

African Natural Resources Centre

Rethinking land reform in Africa new ideas, opportunities and challenges



AFRICAN DEVELOPMENT BANK GROUP



Transition forest area in
Bokito, Cameroon.

Photo: Mokhamad Edliadi

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Maps and mapping practices in Côte d'Ivoire's rural land reform

Thomas J. Bassett

1. Introduction

Mapping is a central component of Côte d'Ivoire's 1998 rural land law requiring individuals seeking land titles to present a map showing the location of the parcel in question, conforming to specific cartographic norms. With less than 1% of the national land area formally registered, land registration is a time-consuming and expensive process. Donors and land authorities have long argued that using geospatial technology reduces the time and expense of mapping since map making is an objective and neutral process that simply "officialises existing land rights" (World Bank interview 1992). But the mapping practices deployed in the land registration process are both social and technical. I argue that rather than representing existing land rights, village boundary and land parcel maps are shaped by the law itself: that is, maps define the territory rather than simply represent it.

The social dimensions of mapping include the capacity of rural populations to read maps. Individuals must be able to interpret the symbols and words to engage with the spatial representation. Low literacy rates in rural Côte d'Ivoire mean that most people are unable to recognise and interpret maps, a skill set which is learned and deployed every time a map is unfolded (Kitchen and Dodge 2007; Pickles 2004). The land reform literature is silent on the prescriptive nature of land right mapping and the uneven development of a map-reading culture. If the immediate problem of Ivorian land reform is to clarify prevailing land rights, then these silences and inequalities must be addressed.

2. Maps and the 1998 rural land law

Map making is integral to two key components of the Côte d'Ivoire rural land law –village boundary delimitation and parcel mapping. Village-boundary maps, specifically the location of geodetic monuments defining the limits of a community's lands, facilitate the drawing of parcel maps by providing surveyors with geographical reference points. Both map types are produced during a multi-stage consultative and bureaucratic process structured by law.

Village boundary mapping

Law defines land registration, mapping, and titling. Clear procedures are specified for delineating the boundaries of village lands or terroir. The meaning of terroir has evolved from referring to a socio-natural landscape such as a terraced upland or a savanna park-land that lacked specific boundaries to a territory managed by a community and whose

boundaries are clearly delimited in the context of ‘development’ programs. The terroirs targeted for delimitation by the Plan Foncier Rural (PFR) and the Projet National de Gestion des Terroirs et d’Équipement Rural (PNGTER) are representative of the latter, territorial-based notion (Bassett, Blanc-Pamard, and Boutrais 2007). In much of this paper, terroir is translated as ‘village lands’ whose boundaries are subject to demarcation by surveying and mapping.

From selecting lists of villages to be delimited to the construction and validation of boundary maps, the application decree details the diverse documents that must be completed, approved and filed at different stages. It is a complicated, time consuming, and costly procedure (Varlet 2014; World Bank 2015).

Once a village is selected for boundary delimitation, the process of defining its limits is led by an investigative team headed by an investigating commissioner appointed by the Department of Agriculture. The team is comprised of at least four representatives of the village being mapped and four representatives from each contiguous village. Each community must provide at least two representatives of the village chief and two members of the Village Land Management Committee (Comité Villageois du Gestion Foncière Rurale) to participate in this initial phase of village land delimitation (RCI 2013). Before staking out the boundaries, the commissioner conducts an enquiry into the history of the village in the presence of the entire investigation team. The team must sign a form indicating their recognition of the authority of the village over the area to be delimited before proceeding to the staking out stage. The application decree requires that each segment of the village boundary be staked out by the commissioner and team members with 100 metres between stakes.

If the investigative team delineates the village boundary, a 1.5 to 2-metre path along the limits must be cleared. Then a certified topographic surveyor walks the boundary with the team to confirm the limits and an agreement is signed by the surveyor and each member of the investigative committee. Within fifteen days the surveyor must place cement

boundary markers at regular intervals along the boundary no more than 300 metres apart. The surveyor and his assistants draw each boundary and note the coordinates of each marker using a Geographical Positioning System device.

The topographic survey team creates a territory map by entering the data for each boundary marker into a software program producing a provisional map at a scale between 1:10,000 and 1:50,000. One half of the sheet shows the village in the form of a necklace with boundary marker IDs as its beads (Figure 1). The other contains columns of geographical coordinates for every boundary marker or what has been termed the ‘perimap’ (Wood and Fells 2008).

