

Customary Land Tenure in the LADM

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Key words: Customary Land Tenure, LADM, Land Administration, Land Information System, Bronislaw Malinowski.

SUMMARY

Incorporating customary land tenure relations into Land Information Systems (LISs) presents knowledge modelling challenges arising from the complex and dynamic nature of customs. We present a case study using descriptions from Bronislaw Malinowski's *Coral Gardens and their Magic* (1935) to illustrate how some complex land tenure concepts can be represented in LADM. In the society described by Malinowski kinship relationships play a central role and form the means by which identity, through membership to a clan, is reproduced. Residence, rights to farmland, and acquisition of titles and responsibilities all depend on clan membership. But more importantly, the responsibilities of the individual to the family and the clan form the central pillar of the sustainability of the society. These responsibilities introduce complications for the land information modeler because they are regulated by the conditions extant at the time of observation. For example, farmland is assigned on an annual basis and depends on the needs and capacities of each household of the community.

Our analysis shows how rights to farmland as described by Malinowski can be addressed and how to model other socially mediated aspects in the LADM. We present a model of the unregular annual allotment of farming plots to families. The plots that each family will farm in a given year will be allotted to them that same year at the Gardening Council. This requires consideration of time which we address with simple versioning.

Our case study brings out the realization that land rights can appear in different, separated dimensions. The spheres of production and consumption are separated in our case study. A substantial part of what is produced by one group is distributed through well-defined networks to end up in the food stores of a different and clearly distinguished group. Thus the tenure on land is not absolute in the sense that the benefits of certain entitlements are not enjoyed exclusively or in great part by those holding said entitlements. To complicate matters, the norms associated with one's place of dwelling and marriage ensure the right to a dwelling without explicitly assigning a specific "real property" at which the right is exercised.

We explore possible solutions to this challenge, separating the different dimensions of the tenure on land (i.e. the stable land allocations, the production side, the consumption side, and the distribution dynamic) and using the LADM Basic Administrative Unit to represent dynamic people-to-land relations.

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1. INTRODUCTION

Incorporating customary land tenure relations into Land Information Systems (LISs) presents several challenges often overlooked when considering LIS design and implementation. These challenges arise from the fact that the nature of “rights” under customary tenures, as opposed to statutory ones, is often fluid in the sense that a “right” may exist to a lesser or greater degree and dynamic, that is, coming into force conditionally or subject to other factors. Beyond this, the degrees and conditions are not always quantifiable rendering some obvious approaches for representing and manipulating this information in a computer system inapplicable.

The challenge is one of having appropriate means of modelling the diversity of customary land relations. From the perspective of official land administration systems, the Land Administration Domain Model (LADM) provides a possible means of modelling customary land tenure relations. LADM standardises the relationships between people and land in a land administration (ISO/TC211, 2012; Lemmen et al., 2015). The LADM derivative appropriately called the Social Tenure Domain Model (STDM) attempts to represent customary land rights categories in a way that is compatible with the LADM, effectively forming an LADM profile (Lemmen, 2013). The problem one faces in assuming accuracy of such representations is that they are forced to ignore the dynamic nature of the land relations involved.

We present a case study using the Trobriand community described in Bronislaw Malinowski’s *Coral Gardens and their Magic* (1935) to illustrate how some complex land tenure concepts can be represented in LADM. In the society described by Malinowski kinship relationships play a central role and form the means by which identity, through membership to a clan, is reproduced. Residence, rights to farmland, and acquisition of titles and responsibilities all depend on clan membership. But more importantly, the responsibilities of the individual to the family and the clan form the central pillar of the sustainability of the society. These responsibilities introduce complications for the land information modeller because they are regulated by the conditions extant at the time of observation. For example, farmland is assigned on an annual basis and depends on the needs and capacities of each household of the community.

In section 2 we briefly review some of the complexities of formally representing knowledge about customary land tenure. Section 3 presents a description of a simplified rendition of Trobriand land tenure using UML modelling as an aid. The LADM model to support representing certain aspects of this complex tenure system is presented in section 4 and a short summary closes the paper in section 5.

2. COMPLEXITY OF CUSTOMARY LAND TENURE

The complexities of customary tenure have challenged state administrators possibly since the emergence of the first states. Scott (1998) refers to the problem as one of the illegibility of evolutionary social (and natural) phenomena such as land tenure from the perspective of the administrative functions of the state. These complexities, however, are not mere decorations on an otherwise straight forward system of relations. Neither do they imply a lack of structure in said relations. Rather, the systems that they emanate from follow a local logic that is at variance with the logic of formal administration (Scott, 1998, p. 25).

Meek (1946) presented a seemingly endless list of customary practices to help show why the British colonial administrations continued to flounder in their task of pacifying the local populations in the colonised lands. For example, in describing the tenure system of the Wa-Bena of Tanzania, Meek, notes that use rights to a piece of land are created by the labour expended in making it usable (p. 19). Once these rights are obtained they can be transferred for some compensation but such compensation is only in acknowledgement of the labour expended in making the land usable and perhaps for any crops still on the land. The question comes then of what happens if the land is left to fallow for an extended period and needs to be cleared again? Does the original labour input expire?

