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Osiris, 2nd Series, Vol. 15, Nature and Empire: Science and the Colonial Enterprise. (2000), pp. 258-281.

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*Christophe Bonneuil**

ABSTRACT

This paper explores the continuous role that science has played in the establishment of a colonial and post-colonial “development regime” in Africa. Examining development schemes that flourished between 1930 and 1970, the paper shows how African agrarian societies became objects of both state intervention and expert knowledge. In pursuing large scale social engineering and social experiments, these schemes constituted a particular—colonial?—way of managing the African environment and of crafting knowledge on African societies. In constructing development ideologies and practices in the late colonial and post independence periods, they also played an important part in the construction of the African state. Their approaches shaped the future of tropical medicine, agriculture, and development studies. Ironically, they also created the preconditions for later interest in the values of indigenous knowledge.

INTRODUCTION

IN 1958, THE BRITISH BIOLOGIST EDGAR B. WORTHINGTON, general secretary of the intercolonial Scientific Council for Africa South of the Sahara from 1950 to 1955, reflected on the problems of African development in these terms:

Can anyone to-day forecast just how the numerous factors involved in the progressive development of backward people will react on each other? . . . The pilot scheme, owing to its limited liability, offers great advantage in testing the theories in advance by intensifying the effort locally. This is a normal procedure when a new discovery or technique is introduced into an enterprise or into agricultural practice. It is less simple when a human society is the object of the study, because mistakes are less easy to rectify.¹

In his first book, *Science in Africa* (1938), which resulted from his work on the African Research Survey, an unprecedented continentwide study funded by the Car-

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¹ Edgar B. Worthington, *Science in the Development of Africa* (Hertford, U.K.: Stephen, Austin & Sons, 1958), p. 26.

negie Corporation in 1931, Worthington had already pictured Africa as a “fruitful field in history for experiment concerning the place of expert scientific knowledge.”² But what he meant by this was that more scientific knowledge of African environments and societies was needed for a sounder and more progressive colonial policy, and that Africa was a continent full of research opportunities. Twenty years later, he was more precise. By then, African development had become an equationlike problem that could be solved by experiment. Planned pilot schemes constituted the laboratories where development could be experimented with, using Africans as subjects. He viewed these schemes as laboratory experiments in “acceleration of progress” that would provide a forward-looking perspective and models that could be used elsewhere to monitor the development process.³ From “science for development” to “development as experimental science,” Worthington’s changing views reveal the evolving discourses and practices of science and development. Exploring these discourses and practices at work in planned-development schemes, this essay considers the role that science played in the building of the developmentalist state in tropical Africa in the colonial and postcolonial period.⁴

By the term “developmentalist state,” I mean a specific stage in the history of African societies, situated between the early colonial state and the post-1980 crisis of the state in Africa. One can locate the birth of the developmentalist state in tropical Africa in the 1930s, when colonial governments confronted the disorders and the threats of the Great Depression, adopted a more *dirigiste* agenda, intervened more directly in the economy, and took steps towards planning and state regulation. Major welfare and development policies also emerged in the 1930s and were key milestones in state building in Africa. Despite political changes during and after the Second World War and decolonization, strong continuities persisted between the 1930s and 1970s.⁵ Postindependence (mostly urban) African elites sought to end

² *Idem*, *Science in Africa: A Review of Scientific Research Relating to Tropical and Southern Africa* (Oxford: Oxford Univ. Press, 1938), p. 17. See Helen Denham (now Tilley), “Africa as a ‘Living Laboratory’: The African Research Survey and *Science in Africa*, 1920–1945,” communication to the Science in Africa conference (Oxford, 7 Mar. 1998), kindly communicated by the author. She is preparing a doctoral dissertation at Oxford on the survey, entitled “Africa as a ‘Living Laboratory’ — The African Research Survey and the British Colonial Empire: Consolidating and Applying Environmental, Medical, and Anthropological Ideas, 1920–1945.”

³ Worthington, *Science in the Development of Africa* (cit. n. 1) p. 26. Note that, writing only a few years after the complete failure of the Groundnut Scheme (a mammoth mechanized peanut-growing program) in Tanganyika, his mention of “mistakes” nevertheless reveals a consciousness of the dangers of this experimentation and a caution concerning unprepared large-scale schemes.

⁴ I am aware that my synthetic perspective neglects important contrasts between different colonies and countries, especially between cash-crop and non-cash-crop areas; between settler and non-settler colonies; among French, Belgian, and British governance styles; and between Marxist and non-Marxist postindependence regimes. But I believe that despite these important differences, there are common trends that singularize the developmentalist era and the role that science played.

⁵ This periodization is suggested by works such as Claudine Cotte, *La Politique économique de la France en Afrique Noire, 1936–1946* (Paris: Thèse de l’Univ. Paris, 7, 1981); Stephen Constantine, *The Making of the British Colonial Development Policy, 1914–1940* (London: Franck Cass, 1984); Jacques Marseille, *Empire colonial et capitalisme français: Histoire d’un divorce* (Paris: Albin Michel, 1984). It differs substantially from Young’s periodization: early colonial state, institutionalized colonial state in the interwar years, post-1945 contested colonial state, independent African state, post-1980 predatory state. (See Crawford Young, *The African Colonial State in Comparative Perspective* [New Haven: Yale Univ. Press, 1994].) This difference can be explained, first, by Young’s mainly political approach, which leaves some important economic, institutional, and social continuities aside. Second, whereas Young sees the welfare and development policy only as a belated legitimation discourse, I consider that this policy was a keystone in the construction of the state itself,

both the economic dependence inherited from colonialism and traditions viewed as delaying their country's entrance into modernity. They therefore largely followed paths opened in the late colonial period and opted for policies and forms of "authoritarian social engineering" first experimented with by the colonial rulers.⁶ One can speak of the developmentalist state emerging when the colonial state gave priority to a form of power concerned with changing ("improving") living conditions, so as to disable old forms of life and subjectivity and to turn African societies into objects of its cognitive apparatus and rationalizing interventions.⁷ Exploring these new forms of power and knowledge, this essay contributes to an archaeology of "development," the word being taken as a regime of practices of intervention and knowledge whose objects were the agrarian societies of Africa.⁸

Science played a central role in the making of this development regime and its maintenance after decolonization. The study of the multilayered role that science played in the colonial enterprise has become an active field.⁹ Conversely, it is now acknowledged that science in the colonies, far from representing a mere transfer of European science, was shaped by the colonial context. For example, specific natural, institutional, and social environments framed not only local practices of the same disciplines, but also the rise and development of new objects and disciplines—the shift from colonial to tropical medicine being the best-documented case.¹⁰ Moreover, encounters with indigenous knowledge and practices brought a level of hybridity that only now is becoming widely acknowledged. More deeply, recent scholarship has viewed "colonial science" not merely as a science practised in the colonies (the descriptive sense in which George Basalla used the term¹¹) but as a kind of knowledge specifically colonial both in the way it was crafted and in that it represented a discourse that conceptualized European domination and shaped the subjectivity of the colonized people.¹² Such reciprocal ties between science and colonialism have

as have scholars like Gerd Spittler, *Verwaltung in einem afrikanischen Bauernstaat: Das koloniale Französisch-Westafrika, 1919–1939* (Freiburg: Atlantis, 1981); David Ludden, "India's Development Regime," in *Colonialism and Culture*, ed. Nicholas Dirks (Ann Arbor: Univ. of Michigan Press, 1992), pp. 247–87; and James Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition have Failed* (New Haven: Yale Univ. Press, 1998).