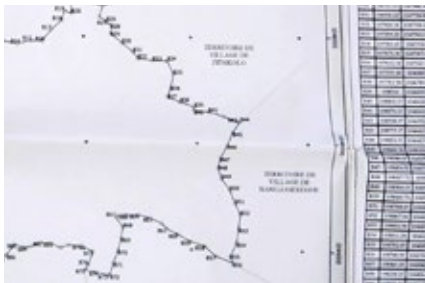


Figure 1. Village lands boundary map showing the locations of boundary markers (center) and their geographical coordinates (right).

To encourage agreement, the law prescribes a community public hearing at which the results of the work and the provisional boundary map are presented. Registers at the village and the Sub-prefecture are opened for 30 days for comment. If everyone agrees, the commissioner writes a report signed by the presidents of all of the Village Land Management Committees. If a neighbouring village committee contests a boundary, the local Sub-Prefect and Prefect become involved to mediate the dispute. A definitive map is then constructed based on more precise field measurements.

This second map uses more precise GPS units. The team travels to the boundary to recalculate the geographical location of each boundary marker, this time with reference to first order geodetic points (Figure 2). The new coordinates must have a less than one-metre level of accuracy in contrast to the 2–3-metre accuracy obtained by the topographic brigade.

The definitive map and the village public hearing report are displayed at the Sub-prefecture validation meeting (Figure 3). If the village delimitation is approved, the documents have additional validation steps at the Prefecture and the cadaster's office.

The World Bank estimates that it takes between six to twelve months to delimit a village territory. It estimates the average cost of village delimitation to be \$7,000. In a country of 10,000 villages, it would cost around \$70 million to map all village boundaries (WB 2015, p.38). The Bank believes that this is a reasonable public investment, especially if it leads to a decline in land conflicts.

Parcel-level mapping

The process of constructing parcel-level maps follows a similarly tortuous path. There are over 20 steps to obtain a land certificate and another dozen to obtain a land title (Varlet 2014, p.32-36).

Like the process of village delimitation, parcel delimitation is initiated by an investigative team headed by a commissioner. The team is comprised of members of the village council, the village land management committee, the land claimant, and individuals who control contiguous land parcels. The commissioner conducts a historical enquiry into the claimant's authority over the parcel in the presence of the investigative team. As in the village delimitation process, the team must agree on the limits of the proposed parcel. If there is no opposition, the land claimant stakes out the parcel boundary and clears a path around it. Next, a certified surveyor is employed to place boundary markers around the limits of the parcel and to draw a map showing the parcel in relation to neighbouring



Figure 2. Surveyor recording the location of village boundary markers with a differential GPS device.



Figure 3. Validation of a village's boundaries before the Rural Land Tenure Management Committee at the Sub-prefecture of Korhogo, August 2018.

land parcels. This mapping work is performed in the presence of the investigative team.

The parcel plan must conform to standards set out in the application decree. It must be at the scale of 1:10,000 or larger, be linked to the Ivorian geodetic grid and show at least two geographical reference points, be oriented to true north, and have at least a one-metre accuracy. The standards do not prescribe a particular surveying method as long as the surveyor is certified and fulfils the aforementioned map format requirements.

Once the map is made, a public hearing reviews the results of the investigation. A subsequent public comment period lasts three months when the claimant's application can be supported or opposed. The period also requires the applicant to publish a notice in prescribed newspapers. This published notice must be posted during the three-month public comment period in public places and in neighbouring communities.

If there is no opposition, the dossier is forwarded to the Sub-prefecture where the application is reviewed. If approved, it is checked by the Ministry of Agriculture which requires that applicants employ surveyors to double check the position and coordinates of parcel boundary markers (Varlet 2014, p.36). If confirmed, the dossier is forwarded to the Ministry's Rural Land Tenure and Rural Cadaster Authority in Abidjan. It checks the application's conformity to the law and then transmits it for a land title to be issued.