Meek, as a colonial administrator seems to have been more concerned with understanding how to achieve administrative goals. Malinowski (1935) on the other hand appears to have been more interested in describing the social and economic structure of the native society of Papua New Guinea before the entrenchment of European influence. Despite the differences, a common thread in both expositions is that land under customary tenure is often allocated so as to ensure that individuals and households have enough land for self-sustenance. El-Amin (1990) makes the same observation for the case of parts of the Darfur region of Sudan. Here state structures are decentralized such that local administrators follow centuries old traditions in the allocation of land for permanent or temporary, private or collective use (El-Amin, 1990; Abdul-Jalil, 2006). Each family must have sufficient land their sustenance subject to rules regarding ranks and titles among the community.

From Scott's perspective it is partly this outcome or goal oriented organization of customary tenure systems that makes them illegible to officialdom (pp. 25-33). For example, measuring land in terms of its sufficiency to provide for the annual nutritional needs of a family of 5 is much harder than measuring its area given appropriate instruments. To make matters worse, the question is not merely the nutritional need. It also depends on the capacity to use the land and other temporally and spatially varying factors. Among nomadic pastoralists, the size of pastures must be measured relative to both herd sizes and movement patterns.

It is these complexities that the increasing standardization of measurement were intended to simplify. With increasing sophistication of measurement and representational tools for knowledge across many domains, it might become possible, as in other domains, to better approximate the complexities and, more importantly, render them legible through the lens of official land administration. Malinowski's study of Trobriand tenure provides us with a well-defined challenge for exploring the application of these modern tools to said effect.

The spatial and legal aspects of land, while related, each require special attention in their own right. The concept of levels (Lemmen, 2010) was introduced to in LADM to allow for varying levels of measurement and representational precision in the spatial component of the land records. In this paper we focus primarily on non-spatial aspects. Space is considered only in its broad categories but not in its measured form: we are interested in spaces rather than space perse.

3. LAND TENURE IN THE TROBRIANDS

Coral Gardens and Their Magic (Malinowski, 1935) presents an in-depth ethnographic study of one of the main settlement in the Trobriand Islands off the coast of Papua New Guinea at the beginning of the 20th century. In the following we use the present tense to describe historical situations to avoid confusion. Relevant concepts are illustrated with UML diagrams which will form the basis for our LADM approximation of the tenure system.

The Trobriands are a coral atoll north east of the Papuan main Island. Malinowski's study focusses on the central village of Omarkana which has the status of a capital of sorts on the island. A map of the layout of the Islands and of Omarkana territory can be found in the book¹ (p. 2 and p. 430 respectively).

3.1 Social Organization

Omarkana is the seat of the paramount chief over the entire islands. As an agrarian society, farming (or, as written in the text, gardening) is the predominant means of self-sustenance in the Trobriands. Farming is supplemented by fishing and to a lesser extent, hunting and the gathering of fruit.

The Trobrianders are a matrilineal society. As such inheritance of social rank, titles, and descendancy are all determined through the mother's lineage and not the father's. The entire society is divided into four clans (p. 35). The more relevant grouping for our purposes, however, is the subclan (pp. 35-38, 84-85) which is the main determinant of ranks and titles. For brevity, in this paper we will use the term clan to refer to both clans and subclans.

According to Malinowski (p. 37, also Ch. VI, XI, and XII) social reproduction is achieved within two overlapping units of social organization. The patriarchal household and matrilineal filiation group formed by a woman, her brother (or other appointed male maternal relative), and her children. The parties with interests on land can thus be grouped into three: natural persons are the finest unit of interested party. Natural persons obtain new interests when they act as part of one the two kinship units – the patriarchal family or the matrilineal filiation unit (see Figure 2). The family unit can be seen as the constituent ingredients to the village community – i.e. the latter is a composition of the former. The filiation unit is a basic unit of the clan. It is the structure through which the clan reproduces itself. Figure 1 shows a UML model of the relationships between the main units of social organization. As will be seen in section 3.3 below, rights to land accrue to each of these units of social organization and in the context of LADM they all correspond to a Party of one kind or another.

¹ A digital copy can be rented at the Internet Archive <https://archive.org/details/coralgardensandt031834mbp>