⁶ Significantly, Young refers to the postindependence state in Africa as the "integral state." Young, *The African Colonial State* (cit. n. 5), pp. 287–90.

⁷ David Scott, "Colonial Governmentality," *Social Text*, 1995, 43: 191–220.

⁸ On the concept of "development regime," see Ludden, "India's Development Regime" (cit. n. 5).

⁹ For recent overviews of this field, see Michael Adas, "A Field Matures: Technology, Science, and Western Colonialism," *Technology and Culture*, 1997, 38: 478–87; Roy MacLeod, "Passages in Imperial Science: From Empire to Commonwealth," *J. Interdis. Hist.*, 1993, 4: 117–50; Paolo Palladino and Michael Worboys, "Science and Imperialism," *Isis*, 1993, 84: 91–102; Richard H. Drayton, "Knowledge and Empire," in *The Oxford History of the British Empire: The Eighteenth Century*, ed. P. J. Marshall (Oxford: Oxford Univ. Press, 1998), pp. 231–52; Patrick Petitjean, Catherine Jami, and Anne Marie Moulin, eds., *Science and Empires: Historical Studies about Scientific Development and European Expansion* (London: Kluwer, 1992); Marie-Noëlle Bourguet and Christophe Bonneuil, "De l'inventaire du globe à la 'mise en valeur' du monde: Botanique et colonisation (fin XVIIIe siècle-début XXe siècle). Présentation," *Revue Française d'Histoire d'Outre-Mer*, 1999, 322–23: 9–38.

¹⁰ Michael Worboys, "The Emergence of Tropical Medicine," in *Perspectives on the Emergence of Scientific Disciplines*, eds. G. Lemaire, R. MacLeod, M. Mulkey et al. (The Hague: Mouton, 1976), pp. 75–98.

¹¹ George Basalla, "The Spread of Western Science," *Science*, 1967, 156: 611–22.

¹² Megan Vaughan, "Health and Hegemony: Representation of Disease and the Creation of the Colonial Subject in Nyasaland," in *Contesting Colonial Hegemony: State and Society in Africa and India*, eds. Dagmar Engels and Shula Marks (London: British Academic Press, 1994), pp. 173–201, on p. 201; Shula Marks, "What is Colonial about Colonial Medicine? And What Happened to Imperi-

an inertia. No wonder that science and technology, shaped in colonial contexts, remained major factors of the colonial legacy.

Large-scale, prepackaged development schemes offer a particularly promising field—but one largely unexplored by historians of science and technology—for research into the relations among science, the state, and society from the colonial to the postcolonial periods. As Worthington's quoted remarks rightly suggest, these schemes were at the center of development discourses and practices. By 1960, they involved more than one million Africans. The first section of this chapter analyzes these attempts to redesign African lives and modes of production from above as emblematic of the growing power of scientists in the culture of development. The second section considers how new power relationships, and new knowledge of African environments and societies, were coproduced in the age of the developmentalist state.

DEVELOPMENT CULTURES: EXPERTS, PLANNING, AND THE MODERNIZATION OF AFRICA FROM ABOVE

An Era of Settlement Schemes

Prepackaged settlement schemes flourished in Africa between the 1930s and the 1970s (Table 1 and Figure 1).¹³ Some of them were driven by public health concerns. As early as 1906, the British in Uganda evacuated African populations from areas inhabited by the tsetse fly. During the interwar years, resettlements were undertaken for similar reasons in British East and West Africa, as well as in the Belgian Congo.¹⁴ Other schemes aimed at the settlement of unpopulated but potentially fertile regions. Moving the Peanut Belt eastward was the aim of the Terres Neuves program in Senegal. Between 1934 and 1937, 4 thousand Sereer people were relocated (often by force) under this scheme in the Terres Neuves.¹⁵

Other schemes were driven by a concern with irrigation—for example, the Gezira Scheme, run by the British in the Sudan, and the Office du Niger, created in 1932 in French Sudan (now Mali).¹⁶ These mammoth projects aimed to bring millions of acres under irrigation and to engineer whole societies around the production of cot-

alism and Health?," *Social History of Medicine*, 1997, 10:205–19. See also Jean Comaroff and John Comaroff, *Of Revelation and Revolution: Christianity, Colonialism and Consciousness in South Africa* (Chicago: Univ. of Chicago Press, 1991), chap. 3, and Valentin Yves Mudimbe, *The Invention of Africa: Gnosis, Philosophy and the Order of Knowledge* (Bloomington: Indiana Univ. Press, 1988).

¹³ There were, during the same period, many similar schemes in North Africa and South and South-east Asia that I cannot discuss here.

¹⁴ See Robert Chambers, *Settlement Schemes in Tropical Africa* (London: Routledge, 1969), pp. 18–22; Michael Worboys, "The Comparative History of Sleeping Sickness in East and Central Africa, 1900–1914," *Hist. Sci.*, 1994, 32:89–102; Kirk A. Hoppe, "Lords of the Flies: British Sleeping Sickness Policies as Environmental Engineering in the Lake Victoria Region, 1900–1950." Working Papers in African Studies, no. 203 (Boston: Boston Univ. African Studies Center, 1995); Maryinez Lyons, *The Colonial Disease: A Social History of Sleeping Sickness in Northern Zaire* (Cambridge: Cambridge Univ. Press, 1992).

¹⁵ Christophe Bonneuil, "Penetrating the Natives: Peanut Breeding, Peasants and the Colonial State in Senegal (1900–1950)," *Sci. Technol. Soc.*, 1999, 4:273–302.

¹⁶ On the Gezira Scheme see Victoria Bernal, "Cotton and Colonial Order in Sudan: A Social History with Emphasis on the Gezira Scheme," in *Cotton, Colonialism and Social History of Sub-Saharan Africa*, eds. Allen Isaacman and Richard Roberts (Portsmouth, New Hampshire: Heinemann, 1995), pp. 96–118.

