes, rural depopulation and urban slum growth. (HIC, 2003; Borwein, 2013; Moyo, 2008 p. 21).

Nevertheless, the actual human factor which might cause degradation is land management rather than tenure. In Namibia, land management is an extremely complicated and varied matter. It would be difficult to map management, as it comprises not only stocking rates, but also the way in which land is subdivided, the degree of concentration of animals, among many other details (S. and H.P. Lühl, personal communication). However, commercial and communal farming (and the intermediate formulas, represented by the categories *'pre-independence allocations'* and *'illegally fenced'*) differ in their principles of land management, especially in regard to the way in which land is divided (fenced or not), the benefits expected and a variety of cultural practices (Mendelsohn, 2006 pp. 13-21), which also define how land and livestock are used.

Thus, although these differences cannot be itemised in detail they correlate, in general terms, with differences in land tenure. Therefore, studying the relation between land tenure structure and land degradation can offer clues about some causes of the phenomenon and, most importantly, point to a factor which falls within the range of human control, as land tenure depends entirely on human decisions.

The following pages will aim to establish the degree of land degradation on areas under different forms of land tenure in the Otjozondjupa Region. The objective is to make an empirical comparison between land degradation under private and communal land tenure. The expectation is to obtain some conclusions about the human causes of land degradation and the validity of the dominant arguments posed above. The research question at this point is:

*Under which form of land tenure has land degraded more?*

In order to answer this question, this paper looks over some of the methodologies that have been applied, up to present, in order to study the phenomenon of land degradation. In doing so, the options which best fit the needs of this study are chosen. The design of the study joins together these considerations, along with those presented in the introduction, in order to operationalise the research question. The description of the research data explains in detail the data sets used, while under the headline “data analysis,” the data are stratified and statistically analysed. Finally, it comes the explanation of the results and the discussion of their implications in regard to the initial question and the concerns posed in this introduction.

### b) Methodological background

Past investigations have applied a wide range of different methodologies to study vegetation changes, but most "traditional" ones are regarded as too subjective, limited by the lack of significance of the sample because of its size (field work to asses land degradation is not capable to sample all the area covered, so it is usually based in data collection at a limited number of predefined spots), or covering too short a time period than needed in order to study the phenomenon (Riebeek, 2007). These limitations were impossible to overcome until the development of Remote Sensing technologies (RS), which allow periodical observations over vast areas (actually, the entire earth surface) at very high resolution.

Several satellite sensors fulfil the task of earth observation in order to monitor vegetation changes. The most relevant ones are:

Table 6: Sensors and satellites.

| **Sensor** | **Satellite** |
|---|---|
| AVHRR | NOAA series |
| MSS | Landsat 1-5 |
| TM | Landsat 4-5 |
| ETM+ | Landsat 7 |
| Vegetation | SPOT |
| MODIS | Terra |
| MODIS | Aqua |

Source: http://phenology.cr.usgs.gov/ndvi_avhrr.php#table1

Several researchers have used Remote Sensing to study topics related to vegetation changes in Namibia. Espach et al. (2010) developed a method to estimate annual changes in grazing capacity (avoiding the fixed calculations normally applied) through a combination of NOAA, Landsat and SPOT data. Wagenseil and Samimi (2007) formulated a model to calculate the extent of woody cover on the Namibian savannah using multi-temporal NDVI data calibrated through Landstat ETM data. However, whilst these studies look at particular aspects of vegetation change, they do not aim to use RS in order to measure the degree of overall land degradation and its relation with human activities.

Land degradation and desertification is a process difficult to define, difficult to asses, and even more difficult to quantify (Riebeek, 2007). According to the United Nations Convention to Combat Desertification (UNCCD), “"desertification" means land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities” (UN, 1994). However, this definition gives little indication of what needs to be measured in order to identify desertification. For that reason, researchers involved in such a task have developed more practical approaches.

Reckoning that the amount of existing vegetation in a given area at a given moment is defined as total standing biomass, while annual biomass productivity is the amount of carbon fixed from $CO_2$ to organic material in an area in a year (i.e. the amount of plant growth sustained by the land in such an area during that period of time), the NASA Earth Observatory defines desertification as “a reduction in the

*productivity* of the land that is not reversible. In other words, land is desertified when it can no longer support the same plant growth it had in the past, and the change is permanent on a human time scale" (Riebeek, 2007, the italics are mine). Therefore, it can be a significant contribution to elucidate the initial question by using annual biomass productivity as an indicator of land degradation.

Currently, the most common measure of plant productivity from satellite is given by annual sums of the Normalized Difference Vegetation Index (NDVI). "Green leaves have a higher reflectance in the AVHRR near infrared band (band 2) than in the visible band (band 1), because of differences in leaf chlorophyll absorption between the two bands" (GIMMS, 2007). NDVI is calculated as the normalized ratio of the difference between the two bands, and thus it is a proxy of the density of green plant cover. A simple model (Monteith, 1972; 1977; cited in Lobo, 2012) can be used to estimate annual productivity, as the annual sum of Photosynthetically Active Radiation (PAR) intercepted by green plant tissue times an efficiency factor accounting for the conversion of irradiance to biomass and reduced by a factor accounting for environmental stress.

NDVI values along weekly or, at most, monthly intervals can provide an estimate of the amount of vegetation cover that is present to intercept PAR, thus providing essential information to estimate annual plant productivity. NDVI annual courses respond to climate variability, in particular precipitation and length of the growth season, as well as to direct or indirect human impacts on vegetation cover.

However, there is methodological debate in relation to NDVI as a means to infer plant productivity and land degradation (Wessels et al. 2007; 2012). They criticise both, the possibility of relating annual plant productivity to the causes of desertification, as well as the validity of NDVI to measure plant productivity, specially in arid and semi-arid areas. According to them, effects of high rainfall variability are impossible to distinguish from human-induced changes in plant productivity, while the relationship between actual plant productivity and NDVI vary between different environments, biasing any intended comparison. The problems pointed by Wessels et al. can be overcome, however, if the analytical approach is designed to isolate the human factor from the other main variables which can cause changes in plant productivity, and if the differential relationship between NDVI and plant productivity between environments is accounted for (see below).

There are several projects processing data obtained by the sensors depicted in table 6, in order to calculate and make publicly available time series of NDVI. The ones covering a long enough period of time for the purposes of this study are the Long Term Data Record (LTDR), made by NASA's Goddard Space Flight Centre, and the one one made by Global Inventory Modelling and Mapping Studies (GIMMS) team, which pertains to the University of Maryland's Global Land Cover Facility Data Distribution.

The LTDR product (Masuoka, 2007) aims to become the next reference collection, with more sophisticated processing and validity across different sensors, but it is still under development, and there is not yet total consistency between the

different data sets they use (AVHRR combined with MODIS). Therefore, the widely accepted GIMMS data set (Pinzon, Brown, & Tucker, 2005; Tucker et al., 2005), has been chosen, as it provides a long-term set of images that are filtered and processed in order to validate them as a reliable source for final NDVI calculations, making them consistent for the whole period of time.

### c) Design of the study

As argued above, the relationship between land tenure and agro-environmental management allows to use the former as a surrogate of the latter. Also the definition of desertification given by the NASA Earth Observatory, points that changes in annual plant productivity are a good indicator of land condition and possible desertification.

However, as Wessels et al. (2012) point out, annual biomass productivity is affected by numerous environmental factors, of which precipitation and vegetation variability are of paramount importance in the area of study. Therefore, retrieving the footprint of human management from within a dataset of annual biomass observations requires a data analysis strategy able to isolate the eventually minor but time-consistent human effect.

Any single comparison of the annual productivity at two given years, even if distant in time, cannot be used as an indicator of the impact of human management

because the great inter-annual variability in precipitation causes large inter-annual variability in annual productivity. Furthermore, different vegetation types and land covers imply different biomass productivity (even under equal rainfall conditions), due to their different ecosystemic dynamics. Both factors (rainfall and vegetation) preclude the isolation of observable human impact. An observed trend in the time series can only be attributed to the impact of management if the long term variability of climate and vegetation factors in time and space is taken into account.

The annual sum of NDVI is a proxy of the annual capacity of green vegetation to intercept PAR, and as irradiance is not a limiting factor in the study region, the annual sum of NDVI of a given pixel is closely related to annual plant productivity at that pixel. However, the attempt is not to evaluate plant productivity in this study, but to analyse its inter-annual variability. In order to isolate the trend caused by the human factor, rainfall and vegetation effects could be filtered out by subtracting the predictions of a climate-vegetation model (as Nicholson et al. [1998] or Prince et al. [1998], both cited in Wessels et al. [2007] propose), but modelling the effect of climate on annual productivity is theoretically challenging (Wessels et al., 2007; 2012), technically difficult and data demanding. Therefore, this study adopted the more pragmatic solution of stratifying the area of study into zones within which climate (in particular, precipitation) and vegetation are assumed to be uniform. By comparing data from the same zone the possible effects of climate change (which would be equal within the same zone) are cancelled, along with the differences on vegetation conditions and precipitation.

Given the aforementioned considerations, the operationalisation of the research question becomes:

*Are there differences in the trends of annual biomass productivity among different forms of land tenure within zones of uniform vegetation and rainfall conditions?*

Finally, while the relationship between annual NDVI sums and annual biomass productivity depends upon the type of vegetation and is thus subject to many potential inconsistencies across different geographic locations (Wessels et al., 2007; 2012), time series of annual changes of NDVI at the same site can be considered linear with annual changes of biomass productivity. Therefore, a positive (or negative) trend in the time series of annual NDVI for a given site indicates a positive (or negative) trend in annual biomass productivity. In this paper annual sums of bimonthly NDVI observations are the surrogate of annual productivity. Thus, the final operational testable research question becomes:

*Are there differences in trends of annual NDVI sums among different forms of land tenure within zones of uniform vegetation and rainfall conditions?*

### d) Description of the research data

In order to answer this question, two sets of data are needed: the first is the characterisation of the land tenure structure, developed in the previous sections. The

second is the dataset regarding plant productivity (NDVI), as well as all the related conditionals liable to affect it (rainfall variability, vegetation types and land cover).