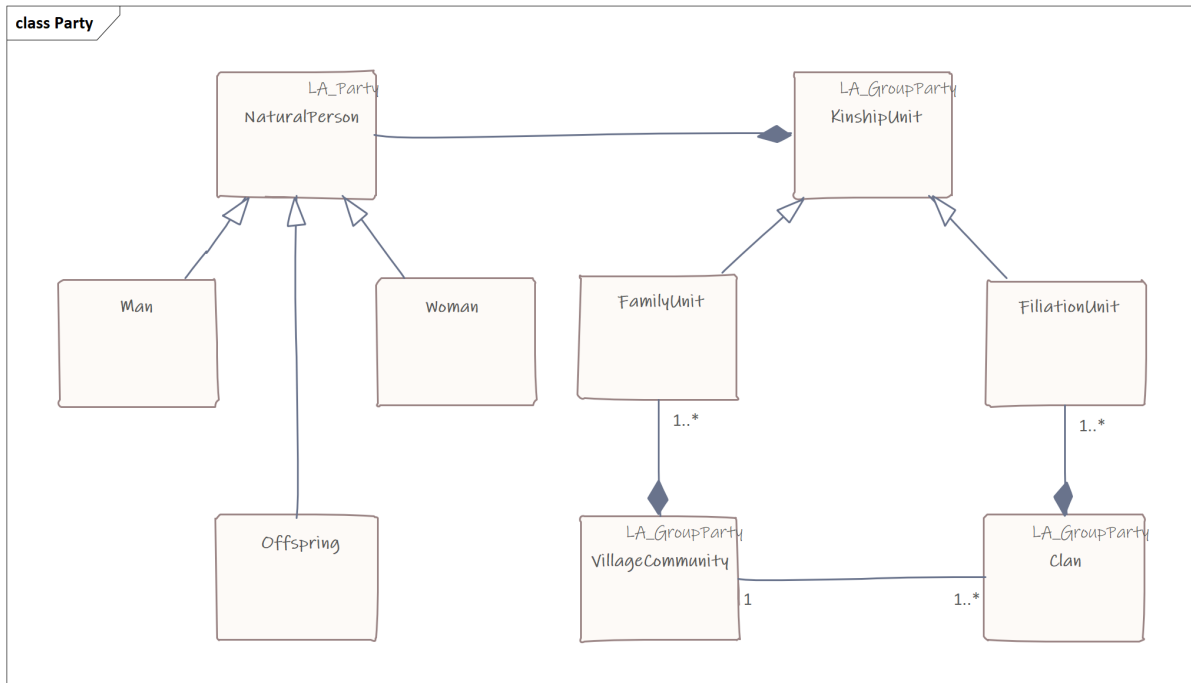


Figure 1. Simplified UML class diagram representing Parties involved in land relations

3.2 Spatial Organization

Land in the Trobriands is divided into territories comprising one or more villages, a number of garden fields, sacred groves, and public spaces within and outside the villages. A territory may comprise a few garden fields that are spatially disjoint from the main body of the territory. As illustrated in Figure 3 the Village and Field are made of Homesteads and Plots respectively, in LADM these would correspond to SpatialUnits.

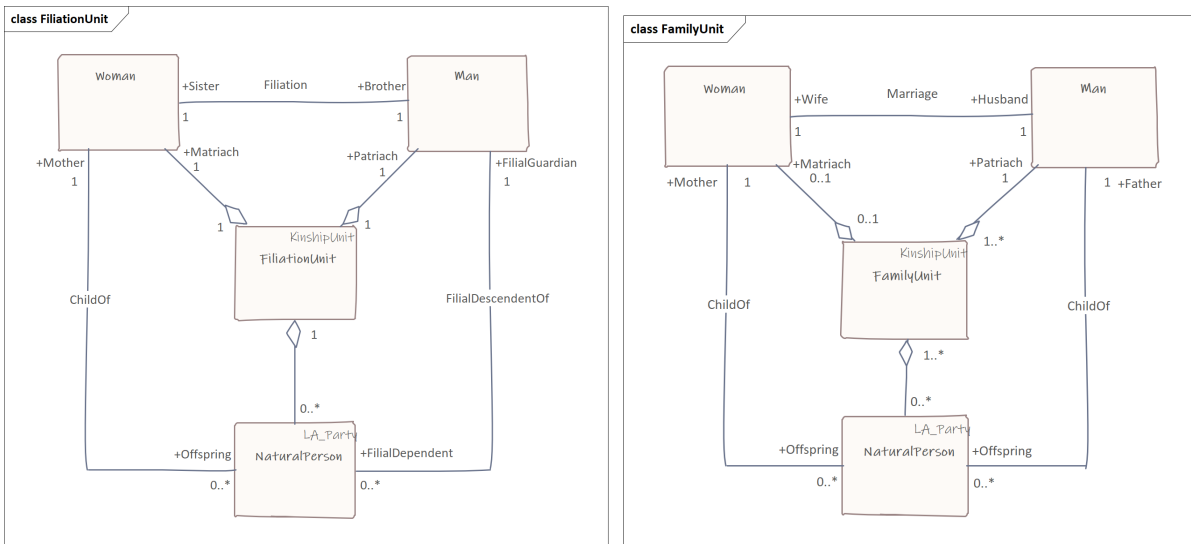


Figure 2. The relationship of individual persons to the kinship units

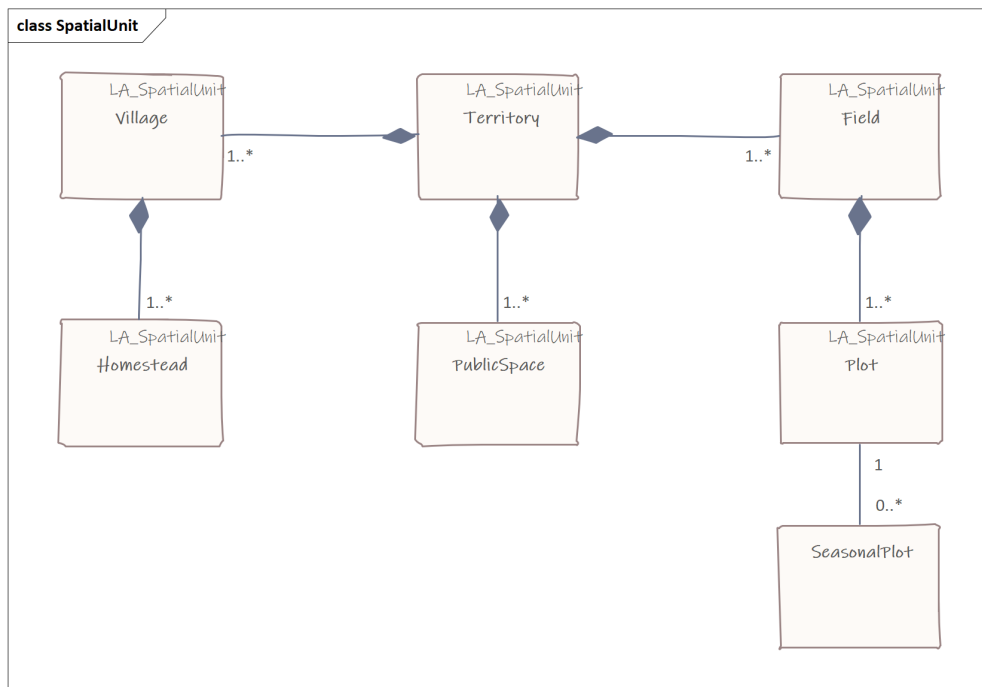


Figure 3. Spatial entities of interest for describing land tenure in the Trobriands