Table 1. Settlement Schemes in Tropical Africa**Planned-resettlement schemes (driven by either productivist or sanitary concerns, or due to dam construction)**

Anchau Rural Development and Settlement Scheme, Nigeria: 5,000 people relocated out of sleeping sickness areas (1930s)

Terres Neuves scheme, Oriental Saloum (Senegal): 4,000 Sereer people resettled (1934–1939)

Numerous “planned-resettlement” schemes in British East and West Africa; examples: resettlement of Mwea in Kenya (included irrigation) and Volta River resettlements in Ghana

Several resettlements due to dam construction

Irrigation settlement schemes (two mammoth undertakings)

Gezira scheme, Anglo-Egyptian Sudan (begun 1906): 420,000 hectares (1939) and 25,000 tenant households (by 1957)

Office du Niger, French Sudan (first scheme begun 1926, Office established 1932): 34,700 inhabitants on 35,673 hectares (1959)

Mechanization settlement schemes (tenancy system)

Farming settlement schemes, Tanganyika (1952–), managed by Tanganyika Agricultural Corporation in Kongwa, Nachingwea, and Urambo (after failure of East African Groundnut Scheme): a few hundred tenant households farming a few thousand hectares by 1961

Boulet (Terres Neuves) and Sefa (Compagnie Générale des Oléagineux Tropicaux, Casamance), Senegal: 10,660 people on 4,460 hectares (1959)

Niger agricultural project (1949–1954) and Sokoto Mechanized Rice Scheme, Nigeria

Volta Dam project, Ghana (1964–1967); relocation into 52 new towns, with mechanized agriculture: 80,000 people (1965)

More integrated technology transfer and welfare settlement schemes (involved changes in land use and tenure, housing and village political organization, agricultural techniques, soil conservation, and often educational and health programs)

“Paysannats,” Belgian Congo (1936–1960): 140,000 inhabitants (1955)

Zande scheme, Sudan (1943–): 60,000 families resettled (1946–1950)

Swinnerton Plan, Kenya (1954–)

Ujaama Villages, Tanzania (1967–1977): *first phase* (1973), 2 million inhabitants in 5,628 Ujamaa villages; *second phase* (forced villagization, 1977), 13 million inhabitants in 7,500 Ujamaa villages

ton to fulfill the needs of industry at home.¹⁷ In these schemes, the land use, farming system, work, and life of the thousands of African tenants, brought from other regions, were strictly constrained by a disciplinary order. Each village was overseen by an African officer, under the authority of European inspectors who were themselves

¹⁷ In fact, only 36,000 were irrigated in 1960 because of various technical and human problems. See Jean-Michel Boudage, *De la terre, de l'eau et des hommes: Colons et techniciens de l'Office du Niger, 1932–1985* (Tours: Thèse de l'Univ. of Tours, 1991); Emil Schreyger, *L'Office du Niger au Mali de 1932 à 1982: La Problématique d'une grande entreprise agricole dans la zone du Sahel* (Wiesbaden: Steiner, 1984); Monica Van Beusekom, “Colonisation indigène: French Rural Development Ideology at the Office du Niger, 1920–1940,” *Int. J. African Hist. Stud.*, 1997, 30:299–323.

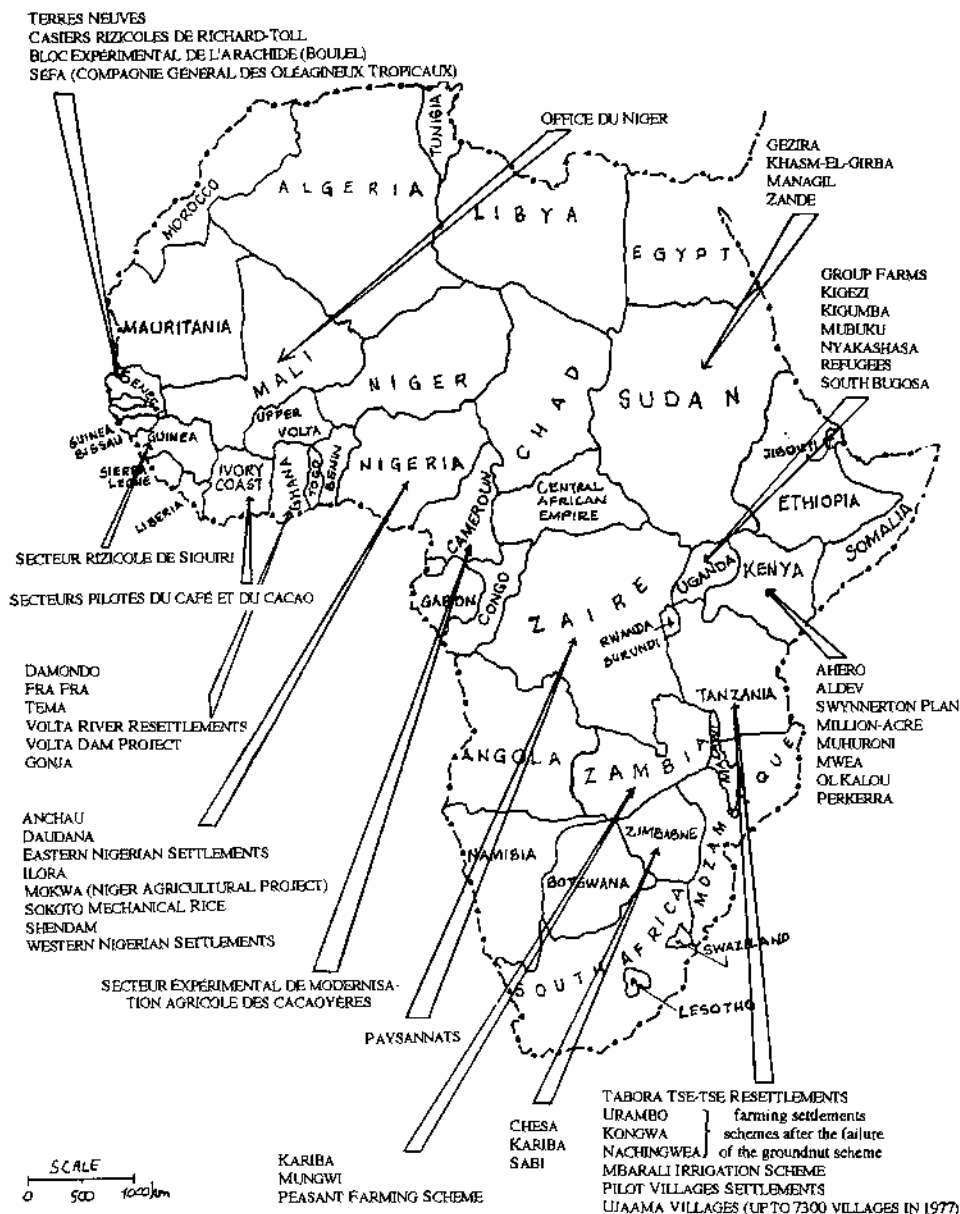


Figure 1. Map showing some of the settlement schemes in tropical Africa.

supervised by a unit manager. Villages were configured so as to be functional—of standardized size (300 inhabitants, in the Office du Niger), housing, and cost. Built on a checkerboard plan, the villages had a central green so people could easily be gathered. African tenant farmers were prisoners of an organization of work in which they were mere factors of production.