This process illustrates how maps and map making are fundamental features of Côte d'Ivoire's 1998 Rural Land Law. They are produced to solve socio-spatial problems, in this case transforming indigenous rural land rights systems into a state-recognised private property regime. The transformation of undefined boundaries into geodetically-referenced territories marked by concrete monuments suggests that boundary and parcel maps are the outcome of scientific and technical practices. But the descriptions of the contexts of boundary and parcel map-making suggest that maps are more than this. Both map types are shown to "emerge...through contingent, relational, context-embedded practices to solve relational problems" (Kitchen and Dodge 2007, p.342). That is, maps are not simply representations of a reality that the surveyor is dutifully recording. The mapping of village boundaries and land parcels is an iterative process of consultation, negotiation, delineation, and validation shaped both by the law and by such practices brought to bear on examining the information's accuracy. The next section investigates the origins of these mapping practices in the context of a series of government and aid-donor funded projects aimed at developing a rapid and low-cost method of delimiting village lands (*terroir*) in Côte d'Ivoire.

3. A genealogy of village boundary mapping practices in Côte d'Ivoire

Since the late 1980s the Côte d'Ivoire government and aid donors have funded a series of land delimitation programmes with a view towards developing a national land registration system. These programmes have typically taken the form of pilot projects designed to test certain methods for mapping the boundaries of village territories and the land rights of individuals over specific parcels. Table 1 lists the most important programmes.

Table 1. Land delimitation programmes in Côte d'Ivoire, 1989–present

Program	Dates
Rural Land Plan (Plan Foncier Rural [PFR])	1989–1997
Rural Land Management and Community Infrastructure Project (<i>Projet National de Gestion des Terroirs et d'Équipement Rural [PNGTER]</i>)	1997–2010
The Village Lands Delimitation Pilot Operation (<i>Opération Pilote de Délimitation de Terroirs Villageois</i>)	2000–2001
National Land Tenure Security Program (<i>Programme National de Sécurisation du Foncier Rural [PNSFR]</i>)	2007–2012
Support Project for the Revival of the Agricultural Sector (<i>Projet d'Appui à la Relance des Filières Agricoles de Côte d'Ivoire [PARFACI]</i>)	2013–

These programmes have tested different technologies with the goal of identifying the quickest and most cost-efficient way to map the country's estimated 10,000 villages and 20 million hectares. A major metric for measuring the success of these programmes has been the number of villages delimited and hectares mapped in the different pilot project zones.

3.1 Rural Land Plan (*Le Plan Foncier Rural*)

The Rural Land Plan began in 1989 with funding from the World Bank and France. Its objectives were: (1) to clarify the land rights of rural populations in order to reduce land conflicts and promote investments in agriculture and environmental conservation and (2) to develop an economical land tenure system that would facilitate land use planning, land administration, and natural resource management (World Bank 1989). A novel feature was its bottom-up approach to recording the land rights of rural populations in a “neutral” manner and “without modifying them” (World Bank 1989, p.6). The plan attempted this by combining land tenure surveys with parcel level mapping. The Plan Foncier reports highlighted the challenges in recording the diversity and origins of land rights and their spatial extent. These difficulties led to focusing on the land rights of farmers and delimiting croplands to the neglect of other legitimate land users and land use patterns. Rather than “officializing existing land tenure arrangements,” (World Bank Interview 1992), the Plan Foncier ended up creating a new land rights system that was primarily driven by the goals of project administrators.

The Plan Foncier took the form of regional pilot programmes that took place in five zones (Abengourou, Béoumi, Daloa, Korhogo, Soubré) which were distinguished by contrasting land rights systems, land conflicts, and geographical conditions. Conflicts over land ownership between immigrant farmers and autochthonous groups in the forest region zone of Soubré and Daloa were important criteria for their inclusion in the project. Land conflicts between farmers and herders in the savanna region led to the

selection of the Niofouin Sub-prefecture in the Korhogo region.

The major steps included (1) a public announcement and explanation of the goals in each village; (2) a demographic survey to determine the population size of a community, the number of farmers, where they farmed, and their specific land rights; (3) a land tenure questionnaire linking 'land owners' to parcels outlined on enlarged aerial photographs; (4) an agricultural survey noting the soil, relief, vegetation and type of crops grown on each parcel; (5) the construction of village (*terroir*) boundary and land parcel maps; (6) a six-month long publicity period during which opposition to land claims could be registered and addressed by a village land management committee organised by the Plan; and (7) the creation of a land tenure register that recorded the land ownership. When agreed by all parties, the land register information and map were deposited in the office of the local Sub-prefecture and at the regional office of the Ministry of Agriculture.



Figure 4. Photoplan of the Karakoro area made by the Plan Foncier Rural, Korhogo, ca. 1992.



Figure 5. Close-up of the Extrait de Terroir de Noufré (Dept of Korhogo) showing the village boundaries and parcels mapped by the Plan Foncier Rural. Scale: 1/10,000.