3.3 Tenure relations

Some rights to land in the Omarkana appear as fixed, permanent rights. Others are dynamic, varying in time and space. Some rights are held by group parties, others by individuals. Malinowski lists 9 claims he considered most relevant in characterising the tenure (pp 328-329). Here we focus on only those rights corresponding to the main parties and spaces outlined above. The village community as a whole has an ownership right over the territory and a right to allocate space for families to establish their homesteads in the village (Figure 4). On the other side, the clan determines control over farmland. Notice that a Filiation Unit or even an entire Clan may have zero or more areas of farm land over which they exercise control.

3.3.1 OCL rules for ensuring instance uniqueness for stable land rights

At this point we encounter our first modelling challenge. The semantics of associations in UML do not restrict the instances of Plot controlled by a particular FiliationUnit instance to only Plots that are parts of Field instances controlled by the FiliationUnit's Clan instance. This is because associations in the class model are, generally, independent of each other. As can be seen in Figure 5 a perfectly legal scenario that violates the FiliationUnit-Clan-Field constraint can be instantiated in this model.

What we would like is to have each minimal cycle in the diagram of Figure 4 to commute – be navigable in any direction. Achieving this requires the use of constraint rules which UML admits in the form of Object Constraint Language expressions (Pilone, 2005). For example, in the case of an instance of Plot, a constraint might be written as

self.field.controller = self.controller.clan

and attached to the Plot class so that an implementation would be left to address the challenge mentioned above by enforcing the constraint.

