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Bulletin Number 94-2

July 1994

ECONOMIC DEVELOPMENT CENTER

**CULTURAL ENDOWMENTS, INSTITUTIONAL
RENOVATION AND TECHNICAL INNOVATION:
THE “GROUPEMENTS NAAM” OF YATENGA, BURKINA FASO**

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**Cultural Endowments, Institutional Renovation and Technical Innovation:
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The views reported in this paper are those of the authors and are not necessarily endorsed by CIMMYT, the Department of Agricultural and Applied Economics, or the University of Minnesota.

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**Cultural Endowments, Institutional Renovation and Technical Innovation:
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In 1986, members of several villages placed the finishing touches on the Somiaga dam in Yatenga region, Burkina Faso. Over 500 meters in length and 4 meters deep, all except parts of the concrete spillway and wings were built by the largely uncompensated labor of men and women over a 5-6 year period (Harrison; Ouedraogo). During the 1970s, farmers in Yatenga put some 60,000 hectares behind earthen dikes they built to harvest water and retain soil (Sanders et al., 1990). Finding that the earthen dikes were vulnerable to heavy rainfall, they switched to porous, stone dikes. By 1989, despite a labor input of up to 200 person-hours per hectare (Sanders et al., 1990), an estimated 8,000 hectares in more than 400 Yatenga villages were again laced with the more durable stone dikes (Critchley, 1991).

The work of an oriental despot¹ or some Hobbesian Leviathan? In Yatenga, the most environmentally degraded region of the Central Plateau of Burkina Faso, these water-retention techniques may make profitable a technical package of improved sorghum seed and modest levels of fertilizer (ICRISAT; Sanders et al., 1990). A traditional method improved by Yatenga farmers and members of the non-governmental organization OXFAM, the stone dikes have been in large part diffused by the *Groupements Naam* (Harrison). The *Groupements Naam* (*Naam* Groups) are

¹Wittfogel uses the terms "hydraulic society" and "Oriental despotism" interchangeably. His thesis is that the patterns of bureaucratic despotism historically found in the Orient arose from the need to harness water for agriculture.

"renovated"² mutual assistance groups that are derived from the traditional age-set associations of Mossi culture.

The significance of the *Groupements Naam* experience is that it represents a particularly successful example of a new set of "third generation" rural development efforts. In contrast to the earlier "community development" and "integrated rural development" efforts this most recent expression emphasizes the role of indigenous local membership groups and support organizations.³

Culture in the Study of Economic Development

In the theory of economic development, the term "culture" has been unpopular since the view that peasant traditions generated barriers to development was supplanted by the doctrine, later promoted by the Green Revolution, that small farmers are poor but rational agents (Ruttan, 1988). In growth theory, the process of institutional change and the role of culture in that process has been neglected relative to the process of technical change. Yet culture shapes the institutions that facilitate or impede technical change.⁴ It has become

²Fetini (1993) defines three archetype models of institutional development: innovation, adaptation, and renovation. Renovation consists of building a new institution from an already existing but no longer functional institution. Fetini characterizes some aspects of the farmer group movement in the Sahelian region of Africa, and in particular that of the *Naam* Groups, as institutional renovation.

³For the rise and decline of community and integrated rural development programs see Ruttan (1975 and 1984).

⁴Cultural endowments affect the innovation possibilities for institutional arrangements, much in the way that basic science knowledge affects the innovation possibilities frontier for technical change (D. Feeny, personal communication).

apparent to donors that failure to understand and nurture the process of institutional change has been a major source of failure of many development assistance projects.⁵

In the economic theory of rational choice, culture is not an explanatory variable but an unobservable parameter on which the utility function is conditioned. In general, conventional microeconomic models based on assumptions of atomistic rational farmers are too limiting to incorporate analytically the role of public or community interests in individual decision-making (Uzawa). For example, one of the major microeconomic theoretical constructs used to analyze farmer decision-making in agrarian societies of Sub-Saharan Africa and elsewhere is the farm household model. The diagnostic and predictive power of the farm household model rests on the assumption that the needs of individual household members are satisfied through one self-contained producing and consuming unit. Yet, in much of Sub-Saharan Africa, and in the Mossi culture described in this paper, different, overlapping groups come together to meet either production or consumption needs of household members (Ellsworth).⁶ According to Fafchamps (1992), one reason that positivist economists feel uncomfortable with issues like culture is that they prefer deterministic theory. Variables such as culture lead to multiple rather than single equilibria.

⁵A recent initiative undertaken by the Africa Technical Department of the World Bank seeks to better integrate traditional cultural traits and incentives in the design and management of projects. M. Dia argues that conventional development projects have erred by emphasizing technical criteria without recognizing the need to adapt assistance to local culture (1992).

⁶The approach used by de Janvry *et al.* to analyze farm household behavior when markets fail may provide a means for investigating the role as market surrogates of kinship and mutual assistance institutions in traditional societies.