The map-making component was a multi-stage process. Survey teams used enlarged aerial photographs at the scale of 1:10,000 called *photoplans* to identify the location and ownership of individual land parcels (World Bank 1989, Annex 1). In the presence of land claimants and contiguous parcel holders, farmers' fields were drawn on the photos. They also used GPS devices to record the coordinates of the field's location which were used when photoplans were converted to maps.

The team did not place boundary markers along the limits of a land parcel. If someone contested boundaries or an individual's land ownership claims and the dispute was unresolved, the topographer did not record that parcel, which led to the appearance of blank spaces on some village land maps.

Teams used the same *methode contradictoire* to trace the boundaries of lands that they used to demarcate land parcels. In the presence of land authorities of adjacent villages, Plan Foncier teams tried to determine a village's limits. If successful, the team drew them on the photoplan. They did not mark these limits with boundary markers. In many cases, a section of a village boundary line was contested by a neighbouring village. In such cases and following Plan protocol, the *terroir* limits were not drawn.

Figure 4 shows the photoplan for village lands in the Karakoro region. The image shows irregularly shaped individual land parcels and fallow fields, the latter symbolised by the letter J. The crop type and ID number of the field owner is recorded within the boundaries of the land parcel.

Figure 5 shows the map of the *terroir* of Noufré, constructed

by cartographers based on its photoplan. The map was printed on heavy duty tracing paper for its archival durability and submitted with the land register to the Guiembé prefecture at the end of the project. The Land Parcel Registry of the Rural Land Plan contained information from the various surveys, notably village and neighborhood names, village and lineage land authorities, farmers with use rights to these lands and their ID numbers and the terroir map showing ID numbers on specific land parcels. In its publicity and project documents, the Plan declared that farmers whose land use rights were recorded in the Parcel Registry would be able to obtain a provisional land title that recognised their rights. Eventually, and at their own expense, these individuals could purportedly obtain an official land title. In fact, the parcellaire register was never completed and the issuance of 'extraits parcellaires' to individuals was suspended (RCI 1996a, pp. 61, 190).

Plan Foncier personnel and project documents presented the cartographic component of the programme as an objective and neutral exercise (World Bank 1989; RCI 1994). Interviews with personnel, reviews of the project literature, and examination of the maps reveal a more complex process and outcome. For example, the claim that the terroir maps simply represent existing land rights is undermined by the narrow focus on farmers. Both the land tenure and agricultural surveys are farmer oriented. The land rights and land use patterns of other resource users such as mobile pastoralists were not investigated. This bias towards farmers over other legitimate land rights holders led Plan Foncier cartographers to produce a particular type of map that highlights cropland in the form of fields and fallow lands. As already noted, this bias towards farmers and cropland was driven by the ultimate goal of creating a land registry and cadastral map that links individuals with privately held land parcels for the purpose of taxation, conflict resolution, and conservation and development.

The surveys and maps also greatly simplify the diversity of rights held by farmers. In the land tenure survey in which the Plan Foncier team asks farmers to articulate their rights to a specific land parcel, just two categories are possible: land owner (*titulaire foncier ou gestionnaire des terres*) and land user (*exploitant*). Subsequent questions ask the land user to explain the origins of their rights, specifically how and from whom they obtained them. This "census of land rights" section of the survey produced a diversity of relationships that defied the two-fold classification of land owner and land user. But these intermediate land rights categories were not transcribed onto the map (RCI 2006, 58, p.178-79). Symbols do exist for three types of *gestionnaire des terres* (lineage, village, individual) but the nature and strength of land users' rights are not represented. Only the demographic number of the *exploitant* is noted on the map.

Similarly, the mapmakers' delimitation of village boundaries is at best a negotiated outcome. It derives from highly circumscribed conditions in which Plan Foncier teams recruited representatives of contiguous villages to create boundaries where no clear ones previously existed. Boundaries emerged on the map as the result of the Plan Foncier's

determination to show that each village had a discretely held territory that could be mapped. In fact, not all settlements have a territory over which they can claim customary control. This is the case with immigrant communities who have been allocated land upon which to settle and farm but who do not possess the right to transfer that land to others or even to plant trees on it. There were many instances in both the northern and southern pilot zones where land lenders and borrowers expressed anxiety over the land delimitation activities of Plan Foncier teams because they feared losing their rights to land (RCI 1991; RCI 2006). In other cases, individuals and communities viewed the Plan's terroir mapping as an opportunity to assert control over land that historically belonged to another village.