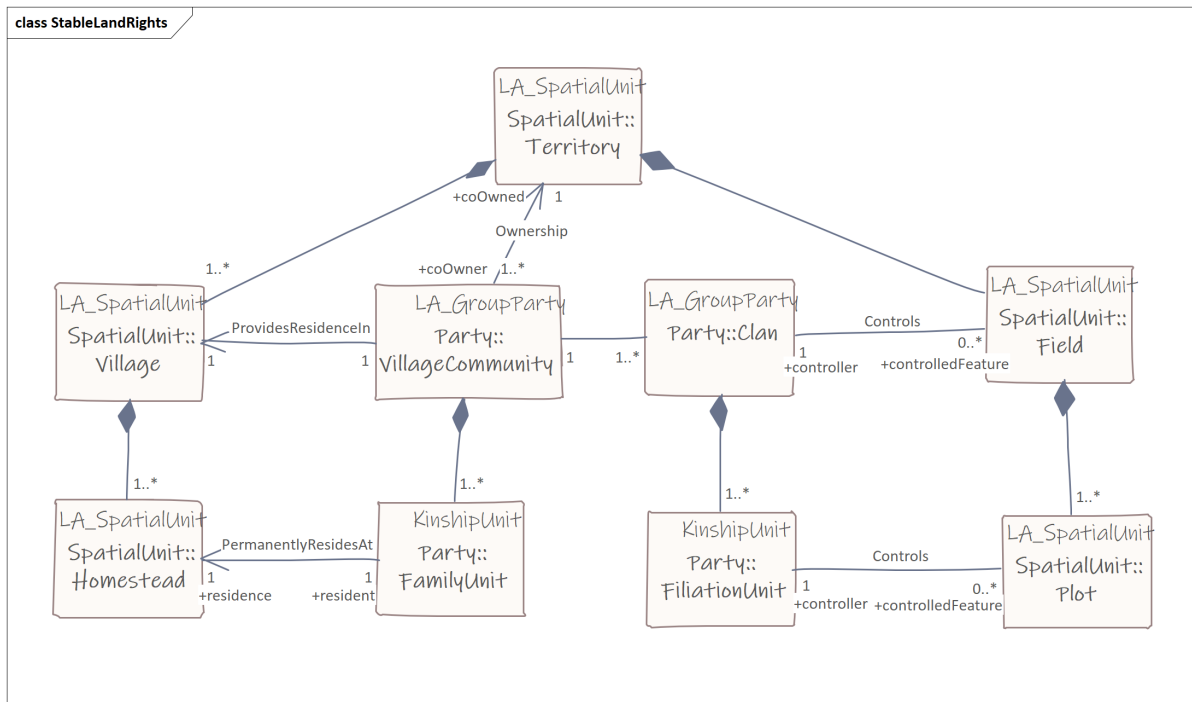


Figure 4. Stable land tenure relations

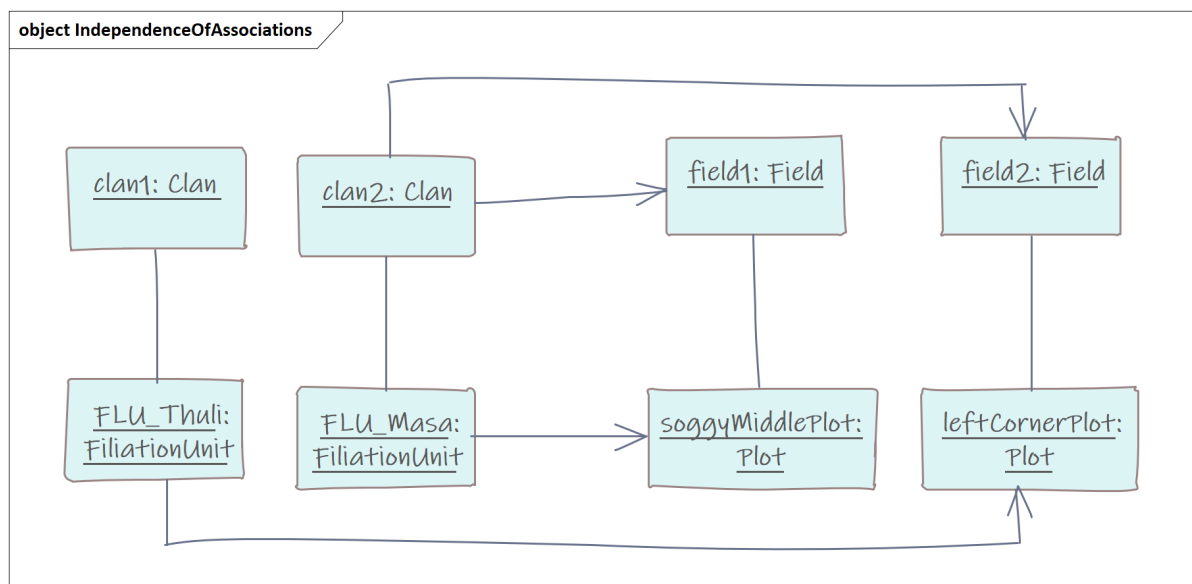


Figure 5. Incorrectly linked instances violating the constraint that a Filiation Unit can control only plots in Fields controlled by its Clan

3.3.2 Dynamic land rights

The most complex of rights to land in Malinowski's description are those to do with the right to sustenance at the household level. Land for cultivation is availed to citizens at the

gardening council – a meeting of all the adult male members of the community where the forthcoming growing season is planned. There is much else that is decided at the gardening council but the most important is the allocation of plots to households. The relationship between the patriarch of a Filiation Unit and the plots under its control is that the man’s consent is required for the allocation of such a plot.

Before allocation begins, a number of fields are declared for cultivating that year. The remaining fields are left fallow to regain fertility. Plots are then allocated so as to balance between the needs of a household and its capacity to cultivate the allocated land (see Ch. II of Coral Gardens for details). The left panel of Figure 6 shows part of the model representing the seasonal production of staples. As can be seen, production occurs at the household level. The model associates with each household a Seasonal Plot object which is a container (a map in programming terms) associating a FamilyUnit, Plot, Season, and SeasonalHarvest instance. As in the situation in subsection 3.3.1, within this diagram it is also possible to associate the same plot and season pair more than once using different SeasonalPlot instances. In this case a uniqueness constraint must be placed on the class pair Plot and Season (i.e. a plot can only be cultivated once per season) by connecting them with an association. The class Season models time through a reflexive precedence relationship. As with other LADM classes it is possible subclass it to the VersionedObject in order to inherit its versioning capabilities.

Trobriand culture imposes through the Filiation Unit an obligation (called urigubu) on the household of the patriarch of that filiation unit to provide roughly half of the staple harvest consumed by household of the matriarch of that Filiation Unit. In plain English, every man is paired up with one of his sisters or possibly a female maternal cousin or other relative to form a filiation unit. This unit is the basis of inheritance to the nephews of the patriarch as well as the means by which the sister exercises her claim on her ancestral land and its produce. The portion of the harvest which a man sets aside for purposes of meeting his urigubu obligations to his sister is called Taytuwala. The remainder left for own consumption is called Taytumwala.