In this study, plant productivity is obtained from the NDVI developed by GIMMS (Pinzon, Brown, & Tucker, 2005; Tucker et al., 2005), for the reasons stated above. The processing that the GIMMS team applies to the data received from the AVHRR sensors consists of:

(i) Selection of two representative composites for every month, the first corresponding to the period from 1$^{st}$ to the15$^{th}$, and the second corresponding to the period from the 16$^{th}$ to the end of the month.

(ii) Extraction and correction of the NDVI value for each composite. The correction accounts for: i) residual sensor degradation and sensor intercalibration differences; ii) distortions caused by persistent cloud cover globally; iii) solar zenith angle and viewing angle effects due to satellite drift; iv) volcanic aerosols; v) missing data in the Northern Hemisphere during winter using interpolation due to high solar zenith angles; vi) low signal to noise ratios due to sub-pixel cloud contamination and water vapour (ibid.).

(iii) Establishment of "quality flags" to indicate the reliability of each image, pointing where there is missing data, desert, snow, or other inconsistent parameters.

The GIMMS researchers then make the data set freely available on their website (http://glcf.umd.edu/library/guide/datadownload.shtml). The data are offered in *geotiff format, in 8km Albers Equal Area Conic projection, Clarke 1866

ellipsoid, as well as in geographic coordinates, WGS84 datum at 0.07272727 degrees of resolution (approximately 8 Km) per pixel. At this study, the WGS84 version has been used.

In addition, there is the need to take into account the several variables that affect plant productivity apart of land tenure, so the comparable zones can be defined for the study region. As shown above, the main natural variable affecting plant productivity in this region is rainfall. Also, the relationship between NDVI observations and plant productivity is affected by vegetation type. Vegetation type depends on life-form composition (closely linked to species composition) and structure (land cover).

Climate conditions (in particular, rainfall) are assumed to be uniform within areas of uniform vegetation types, because of the well established climate-vegetation relationship (Walter, 1973; Woodward, 1987). Soil types are also among the natural variables affecting plant productivity, but it is assumed that a proper geographical knowledge of a given region (as good as to define vegetation distributions) takes this variable into account. Fortunately, such geographical knowledge is available in Namibia thanks to the work of John Medelosohn et al., condensed in their *Atlas Of Namibia* (2009), and available in a manipulable digital format (shapefiles) through the EIS. The shapefiles on vegetation types and vegetation structure of Namibia have been clipped to fit the study region, and combined with the depiction of the land tenure structure in order to define the zones that will be compared (see below).

### e) Data analysis

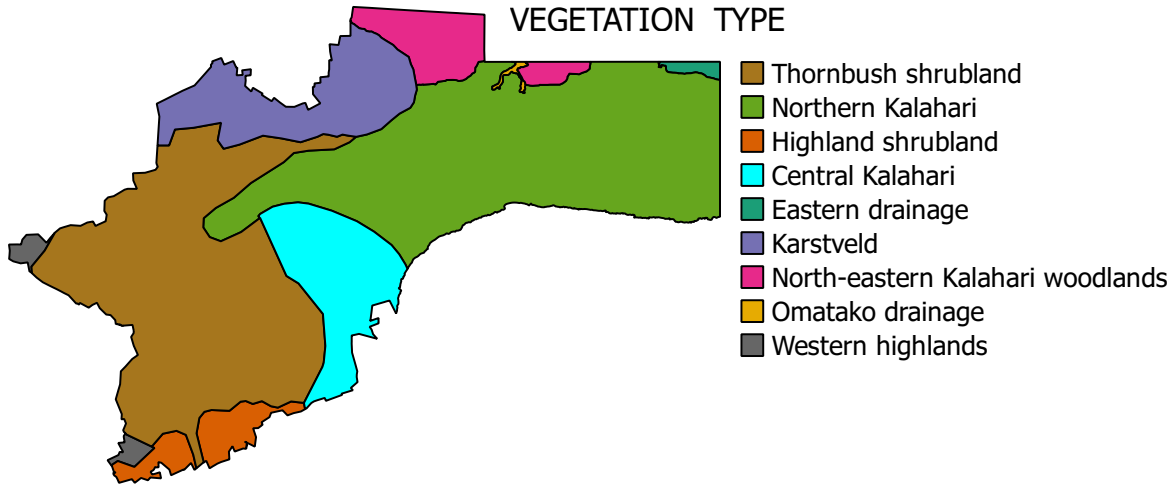
- **Stratification**

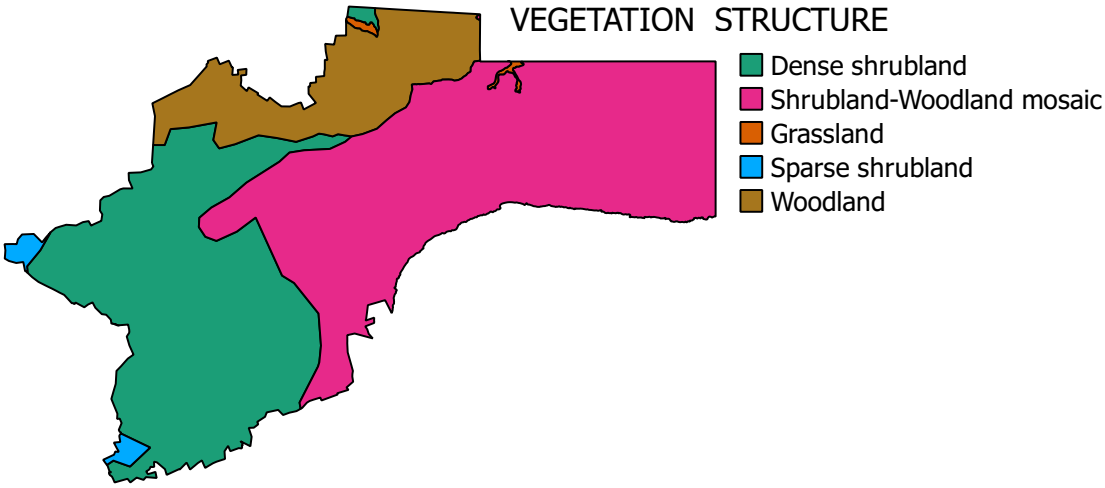
In order to define spatially the zones within which climatic and vegetation conditions are assumed to be uniform, the maps on vegetation types and vegetation structure from the *Atlas of Namibia* (Mendelsohn et al., 2009) provided by the EIS have been combined (Map 5, p. 77). The resulting 'VEG' zones are used to stratify according to them the depiction of the land tenure structure derived from Map 2 (p. 44). Map 6 only shows 'VEG' zones with more than one tenure status (p. 78). Tenure zones are coded: Private as PRIV; pre-independence allocations as ALLOCSPREINDEP; illegally fenced on communal as ILLEGFENC; and open communal as OPENCOMM.

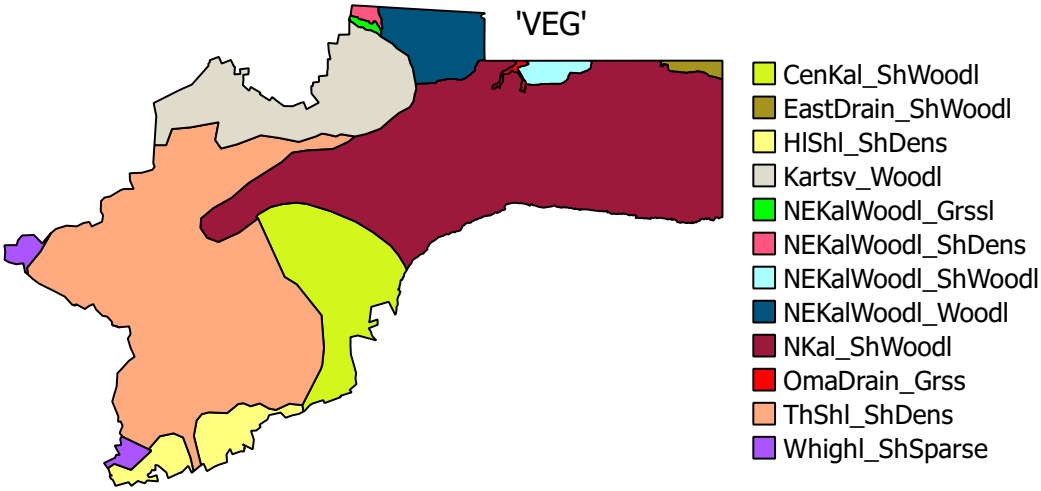
- **NDVI data handling**

24x19 NDVI images from 1982 to 2000 were downloaded from the GIMMS website. Each image was clipped to fit the study region. Observations with a quality flag indicating unreliability were noted as NA, while pixels corresponding to the parts of the region in which the tenure status is unknown were discarded, leaving a total of 1554 pixels of 8x8 Km and 24 NDVI values per year (2 per month). Finally, for each pixel and year the 24 annual values of NDVI have been added up to a total annual NDVI value, and these annual sums have been ordered in a table of 1554 pixels x 19 years. *'R'* scripts were written for all data handling. *'R'* is a free-source software for data management and statistical analysis (R Core Team, 2013).