A third complication concerns the use of Plan Foncier maps by rural populations. The Plan deposited a terroir map in each village that it successfully surveyed. According to project documentation and interviews with personnel, the terroir maps would help to reduce land conflicts and would be useful for land use planning. Such statements make heroic assumptions about the existence of a map culture among rural populations. Map reading skills require a basic literacy level, some experience in map interpretation, and repeated use of maps. The high levels of illiteracy in rural Côte d'Ivoire suggest that maps and map use were rare in the areas where the Plan worked. The Plan Foncier could have helped to fill this gap but the project did not include training programmes on map reading. The most it did was to explain the symbols in map legends to members of village land management committees. (Author interview with Plan Foncier personnel, 1992). That is, for the majority of the rural population, the map did not exist (Pickles 2004; Kitchen and Dodge 2007). The maps were viewed as large pieces of paper marked with lines, numbers, and oddly shaped figures.

If the Plan Foncier's maps were illegible to ordinary farmers then to whom did they speak? There is evidence that some landholders recognised parcel maps as representations of their fields that could be used to obtain an official land title. Some Plan offices facilitated this practice by offering land parcel certificates (*Attestation de Limite*) to PFR verified landowners (RCI 1996, Annex 8). Plan personnel considered village land management committees as their audience and at least one member of these committees had to be literate. The Plan Foncier ultimately viewed its maps as experiments in boundary mapping. The audience was comprised primarily of government administrators, politicians, and aid donors who viewed this work as important to reducing land conflicts and creating economic investment opportunities by reducing uncertainty over land ownership.

In summary, the Plan Foncier sought to develop an efficient and low-cost method for delimiting village boundaries and individual land parcels for the purposes of land titling and registration. It billed its activities as clarifying customary land rights through a process that it described as "formalizing custom" (Interview, Plan Foncier 1992). It experimented with cutting edge, low-cost geo-spatial technologies to demonstrate that Côte d'Ivoire's rural areas could be quickly and inexpensively surveyed. Progress was

measured by noting the number of hectares surveyed annually by the Plan's teams. The results of its activities were mixed. External evaluators considered its mapping technologies to be sound but noted that the emphasis on "yield" compromised the quality of the land tenure information collected (RCI 1996a). The maps were more prescriptive than descriptive. They simplified complex land use and land rights systems by focusing on farmers (Bassett 1995) and often depicted village boundaries where they previously did not exist. In this sense the Plan's maps created new land rights systems and territories rather than portraying "neutral facts" (RCI 1996a, p.191). Finally, although pitched as serving the interests of peace and land use planning, there is no evidence that land disputes have declined in surveyed areas or that maps have been systematically used for planning.

Over its 1990–1996 pilot phase period, Plan Foncier teams reportedly mapped more than 27,000 parcels in 360 villages in five zones. The project surveyed nearly a half-million hectares of rural land and "clarified the land tenure rights" of some 270,000 persons (IDA 1997). According to the World Bank, the Plan achieved its work at an average cost of 3600 FCFA/ha. These economic results encouraged aid donors to extend the Plan Foncier nationally. In 1997 it was integrated into Côte d'Ivoire government's Rural Land Management and Infrastructure Development Project (Projet National de Gestion des Terroirs et d'Équipement Rural [PNGTER]). During the transition between its Pilot Phase and its integration, the PFR completed additional surveying work with funding from the Caisse Française pour le Développement (CFD) (see RCI 1996b, p.8–9 and Plan Foncier Rural Etat de Couverture, 1990–2002).

3.2 The Rural Land Management and Community Infrastructure Project (*Projet National de Gestion des Terroirs et d'Équipement Rural [PNGTER]*).

The PNGTER was funded by the World Bank with additional support from the French Development Agency and the Ivorian government. The project was originally conceived to last for six years (1998–2004) but an armed rebellion (2002–2010) and the suspension of the project on two occasions (due to non-payment of previous debts to the World Bank) led to the extension of the project until 2010. The 13-year project had the "dubious distinction" as being one of the Bank's longest development projects (World Bank 2011, p.11).