The example of the *Naam* Groups, presented here, illustrates why economists who study innovations need to attempt to move cultural endowments from an invisible position behind the utility function to a more analytical position in a jointly determined system with resource endowments, technology and institutions (Ruttan, 1988). The story of the *Naam* Groups generates three hypotheses that are related to this issue. First, cultural endowments may shape the propensity of communities to build or reform institutions that can serve as vehicles for their own socioeconomic development. Any particular cultural endowment may either enhance or impede the possibilities for institutional change. Cultural endowments such as the tradition of strongly disciplined, self-reliant *Kombi-Naam* may increase the supply of institutions by reducing the cost of social consensus (Ruttan and Hayami; North). Some traditional organizations can be "renovated" (Fetini) as progressive institutions.

Second, such renovated institutions may facilitate certain technical innovations because (a) they provide an incentive-compatible mechanism for the allocation of the benefits of collective action and public investments without which the proposed technique would not be privately profitable, or (b) they alter the private economic benefits of a technical innovation by lengthening the planning horizon or adding psychic premiums. Third, this last possibility, as well as the fact that such institutions are renovated rather than transferred, may increase the opportunities for technical changes and productivity increases that endure. The paper closes with some caveats on the potential for replicability and continuity in institutions like those of the *Naam* movement.

Cultural Endowments and the *Naam* Movement

What is the *Kombi-Naam*?⁷

Here, the term "cultural endowments" refers broadly to the dimensions of culture, including religion and ideology, that have been transmitted from the past.⁸ Those endowments most clearly instrumental in the formation of today's *Naam* Groups are expressed in the operation of the *Kombi-Naam*, one of the traditional mutual assistance organizations of the Mossi who inhabit the Yatenga province of Burkina Faso.

A stylized picture of traditional Yatenga society provides a point of departure for understanding the traditional and potential role of the *Kombi-Naam*. Based on segmentary lineage groups, the pre-colonial Mossi were organized hierarchically into about 20 centralized kingdoms, including the kingdom of Yatenga, which is estimated to date from 1540 (Izard, 1985a,b). Mossi kings were not so much placed at an apex of a pyramidal structure, but at the symbolic center of a loosely woven political web (Hammond). Skinner (1964) calls the Mossi kingdoms "confederacies". The characteristic feature of the Yatenga society was its ability to

⁷The description of the *Kombi-Naam* is drawn from Ouedraogo's account, which he based on interviews with elders who had been courtiers for the last king of Yatenga. A similar description is found in Skinner (n.d.).

⁸There are many definitions of culture in the anthropological literature. In the context of this paper, one of the more helpful and contemporary perspectives is that the basis of culture is the means of preserving order (Gans). In economist North's framework, culture is the socially transmitted body of teachings, knowledge and values which generate the informal constraints that, combined with formal rules, compose institutions. Institutions are the constraints on individual choice sets that humans devise to shape their interaction (1990). In political scientist Ostrom's view, "culture" is in large part made up of the norms and codes of behavior that have evolved to counteract opportunistic behavior (1992). In some recent literature the term "social capital" is being used to refer to what has in earlier literature been identified as cultural endowments.

integrate each member into a well-defined role at the same time that it limited the potential for social or technical change. Through the symbolic authority of the king and court, girded by a nexus of customs and subordination to kin group, individual initiatives were regulated in order to preserve the stability of the community. To Ouedraogo, in this stylized Yatenga society, social equilibrium was achieved at the cost of technical stagnation (Ouedraogo). To Hammond, the very continuity of Mossi society in the face of colonialism can be explained by the absence of technological innovation. Moreover, in a Boserupian framework incentives for land saving technological innovation would be limited as long as population density remained low and land abundant, limiting the potential gains from the adoption of innovations.

The *Kombi-Naam* was a temporary association of young men and women from the same age group, re-established spontaneously in each generation when they gathered to choose leaders and designate annual group activities. They worked in common fields, provided labor in the fields of those who demanded or were in need of special assistance, and were remunerated in kind according to the nature of the labor and the means of the household employing them. Certain other vital community tasks were collectively and cheaply completed by the youth association. At the close of the year, to mark the dissolution of that particular realization of the *Kombi-Naam*, they organized a festival to which youth of other villages were invited.

Several features of the *Kombi-Naam* bear special interest to the study of institutional and technical change. The first special feature of the *Kombi-Naam* is that membership and internal leadership cut through the hierarchy to include individuals from all socio-occupational sets, including minorities and servile groups. Strict sexual mores were enforced, to encourage young men and women to learn mutual respect in a cooperative work environment. For a moment in

time, all villagers of that generation were "equal".

The second special feature was the method for selecting leaders. In contrast to Western definitions of democracy as majority rule, Ouedraogo describes the traditional election as an exercise in "qualitative democracy." Consensus was achieved when unanimity emerged from a long process of palaver and mutual concessions.

A third special feature is that the *Kombi-Naam* leadership included some dignitaries who represented institutions of the greater traditional society. The link between youth and elders mediated inter-generational tensions in a society where age conferred status. The content of the cooperative work activities, such as cleaning of the village mosque, increased positive intergenerational contact.

The signal feature of the *Kombi-Naam*, for our purposes, is the tradition of rigorous discipline and the denial of opportunism to which youth freely consented, given that unanimity had been achieved for certain key decisions. Hammond observed that "the young people set to work without supervision after the leader and farmer have agreed upon a price...work is performed collectively and profits shared equally"(p. 91).