Map 5



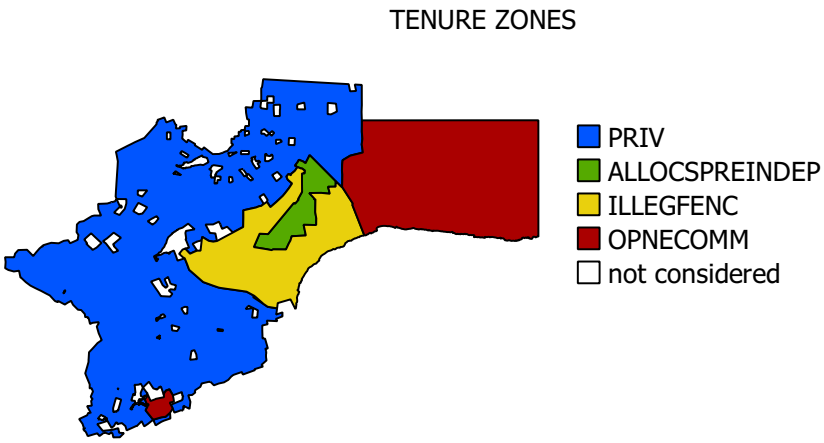



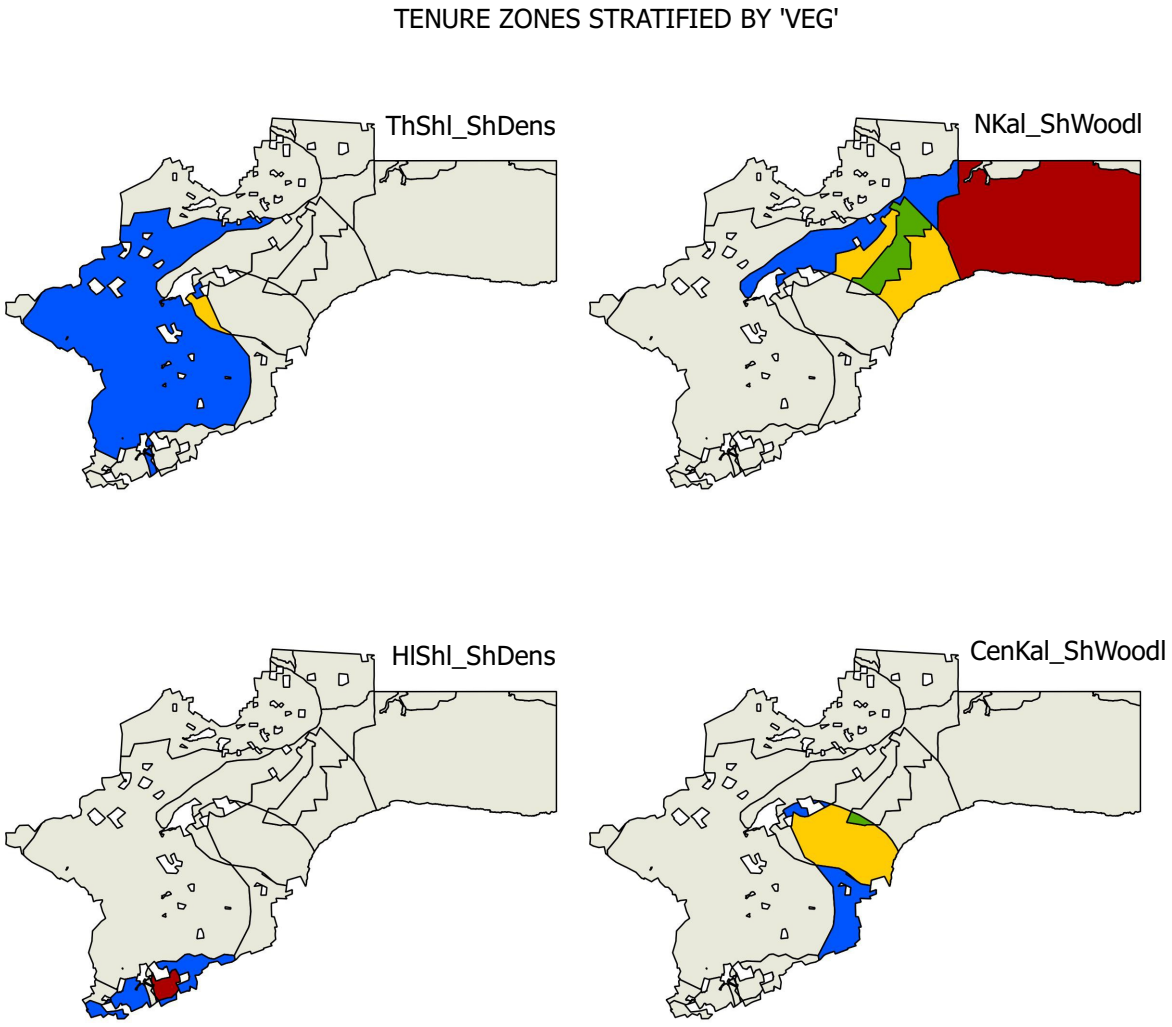




Source: EIS

Cartography: Pablo Gilolmo

Map 6




Source: this research

Cartography: Pablo Gilolmo

- **Statistical analysis**

In order to put in evidence the information contained in the data set, the following graphic and analytical tools were used, in all cases using *'R'* (R Core Team, 2013):

(i) Sequences of boxplots (Fig. 2): they are an abridged graphical representation of the distribution as rectangular boxes representing the inter-quartile distance (thus, the central 50% of the distribution) with a line marking the median, and segments ("whiskers") spanning +/- 1.5 of the IQR (central ~99% of the distribution) (Chambers et al 1983). Sequences of boxplots for annual NDVI sums for the different land tenure types help visualise differences among them.

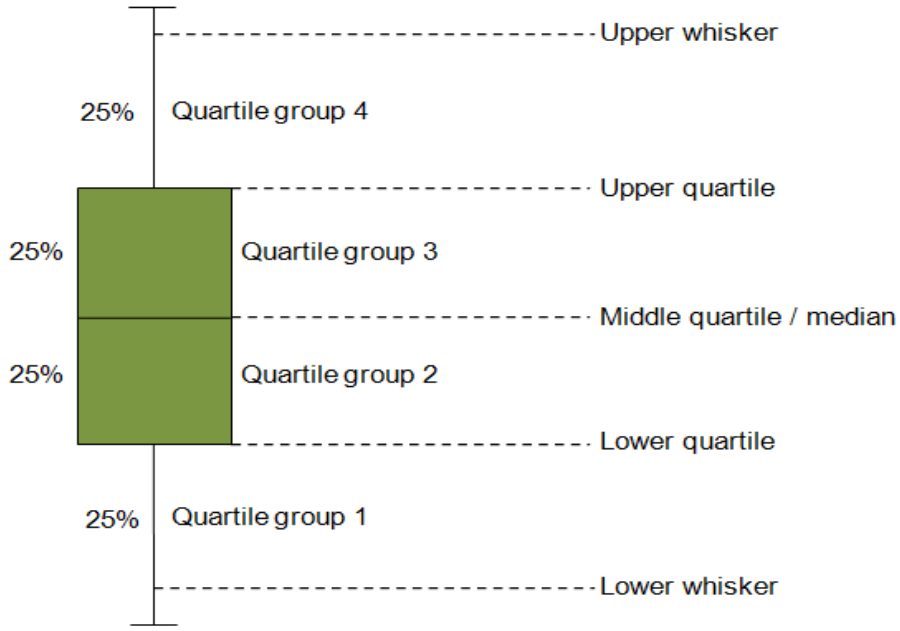



Fig. 2: Boxplots Source: http://www.wellbeingatschool.org.nz

(ii) Time series of medians: Lines linking the annual median values of NDVI sums further simplify the visualisation of the differences among land tenure types along time. However, it is impossible to calculate from these plots if the differences observed are persistently significant through the entire period covered or not. Furthermore, the effects of climatic variability from year to year are not taken into account, so if trends are calculated directly from the medians, we would be blind to the differences in the reactions to climatic variability within each zone.

(iii) Time series of anomalies: The anomalies basically respond to the annual climatic differences. Given that within each 'VEG' zone the climatic characteristics are uniform, the null hypothesis is that the trends of the anomalies should be equal for all the tenures within a given 'VEG' zone. Temporal anomalies are calculated per pixel. The median of the 19 annual values of a pixel would represent the “normal” NDVI value for that pixel, given the total sample. The difference between each annual value and that median calculates how “anomalous” each year is.

(iv) Calculation of linear trends: consists on repeating the previous operation for every pixel, and grouping the pixels pertaining to the same zone (same 'VEG' and same tenure status). Then, the linear regression model (best fitting line) is calculated for each zone through ordinary least squares adjustment. Each linear trend has a slope, which quantifies how much NDVI increases (or decreases) per year in the linear regression model. However, there is the need to test if the model is representing an actually existing trend in the actual data set, as well as the significance of the slope for the total sample.

(v) Tests of significance: $R^2$ values measure the fraction of the total variance that is accounted for by the linear model (the trend), and thus, its predictive capacity. The closer to 0, the less the model can be used for predictions. F-test (p-value of the $R^2$) tests the significance of the regression, that is whether the $R^2$ is significantly different form 0. Its associated p-value is the probability of being wrong if the null hypothesis of a 0 correlation is rejected. Values below 0.05 (5%) are required to reject the null hypothesis and thus accept that the $R^2$, even if small, is actually different from 0. T-test (p-value of the slope) tests if the slope of the trend is significantly different from 0. Its associated p-value is the probability of being wrong if the null hypothesis of a slope of 0 is rejected. Values below 0.05 (5%) are required to reject the null hypothesis and thus accept the existence of a trend with a slope different to 0.

(vi) Comparing trends: Finally, it must be tested if two slopes are significantly different. In order to do so, an analysis of covariance of every pair of tenures to compare is conducted at each 'VEG' zone. The analysis of covariance implies looking at the interaction between two linear regression models. In practice, the p-value of the covariance analysis equals to testing the significance of the difference between the slopes of the two samples analysed (Crawley, 2005 pp. 187-194). Again, the limit to consider it significant is 0.05, which is the highest acceptable probability of being wrong if the null hypothesis (both slopes are not different) is rejected.

### f) Results

Boxplots of NDVI annual sums for each tenure zone over all the area of study are depicted in Graph P1 (p. 84), which indicates that there are differences of productivity among land tenure types and a high inter-annual variability. In order to facilitate comparisons, graphic PM.1 (p. 86) is provided, in which only the time series of annual medians of NDVI sums is represented.

As explained in the Design of the Study, these relationships must be analysed by strata of uniform vegetation and climate, because tenures are not randomly distributed and the differences in this graphics could just be a consequence of some tenure types being more frequent in areas of higher productivity.