The PNGTER had three interrelated components: rural land use planning (*gestion de terroir*), building land tenure security (*sécurisation foncière*), and infrastructure development (*équipement rural*). The goal of the land tenure security component was to maintain and extend the Rural Land Plan. Maintenance referred to the updating and archiving of Plan Foncier Rural land tenure studies and maps as parcel holders and sizes changed. It also verified that Foncier documents complied with the government's requirements for land registration and titling.

One of PNGTER's objectives was to extend the geographical area of the Plan Foncier's activities to the national level. This goal was to be facilitated by the deployment of new

geospatial technologies for delimiting village boundaries and land parcels. Project documents stated that these new mapping methods would accelerate the process of land tenure clarification and at the same time conform to the requirements of cadastral mapping. The project also created land management committees at the Sub-prefecture (CGFR) and village (CVGFR) levels to validate the land parcel and boundary delimitation processes (RCI 1998). These new institutions and mapping practices became formalised with the passage of the 1998 Rural Land Law and its application decrees. Law 98-750's requirement that all rural land had to be registered within ten years or else become part of the public domain added a certain urgency to these activities. The government's decision to make village boundary delimitation a public infrastructure project led PNGTER and aid-donors to focus their activities on developing new methods to demarcate village lands (*terroirs*). The French-funded *Opération Pilote de Délimitation de Terroirs Villageois* introduced a number of mapping practices that would soon become standard operating procedures (Decree No. 2013-296).

3.2.1 Opération Pilote de Délimitation de Terroirs Villageois (2000–2001)

The AFD-funded project aimed to test the technical and financial feasibility of a village boundary delimitation method that could be used to delineate more than 10,000 villages and at the same time conform to the land registration requirements of application decree (No. 99-594 of 13 October 1999).

The mapping innovations of the *Opération Pilote* included using (1) high resolution SPOT Panchromatic satellite georeferenced images at the scale of 1:25,000 called spatio-cartes on which village boundaries could be traced in the field; (2) the use of differential GPS units to allow surveyors to link boundary markers to the Ivorian geodetic grid which was established with reference to the WGS84 global geodetic grid; (3) planting boundary markers along village boundaries; and (4) the construction of maps that conformed to the technical specifications set by the Cadastral Department.

The project's goal was to delimit 171 *terroirs* using the new methods starting by selecting one hundred *terroirs* already delimited and which were in the public hearing period of the process. The project ended after six months without successfully delimiting any new village territories. However, the new methods were sufficiently promising that aid donors and the Ivorian government decided to further invest into the delimitation of village territories. During the second phase of the World Bank-funded project, the government decided to invest in a test operation with the goal of delimiting 280 villages – 150 in the southern half of the country, 130 in the north. However, the September 2002 rebellion forced the Cartography and Remote Sensing Centre (CCT) to focus its activities in the government-controlled south. Between 2004 and 2006 the project managed to successfully demarcate and map 108 villages (RCI 2006, 16). During the PNGTER's third and final phase (2008-2010), CCT teams surveyed an additional 60 villages, bringing the total number of

successfully demarcated and mapped villages to 168.

By 2015 just 171 villages out of 10,000 villages had been successfully delimited. And just 900 land certificates out of an estimated 1 million rural parcels had been delivered (World Bank 2015, p.31). The extraordinarily slow progress of the PNGTER and subsequent land registration programmes (Programme National de Sécurisation du Foncier Rural [PNSFR 2007-2012]; Projet d'Appui à la Relance des Filières Agricoles de Côte d'Ivoire [PARFACI]) in creating a map-based land cadaster has been largely attributed to the highly bureaucratic and costly land titling process (Varlet 2014; World Bank 2015). Côte d'Ivoire's land registration program is one of the most expensive in Africa (World Bank 2015). Expense is just one factor. Another is widespread contestation over village boundaries even in areas where the Plan Foncier operated. For example, just five out of the 24 terroirs mapped during the Plan's phase in the Niofouin Sub-prefecture were successfully remapped using the new boundary delimitation methods (personal communication, Direction Régionale du Ministre de l'Agriculture, 2018). In the next section I focus on mapping practices as an additional explanation for this poor performance.