Other related facts about the historical evolution of the *Kombi-Naam* are also important to remember. The first is that the concept of *Naam* is a dominant leitmotiv in the lives of the Mossi of Burkina Faso (Skinner, 1964; Izard). Literally, *Naam* means chieftainship (Ouedraogo), sovereignty or power (Izard, 1985b), or the power first possessed by the ancient founders (Skinner, 1964). Philosophically, the Mossi refer to it as that "force of God that enables one person to dominate others" (Skinner, 1964, p.13). Many of the key economic, political, religious and social institutions of the Mossi are patterned around *Naam* and are designated by titles

derived from that word (Izard, 1985b; Skinner, 1964).

Second, the colonial regime attempted unsuccessfully to incorporate Mossi society by making use of *Kombi-Naam* labor groups to produce cotton. The *Kombi-Naam* fled to the Gold Coast to escape the work or were sent away as forced laborers to the Ivory Coast (Skinner, n.d.). This occurrence may have been the origin of the "coming of age" migration patterns that later became customary in the life-cycles of young men. To Ouedraogo, much of the motivation for rebuilding the *Kombi-Naam* as a development tool was, ironically, to counteract the outmigration of youth.

Finally, one detail reported by Hammond (1966) sheds light on how work groups such as the *Kombi-Naam* interacted with the broader society, such as other ethnic groups, the colonial regime, or currently, international development organizations. The internal cohesion and independence of the work group was protected by the fact that only the senior member of the work groups came into direct contact with non-Mossi (presumably, other ethnic or colonial) employers. Work groups interacted with "outsiders" through trusted intermediaries. In terms of its potential role in the process of institutional and technical change, what was most limiting about the *Kombi-Naam*? First, the experience in equality, self-reliance, community service, and mutual assistance lasted only one year. Second, at the close of the year, the stock of earnings accumulated as compensation in the course of *Kombi-Naam* activities was exhausted in one ceremony. Youth carried the sense of having participated into adulthood, but the titles and active solidarity were embodied only in the *Kombi-Naam* institution. Servants then undertook their hereditary occupation as servants, and young women prepared to become wives and mothers in a patriarchal society.

What Explains the Existence of The *Kombi-Naam*?

The *Kombi-Naam* is only one of a number of traditional associations that promoted mutual assistance, cooperative work projects, and solidarity among the Mossi of Yatenga. Ouedraogo stresses repeatedly in his book that one of the essential values of the Mossi is that of solidarity. He cites a Mossi proverb: "one should not only wash one's own belly, but also the back of another..."(p. 175). Ellsworth (1988) presents evidence of the enduring economic importance of such associations in Burkina Faso. In general, mutual assistance groups and solidarity networks are a common feature of traditional societies, but not necessarily of societies in transition.

Anthropologists, political scientists and economists have long debated why such groups exist and how effective they are. For political scientists, the focal question has been under what conditions voluntary cooperation exists without the imposition of a coercive state. Economists have often expressed the issue in terms of the contradiction between altruism and the pursuit of self-interest.

Scott (1976) explained the existence of mutual assistance and solidarity networks in southeast Asia through the "subsistence ethic" of peasants, which reflected, in a "moral economy", the overriding and common need to organize against food crises. Opposing Scott's view, Popkin (1979) argued that collective action often fails because of the opportunistic behavior of peasants who have no incentive to organize cooperative strategies. Collective action can succeed, said Popkin, when leadership is provided by agents whose religious or ideological motives are less vulnerable to self-interest (Feeny). Posner (1980) reconciled the views of Scott and Popkin by arguing that mutual assistance systems can be sustained in the long run by the existence of a lasting relationship between self-interested members. Similarly, anthropologists have long

recognized that gift-giving is a form of commodity exchange that, as compared to an impersonal exchange of goods in a market, establishes a durable personal relationship between donor and recipient (Mauss; Gregory). Posner's argument was formalized in work by Kimball (1988) and others. Related literature, models and arguments are exhaustively reviewed by Platteau (1991) and Fafchamps (1992).

Political scientists and economists have relied largely on the game theoretic approach to present the formal explanation for the existence of mutual assistance groups and cooperation. They solved Olson's "free-rider" problem (1965) by showing that in repeated, rather than one-shot games, there is no dominant strategy. Wealth- or utility-maximizing individuals will find it worthwhile to cooperate with other players when the game is repeated, when they possess complete information about the other players' past performance, and/or when there are a small number of players.⁹ Building on the extensive literature and expanding the game theoretic approach, Fafchamps (1992) has demonstrated how key observed features of mutual assistance groups and solidarity networks can be explained through the theory of repeated games. Using a different approach with game theory, Ostrom (1990) demonstrates simply that a contract enforced by unanimous approval of the rules, such as in Ouedraogo's "qualitative democracy", can result in a cooperative equilibrium in which agents share costs and returns from common property.

The use of game theory in this context has also been criticized. When game theory is used as the construct for explaining why mutual assistance groups exist, the analysis focuses on how cooperation results from the optimal meeting of game-derived demand functions, rather than the

⁹In a related argument, Runge (1981) reformulated the common property problem as a cooperative game in which individual choices are interdependent and gains are possible through "assuring" (Sen) coordinated expectations about others' actions. This formulation shifts the emphasis from the individual profit motive for exploiting common property to the institutional and legal context of the decision.

institutionalized incentives individuals have to participate (Ellsworth) or how the costs of transacting are altered by different institutional structures (North). As Fafchamps (1992) argues, repeated game theory does not explain how specific organizational structures or mutual assistance associations are chosen. The elements needed to build such a theory, says Fafchamps, would include culture, political institutions, and historical events. For the purposes of this paper, although game theory can be used to explain the existence of the *Kombi-Naam*, it tells us little about whether the *Kombi-Naam* can evolve as an institution that supports technical innovation. Game theory can be used to demonstrate why a particular institution assures a stable equilibrium, but cannot explain why that institution (and not another) evolved historically.