After the Second World War, mechanization of agriculture became the order of

the day and motivated many prepackaged schemes. Impressed by the American and Soviet agricultural models, France and Britain sought to increase African agricultural production with the help of mechanical modes of production to cope with the postwar foreign-exchange crisis. After the failure of projects based on wage labor (the most notorious being the Groundnut Scheme in British Tanganyika), mechanization schemes flourished in almost all the colonies in the 1950s and assumed an organization based on tenant farming.¹⁸

Rather than being resolutely focused on a single theme (public health, irrigation, colonization of marginal lands, agricultural production, mechanization), many schemes simultaneously pursued several goals. The *paysannats* in the Belgian Congo are examples. In public health policy as well as in agricultural development, the authoritarian and interventionist character of the Belgian colonial regime prepared the authorities in Zaire to engage in social engineering on a larger scale than their French and British counterparts. The *paysannats*, established from 1936 onward, were therefore bold and huge settlement and land-use schemes that by 1955 included no less than 140,000 Africans.¹⁹

Following decolonization, the *paysannats* faded away, but most other large-scale development projects that started in the late colonial period continued after independence. Whereas agricultural development programs in tropical Africa during the last years of colonial rule saw a tendency to move away from bold settlement and mechanization schemes towards piecemeal improvements, a spectacular renewal of large technocratic schemes marked the postindependence years at the initiative of the new ruling elites, who expected to turn their modernist aspirations into reality.²⁰ The Office du Niger, for instance, survived decolonization quite well: after 1960, farmers became—in an almost unchanged Office—the guinea pigs for the collectivization policies of the new regime. In President Kwame Nkrumah's Ghana, despite the failure of the Gonja Development Scheme in the late colonial period, another huge mechanization scheme was started in 1964, in fifty-two new towns to which 80,000 people were relocated after the construction of the Volta Dam. Independent Tanganyika also followed the path opened by British East Africa's settlement schemes. President Julius Nyerere sought to modernize rural societies through the collection of people in villages providing education, health facilities, and newly rationalized farming methods. Not only did the Rural Settlement Commission take over nine schemes formerly managed by the colonial Tanganyika Agricultural Corporation—including three holdovers from the Groundnut Scheme—but it also established eight

¹⁸ On the Groundnut Scheme, see J. S. Hogendorn and K. M. Scott, "The East-African Groundnut Scheme: Lessons of a Large Scale Agricultural Failure," *African Economic History*, 1981, 10:81–115. For similar but smaller experiences in Senegal, see Marina Diallo Côt-Trung, *La Compagnie générale des oléagineux tropicaux en Casamance de 1948 à 1962: Autopsie d'une opération de mise en valeur coloniale* (Paris: Karthala, 1998); for postindependence government mechanized farms in several African countries see Hamid Ait Amara and Bernard Founou-Tchuigoua, eds., *L'Agriculture africaine en crise dans ses rapports avec l'état, l'industrialisation et la paysannerie* (Paris: L'Harmattan, 1989).

¹⁹ Maryinez Lyons, *The Colonial Disease: A Social History of Sleeping Sickness in Northern Zaire* (Cambridge: Cambridge Univ. Press, 1992); on the *paysannats*, see Bogumil Jewsiewicki, *Modernisation ou destruction du village africain: L'Economie politique de la "modernisation agricole" au Congo Belge* (Brussels: Centre d'Etude et de Documentation Africaines, 1983); and Wemo Mengué, *Le Transfert de savoir d'une métropole vers une colonie: Le Cas de l'Institut National pour l'Etude Agronomique du Congo Belge (INEAC)* (Paris: Thèse de l'Univ. Paris 7, 1998).

²⁰ Chambers, *Settlement Schemes* (cit. n. 14), p. 31.

Pilot Village Settlements.²¹ This "villagization" policy was made more vigorous between 1973 and 1977, when five million people were relocated.²²

Designing Development

The similarities and parallels between late colonial European and postindependence rural modernization policies in Africa that attempted to "redesign rural life and production from above" tell us "something generic about the project of the modern developmentalist state," whether colonial or postcolonial.²³ Beyond the diversity of the concerns that motivated them (productivist, sanitary, soil conservation, etc.) and of the technical recipes (irrigation, motorization, improved seeds, etc.) that they implemented, all of these large-scale schemes had indeed much in common. First, all put experts in power. The schemes were designed and often headed by scientists or technical officers, commanding a hierarchy of bureaucrats, inspectors, and overseers. The creation and management of settlement schemes stimulated the growth of technical and research services.²⁴ Scientists and technical officers (in such fields as agriculture, soil and forestry, education, public health, and public works) gained greater status and power with the emergence and affirmation of the developmentalist state. As a former colonial officer wrote, "[I]n the later stages of colonial rule they considerably outnumbered the Administration in the field and progressively exerted more influence at all levels of government."²⁵

These experts were mobilized by the colonial state to help appropriate and master African environments, pathologies, and societies. In British Africa, the 1930s saw increasing concern with soil erosion and deforestation as well as with malnutrition and public health.²⁶ These brought to power a flood of experts. The gospel of soil conservation legitimized scientific measures (including confinement of people in settlement schemes, where access to land and grazing were restrained) against "irresponsible" Africans who had to be prevented from destroying their environment.²⁷

²¹ D. J. Morgan, *The Official History of Colonial Development*, 5 vols. (London: Macmillan, 1980), vol. 4, *Changes in British Policy, 1951-1970*, pp. 83-86.

²² Scott, *Seeing Like a State* (cit. n. 5), pp. 223-34. See also Goran Hyden, *Beyond Ujamaa in Tanzania: Underdevelopment and an Uncaptured Peasantry* (Berkeley and Los Angeles: Univ. of California Press, 1980), and Henry Mapolu, "Impérialisme, Etat et Paysannerie en Tanzanie," in Amara and Founou-Tchuigoua, *L'Agriculture africaine en crise* (cit. n. 18), pp. 71-88.

²³ Scott, *Seeing Like a State* (cit. n. 5), pp. 184 and 224.