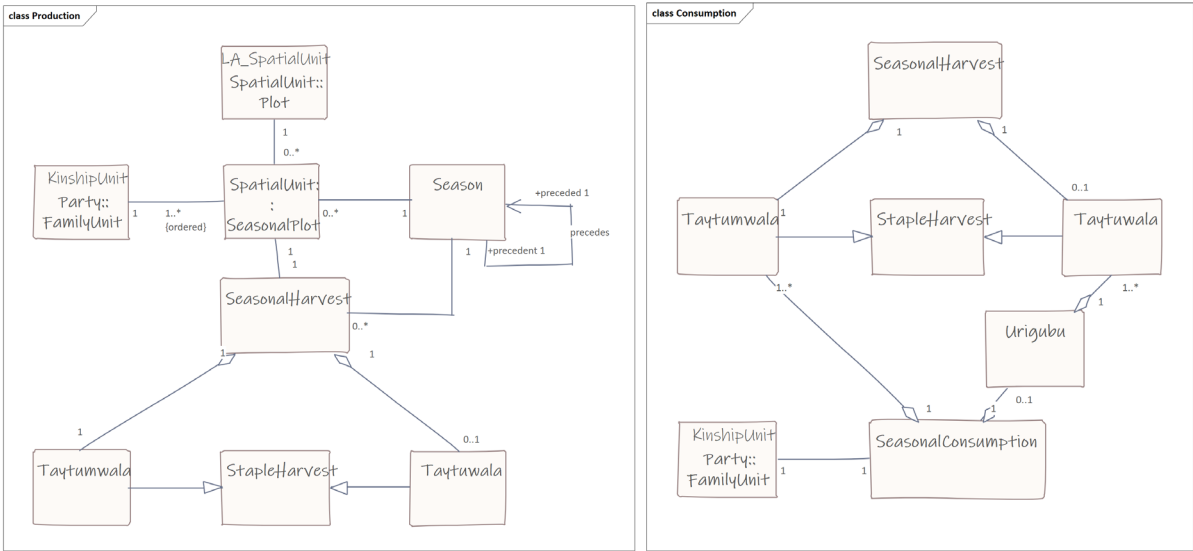


Figure 6. Production and consumption side models

The two portions of Taytumwala and Taytuwala can also be observed from the consumption side of the food supply chain (right panel in Figure 6). Like production, consumption occurs at the household level. The total amount of staple crops available for consumption in a given season is the sum of Taytumwala crops from the households own harvest and the roughly equal amount of urigubu crops from the household of Filial patriarch.

Now that we have given a somewhat broad description of our understanding of Trobriand land tenure as described by Malinowski we proceed to present how this simplified model fits into the LADM.

4. APPROXIMATING TROBRIAND LAND TENURE IN LADM

Some of the rights to land described thus far can directly be translated into LADM. The Parties and SpatialUnits are obvious candidates as can be gleaned from the superclass labels in top-right corners of the classes in Figure 4. To see how this would look like in a scenario consider the object diagram of Figure 6. A man named Masa is married to a woman called Thuli. This is indicated by the shared FamilyUnit labelled FMU_ThuliMasa. The model captures also the fact they have an offspring called Thembi. FMU_ThuliMasa is a member of the VillageCommunity called community, they have a permanent right of residence at spatial unit Homestead which is a part of Village mainVillage.

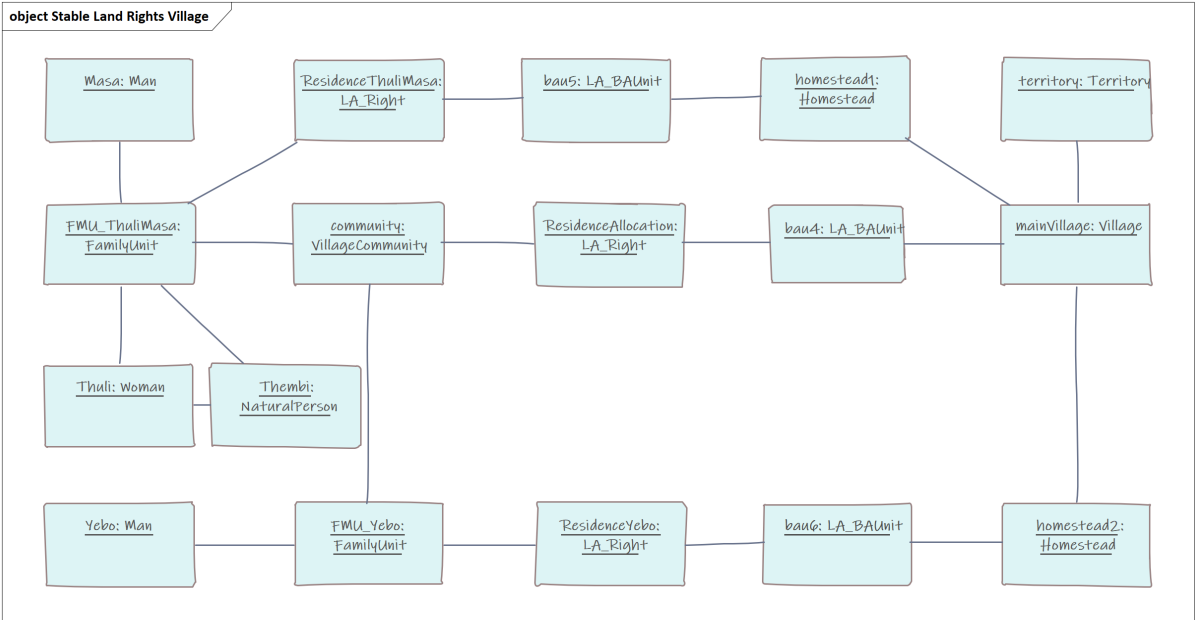


Figure 7. Object diagram illustrating a snapshot of the land tenure system as captured by the model

Notice that the FamilyUnit instance FMU_Yebo is associated with only one Man object and no other NaturalPerson objects which is allowed reflecting the part of the model shown in Figure 2. A similar scenario can be generated for Clan, FiliationUnit, Field, and Plot objects among others.

Let us now turn our focus to an LADM extension to handle the annual land allocations. The model is shown in Figure 7. The model distinguishes three types of RRR by subclassing. The preferred LADM approach is to use codelists to distinguish primitive types of the land

administration domain. The Taytuwala responsibility is dual to the Urigubu right and thus the classes must reference each other.

The Seasonal Value Unit (SVU) is a basic administrative unit which is based on the value derived from the rights and responsibilities incident on it. An SVU is associated with a history of Seasonal Harvest records and a set of plots that have ever been associated with the SVU. The historical information is captured in the sequence of Season instances respecting the precedence relation of the Season class. Like the BAU, the SVU must do a share check on the incoming RRRs. However, share of Taytuwala Responsibility must equal the sum of Urigubu rights shares.

Like the model of Figure 5, the model in Figure 7 allows duplication of Plot-Season pairs. A specification of uniqueness can be achieved by associating the two classes but we leave out the connecting line to reduce clutter in the diagram.