Mutual assistance groups and solidarity networks can also be viewed as special cases of risk-pooling insurance mechanisms in which villagers organize vertically (as in patron-client relationships) or horizontally (as in the original *Kombi-Naam*) to protect themselves against famine and other disasters. In the land-abundant, semi-arid countries with simple technology, high covariance of risk in crop or livestock output helps to explain the lack of formal insurance mechanisms and the need for geographically extensive social institutions or private capital accumulation in the form of grain stocks or livestock (Binswanger and McIntyre, 1987). As population densities increase, however, the propensity to rely on such extensive social institutions as insurance mechanisms can be expected to decrease because of the reduced cost of the infrastructure and access to economic activities with less co-variation. Although the *Kombi-Naam* were organized horizontally, the only risk they were designed to cover, or could cover effectively, was uncorrelated and specific, such as providing labor to assist the sick or needy.

The *Kombi-Naam* and Technical Change

Two prominent features of the *Kombi-Naam* institution, cited above, blocked its usefulness as a collective instrument for technical innovation. First, membership in each realization of the *Kombi-Naam* was only temporary. There was no time for individuals to reap long-term benefits from today's investment in mutual assistance. Second, the *Kombi-Naam* accumulated no capital but spent it all in one annual festival. Presenting similar evidence for other societies, Platteau concludes that many traditional village support systems provided disincentives for investment. In the context of the induced innovation model (Hayami and Ruttan), some of the changes in factor endowments necessary to influence the real factor prices and the demand for technical innovations generally would be mitigated by traditional institutions like the *Kombi-Naam*.

Nor does much capital accumulation appear to have occurred in the Mossi kingdoms in general. In general wealth in pre-colonial West Africa was based on control over people (and hence, given land tenure arrangements, over space). Although the Mossi believed that their king was wealthy, visiting Europeans and scholars appear to have found slight difference between the standard of living of the rulers and that of the people and questioned the economic base of the Mossi kingdoms' political organization (Hammond; Skinner, 1964).

Renovating the *Kombi-Naam* Institution¹⁰

Bernard L. Ouedraogo, the charismatic leader of today's *Naam* movement, is a Burkinabe

¹⁰Much of this section is drawn from Ouedraogo's book. See footnote 4 for an appropriate definition of institutions from North (1990).

sociologist with long experience developing public education programs. Disenchanted with the standard public education model, dissatisfied with farmers' attitudes toward extension services, and concerned, as were many other public leaders, about the speed of youth outmigration from rural areas, he undertook to initiate a process of building a community development institution from the traditional *Kombi-Naam*. In his own words, he and his co-workers sought "development without damage (*développer sans abîmer*)"(Ouedraogo, p.13).

The process of renovation occurred in several stages. First, public education programs that had been originally designed to provide basic instruction to village children were re-organized as training programs for young farmers (*Formation des Jeunes Agriculteurs*, or FJA). The FJA were then broadened to include post-school farmer youth groups (*Groupements des Jeunes Agriculteurs*, or GJA). In 1967, The GJA were then "grafted" onto the *Kombi-Naam* by redefining rules of function and organization.

As in the *Kombi-Naam*, the GJA/*Naam* Groups maintained close ties with village elders. To gain acceptance in a village, the GJA/*Naam* Groups provided assistance to village elders, retaining an honorary presidential post for elders (usually an ex-soldier who had travelled), and in return, obtaining land use rights from elders, borrowing their plows and oxen. As in the *Kombi-Naam*, membership of the GJA/*Naam* was open to individuals of all ethnic and socio-occupational groups. Leaders were selected through a consensus process similar to that used in the *Kombi-Naam*, although the leadership functions were defined in new ways. The general functions of the GJA/*Naam* Groups were newly defined as (1) educational (2) political (3) recreational and (4) economic.

Ouedraogo recognized that (1) temporary association and (2) inability to accumulate capital were inherent features of the *Kombi-Naam* institution that needed to change before the

traditional institution could be used as a development tool by the community. Solving the capital accumulation problem in function (4) of the *GFA/Naam* Groups entailed convincing members that the earnings once exhausted at the annual festival could be more usefully directed toward collective savings and investment decisions.

The second institutional modification--prolonging the lifespan of the *Naam* Groups--seems to have been reinforced by concurrent changes in resource endowments. Those who joined the *GJA/Naam* in the 1960s remained members well into adulthood in the 1970s. Ouedraogo and others (Gentil; Pradervand) contend that the 1967-1985 period of low rainfall, which included the severe droughts of 1967-73 and 1982-84, contributed to the proliferation of the *Naam* Groups. In order to reclaim degraded land through the construction of dikes, dams, reservoirs, and other public works, villagers needed cooperative collective action. In terms of the induced innovation framework, a change in resource endowments (the drought) increased the demand for an institution of collective action, and cultural endowments (the *Kombi-Naam*) increased the supply by reducing the cost of institutional change. In terms of the Binswanger and McIntyre paradigm, the drought period is likely to have increased the desirability of geographically extensive insurance mechanisms even though rising population densities over time on the Mossi plateau would be expected to decrease the demand for such institutions.