²⁴ Significantly, the Belgian Congo, where the *paysannats* had become tropical Africa's largest settlement schemes in the 1950s, also ranked first in agricultural research.

²⁵ Chambers, *Settlement Schemes* (cit. n. 14), p. 17.

²⁶ On concerns about soil erosion, see William Beinart, "Soil Erosion, Conservationism and Ideas about Development: A Southern African Exploration, 1900-1960," *J. Southern African Stud.*, 1984, 11:52-83. For Lord Hailey, the most urgent problem in all British territories was the introduction of methods of maintaining soil fertility without recourse to shifting cultivation. See Lord Hailey, *An African Survey* (Oxford: Oxford Univ. Press, 1938), p. 969. In French Africa, the soil question only became prominent some years later with the creation of a Comité des Sols at the Office de la Recherche Scientifique Coloniale in 1943, and then when a survey was ordered by the Ministère des Colonies in 1945 that led to the creation of a Bureau des Sols in each colony. See Fonds AOF, 3R58, Archives du Senegal, Dakar. On nutrition, see, Michael Worboys, "The Discovery of Colonial Malnutrition between the Wars," in *Imperial Medicine and Indigenous Societies*, ed. David Arnold (Manchester: Manchester Univ. Press, 1988), pp. 208-25.

²⁷ William Beinart, "Agricultural Planning and the Late Colonial Technical Imagination: The Lower Shire Valley in Malawi, 1940-1960," in *Malawi: An Alternative Pattern of Development*, proceedings of seminar at Centre of African Studies, Univ. of Edinburgh, May 1985 (Edinburgh: Univ. of Edinburgh, Centre of African Studies, 1985), pp. 95-148.

Social changes within African societies, the rise of new African elites, and the will to govern in a more scientific way also led to a call for social scientists and attempts to integrate science into policy making. In British Africa, a growing research school in social anthropology viewed "contact," "colonial situations," and "development"—rather than "tradition"—as its central objects of investigation.²⁸

These new concerns, together with the will to systematize all branches of knowledge on Africa and improve cooperation among colonial governments, engendered numerous new scientific institutions, conferences, and surveys. The first pan-African Agricultural Conference was organized in 1929, followed in 1935 by a Pan-African Health Conference sponsored by the League of Nations. While in British Africa the African Research Survey emphasized the relationship between scientific research, economic development, and good governance, in France two Congrès de la Recherche Scientifique Coloniale were held in Paris in 1931 and 1937. These led in 1942 to the creation of the Office de la Recherche Scientifique Coloniale, a research agency that established branches in all French colonies after the Second World War.²⁹ In the social sciences, the International Institute of African Language and Cultures was established in 1926 in London. In 1936, the Institut Français d'Afrique Noire was founded in Dakar, and the Rhodes-Livingstone Institute was established in Lusaka (Northern Rhodesia, then Zambia) in 1937. After the war, anticolonialism encouraged cooperation among the colonial powers, which established the Scientific Council for Africa South of the Sahara in 1949.

This call for expertise spurred the emergence and growth of scientific communities. From fewer than one thousand researchers—still mostly European—in the late 1930s, by 1950 the number had risen to several thousand in Belgian, French, and British Africa.³⁰ As the number and authority of scientists and technical officers increased, so the problems of development, such as soil erosion, deforestation, and malnutrition, which had sometimes been called upon as evidence of colonialism's extractiveness and unsustainability,³¹ were reconceptualized as mere technical problems to be solved with appropriate expertise. The deployment of development expertise and discourse often functioned as a depoliticizing machine.³²

²⁸ See C. Rosseti, "B. Malinowski, the Sociology of 'Modern Problems' in Africa and the 'Colonial Situation,'" *Cahiers d'Etudes Africaines*, 1985, 25, 4:477–504; Benoît de L'Estoile, "The 'Natural Preserve of Anthropologists: Social Anthropology, Scientific Planning and Development,'" *Social Science Information*, 1997, 36, 2:343–76; Lynette L. Schumaker, "Fieldwork and Culture in the History of the Rhodes–Livingstone Institute, 1937–1964" (Ph.D. diss., Univ. of Pennsylvania, 1994); Henrika Kuklick, *The Savage Within: The Social History of British Anthropology, 1885–1945* (Cambridge: Cambridge Univ. Press, 1991).

²⁹ Christophe Bonneuil and Patrick Petitjean, "Science and French Colonial Policy: Creation of the ORSTOM: From the Popular Front to the Liberation via Vichy, 1936–1947," in *Science and Technology in a Developing World*, eds. T. Shinn, J. Spaapen, and V. V. Krishna, *Sociology of the Sciences Yearbook 1995* (Dordrecht: Kluwer, 1997), pp. 129–78.

³⁰ Thomas O. Eiseimon, Charles H. Davis, and Eva-Marie Rathberger, "Colonial Legacies: Transplantation of Science to Anglophone and Francophone Africa," *Science and Public Policy*, 1985, 12:191–202. The training of numerous African graduates came only after the Second World War. (The British began training them much earlier than the French.)

³¹ Examples of such "green anticolonialism" are Jean-Paul Harroy, *Afrique, terre qui meurt: La Dégradation des sols africains sous l'influence de la colonisation* (Brussels: Marcel Hayez, 1944), and Pierre Boiteau, "Biologie et colonialisme," *La Nouvelle Critique: Revue du Marxisme Militant*, (Nov. 1952):76–88.

³² See James Ferguson, *The Anti-Politics Machine: "Development," Depoliticization, and Bureaucratic Power in Lesotho* (Cambridge: Cambridge Univ. Press, 1990). Technocratic ideology in Africa has been well analyzed by an African follower of Herbert Marcuse: Sidiki Diakite, *Violence techno-*

Another feature common to the various schemes of the developmentalist era is that their physical and social space was designed in accordance with "plans" produced by the scientific bureaucracy. Agricultural and social activities were construed in terms of uniform fields and villages, with rigid schedules. Farmers were told what to plant and what cropping systems to use. The timing of each farming operation was centrally controlled. In the Office du Niger scheme, for example, work started at the sound of a bell, and anybody caught in the village during field time risked having his food ration cut. This rigid order reflected the ambition of the developmentalist state to reorganize agricultural production and to hasten African society into modernity. Though they were not given large financial means before the 1940s, premises of planning emerged in the 1930s in the French and British Empires and developed strongly in the following decades.³³ This did not end with decolonization. With the assistance of foreign experts, independent states, especially Marxist regimes, looked also to planning with the aim of hastening growth and modernization. The faith in large, integrated, planned projects rather than grass-roots initiatives and piecemeal improvement was typical of the high modernist ideology of the developmentalist state.