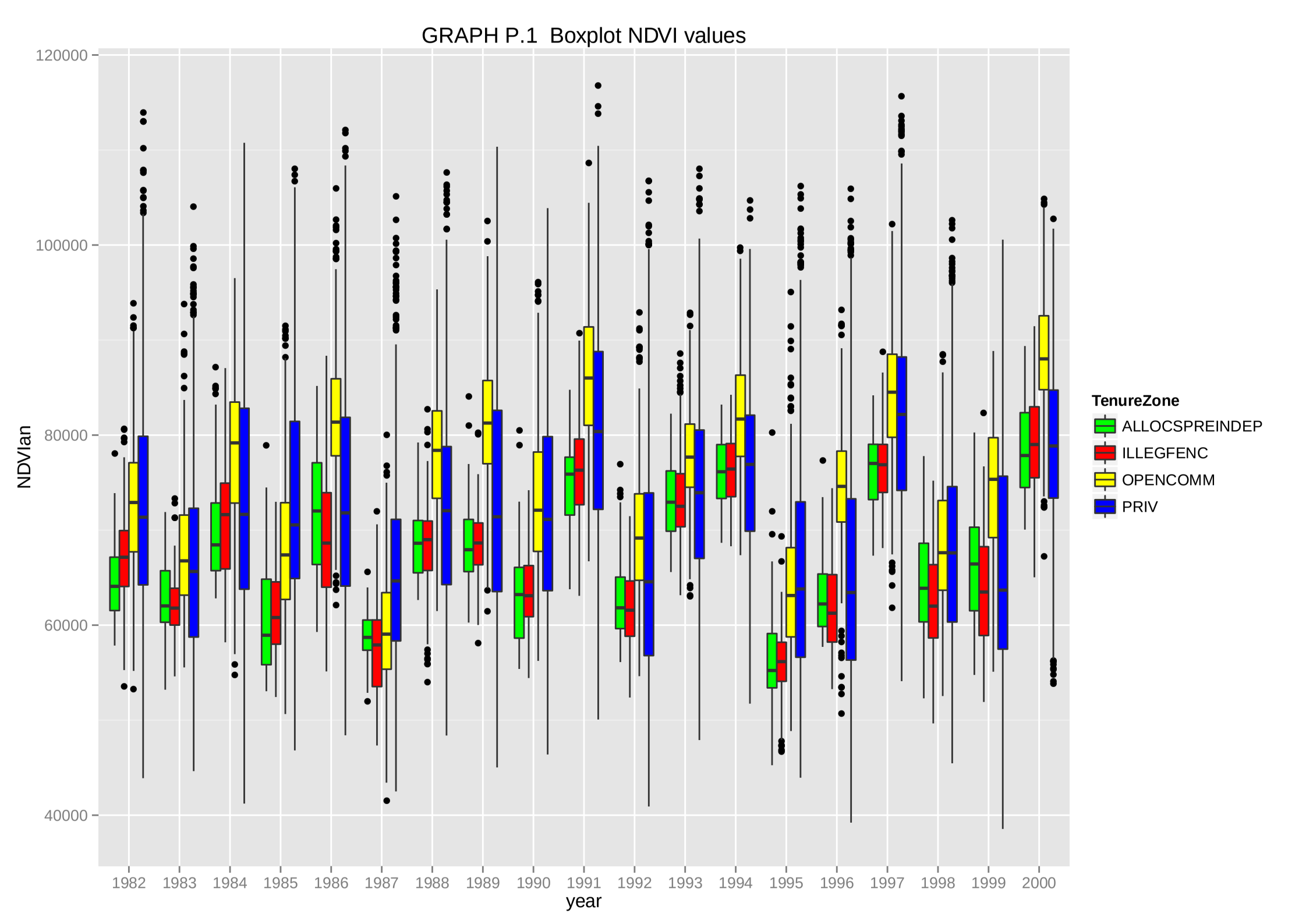
Thus, the same graphic analysis stratified by 'VEG' zones has been carried out. Graph P.2 (p. 85) presents the boxplots of the annual sum of NDVI for the 4 "VEG" zones (CenKal_ShWoodl; HlShl_ShDens; Nkal_ShWoodl; and ThShl_ShDens) that feature more than one tenure type. Graph PM.2 (p. 87) shows time series of medians for every 'VEG' zone. Note that, as suspected, the pattern of plant productivity *vs*. tenure is not uniform across 'VEG' zones.

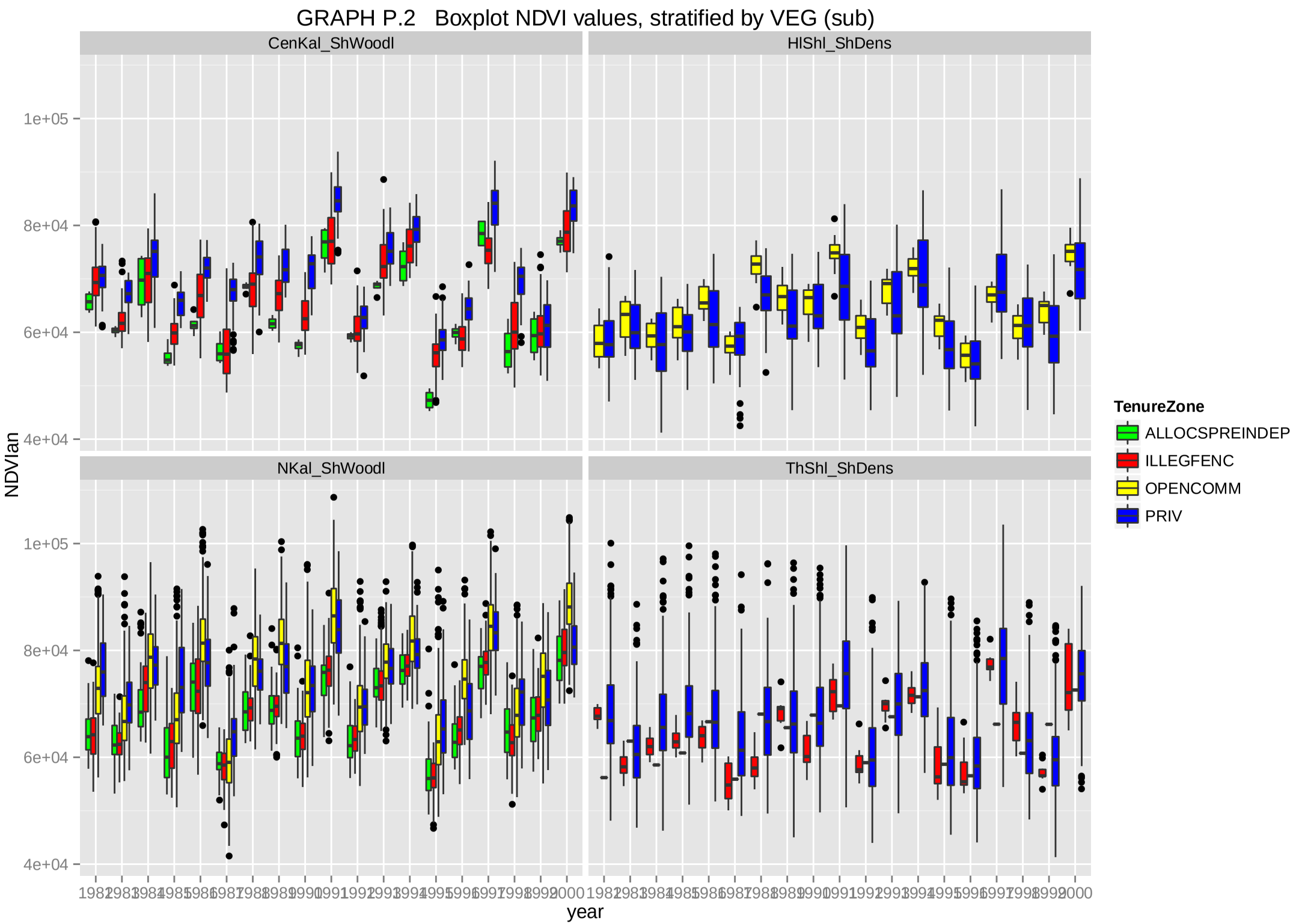
Nevertheless, as stated when the statistical analysis was explained, the variable of interest is not plant productivity (through its proxy of the annual sum of NDVI) but the trends of the anomalies of plant productivity. Graph G.1 (p. 88) is an