The *Naam* Groups of today are a diaspora of associations that include young and old, men and women. Crudely, the "renovation" of the *Kombi-Naam* extended the payback period for investment in mutual assistance and diversified its portfolio. Conceived with the objective of encouraging youth to remain in the villages rather than join the rural exodus, the future dynamism of the *Naam* movement depends on the extent to which it can prolong or reproduce cooperative relationships.

Technical Innovation

In the Sahelian and Sudanian climatic zones of the semi-arid regions of Sub-Saharan Africa, the principal production constraints are soil moisture and low soil fertility. In many years, land degradation has caused even further deterioration in soil quality. Recognition of high capital and maintenance costs has deterred investments in conventional, large-scale irrigation projects over the past two decades (Matlon; Harrison). Numerous other water conservation or retention techniques are potentially important, particularly in degraded Sudanian regions like Yatenga. In areas such as Yatenga, rainfall is low and irregular and soil encrustation leads to infiltration problems. Water-retention techniques can reduce runoff and help exploit rainfall by increasing the effectiveness of nutrients, especially when combined with improvements in soil fertility (Sanders et al.).

Sorghum and millet are the staple cereals in the Sahelo-Sudanian zones of Burkina Faso. Based on the record of nearly a decade of research on new technologies in Burkina Faso, Sanders et al. conclude that only with increased soil moisture and moderate fertilizer application (organic or inorganic) are improved sorghum varieties significantly higher yielding and more profitable with a low degree of risk. Increasing soil moisture when the nutrient levels remain low does not generate large yield increases; applying fertilizers (organic or inorganic) without an assured water supply is economically risky since the response to fertilizer is dependent on the availability of water at critical stages of plant development (Sanders and Ramaswamy). They argue that moderate improvements in agronomic environment would provide breeders with an opportunity for success by limiting the extreme variability in plant environment. As they portray it, technical change in the Sahel is a staged process, depending on initial soil conditions and isohyet (Sanders

et al.; Sanders and Ramaswamy). The adoption of water-retention/soil-fertility technologies is the pre-condition for the productivity increases associated with varietal change.

Using the induced innovation framework, Sanders et al. argue that with the Sahelian drought, changes in resource endowments spurred the demand for technical innovation. As soil resources declined from depletion and erosion, and non-farm employment opportunities (even through migration to the south) grew less rapidly than rural population, farmers were induced to adopt yield-increasing, labor-intensive technologies such as contour dikes and organic fertilizer.¹¹ Dike construction increases labor utilization especially during the out-of-crop season periods when the opportunity costs of labor have traditionally been low. Sanders et al. (1990) report that the region of most rapid adoption of water-retention/soil-fertility technologies has been Yatenga, even though the estimated rates of return to the technologies are higher in other, less degraded regions. They explain this anomaly by hypothesizing that unless farmers are pressured by soil deterioration and falling labor/land price ratios, the implicit returns on these large labor inputs are too low to interest farmers (p.8). As suggested here, however, there may also be cultural reasons why diffusion was more rapid in Yatenga.¹²

One of the more effective dike (alternatively, *diguette*, bund, contour ridge, or contour line) techniques had its genesis in Mossi methods. Based on field work in western Burkina Faso, Savonnet (1958) identified and described in detail four different techniques for soil erosion and

¹¹This bears some resemblance to the Boserup (1965) hypothesis that with increased population density (alternatively, persons/land unit), investments in land and soil fertility maintenance result from the need to raise land productivity and offset the increased labor required to meet subsistence requirements.

¹²Depending on the location, conservation activity and time, reports differ about whether public financing or Food-for-Work was used to compensate labor. Much of the work, particularly in the early years of the *Naam* movement and when innovations such as the dikes were constructed in the fields of individual farmers, appears not to have been externally financed.

water control among Mossi and other ethnic groups. These and other techniques used historically by the Mossi are also reported in Reij (1989), Critchley (1990, 1992), and Djibo (1991). Many of these techniques had fallen into disuse. The efficiency of stone and earthen lines was limited principally because contours were not accurately measured, and other construction details such as stone placement and line spacing needed improvement.

Harrison (1987) calls the process of dike improvement in Yatenga "barefoot science." When OXFAM began work on an agroforestry project in Yatenga in 1979, one of their field workers brought the concept of water-harvesting from a visit to the Negev desert in Israel. In emphasizing that their priority was food production rather than agro-forestry, farmers helped shift the design of the project. The farmers and the OXFAM project director set to work improving the simple stone contour line. One improvement involved the placing of large foundation stones preceded by smaller stones to act as a permeable water filter (Critchley, 1990). But accurate contours are impossible to gauge by eye on the slight slopes (2-3 percent, according to Reij et al.) in Yatenga. Aside from questions of spacing, breadth and depth, the key was the development of a simple hosepipe water level that costs 6 dollars to make, can be mastered by illiterate villagers in a day or two, and ensures correct alignment of the contours (Wright; Harrison). The *Naam* Groups subsequently adopted the technique and diffused it as rapidly as OXFAM itself (Younger and Bonkougou; Harrison). Reij et al. classify contour lines as macrocatchment water harvesting or as "water harvesting from long slopes" (p. 48). As compared to earthen dikes, permeable stone dikes slow surface runoff and increase the water infiltration rate rather than retaining water. Field experimentation suggests that particularly in clayey soils, earthen dikes can reduce yields because of waterlogging. In either clay or sandy soils with slight slopes, permeable stone dikes distribute water more evenly throughout the field (Eger). Earthen dikes also break more easily in the heavy

downpours and sheet water movement characteristic of the area.