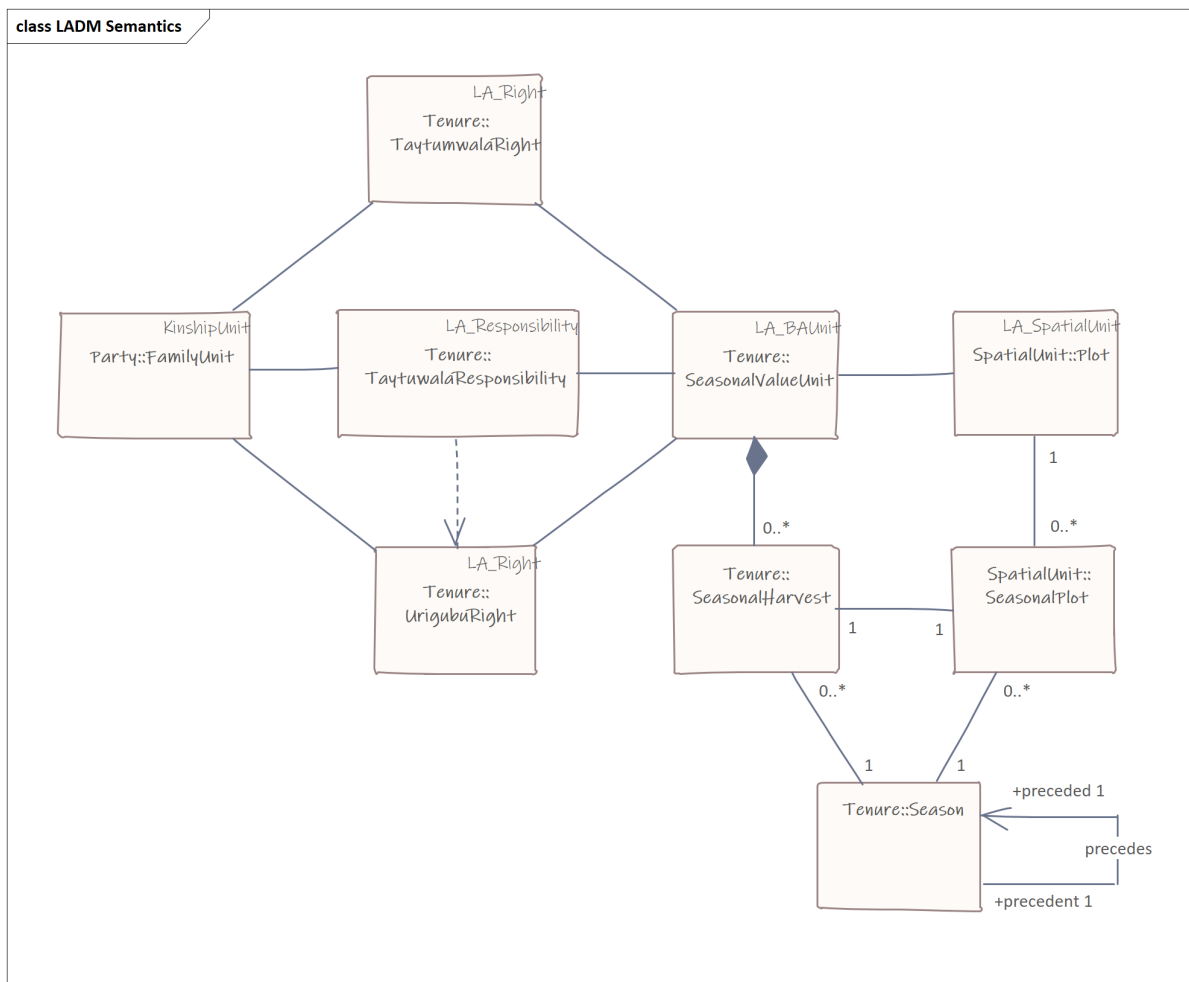


Figure 8. Core LADM derivative classes plus extension classes to capture additional details relevant to the local tenure system

The object diagram in Figure 8 illustrates an instantiation of the model in Figure 7. The link between the producing household to the household receiving the urigubi can be seen to clearly go through the Filiation Unit. In Figure 8 we see only the Seasonal Value Unit corresponding

to Yebo's cultivation activities. A more extensive diagram would also show the controlling rights over the plots.