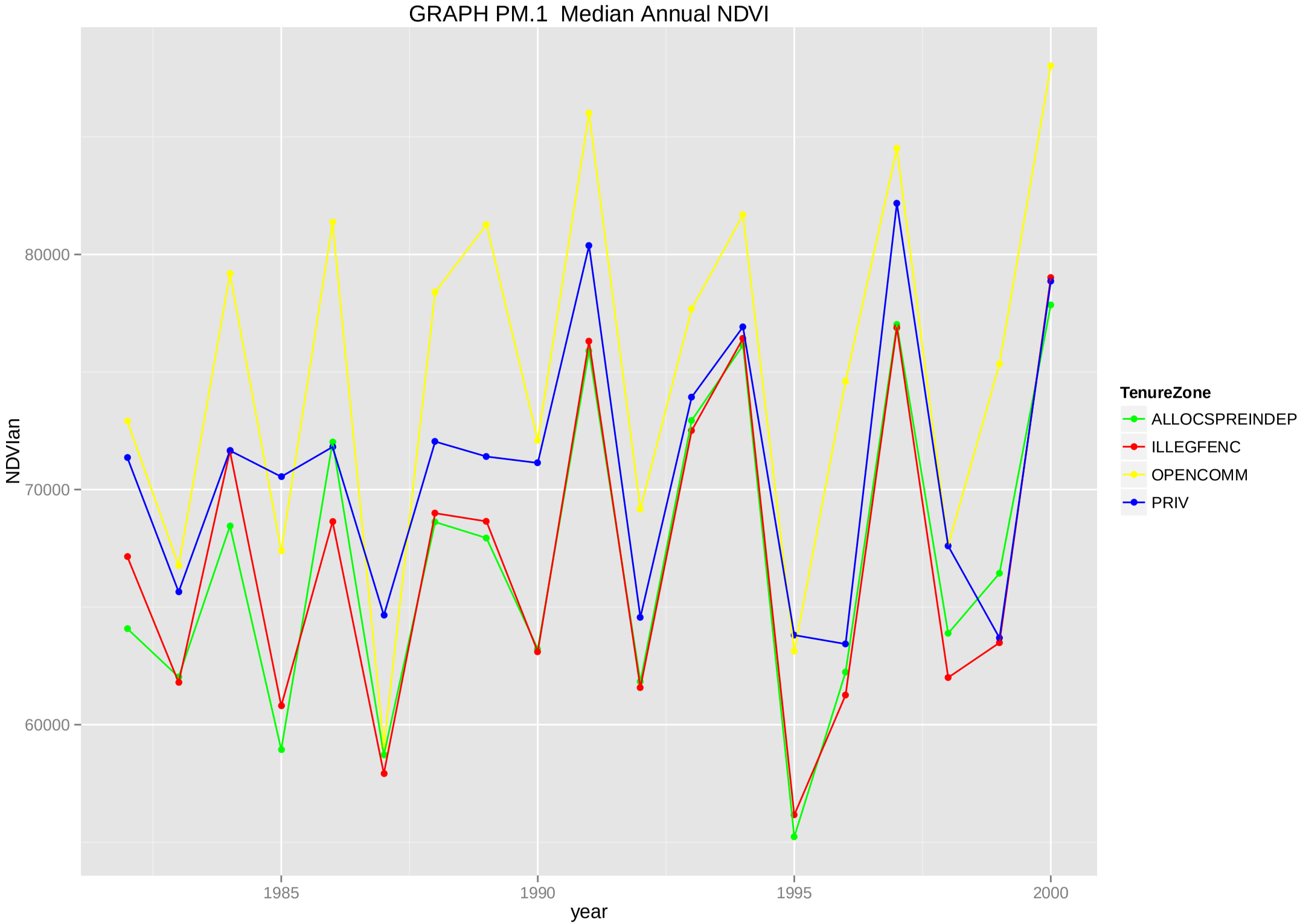
example of a time series of anomalies, the calculated linear trend and its 95% confidence interval (shaded band) for the 'VEG' zone CenKal_ShWoodl and ILLEGFENCE tenure. This process has been carried out for every zone, but it is unnecessary to print out all the graphs, as the trends, which are what really interests us, are depicted in graphs DP.1 and DP.2 (pp. 89 and 90). Note that the linear trend is just a small fraction of the total variability of the time series, which shows very high inter-annual variability.

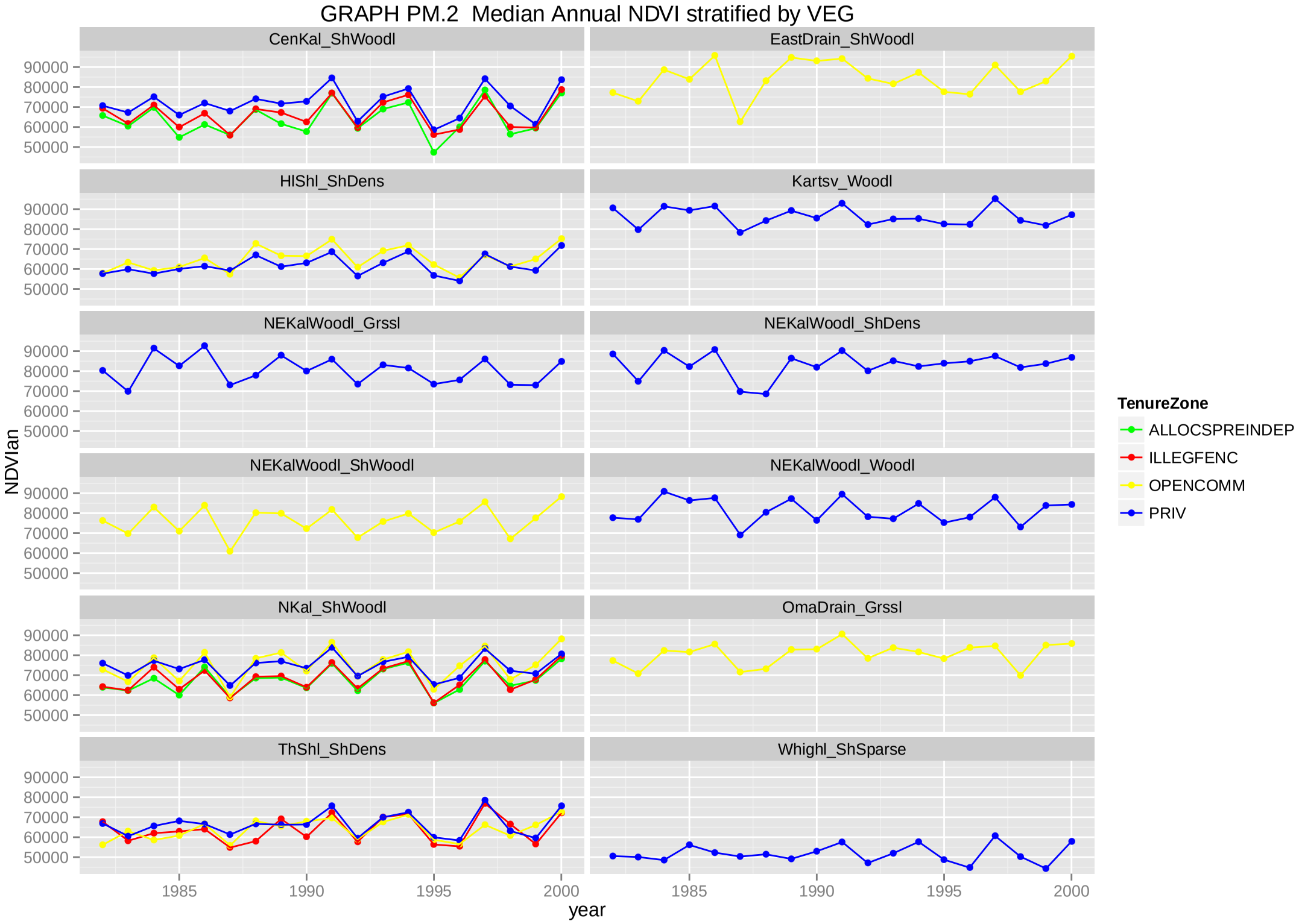
As a consequence, the associated $R^2$ will be low and the trend of very limited interest as a predictive tool, but this is not a concern in this case: the goal here is to compare trends as indicators of management quality. Note as well that despite the low $R^2$, the slope of the trend is significantly different from 0: no horizontal line can be drawn within the shaded area.

The same stratified analysis, including statistical tests of significance, was performed for the aforementioned 4 'VEG' zones (Graph DP.2). As in the case of CenKal_ShWoodl-ILLEGFENCE, slopes of the linear trend of each tenure type in each 'VEG' zone were significantly different from 0 in all cases but two. The corresponding $R^2$ values were always low because of the mentioned high inter-annual variability, but the differences between the slopes were significant in all cases but 2. Details follow in the next subsections (see Tables 7 to 14). Unstratified (for the entire area of study) trends for each tenure type are presented in Graph DP.1 for completeness.

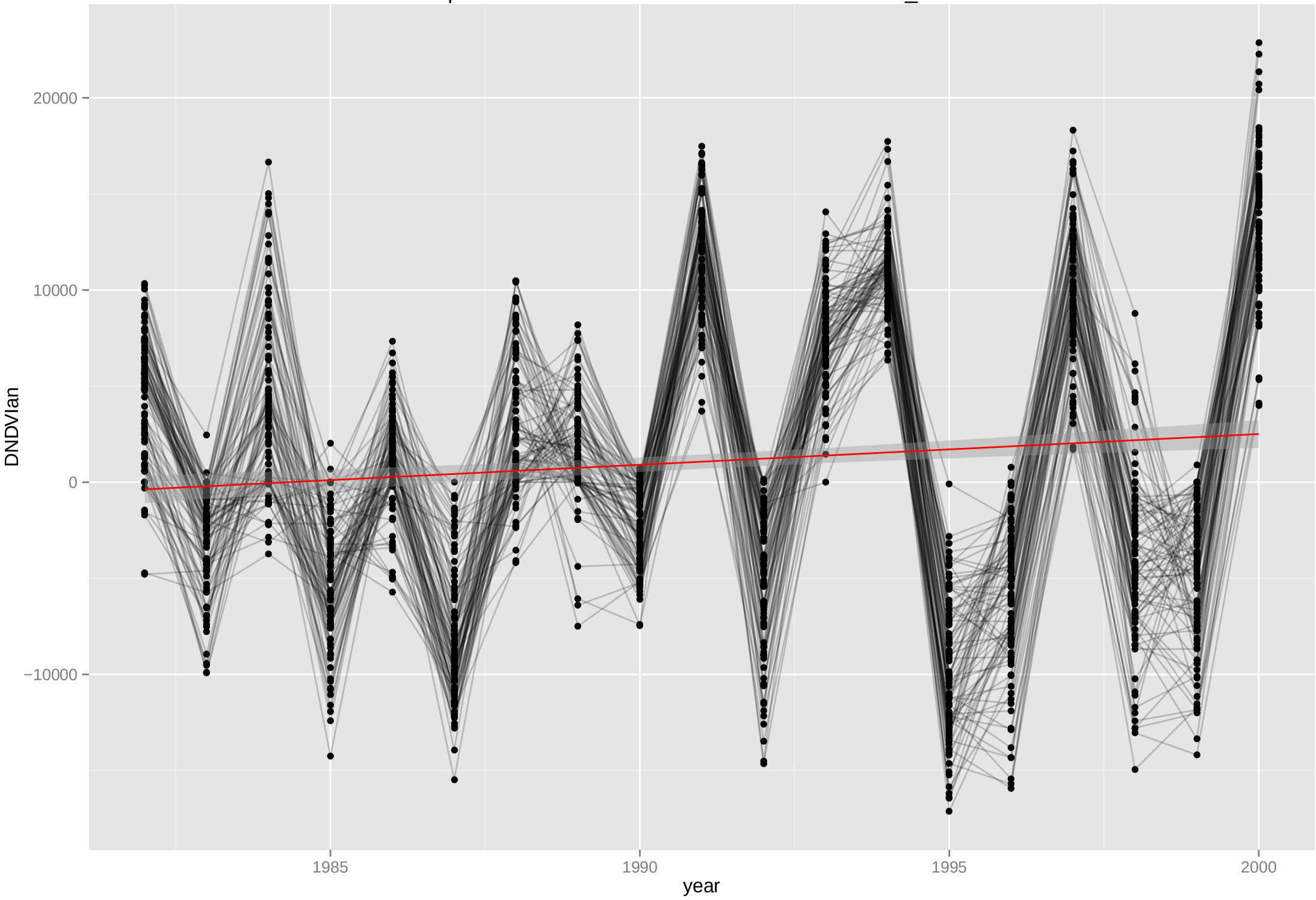

GRAPH P.1 Boxplot NDVI values
120000
100000
80000
60000
40000
NDVIan
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
year
TenureZone
ALLOCSPREINDEP
ILLEGFENC
OPENCOMM
PRIV