Permeable stone dikes control both water and soil loss. In the short-term, the contour dikes improve crop yields in two ways. The dikes improve infiltration by controlling rainfall runoff, increasing water absorption by crops and land. Second, fertilizer (usually manure) and other organic material applied behind the dikes is much more effective since it is less likely to be washed away. The organic matter also attracts termites that bore into the ground and aerate the soil. Over the longer term, the principal advantage of the dikes is erosion control and an increase in soil quality.

The evidence on the economic rate of return to contour dikes is positive, but patchy and inconclusive. According to Sanders and Ramaswamy (1992), the yield effects of contour dikes combined with organic fertilizer placed behind the dikes are "small but the diffusion is impressive"(p. 249). Based on the short-term yield increases resulting from the introduction of contour dikes in farmers' fields, Matlon and Spencer (1984) describe them as "among the most promising technologies available for semi-arid zones with moderate to high population pressure" (p. 673). In 1985, ICRISAT evaluated a package of stone dikes, tied ridges, a low dose of fertilizer, and an improved sorghum variety. On farmers' fields, where only the package was evaluated, the yield difference was 67 percent in only the first year in the Sahelian (less favored) zone. They calculated that a break-even sorghum yield increment of only 155 kg would assure a return of 15 percent on labor and cash investment, which was exceeded by over two-thirds of farmer participants in the Sahelo-Sudanian zone. As a comparison of rules-of-thumb, CIMMYT usually recommends using a discount rate of 50 percent for technologies that are familiar to the farmer, and up to 100 percent for technologies that are unknown to the farmer. In either case a 15 percent discount rate is generous in that it does not incorporate risk and uncertainty factors.

On the other hand, all data came from the first year of application only--understating the rate of return for the package over time as the effects of the contour dikes on soil quality cumulate. On researcher-managed fields in the Sahelian zone, the yield increment from stone dikes alone was 40 percent in the first year. OXFAM's data is less controlled, but generally shows statistically significant yield increases with stone contours on farmers' fields, with the highest differential occurring in dry years (Wright).

Using ICRISAT's cost data and some of the lower yield differentials in Wright's data, Younger and Bonkougou estimated an internal rate of return to the OXFAM project (excluding the diffusion outside of the project zone by the *Naam* Groups) of about 40 percent. For a new hectare of land (excluding sunk R and D costs), the rate of return they calculate is 147 percent. They conclude that the most obvious proof of economic return is the speed of diffusion, without artificial incentives or subsidies, among Yatenga farmers. In an appendix, they report that in the project zone only between 1981 and 1986, about 2000 ha were treated with stone contour dikes. For approximately the same time period, Critchley (1991) reports an estimated 8000 ha treated in Yatenga province (including the project zone and other areas). Estimating the area covered is difficult because the dikes are constructed by both groups and individuals on communal fields, village lands, isolated individual fields and multiple, adjacent fields.

Institutions such as the *Naam* Groups, however, affect the calculation of rates of return to investment in technologies such as the contour dikes, larger-scale dams and water retention infrastructure. As North argues, institutions affect the costs of exchange and production through determining transaction and transformation costs (p. 5). Existing rates of return calculation do not capture the external effects of dike construction by one farmer on other farmers' fields, or the possible cost-reducing effects of construction by a *Naam* group as compared to construction by

an individual. Dikes are a divisible, but lumpy technology. The only portion of the decision that is measured in conventional rate of return analyses is the private benefit to the farmer of planting a fertilized, improved cultivar behind the dike.

Viability of the *Naam* Groups and Their Activities

Important caveats are nevertheless raised by the story of the *Naam* Groups, several of which are recognized in the writings of Ouedraogo, his supporters and his critics. The first set of caveats is related to continuity of the *Naam* movement itself. The second set is related to the issue of replicability.

Continuity

(i) economic viability

To secure the necessary seed capital for the *Naam* Groups, its creators insisted that in a first phase capital should be self-generated, "so that potential supporters and detractors of the organization could take it seriously" (Fetini). The basic organization of savings and credit in the *Naam* Groups is described by Ouedraogo. All earnings are deposited in a bank account, distributed in three unequal parts depending on the needs of the Group. The first part is seed money for a revolving fund or for repaying loans taken from the bank. The second, smallest part, is an expense account for funding annual harvest festivals. The third part is for expansion of activities through purchase of factors of production, or for livestock and tool replacement. To draw individual loans from the account, such as consumption credit, is prohibited.