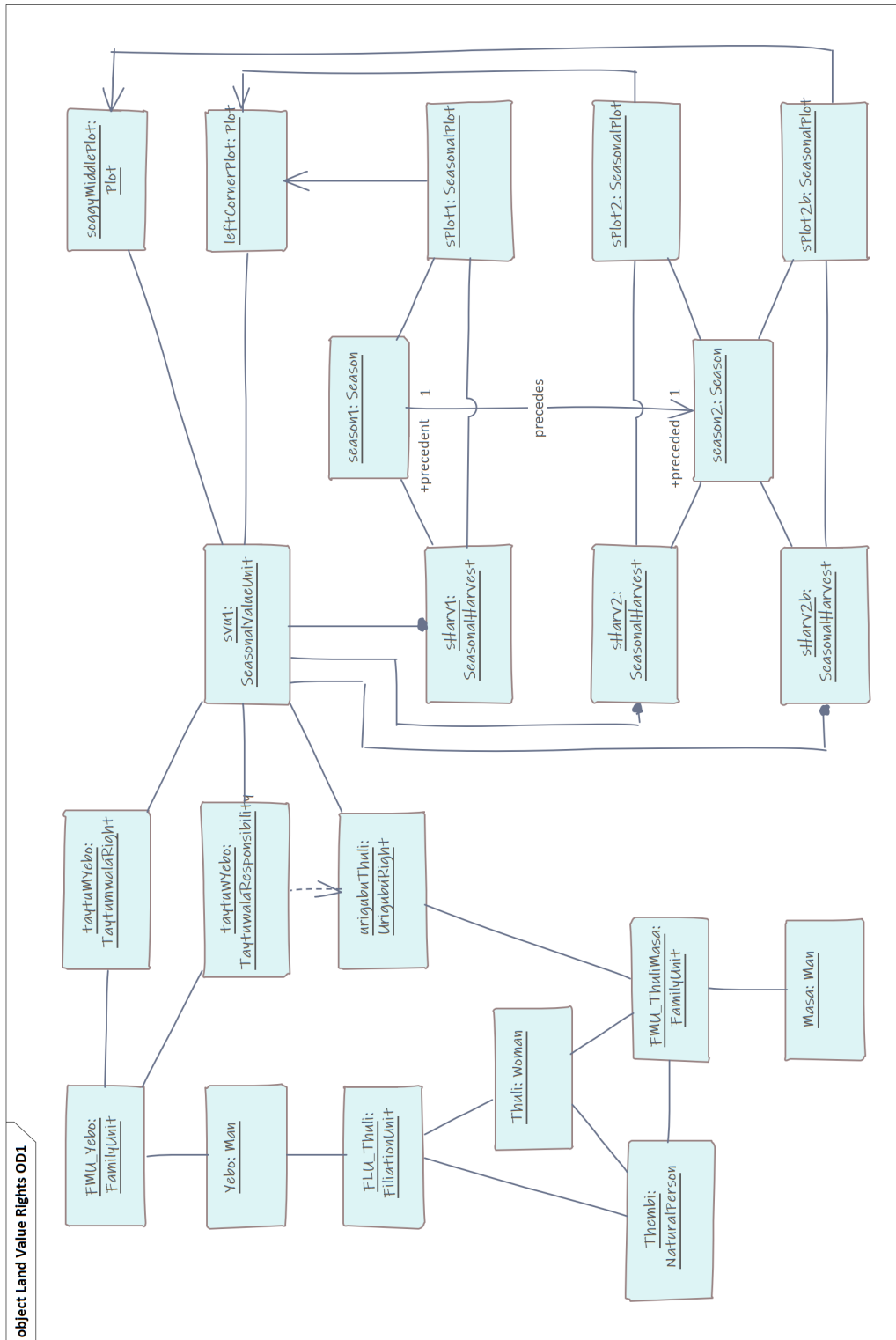


Figure 9. Object diagram illustrating model capturing annual usage of farm plots.

The successive Season instances – season1, season2, etc. – provide a filter through which a snapshot for a particular season can be retrieved from the underlying database. In the scenario in Figure 8 the amount of farmed area has increased over the two seasons. With this model, it is also possible to tell whether the yield has also increased or not.

5. SUMMARY

Tenure on land governed by local social norms often takes a form that is difficult to fit in official Land Administration models. In this paper we explored an LADM model extension to support dynamic land allocations based on the case described by Malinowski (1946). Several lessons can be learned from this exercise.

First it is important to note that a highly simplified rendition of Malinowski's account has been used here to aid both understandability and to make the modelling feasible. Also, no internal details of the classes presented have been outlined. The focus here was on the structural aspects of the model. What classes make sense and what class relationships are required?

It is clear that a separation of the different dimensions of the tenure on land (i.e. the stable land allocations, the production side, etc.) is necessary in order to arrive at a model that can be analysed using, for example, object models. The different dimensions diverge and converge in different points of the analysis. For example, the production and consumption models converge at the season harvest and at the role of the woman as matriarch in both the Family Unit and the Filiation Unit. The stable land rights meet the more dynamic ones through the Plot, the unit at which agricultural activity actually takes place and is subject to both annual and perennial interests from different parties.

The Seasonal Value Unit can be thought of as a cup from which certain rights drain. Someone must fill the cup (e.g. via the Taytuwala Responsibility) for the rights attached to it to be satisfied. The right cultivate is met by the provision of a Plot which is recorded in the Seasonal Plot slot for that season. In this way the SVU plays at the very least the role of an administrative object, a BAU.

There still remains to build an actual simulation of the situations described in the text and examine how well, if at all, a simulation based on the models presented in this paper capture the meanings documented by Malinowski. Additional directions of research such as Chipofya et al's (2020) implementation of semantic web rules on top of an OWL model of LADM (Soon, 2013) to isolate the dynamic elements of customary tenure could be explored in conjunction with the present model.

Our results are relevant for other modelling work in the Land Administration domain, especially for the STDM. Further exploration of the phenomena that Malinowski's book brings to light will help us identify modelling techniques that may be useful in any upcoming major upgrades of STDM. Like STDM, the extension presented in this paper provides a basis for developing LADM customary domain profiles. Contemporary knowledge could be integrated following insights on country profile development presented by Kaloggiani et al (2021). These profiles would be especially applicable to legal regimes like the one established by the Community Land Act (CLA) of Kenya (2016). In the CLA case, the territory over which the customary tenure system applies is considered as a single cadastral object in the

national cadastre while customary law has legal force inside the territory and is recognized as such in the Kenyan constitution.

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BIOGRAPHICAL NOTES

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