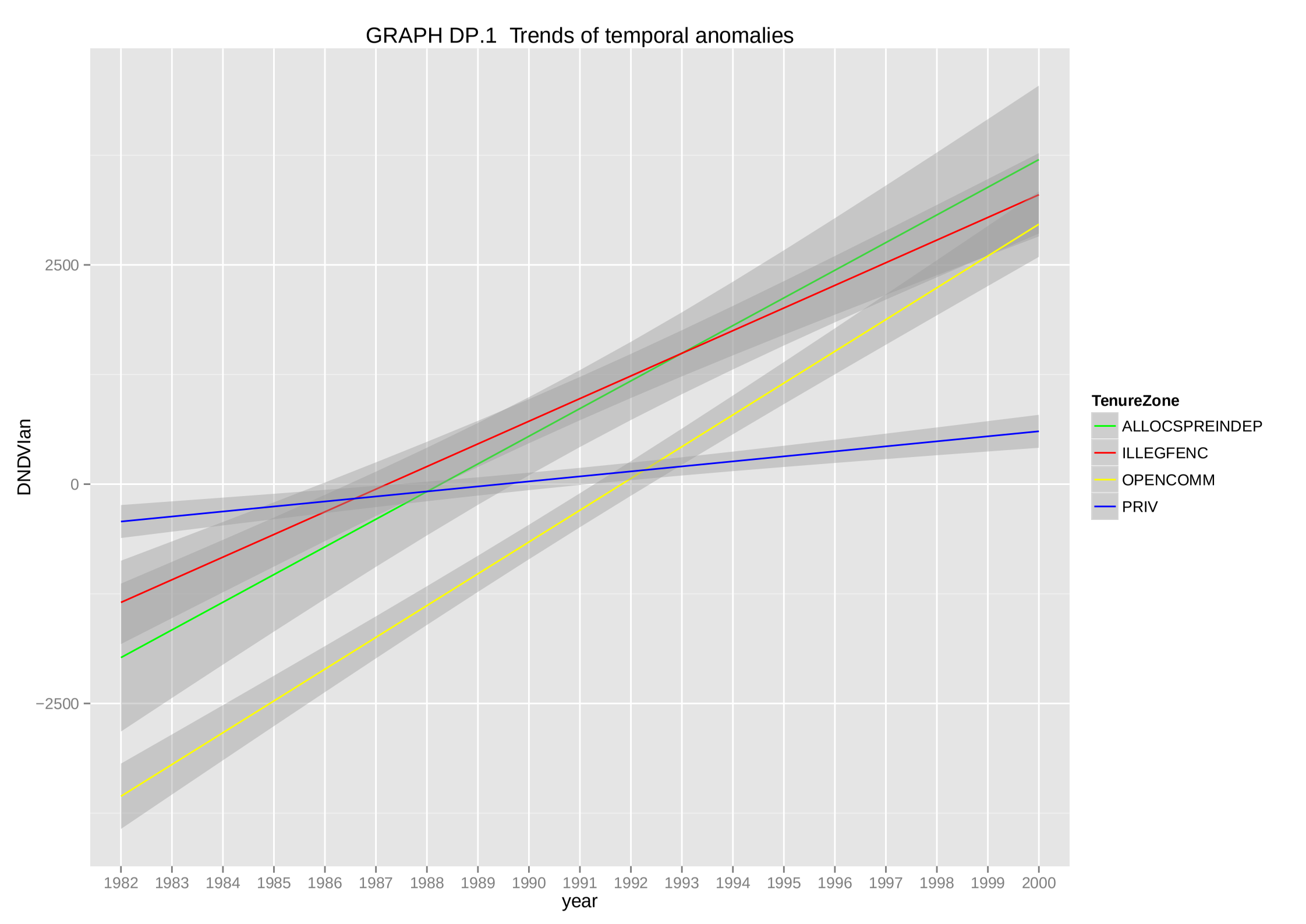

GRAPH P.2 Boxplot NDVI values, stratified by VEG (sub)
CenKal_ShWoodl
HlShl_ShDens
NKal_ShWoodl
ThShl_ShDens
NDVIan
1e+05
8e+04
6e+04
4e+04
1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000
year
TenureZone
ALLOCSPREINDEP
ILLEGFENC
OPENCOMM
PRIV

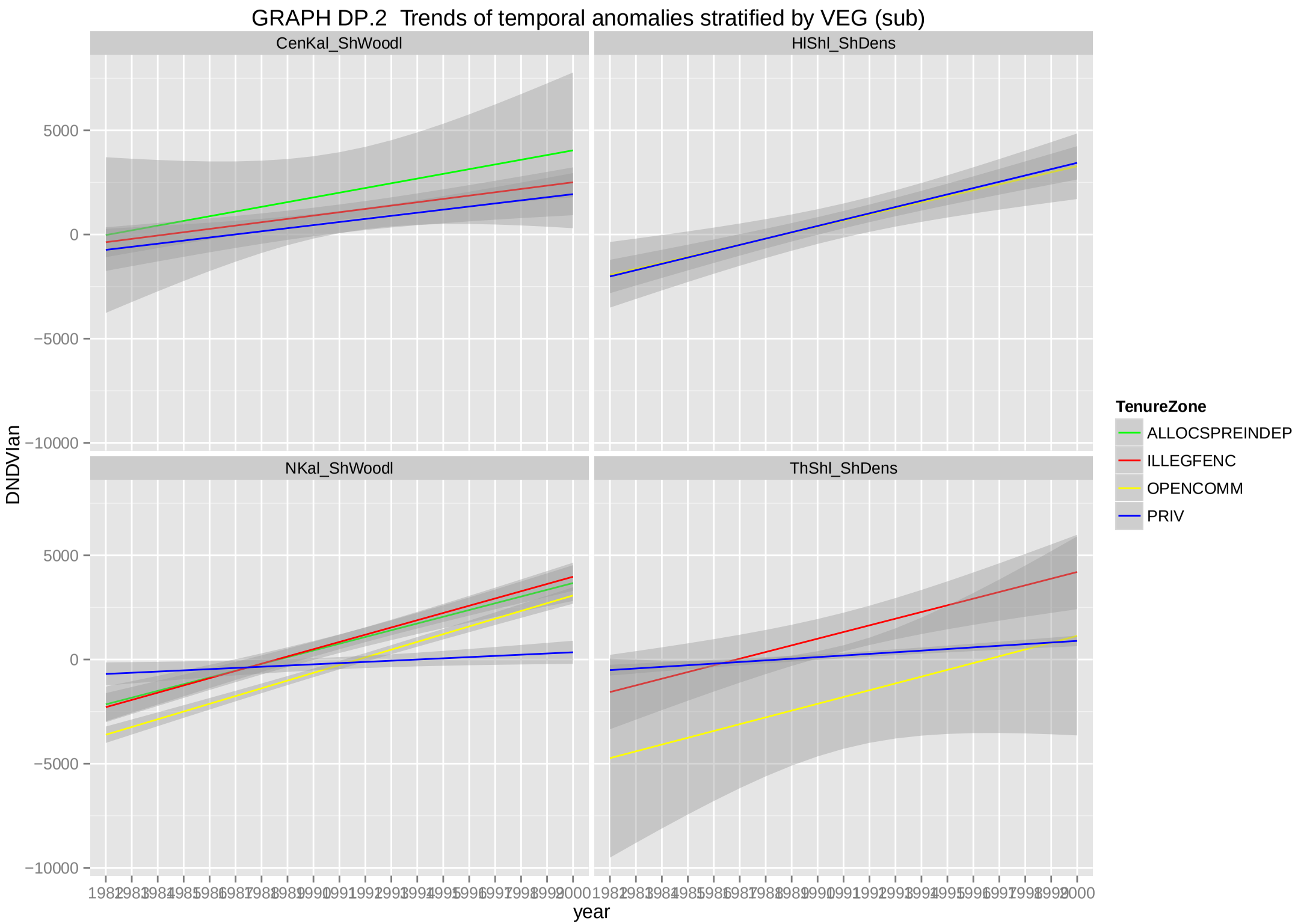

GRAPH PM.1 Median Annual NDVI
NDVIan
80000
70000
60000
1985
1990
1995
2000
year
TenureZone
ALLOCSPREINDEP
ILLEGFENC
OPENCOMM
PRIV


GRAPH PM.2 Median Annual NDVI stratified by VEG
CenKal_ShWoodl
EastDrain_ShWoodl
HlShl_ShDens
Kartsv_Woodl
NEKalWoodl_Grssl
NEKalWoodl_ShDens
NEKalWoodl_ShWoodl
NEKalWoodl_Woodl
NKal_ShWoodl
OmaDrain_Grssl
ThShl_ShDens
Whighl_ShSparse
NDVIan
90000
80000
70000
60000
50000
1985
1990
1995
2000
year
TenureZone
ALLOCSPREINDEP
ILLEGFENC
OPENCOMM
PRIV

GRAPH G.1. Temporal anomalies and their linear trend: CenKal_ShWoodl ILLEGFENC




GRAPH DP.1 Trends of temporal anomalies
DNDVIan
2500
0
−2500
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
year
TenureZone
ALLOCSPREINDEP
ILLEGFENC
OPENCOMM
PRIV


GRAPH DP.2 Trends of temporal anomalies stratified by VEG (sub)
CenKal_ShWoodl
HlShl_ShDens
NKal_ShWoodl
ThShl_ShDens
DNDVlan
5000
0
−5000
−10000
year
TenureZone
ALLOCSPREINDEP
ILLEGFENC
OPENCOMM
PRIV

**Central Kalahari, Shrubland-Woodland mosaic (CenKal_ShWoodl)**

Table 7

| Tenure Zone | n | Slope (std. error) | t-test (p-slope) | $R^2$ | F-test (p-$R^2$) |
|---|---|---|---|---|---|
| illegally fenced on communal | 1691 | 159.77 (34.65) | 4.32e-06 | 0.01243 | 4.317e-06 |
| private | 874 | 148.59 (48.85) | 0.00242 | 0.0105 | 0.002421 |
| Pre-independence allocations | 76 | 226 (178) | 0.208 | 0.02131 | 0.2083 |

$R^2$ values are significantly different from 0 (low values for the F-test) in illegally fenced and private tenure types, which implies that, on top of the high inter-annual variability, a linear trend of the anomalies of the annual sums of NDVI actually exists in this zones. Slopes of these trends are positive and significantly different than 0 (low values for the t-test) in both cases, meaning that they have experienced an overall significant increase in plant productivity during the observed period.