Large development schemes were products of this culture of planning that gave the state responsibility for organizing (colonial, then national) economic development and assumed that society was a complex machine that only experts could operate optimally.³⁴ In these schemes a developmentalist discourse of experimentation flourished. From the 1930s onward, development narratives are filled with the deliberate use of words like "experiment," "experimentation," and "test"—on the part not only of experts and scientists, but also of colonial officers and journalists.³⁵ Significantly, the first step towards the creation of the Office du Niger, conducted in 1926 by relocating nine families near the agricultural station of Nienebalé (80 km downstream from Bamako) to cultivate cotton under the supervision of the station, which provided irrigation, was called a "settlement experiment" (*expérience de colonisation*). Showing "that the yield for indigenous farmers working for their own was much higher than their yield the previous year when they were employed as

logique et développement (Paris: L'Harmattan, 1985). The 1980s saw the rise of civil society in Africa and a repoliticization of development issues.

³³ Among the initiatives of the 1930s are the Colonial Development Fund in 1929, the Conférence Impériale in 1934, and early planning attempts in British East Africa in the late 1930s. For the 1940s, the main achievements were the ten-year colonial plan of the Vichy government (1942), the Fonds d'Investissement pour le Développement Economique et Social in 1946, and the Colonial Development and Welfare Acts in 1940 and 1945. See Claudine Cotte, *La Politique économique de la France en Afrique Noire, 1936-1946* (Paris: Thèse de l'Univ. Paris 7, 1981); Constantine, *British Colonial Development Policy* (cit. n. 5); Michael Worboys, "Science and British Colonial Imperialism, 1895-1940" (Ph.D. diss., Univ. of Sussex, 1979); Catherine Coquery-Vidrovitch, "L'Impérialisme français en Afrique noire: Idéologie impériale et politique d'investissement, 1924-1975," *Relations Internationales*, 1976, 7:261-82.

³⁴ A. F. Robertson, *People and the State: An Anthropology of Planned Development* (Cambridge: Cambridge Univ. Press, 1984).

³⁵ See, for instance, book titles like these: K. D. S. Baldwin, *The Niger Agricultural Project: An Experiment in African Development* (Oxford: Blackwell, 1957); E. O. W. Hunt, *An Experiment in Resettlement* (Kaduna, Nigeria: Government Printer, 1957); Elsbeth Huxley, *A New Earth: An Experiment in Colonialism* (London: Chatto & Windus, 1960); John C. de Wilde, *Expériences de développement agricole en Afrique Tropicale*, 3 vols. (Paris: Maisonneuve & Larose, 1967-1968). See also Herbert Frankel's articles "The Kongwa Experiment" in the *London Times*, 2 and 5 Oct., 1950, and Terrason de Fougère, "Expériences de colonisation indigène au Soudan Nigérien," *Compte-Rendus de l'Académie des Sciences Coloniales*, 1928-1929, 12:293-307.

waged labourers," the experiment confirmed the officials' vision of the progressive individualist African farmer.³⁶ "The communism existing in the black society does not resist the lure of profit," concluded the governor with satisfaction.³⁷ As a result of this "experiment," which scientifically falsified the idea of an African "communism," the Office du Niger would be based on a tenancy system. But when the nine African families expressed their desire to go back home, they were told by officials "that the experiment was not finished, and that they had to stay" in the program.³⁸ The experimentalist gospel indeed often helped make authoritarian and productivist obsessions look like the pursuit of knowledge. Does not a good experiment require control of all parameters? Sometimes, the rhetoric of experimentation (as in the case of the Groundnut Scheme in Tanganyika) also helped to justify the huge amounts of money lost in such schemes and to excuse in advance all errors.

In French Africa, the idea that the practice of colonial domination was a permanent process of experimentation on African societies was conceptualized as early as 1935 by Robert Delavignette, a district commissioner in West Africa, who in 1937 became director of the French school of colonial administration.³⁹

TAMING AGRARIAN SOCIETIES INTO OBJECTS OF DEVELOPMENT

More than mere showcases of a development ideology that advocated the transformation of Africa from above and brought scientists into power, settlement schemes were key attempts to shift the balance of power between agrarian communities and the state. Challenging both colonialists' self-representation and the anticolonialist historiography that overestimated the success of European control over African lives, many historians have recently underlined the epistemic and political weakness of the colonial state.⁴⁰ In Africa, the early colonial state confronted, in the late nineteenth century, environments, knowledge, and social relations that had evolved prior to and independently of its plans. Most of rural life and production remained out of the reach of the early colonial state. The difficulties faced by administrators in

³⁶ Archives CIRAD-CA, Colonie du Soudan Français, "Rapport agricole 1927," p. 39.

³⁷ De Fougère, "Expériences" (cit. n. 35), on p. 295.

³⁸ *Ibid.*, p. 294.

³⁹ The first mention of the "experimental method" is found in Robert Delavignette, "Pour le paysannat noir, pour l'esprit africain," *Esprit* 1 Dec. 1935, 367-90: "Mais l'exploration, la découverte, l'invention n'est pas finie; il faut la poursuivre en profondeur, dans le repli des coutumes du pays. Sous la colonie, voir les pays pour mieux régler l'invention et d'autre part éprouver les pays par la colonie. C'est dans cette attitude expérimentale que réside la plus sûre garantie d'humanité de l'action colonisatrice." (But exploration, discovery, and invention are not over; we have to continue this task in the thickness of local customs. Under the "colony" we have to see the country, so as to better adjust invention and put the countries to the test of the colony. In this experimental behavior lies the better guarantee of the humanity of colonization) (p. 389). See also *idem*, *Les Vrais Chefs de l'empire* (Paris: Gallimard, 1939), p. 21, 30, 210, and 213. It is ironic—and significant of the spreading of the discourse of experiment beyond settlement schemes—that Delavignette, who contributed greatly to making experiment a central theme of colonial discourse, opposed the Office du Niger and other such technocratic schemes.

⁴⁰ On the political and epistemic weakness of the (colonial and postcolonial) state in Africa, see Gerd Spittler, *Verwaltung* (cit. n. 5); *idem*, "Administration in a Peasant State," *Sociologia Ruralis*, 1983, 23:130-44; Robert Debusmann, "Bureaucratie contre paysans: Un Modèle sociologique du pouvoir colonial," in *La Recherche en histoire et l'enseignement de l'histoire en Afrique centrale francophone, colloque international* (Aix-en-Provence: Univ. of Provence, 1997), pp. 105-16; Henri Brunshwig, *Noirs et blancs dans l'Afrique noire française* (Paris: Flammarion, 1983), especially pp. 105-33; Jean-François Bayart, "La Politique par le bas en Afrique noire: Questions de méthode," *Politique Africaine*, 1981, 1:53-82.

understanding and controlling rural Africa were the result of several factors, including low population density; the huge diversity of cultures and ecologies; the variety of work techniques, languages, units of measure, and family structures; the weak connection between household economies and the market—the peasant being better known by the state cognitive apparatus when integrated into the market economy—and strategies of passive resistance. To bring agrarian societies under its epistemic (and hence political) grasp, the colonial state undertook to transform materially the social and environmental conditions of life in rural areas. This strategy—which characterizes the emerging developmentalist state—worked through transportation, irrigation, and agricultural “modernization,” education, standardization of units, and integration of producers into the market. Prepackaged settlement schemes were major building blocks of this enterprise. They were the laboratories where the developmentalist state attempted to shape agrarian societies and environments so as to render them compliant to “development”: more productive, more commensurable to expert knowledge, and more amenable to state intervention.