In 1976, to meet the challenges of training farmers in both technical spheres and in project development, and to relieve key scientific or capital constraints in projects they identified, Ouedraogo and a colleague (Bernard Lecomte) established an umbrella organization that also

includes local and international NGOs across the Sahelian region, the 6-S (*Se Servir de la Saison Sèche en Savane et au Sahel*). Although the 6-S expands the capital base of the *Naam* movement, a large proportion of funds are provided as reimbursable loans.

Central to the financial functioning of the 6-S is the notion of *fonds souples* (flexible funds), as contrasted to project aid. Initially, modest funds are made available without earmarking them for specific end-uses. The funds are distributed only when a Group shows sufficient initiative, and are increased only as the Group demonstrates management ability. When a project becomes profitable, the funds are reimbursed and the money is recycled to another project. At the level of the NGO, the funds are a grant, but they are used as a 70 percent reimbursable loan by the *Naam* recipients. That 70 percent is then placed in a revolving fund to be extended to poorer *Naam* Groups. Funding then diminishes or ceases when Groups demonstrate enough efficiency to attract other donors (Fetini).

As the *Naam* Groups proliferate and as the range of the commercial activities expands, some groups and some activities are clearly more successful than others. Ouedraogo stresses the significance of the villagers' acceptance of the revolving fund concept, of which they were originally suspect. He relates how the concept was explained to villagers, and how in the ideology of the *Naam* movement, they are constantly reminded of how their actions relate not only to their own Group, but to the potential of other, less well-endowed Groups. The concept of repayment with interest and the prohibition on giving credit or food to the needy from the Group account have been difficult but usually not insuperable problems. In some cases, more flexible arrangements have been developed.

Naam groups engage in a portfolio of activities, only some of which generate cash income. The commercial activities of the *Naam* Groups include the purchase, installation, and operation of

grain mills, the constitution and regulation of village grain banks, livestock production, artisanry, vegetable production on irrigated plots operated by the collective, and petty trading. Some (Beaudoux and Nieuwkerk; Gentil) have expressed reservation about the economic performance of some of these activities.

But Ouedraogo and others emphasize that commercial activities are in some sense of lesser importance to the long-term vitality of the group than the community and social activities that lend the group its fundamental cohesion. Ouedraogo describes water-retention work as one of the principal activities of the *Naam* Groups, although he classifies it as a "community" rather than an "economic" activity. In his survey of several hundred groups, Buisrogge (1989) was startled to find that among the groups that identified future intended activities, most were best classified as public work projects. He explains that for many of the villages beset by drought and youth outmigration, community action was a question of survival. To maintain viable communities, it was necessary to retain the population. Questions of environment and soil fertility, for example, were foremost.

The very breadth in *Naam* Group activities may be a key to their success in adopting and diffusing agricultural technology. One problem with many failed efforts at community action in agricultural experimentation and terrace building is that people were organized for too limited a set of tasks and the transactions costs were not compensated by the specific activity. The lesson to be learned may be that, in encouraging one community-based activity, it is better to base the work within existing institutions and to ensure that the institutions have a life beyond that particular activity (R. Tripp, personal communication).

Pradervand refers to the 6-S as the first international organization run by peasants. Harrison writes that in the 6-S, professionals and experts take up their proper role of training,

technical and financial back-up, but "the heart of the *Naam* is...in the villages"(p. 282).

Ouedraogo himself concludes that the future of the federation in the 6-S, in terms of retaining a sense of village base and control while satisfying requirements for long-term financial viability, is unsure.

Project aid and new technologies are usually evaluated in terms of simplistic measures of economic rate of return. Is there something more important at work in the *Naam* movement than measurable current profits or easily measured rates of economic return? The *Naam* movement is now in its third decade--a life longer than most technical assistance projects. Both Pradervand and Buisrogge suggest that, in a sense, individuals who choose to remain in the village and participate in groups like those of the *Naam* may derive psychic "premiums" from a renewed sense of community and self and a rediscovery of their own cultural past. The potential of such institutions to initiate and sustain technical innovations and productivity increases may be great.

(ii) political viability

Political viability is a second issue that is related to continuity of the *Naam* movement. Assembling data from across West Africa, Gentil describes the current farmer movement as consisting of three types of groups: (1) groups promoted by a non-statal apparatus, such as a church or NGO, (2) groups initiated by farmers, but linked closely to a charismatic leader with non-farmer status, and (3) groups initiated and sustained by farmers and farmer leaders. He claims that a large proportion of the groups are created and dissolved within a short period of time. He describes many of the groups as artificial and entirely dependant on external organizations.

Some groups have clearly been initiated by, and derive their strength from, village

communities. But the unique qualities of groups like those of the early *Naam* movement may succumb to externally-driven development fads and fashions or evolve from democratic to oligarchic control (Fisher, 1994). Certainly the *Naam* Federation of today is likely to include more "collective opportunists" than in the early years before government acceptance and the establishment of the 6-S. The *Naam* movement was officially recognized in 1978 by the government of Burkina Faso, and the *Naam* Groups were then federated and linked to a broader national structure. Most of the groups in Buisrogge' survey (1989) were formed around 1974-1977, when the government began to pursue specific community development policies. In general, one of the most remarkable aspects of the *Naam* movement is how its leaders have been able to work effectively with revolutionary regimes in Burkina Faso as well as in other parts of West Africa (Skinner, n.d.). A more philosophical question is, however, the extent to which the views of *Naam* farmers, rooted in their own experience and localities, can continue to mesh with those of the national politicians and the international development organizations. As the scale of the *Naam* bureaucracy and the involvement of its leaders with national politics and donor culture increase, how will the institution evolve?