While the slope is also positive in the case of pre-independence allocations, the lack of significance of the trend (p-value of F-test = 0.2083) implies that the existence of such a trend cannot be corroborated. Also, the null hypothesis of a slope not different from 0 (p-value of t-test = 0.208) cannot be rejected in this case. This might seem surprising, as the slope (226) is the highest of all three areas. However, the standard error of the slope (178) is very high in relation to it, probably because the number of observations is much smaller for this tenure. As the inter-annual variability is high, an elevated number of observations is required to detect any trend.

Reliable comparisons can only be carried out between the slopes of trends that have been corroborated to be significant, that is, to determine if the slope of the trend in the farms under illegally fenced (160) is significantly different than that for private land (149). The interaction test (Table 8) indicates a very high probability of error in case the null hypothesis of equal slope were rejected, thus it cannot be claimed that the 2 slopes are actually different: no significant differences in terms of the trends of productivity (through the proxy of the anomalies of the annual sums of NDVI) between the 2 land tenure types in this 'VEG' zone.

Table 8

| **'VEG'** | **Tenures** | **Interaction test** | **p-interaction** |
|---|---|---|---|
| CenKal_ShWoodl | 'PRIV' vs 'ILLEGFENC' | -11.19 | 0.851 |

If there were a higher number of observations (n) for pre-independence allocations, the most probable is that the trend would be verified to be significant. However, it is not possible to quantify the figure of this probability. Thus, no comparative test can be conducted under this conditions, as the high p-$R^2$ values would lead to a result indicating low significance of the differences, but such a result would be highly uncertain.

**Highlands Shrubland, Dense Shrubland (HlShl_ShDens)**

Table 9

| Tenure Zone | n | Slope (std. error) | t-test (p-slope) | $R^2$ | F-test (p-$R^2$) |
|---|---|---|---|---|---|
| open communal | 190 | 289.45 (75.76) | 0.000181 | 0.07205 | 0.0001807 |
| private | 684 | 303.12 (38.67) | 1.75e-14 | 0.08265 | 1.751e-14 |

$R^2$ values are significantly different from 0 (low values for the F-test) in both tenure types in this 'VEG' zone. Thus, there is a linear trend of the anomalies of the annual sums of NDVI on top of the high inter-annual variability. Slopes are positive and significantly different than 0 (low values for the t-test) in both cases, meaning that they have experienced an overall significant increase in plant productivity during the observed period.

The interaction test (Table 10) indicates a very high probability of error in case the null hypothesis of equal slope were rejected, thus there are no significant differences in terms of the trends of productivity between the 2 land tenure types in this VEG zone.

Table 10

| 'VEG' | Tenures | Interaction test | p-interaction |
|---|---|---|---|
| HlShl_ShDens | 'PRIV' vs 'OPENCOMM' | 13.67 | 0.87 |

**Northern Kalahari, Shrubland Woodland mosaic (Nkal_ShWoodl)**

Table 11

| Tenure Zone | n | Slope (std. error) | t-test (p-slope) | $R^2$ | F-test (p-$R^2$) |
|---|---|---|---|---|---|
| illegally fenced on communal | 1710 | 347.91 (32.61) | <2e-16 | 0.06248 | < 2.2e-16 |
| open communal | 6973 | 371.37 (19.06) | <2e-16 | 0.05164 | < 2.2e-16 |
| private | 1900 | 57.79 (26.85) | 0.0315 | 0.002435 | 0.03149 |
| Pre-independence allocations | 836 | 323.54 (41.44) | 1.75e-14 | 0.06811 | 1.75e-14 |

This is the only 'VEG' zone in which there are represented the four possible land tenures. The F-test (all under 0.05) indicates that, on top of the high variability, in all the tenure zones there exists a linear trend of anomalies annual sums of NDVI. Furthermore, all of them show a low (private) to very low (all the rest) probability of their slopes being equal to zero (low t-test results). Therefore, all the zones have increased their plant productivity significantly. Again, the differences between the slopes is tested as follows:

Table 12

| 'VEG' | Tenures | Interact. test | P-inter. |
|---|---|---|---|
| NKal_ShWoodl | 'PRIV' vs 'OPENCOMM' | -313.58 | 1.22e-15 |
| NKal_ShWoodl | 'PRIV' vs 'ILLEGFENC' | -290.12 | 5.34e-12 |
| NKal_ShWoodl | 'PRIV' vs 'ALLOCSPREINDEP' | -265.75 | 6.08e-08 |
| NKal_ShWoodl | 'OPENCOMM' vs 'ILLEGFENC' | 23.46 | 0.574 |
| NKal_ShWoodl | 'OPENCOMM' vs 'ALLOCSPREINDEP' | 47.84 | 0.400 |
| NKal_ShWoodl | 'ILLEGFENC' vs 'ALLOCSPREINDEP' | 24.38 | 0.657 |

Table 12 indicates that the probability of error if it is accepted that the slope of 'PRIV' is significantly different from the slope of 'OPENCOMM' is very low. So it is accepted: their slopes are significantly different. Also the slopes of 'PRIV' and 'ILLEGFENCE' are significantly different from each other. Also the slopes of 'PRIV and 'ALLOCSPREINDEP' are significantly different from each other. On the other hand the slopes of 'OPENCOMM', 'ILLEGFENC' and 'ALLOCSPREINDEP' are not significantly different among them. In summary: the slope of 'PRIV' is significantly different (lower) from the other three, which are not significantly different among them (see also Graph DP.2).

**Thornbush Shrubland, Dense Shrubland (ThShl_ShDens)**

Table 13

| **Tenure Zone** | **n** | **Slope (std. error)** | **t-test (p-slope)** | **$R^2$** | **F-test ($p$-$R^2$)** |
|---|---|---|---|---|---|
| illegally fenced on communal | 209 | 320.25 (86.02) | 0.000254 | 0.06276 | 0.0002538 |
| open communal | 19 | 325.9 (214.9) | 0.148 | 0.1192 | 0.1477 |
| private | 9519 | 77.91 (12.29) | 2.38e-10 | 0.004207 | 2.384e-10 |

At this 'VEG' zone, high p-value for the F-test indicates that the existence of a trend in 'OPENCOMM' cannot be corroborated, as indicated by the p-value (0.148) of the slope, despite its high value. Again, a high standard error (214.9), probably due to a very low sample (n=19), make impossible the detection of any trend.

On the other hand, both illegally fenced and private areas show a trend on top of their respective variabilities (F-test values low), and a very low probability of their slopes being equal to 0 (t-test values low), meaning that the plant productivity in this areas has increased significantly during the observed period.

Finally, the interaction test (Table 14) indicates that the probability of being wrong if accepting that these slopes are significantly different is low enough (0.03%). So it is accepted: the slopes are significantly different. As in the case of Nkal_ShWoodl did communal lands, in this case illegally fenced land have a more positive trend of plant productivity than private land.

Table 14

| **'VEG'** | **Tenures** | **Interaction test** | **p-interaction** |
|---|---|---|---|
| ThShl_ShDens | 'PRIV' vs 'ILLEGFENC' | -242.34 | 0.003876 |

### g) Discussion

Given that Namibia is a country where the occurrence of desertification is widely accepted (e.g. Dirkx et al., 2008), it might seem surprising that all the trends are positive. A possible explanation is that the trends are calculated out of data covering a period of time which started with a prolonged drought (1979-1987 and 1992-1993). Rainfall is the main factor affecting plant productivity, so a time frame starting with low levels of rainfall and followed by more normal levels will result in a positive trend.

This does not mean that Namibia is not desertifying, although to prove such desertification data for a much longer time period would be needed (especially data covering the years preceding the 1880s dry period) which, unfortunately, are not available. However, it could be argued that NDVI trends are actually not a good method to measure the evolution of plant productivity, as suggested by the fact that it is showing positive trends in an area where desertification is a well established fact. Against this critique, the counter would be that, regardless of whether NDVI is actually a good indicator for desertification, the methodology used for the different areas is still the same, and thus internally consistent.

This means that, as long as the main factors which can cause variations in plant productivity and its measurement through NDVI (climate and vegetation) are cancelled (as the stratification did), the results for the different tenure zones allow meaningful comparison. Thus, a correction of the method would affect every tenure

equally, and while alternative trends would be observed, the differences between them would most probably remain.

The results show that in any case there are definitely tenures that, studied through the same methodology, show higher NDVI increases than others. Thus, it can be affirmed that there are tenure zones that reacted better than others to the same climatic conditions. If, in addition, we accept trends of NDVI annual sums as a good indicator of the evolution in plant productivity, it can be affirmed that there are tenure zones that increased their plant productivity more than others. It must be remembered here that the difference between desertification and temporal drought is the capacity of the land to support plant growth once good rainfall conditions are re-established (Riebeek, 2007).