Legible Villages

Whereas the African village remained a social hieroglyph for the early colonial state, the planned-development schemes of the developmentalist era were major attempts to capture the peasantry into stable, legible, and more productive units that would make taxation, conscription, and “enlightened” intervention easier.⁴¹ For example, new villages were often located along main roads and sometimes used for regrouping and stabilizing itinerant or scattered populations. Village layout and housing as well as social life were also designed from above, so as to turn villages into functional units of command and control: not organic historical and cultural units but units of supervision and experimentation (Figure 2).⁴²

Land tenure and land ownership are fundamental elements of social control, and experts and bureaucrats attempted to reorganize and standardize land tenure and use. In Kenya and Southern Rhodesia, where European settlement had reduced the amount of land available for African use, several schemes were designed to confine and control African farmers in their own areas (for example, by limiting areas of cultivation, introducing irrigation, or limiting animal stocks and grazing rights).⁴³ Even in colonies without European settlers, growing concern about overpopulation and soil erosion led to schemes designed to confine populations within smaller areas so as to favor more intensive cultivation: the Zande Scheme in British Sudan, for instance, as well as some Congolese *paysannats*, were attempts to transform slash-and-burn cultivation into standardized sedentary land use. Though limited, this control

⁴¹ Colonial and postcolonial statecraft presupposed the rationalization and standardization of the village into a more productive, a “legible and administratively more convenient format.” Scott, *Seeing Like a State* (cit. n. 5), p. 3.

⁴² But on the other hand, elements of what was believed to be “traditional” were grafted (reinvented or maintained) onto this unit so as to make it more acceptable and to ensure social stability. One vivid example is the fact that Mossi settlers brought from Yatenga (upper Volta region) to the Office du Niger were grouped in villages that remained under the authority of the descendant of the king of Yatenga (nominated *chef de province* by the French rulers). Negotiation with or reinforcement of local structures of power (especially chiefship) is a common feature in the ‘blocs’ of development.

⁴³ On irrigation schemes driven by these concerns in the Kikuyu region in Kenya and in Southern Rhodesia in the 1950s, see Chambers (cit. n. 14), *Settlement Schemes*, p. 25.



Figure 2. Geometrizing nature and society: a view of the Office du Niger. (From Office du Niger, Le Delta ressuscité [Ségou: Mali, 1960]).

of land represented a major step in the history of the African state in the twentieth century. Except in the few areas where land was appropriated by European settlers, the early colonial state had failed to incorporate decisions about land tenure into its realm and never succeeded in establishing village institutions strong enough to challenge the authority of kinship organization. For these reasons, the African state remained (and still often is) a "state without territory," unable to transform the basic

relations of production in the countryside.⁴⁴ Settlement schemes therefore represent a shift in governmentality from ruling “non-state spaces” to administering “state spaces,” that is, places where state power was reinforced by a new mode of production.⁴⁵

Geometrization, simplification, standardization, and discipline ensured not only the social order and legibility sought by the state but also the experimental order necessary to produce expert knowledge. The geometrization of land use and the replacement of polycropping by monocropping were also simplifying strategies that aimed at transforming the richness and complexity of local practices into more uniform and controllable systems, more amenable to expert modes of knowing and intervening.⁴⁶ In many ways, settlement schemes were up-scaled agricultural-station programs. Often established near a preexisting research station, they were generally set up to experiment with technical recipes proposed by scientists in such areas as new varieties, new crop rotations, and new tools: the schemes were trials of strength (*épreuves*, as Bruno Latour would put it) in which a possible extension to the outside world of the validity of the results and artifact of the station was tested. The Terres Neuves scheme in Senegal provides a good example. This authoritarian scheme served as a laboratory for the testing and multiplication of “improved” peanut varieties developed by researchers at Bambey experiment station. Because the first trials of the new varieties entrusted to African chiefs were disappointing and their value was much debated, scientists at Bambey gained clearance to organize and supervise a test themselves in two villages in the Terres Neuves in 1935. Totally new, these villages were perfect sites for the experiment: the administration had cleared the land with penal labor and distributed it, built roads and wells, recruited and transported the Sereer settlers, and fed them during the hungry season. No area was better known to the administration. In no village could the social structures and agricultural activities be more easily bent to the imperatives of control. Only in this vast social and agricultural laboratory, under tight supervision, were the yields of “improved” varieties measurable—and they proved remarkable. This first controlled large-scale trial cleared the way for one of the most successful seed distribution schemes in Africa.⁴⁷ The Paysannat Turumbu, established in 1942 in the neighborhood of the agricultural station of Yangambi (Belgian Congo), the headquarters of the Institut National pour l'Etude Agronomique du Congo Belge, also worked as an extension of the research station. Involving no less than 5,300 people in 1953, it served as a center for the large-scale testing of varieties selected in the station and for seed multiplication.

In this scaling-up process, “improved” techniques and seeds were not the only

⁴⁴ Goran Hyden, “State without Territory: Africa in Comparative Perspective,” address presented at The Relationships between State and Civil Society in Africa and Eastern Europe conference (Bellagio, Italy, 5–11 Feb. 1990), p. 8.

⁴⁵ I borrow the phrase “state space” from Scott, *Seeing Like a State* (cit. n. 5), p. 187.

⁴⁶ “[S]cientific agricultural research has an elective affinity with agricultural techniques that lie within reach of its powerful methods. Maximizing the yields of pure-stand crops is one technique where its power can be used at best advantage . . . [A]gricultural agencies . . . have tended to simplify their environments in ways that make them more amenable to their system of knowledge.” *Ibid.*, p. 291.

