

Property Rights, Risk and Livestock Development in Africa: Niger Case Study

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INTRODUCTION AND PURPOSE

This brief describes preliminary results of an attempt to model the linkages between property rights, risk, and livestock development in Niger. The research contributes to the rangeland and mobility debate, and is intended to offer a clearer understanding of how environmental variability and the use of land for agricultural and pastoral activities affect land tenure in Niger. This is important because the Niger government has been implementing a new rural code that should redefine access, use, and natural resources in the country.

BACKGROUND: TRADITIONAL LAND TENURE IS CHANGING

Land tenure in Niger is under stress. Traditional tenure arrangements are facing challenges posed by population increase, unfavorable changes in climate, and the changing political environment, and the system seems to be shifting from one geared toward an equilibrium between pastoral and agricultural activities to one geared toward agricultural activities. This is mainly attributed to increasing arable-land scarcity, combined with a growing importance of agriculturalists in the local political sphere. Successive land tenure reforms have led to confusion and generated tension and conflicts. De facto, village and canton chiefs remain the principal authorities regarding land-allocation decisions, customary tenure arrangements prevail, use-right holders have secure tenure, and tenants always face the risk of losing their fields.

Until independence, rangeland consisted of uncultivated areas under the control of village and canton chiefs. Afterward, lands that had never been cultivated were nationalized, and those that were fallow were considered as common village land. Rangeland is presently under the control of groups with a strong agricultural tradition. Property or use rights are defined seasonally: any uncultivated land can be used as pasture land during the rainy season, and all fields are open for grazing on residues during the dry season.

Development policies have also affected land use and land allocation to rangeland. The terroir approach to land-use planning, linked with sedentary agriculture, may risk contributing to further transformation of land-tenure arrangements traditionally adapted to mobility. Though the relative importance of livestock has been growing steadily since the 1980s, livestock development in Niger faces a series of challenges, including the gradual colonization of pastures by agricultural activities, and transfer of ownership from pastoralist groups to groups not historically practicing pastoral activities, including absentee owners.

GATHERING DATA AND ITS PURPOSE

Though secondary sources enable a general understanding of how property rights, risk, and livestock development interact in Niger, recent, detailed information is missing. To determine whether village rangeland in western Niger is managed and to quantify the determinants of rainy season mobility, a stratified sample of 40 villages on the edge of the continental shield were selected, based on their average annual rainfall and rainfall variability. In each village, interviews were conducted with chiefs and their advisors. Community members engaged in participatory mapping, locating fields, pastures, water, and areas of particular geographical interest, as well as identifying their use and management.

The next step was a field survey, followed by precise determinations of village land boundaries and assessments of its grazing resources. For each geographical unit, the following was geo-referenced and visually estimated: proportion of fallow, bush, cultivated, and barren land; millet density on cultivated fields; three dominant species in the herbaceous layer and in the tree layer; and level of grazing on the pastures. Socioeconomic data was gathered from group interviews, and a livestock-price survey was conducted in 10 markets.

Data gathered provides a basis for modeling decisionmaking regarding range management during the rainy season. Among the purposes that the model will serve are the following:

- analyzing how and whether village rangelands are managed
- quantifying the relative importance of different rationales for mobility
- determining other factors in land-use decisions.

DATA ON RANGELAND MANAGEMENT, EQUATION, AND HYPOTHESES

In all communities, access to pastures was considered open, but some access was reduced through enclosure of pastures and watering points. In 25 villages, informants reported that pastures were not used by neighbors. Transhumant herders during the early and late dry season were the only outsiders reported. In villages where rainy-season pastures were used by neighbors, their contribution to the stocking rate rarely exceeded 10 percent and they never exercised a management right on the pastures.

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Partial or total exclusion manifests cooperative behavior to manage the village rangeland, and is reflected in the outsiders' contribution to the stocking rate. Pastoral action-space thus consists of several subspatial units, defined by the rationale for their use and tenorial status. The subunits can touch each other, allowing a passage from one to the other, or can be connected by transhumance corridors.

The actual stocking rate, expressed as tropical livestock units per hectare, is affected by the range quality, scored from 1 to 5 and influenced by the proportion of land in a geographical unit available for pasture. Other factors in the equation are the average rainfall, standard deviation of rainfall, the relative price of livestock to millet, and the number of community members engaged in livestock raising, as well as the level of livestock mobility—involving the tropical livestock equivalent of animals seasonally absent from village land. The computation also entails a cooperation index, the distance to the nearest regional livestock market, and the wealth of the community, proxied by the total millet production as a proxy of land quality.

Estimating the equation should allow the testing of the following hypotheses:

1. Changes that increase livestock profitability (increased prices, better market integration, better range quality) increase the stocking rate.
2. Increases in rainfall variability leads to decreases in stocking rates. For a given level of cooperation, a negative coefficient on this term implies that that rangelands in higher rainfall variability areas face a smaller risk of being overstocked.
3. Increases in the level of cooperation lead to decreases in the stocking rate. This demonstrates that management of the range, while difficult to measure quantitatively, is important.

However, to avoid an endogeneity problem, this equation must be estimated simultaneously with a mobility equation.

DATA ON MOBILITY, EQUATION, AND HYPOTHESES

In 25 villages, part of their livestock was away during part of the rainy season. Daily movements to pastures shared with other nearby villages were justified by the need to have the animals graze where they do not interfere with agricultural production. Movements of less than one month to pasture areas less than 50 kilometers away generally occurred toward the end of the dry season. Four-month transhumance movements during the rainy season were destined for pastures in northern Niger and, more recently, southern Benin, where, informants suggested, pasture quality is inferior but pasture quantity and livestock safety are better.

Reasons for being mobile included avoiding destruction of crops (giving priority to agriculture), benefiting from earlier onset of rain when rains are late in their own villages (risk management), and benefiting from better pastures (rent capture). In communities where no livestock movement outside of village land was reported, two rationales were given: grazing resources on village land were sufficient, or the expected cost of movement was too high to justify movement.

Quantifying the relative importance of these different rationales contributes to a better understanding of mobility and its importance in the face of environmental variability. Analysts should keep in mind the characteristics of each justification for mobility when modeling property rights, environmental variability, and livestock development.

A purely preliminary reduced-form model is proposed in an equation that factors in range quality, the stocking rate, a cooperation index, and the cost of mobility. This entails the sum of the labor cost of tending the animals while away, and, where relevant, the addition of expected livestock losses. Use of the equation should allow the testing of the following hypotheses:

1. As environmental variability increases, mobility increases.
2. As the stocking rate increases locally, mobility increases.
3. As range quality increases locally, livestock mobility decreases.

OTHER FACTORS THAT DRIVE DECISIONS

Subsumed in most of the literature on the colonization of pastoral land for agriculture is the assumption that the two major (if not only) driving forces are population densities and rainfall diminution. However, in their land use decisions, agropastoralists are likely to take into account other pastoral activities and exogenous factors, such as prices for livestock products or wages from external sources of employment.

Supplementary insight may be gained by analyzing dry-season behavior, when water is the driving force behind decisions on livestock management. This would nevertheless pose a series of problems: very little can be known of the contribution of dry-season transhumant stock to the stocking rate or of such features of the institutional environment as interstate conventions on transhumance.

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