Further, through the *Naam* movement, a substantial portion of the labor-intensive work involved in constructing infrastructure and of the costly work of on-farm research and demonstrations is being transferred from the state to its poorest citizens. One might hypothesize that some "enlightened" governments may choose to use farmer groups to shift the burden of development costs back onto rural communities. Some governments may find it in their interest to "co-opt" successful farmer groups in order to consolidate their own political base. The case of the Bakel farmer groups in Senegal, detailed by Adams (1981), demonstrates that at least some associations perceive government recognition as potentially exploitative and resist assimilation.

Skinner (n.d.) is suspicious that the development community, unwilling and unable to obtain or use effectively the tremendous amount of resources necessary to assist Africa, may have simply decided to turn the problems over to Africans. According to one example he cites, the *Naam* Groups were viewed by some as "rivaling" other development organizations. It is not surprising, then, that their role may often have been downplayed by envious development practitioners. Finally, can movements such as the *Naam* Groups resist co-option by international NGOs? Over the past few decades, a proliferation of NGOs have gradually assumed the tasks of community development (and more) from bilateral development assistance institutions. Yet some have expressed concern that many of them may be repeating the same errors (Ward).

Replicability

A second set of issues relates to the potential for replicating the *Naam* experience in other regions of Sub-Saharan Africa. The *Naam* movement and similar farmer organizations are widespread in the Sahel, and particularly in Senegal and Burkina Faso. Gentil cites a number of factors that are likely to be related to the evolution of successful farmer movements. The first is the openness of the surrounding political climate. The governments of Senegal and Burkina Faso have been relatively tolerant of trade union activity, multipartyism, and free press. He notes, however, that most successful groups serve at least some government interests. For example, the economic activities of the farmer groups in Senegal have never threatened the cash crops that are the lifeline of the Senegalese economy. A second obvious factor is the capacity for accumulating capital and self-financing. In certain types of water-retention or conservation activities, the size distribution of land, land markets, or equality of access to communal land may influence the chances for successful community action (Kikuchi et al., 1978).

Charismatic leaders also seem to play a crucial role, and especially those with one foot in the European world and one foot in the African world, who can play an intermediary role. A unifying ideology, a "hostile" external force, or a major obstacle to overcome help to rally support and enforce cohesion. Pradervand describes farmer groups in the Sahel as well as in Eastern and Southern Africa, but finds only those in the Sahel to be pursuing goals related to rediscovering and building on their own cultural identity.¹³ He characterizes those of Zimbabwe and Kenya, for example, as concerned primarily in improving material well-being. Consistent with the major hypothesis presented here, cultural endowments such as the structure of traditional society are likely explanatory factors. Many of the West African traditional societies were organized into centralized states, whereas many of those in Southern and Eastern Africa were acephalous. Differences in the more recent colonial experience, such as the relative magnitude of the European settler presence in Zimbabwe and Kenya, may matter in certain comparisons.

Conclusions

The example of the water-retention work of the *Groupements Naam* of Yatenga, Burkina Faso demonstrates several points of importance to economists who research technical innovations and work with development practitioners. First, specific cultural endowments of the Mossi in Yatenga appear to have reduced the cost of the institutional innovation and development and to have facilitated technical innovation in rural communities. Although the anthropological, political

¹³For example, the farmer group of Bamba-Tialene, part of the wider *Entente* ("common ground") *de Koumpentoum* in eastern Senegal, has an Arts and Culture Committee that has been researching the theme of peasant identity. According to a farmer quoted by Pradervand "we researched our past to discover things that are vital for our future, for instance, the principle of solidarity and mutual assistance upon which our society was once based"(p. 129).

science, and economic literature all provide theoretical justification for the existence of mutual assistance groups like those of the *Naam* movement, there is no formal articulation in the economic literature of their role in technical change.

Recent refinements in the analysis of impure public goods, game and contract theories may furnish adaptable research tools that would improve modelling efforts, but economists need first to recognize the economic significance of such institutions.¹⁴ By lengthening the payback period for an individual's investment in mutual assistance and by altering the nature of the premiums, such groups may (1) encourage productivity-increasing technical changes when short-term private costs appear to be prohibitive and (2) enable those changes to be sustained over time. Important caveats need to be raised, however, about the potential for continuity in the *Naam* movement and for the replicability of such movements in other regions.

Established community organizations can be used for new purposes as the needs of communities evolve. Administrative autonomy and seed money can assist them in their "renovation" process, but the story of *Groupements Naam* also suggests that the emphasis leaders play on rediscovering certain unifying cultural values provided key ideological support to the movement. "Renovation" of community structures may be an effective strategy for participatory development. The case study illustrates the potential of such a strategy but also demonstrates the need for further research to identify the conditions that facilitate or inhibit the effectiveness of indigenous community organizations in serving as a bases for development.

¹⁴For example, farmer groups are mentioned in the work by Sanders *et al.* and a recent study of the Burkina extension system (Bindlish *et al.*), but the authors do not recognize how their operation may affect economic analysis.

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