4. Reforming mapping practices

It may be a surprise that mapping practices may partially explain the slow progress in the delimitation of village boundaries in Côte d'Ivoire. Project evaluation reports have repeatedly given positive evaluations to terroir mapping (RCI 1994; RCI 1995; RCI 2006; Varlet 2014; World Bank 2015). This positive assessment can be explained by mapping practices being reduced to technical questions. Mapping is portrayed as a scientific process in which new technologies are deployed to provide greater accuracy and lower costs per hectare surveyed. The transition from the Plan Foncier's use of aerial photographs (photoplans) to PNGTER's reliance on satellite images (spatiocartes) is one example of this emphasis on best scientific practices. A second example is the use of more advanced GPS technologies which allow greater accuracy in determining boundary marker locations. The ability of surveyors to link rural land boundaries to national and global geodetic grids is another example in which mapping is evaluated in terms of its scientific merits. But the social dimensions, particularly map reading skills, are absent in project documents and evaluations. There is no discussion of the capacity of rural communities to engage with maps. Yet project evaluations and interviews with surveyors repeatedly point to the anxiety of populations regarding village boundary mapping (RCI 1991; RCI 2006).

The lack of this important discussion and the absence of map literacy programming in mapping projects raises questions about the relevance of current practices to the implementation of the 1998 land law. As one survey of land cadaster systems demonstrates, mapping is not essential to building a land registration system. For example, maps are not key to the United Kingdom's cadastral system. Even where they are integral, they are commonly not updated and thus not reliable indicators of ownership (Kain and Baignet 1992).

The World Bank's current support program to Côte d'Ivoire recommends informal written agreements as documentation to obtain land certificates without turning them into individual titles (World Bank 2015). Figure 6 shows an innovative informal land tenure registry used in Katiali in northern Côte d'Ivoire that recognises immigrant rights to farmland. The user's ID card is photocopied and his signature acknowledges that he recognises the authority of Katiali over his farmland.



Figure 6. Informal land registry in the Sub-prefecture of Katiali. August 2019

If government land agencies recognise such documents as sufficient to obtain a land certificate, will it also accept an alternative map of these lands? Will a simple sketch map suffice and if so, what mapping skills are necessary for villagers to make such maps?

An innovative feature of the World Bank's '4-in-1 systematic land registration process' is the use of "local para-surveyors and archivists using modern technology" (World Bank 2015, p.55). Important questions that require immediate attention include: What and who will be included in the para-survey training programmes? What will be the training goals? What set of mapping practices will emerge that allow for community learning and participation in mapping? The project also strengthens the country's mapping infrastructure enabling more accurate and economical surveying (World Bank 2015, p.19). How will this reinforcement of geo-spatial technologies intersect with participatory village-boundary mapping techniques? What role will surveyors play in Village Land Tenure Committees and the proposed web-based Land Information System?

The answers to these questions depend on the goals of state mapmaking. If the objective is to create a property tax system, then more precise property maps will be required. If the goal is political stability and rural development, then informal land registers and maps might suffice. The point is that these spatial representations will remain "coloured ink on the page" in the absence of map readers who possess "knowledge of what constitutes a map... [and] how a map works." (Kitchen and Dodge 2007, p.335). Inequalities in the ability to engage with maps means that some people are better positioned than others to make maps work in their interests.

Conclusion

This paper highlights the importance of maps to how Côte d'Ivoire's 1998 rural land law is implemented. It traces the history of the mapping practices used for the delimitation of village boundaries and land parcels. It argues that the prescriptive nature and uneven development of these practices, particularly map literacy, helps to explain the slow

progress in village mapping. The paper reveals that aid donors and map surveyors have overemphasised the technical dimensions of map-making to the neglect of these social dimensions. More serious attention must be given to mapping practices so that rural populations can wield these potential tools for securing their land rights and eventually for development planning.

The World Bank proposes to modify Côte d'Ivoire's existing land registration process by encouraging the newly created Rural Land Tenure Agency (AFOR) to recognise alternative documentation like the informal written agreements established between land lenders and borrowers. The Bank also appears to be endorsing alternative mapping practices in which a new group of map makers participate in boundary mapping. Given the lack of map literacy in Côte d'Ivoire's rural communities, it is important that the Bank and AFOR experiment with participatory mapping and introduce map reading skills in its land law initiatives (World Bank 2015). There is an abundant literature on participatory mapping, including counter-mapping, that policy makers should consider in thinking about alternative mapping practices (Hodgson and Schroeder 2002; Lefebvre, Bonnet and Boyer 2017; Nietschmann 1995; Peluso 1995; Robert and Duvail 2016; and Wainwright and Bryan 2009).

Maps are only meaningful when their users engage with them. If they are to play a central role in the implementation of Côte d'Ivoire's land law then land authorities and donors must consider how current and future mapping practices affect the outcome of their land reform programmes.

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