As shown on the previous pages, in two of the four vegetation zones (Nkal_ShWoodl and ThShl_ShDens), land under private tenure did increase plant productivity at a slower pace than the rest of the tenure forms. In the other two vegetation zones (CenKal_ShWoodl and HlShl_ShDens), private land increased its plant productivity similarly to the other tenure zones. In the areas where there is possible direct comparison between private land and open communal land, there is one case (HlShl_ShDens) where both increase plant productivity in a similar way, while in the other case (NKal_ShWoodl) open communal land increased plant productivity significantly more than private land.

At the same time, Graphs P.1, P.2, PM.1 and PM.2 show that absolute values of annual sums of NDVI (not the anomalies), indicate that in general plant productivity is higher in private land. This means that it could not be argued that the land in other tenures is more productive, and thus more favoured by the climatic conditions. By the contrary, private land being more productive shows similar or worse trends than the other tenure zones which are handicapped in relation to it.

From a methodological point of view, it must be noted that the stratified approach simplifies the analysis, but it implies that there are some areas that cannot be studied, or are so small that they cannot achieve statistical significance. With a model that includes climate and vegetation it would not be necessary to stratify. The difficulty of performing such analysis is the reason because a more prudent approach has been chosen. However, there is still work to develop in that direction.

In any case, these results offer strong evidence to reject the argument which states that communal tenure causes a higher degree of land degradation and, thus, constitutes a risk factor for desertification. Actually, at least under the conditions in which there is a statistical difference, it is the other way round: private tenure shows lower increases in plant productivity in the semi-arid environments of the Otjozondjupa Region.

Whether this conclusion can be generalized to the rest of Namibia, or used as a guideline for the African continent in general, is too risky to ascertain. However, the present results lead to critical questions about the foundations of the privatisation

programmes that are currently being implemented in many dry African countries. This study offers an easily replicable methodology, which can be applied anywhere as long as the necessary data on land tenure and vegetation are available. The results offer enough confidence to suggest that, before the promotion of such programmes curbing communal land tenure, an empirical study of this kind is highly recommended.

# IV. RESULTS

**The land tenure structure in the Otjozondjupa Region by 2012**

The first result is Map 2, which depicts the spatial representation of the land tenure structure of the area under study.

**Inherited racial imbalances**

The second result is the quantification of the extent to which racial imbalances inherited from previous administrations have been corrected by 2012 on commercial land. A total of 26.3% of commercial land is now enjoyed (as owners or as resettlement beneficiaries) by previously disadvantaged Namibians. The figure includes land acquired both through private initiative or with the assistance of the land reform programme, which accounts for 20% of the land in previously disadvantaged farms (16.8% PDAA; 3.2% PDRES).

**Socio-economic inequalities**

Based on the available data on the amount of land pertaining to the different categories of previously disadvantaged, and filling in the missing aspects from public information and logical deduction, it was developed an argument which resulted in the following statement: A relatively large number of *poor* people have obtained a

relatively small amount of land, while a relatively small number of *wealthy* people have obtained a relatively large amount of land. Thus, it was argued that the degree of concentration of land ownership is a characteristic of the commercial land tenure structure that has not been much affected by land reform in the past 18 years, despite the fact that ownership and tenure has to some extent shifted from previously advantaged to previously disadvantaged Namibians.

**Communal tenure structure**

The analysis of the land tenure structure at the communal area has been more descriptive than analytical, due to the different nature of the data available for this zone. The contrast between the official status of communal land in relation to tenure aspects on the ground is one of the results of this part of the study. A second result is the description of the different livelihood options of the social and ethnic groups living in different geographical areas. While the predominantly Herero area is mainly dedicated to farming activities, the San communities are more concerned about keeping alive their traditional livelihoods. The estimation of the spatial distribution of illegal fencing shown in maps 2 and 4 (pp. 44 and 60) is also a result of this part of the study.

**Land tenure structure and environmental degradation**

Finally, through a case study in which trends of annual sums of NDVI from 1982 to 2000 across different tenure statuses were compared, the conclusion is that there is no evidence to support the often accepted idea that communal tenure implies

a higher degree of land degradation than private tenure. In fact, the analysis indicates that, under some vegetation conditions, private tenure shows worse results than communal tenure in terms of the evolution of plant productivity over the studied period.

# V. DISCUSSION

Whereas some of the results are straightforward, such the progress in the correction of inherited racial imbalances in access to land, others may seem more controversial. Attention to them is paid in this chapter.

**The nature of changes on commercial land: redistribution or transaction?**

It is questionable to use of the term *redistribution* to refer to a process in which the identity of the owners changes but the degree of concentration remains. It might be that an alternative term, such as *transaction,* would serve better to describe this scenario.

This is more than a superficial terminological debate. The connotations of the term redistribution are strong enough to give the impression that the process is actually helping to overcome social inequalities in access to land, whereas this seems not to be the case.

On the other hand, the use of the term transaction supports a notion already proposed by other researchers (e.g. Kaapama, 2007), which points out that land reform is encouraging class formation and strengthening (rather than alleviating) social differentiation and inequalities.

This implies that the changes since 1995 have affected some of the defining aspects of the line between the privileged and the marginal. As it has been often stated (ibid.), before independence this line was defined by race, whilst since independence it is becoming defined by economic status. The results presented here seem to support this argumentation. Yet, a *class struggle* approach would be interesting in order to study this process, paying attention to specific class interests and the political dynamics of conflict and alliance.

**Communal land: Towards privatisation?**

The forecast stated by E. Kavetuna quoted at the end of page 66, was (according to him) based on the fast spread of illegal fencing, added to the existence of pre-independence allocations. Both phenomena translate into de facto individualisation/privatisation of the rights on the use of communal grazing land (Millennium Challenge Account Namibia, 2011, p. 10).

Furthermore, according some authors who have studied land reform from a more general and theoretical perspective, policies of individual titling of rights in communal areas are a decisive step in a process that, eventually, leads to privatisation of communal land (Borras & Franco, 2010), when it is not considered a way of privatisation by itself (Atuahene, 2006).

At the moment, the titling process in the Otjozondjupa Region applies only to residential or small-cropping plots of a maximum of 20 ha. However, individual

allocations of larger tracts of grazing land have already taken place in other regions of the country, such as the southern part of the bordering Kavango Region (Millennium Challenge Account Namibia, 2011, p. 10).

The development of the legal and administrative instruments for these allocations to be officially recognised, show a pronounced contrast with the lack of an operative framework for the collective management and control of the commonage (Mendelsohn, 2008, p. 4). All of these factors taken together beg the question about the possible near future of communal land, as the affected people, such as E. Kavetuna, easily realise.

Therefore, this researcher agrees with Mendelsohn (ibid.) in proposing that "ownership of commonages be vested and registered in local management institutions in which local residents have both control and shares" (p. 4). As a contribution, this paper adds that communal management systems and organisations should be officially recognised as full holders of the decision-making powers in regard to their respective territories, along with the promotion of democratic forms of governance, for which Communal Conservancies are a good example.

# VI. CONCLUSIONS

Land tenure structure in the Otjozondjupa Region has experienced some changes in the past 18 years. Previously disadvantaged Namibians account for a 20% of the commercial land, while in the communal land Communal Conservancies and Traditional Authorities give rights to the communities that that they did not enjoy before independence. Both facts doubtlessly make a difference in comparison to the previous situation. In contrast, the small significance of resettlement schemes open questions about the path that Namibia is following in regard to its land question.

The country has embraced the neo-liberal formulation on the politics of land since the inception of its land reform programme. The market friendly approach, the business oriented schemes that favour the creation of a rural middle class before prioritising poverty alleviation and redistribution (sensu stricto), as well as the observable process of individualisation/privatisation of rights over communal land (either legally or illegally), all come to confirm this point. The result, as it could be expected, is the favouring of sectors of the society which are not at all in a situation of poverty or necessity, unlike many other citizens who are receiving a very small proportion of the benefits derived from the process.

Another remarkable point is that the changes occurred in regard to the regional land tenure structure did not affect the configuration of the agrarian system. This means that, as long as there is no reorganization of the spatial configuration of

the land tenure structure but only (or mainly) a shift in the identity of the owners, a given amount of land will not be able to support the livelihoods of more people than it is currently doing. The criteria used to evaluate the failure or success of farming activities are closely related to the neo-liberal approach referred above. At the same time, the dominance of these criteria are inserted in a wider debate about the validity of different cultural cosmologies and, in practice, is a material manifestation of epistemic colonialism.

However, Namibia needs to be able to use its land to support the dignified livelihoods of much more people that it is currently doing. At the same time, the previously disadvantaged population of the rural areas can only make their agrarian activities successful if they are allowed to develop such activities in accordance to their own understanding of the world, their own values, their own priorities and their own objectives. And they can only do so if they have the necessary material means, including the land. But the path followed by the land reform process goes exactly in the opposite direction. This thesis offers some strong evidence that suggests that some of the argumentations usually held to follow this direction are not scientifically valid.

There is no evidence of the advantages of the neo-liberal stance in regard to land degradation, and, in following this model, we find little or insignificant progress towards the objective of poverty alleviation. Namibia need to rethink about the foundations on which the politics of land are based. If rural poverty is really to be combated, and a decolonisation process accounting for material assets is to be

achieved, a different agrarian system according to different, local, criteria and values, has to be developed. And, currently, there is no bigger obstacle for this to happen than the inherited land tenure structure. The changes to be performed on it cannot be superficial, and they pass by the reorganization of the rural space. The division of land in farm units and the separation between communal and commercial areas was designed by the previous administration with specific purposes, to create and support a specific social organisation. Inequality was the main characteristic of it. And inequality will not be overcome if the agrarian system which supports it is not profoundly rearranged.

It might seem difficult to find the ways to implement these ideas. But since communal tenure does not imply higher degree of land degradation, and most of the rural poor live in communal land, the solution could pass by enlarging it at the expense of private land. Furthermore, if communal governance and the power of communities over their own territories are strengthened, with the provision of the necessary State's support, we might find an alternative path for development. One which really accounts for the material well-being of the population and allows the people to define their own livelihoods, according to their own criteria.

The conclusion, thus, is that Namibia needs an alternative land tenure structure for an alternative agrarian system if a different society, not based on inequality but on material development and authentic decolonisation, is to be achieved.

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