⁴⁷ By 1951, half of the 800,000 hectares under peanut cultivation in Senegal were planted with “improved” varieties. This was a major achievement at a time when the green revolution was still in the air. For a detailed study, see Christophe Bonneuil, “Penetrating the Natives: Peanut Breeding, Peasants and the Colonial State in Senegal (1900–1950),” *Sci. Technol. Soc.*, 1999, 4:273–302.

things disseminated from the research station. Some important elements of the station's experimental order—working methods, including rules for keeping varieties pure, thorough weeding, practices of precision (such as mapping and measuring plots and yields, and tactics for observing of farmer's activities)—were also imposed on the villages that were involved in the settlement schemes.⁴⁸ In the Office du Niger scheme, thousands of farmers, caught within a standardized and rigid organization of space and work, were turned into objects of experimentation. For instance, as the researchers of the Office were seeking a solution to the problem of maintaining soil fertility, the standard crop rotation scheme imposed upon all tenants changed four times between 1937 and 1947.⁴⁹

The Paysannat Turumbu also illustrates how agriculturalists' attempted to simplify and "rationalize" African farming systems, and how the capture of farmers as subjects of experimentation, led to a better knowledge of the conditions of agriculture in the rain forest of the Congo Basin. Until the 1930s, Belgian agronomists and foresters harshly condemned shifting cultivation, viewing it as responsible for deforestation. Agricultural scientists worked hard to find alternatives to the "Bantu primitive system" of shifting cultivation and instead promoted ploughing, monocropping, and short grass fallowing with leguminous plants. But because they never managed to find a system capable of maintaining the fertility of the (rather poor and fragile) soils of the Congo Basin, scientists were led to acknowledge the ecological efficiency of multicropping (which better protects the soil against sun and rain) and of long forest fallowing. In their view, however, the indigenous system had still to be scientifically "improved." The Paysannat Turumbu hence became in the 1940s a laboratory for testing a "rationalized" land-use and cropping system under equatorial-forest conditions. Access to land was obtained from the customary chief, but farmers' land use had to conform to a standard "corridor system": one band (rectangular and standardized in size) of cleared land alternating with one band of forest, so as to accelerate the recolonization of cleared lands by forest during the fallow period (Figures 3a and 3b). Furthermore, crop rotation included a shorter fallow period (twelve years, instead of twenty in Turumbu farming practices). The experiment was not successful. After some time, it was found that the shorter fallow period could not maintain soil fertility, so managers of the scheme had to instruct farmers to lengthen it—returning to Turumbu practice!⁵⁰

An important point made by recent social studies of science has been to view the production of scientific knowledge as a local and situated activity and to show that scientific knowledge and artifacts travel only with their ecologies—that is, if their new social and natural environments can be reengineered in a way similar to that of the place where they were first elaborated.⁵¹ Similarly, one can view the settlement

⁴⁸ For a detailed study following how elements of the experimental order of the station were imposed on the farmers (through successive steps: indigenous farm within the station, Terres Neuves settlement scheme, and hiring farmers to multiply seeds), see *ibid.*

⁴⁹ Bordage, *De la terre, de l'eau et des hommes* (cit. n. 17), p. 141.

⁵⁰ J. Henry, "Les Bases théoriques des essais de paysannat indigène, entrepris par l'Ineac au Congo Belge," in *Contribution à l'étude du problème de l'économie rurale indigène au Congo Belge*, *Bulletin Agricole du Congo Belge*, special number, 1952, 43:159–192; J. Muller and E. Vervier, "Paysannat et coopérative Turumbu," *Bulletin d'Information de l'Institut National de l'Etude Agronomique du Congo*, 1953, 2:115–22.

⁵¹ Harry M. Collins, *Changing Order: Replication and Induction in Scientific Practice* (London: Sage, 1985); Joseph Rouse, *Knowledge and Power: Towards a Political Philosophy of Science* (Ith-

schemes as crucial sites for aligning rural societies with the conditions and practices of the station. The schemes were designed to answer under controlled conditions the questions agricultural scientists asked.⁵² They were hence "experimental systems," in Hans-Jörg Rheinberger's sense, insofar as they constituted an arrangement of objects and people designed to produce experimental data.⁵³ As an experimental system ought to do, a settlement scheme was also a web designed to record unexpected phenomena, since it helped to capture within the experimental realm, through the experimental manipulation of farmers' lives and practices, previously unseen aspects of indigenous farming knowledge.

The experimental design of the settlement schemes was a hybrid construct with features of both village and station. This hybridity was essential. On the one hand the schemes were supposed to tell something about how new techniques would work in "indigenous farming conditions"; on the other hand, they created state-space conditions in order to operate under controlled conditions similar to that of the station.⁵⁴ From the scientists' perspective, the making of valid knowledge required that African farming practices be integrated into and manipulated within a controlled experimental design. It was only after having experimented themselves in the Yangambi station that Belgian agricultural scientists acknowledged that shifting cultivation was a rational practice. Similarly, only after having experimented with short forest fallowing on a large scale in the *paysannat* did they acknowledge that a long fallow period (as practised by Turumbu farmers) was necessary. It is therefore precisely because they were hybrid experimental systems that the settlement schemes established certain lines of commensurability between expert knowledge and farmers' knowledge.⁵⁵ In settlement schemes, bringing (and refashioning) the "indigenous" into the experimental realm was a strategy for domesticating the opacity of village

aca: Cornell Univ. Press, 1987), on pp. 209-47, Bruno Latour, *Science in Action: How to Follow Scientists and Engineers through Society* (Cambridge, Mass.: Harvard Univ. Press, 1987); Simon Schaffer, "Glass Works: Newton's Prisms and the Uses of Experiment," in *The Use of Experiment*, eds. D. Gooding, T. Pinch, and S. Schaffer (Cambridge: Cambridge Univ. Press, 1989), pp. 67-104.

⁵² In the examples that I have discussed, these were some of the questions: Are Bambeey-improved peanut varieties really suitable for release to Senegalese farmers? Is the Sudanese farmer really communist? Which cropping system best maintains the fertility of the soil in irrigated cotton farming in the delta of the Niger or in the equatorial forest? Which farming operation can profitably be mechanized and which not?

⁵³ For an elaboration of the concept of "experimental system," see Hans-Jörg Rheinberger, *Towards a History of Epistemic Things: Synthesizing Proteins in the Test Tube* (Stanford: Stanford Univ. Press, 1997). Unlike Rheinberger, who considers experimental systems only within the space of the pure-science laboratory and uses this concept to draw a demarcation between science and technology (p. 32), I tend to see a strong similarity between Michel Foucault's *dispositifs* and Rheinberger's "experimental systems."

⁵⁴ In reality these "indigenous conditions" were state-space conditions that differed strongly from indigenous non-state-space conditions. In the state space the practices were designed from above, the farmers (sometimes) came from distant regions with differing farming conditions, household plots were (often) chosen and assigned by the experts, and farmers were working and living under permanent scrutiny and control.

⁵⁵ I am indebted to the historian of anthropology Michael Bravo for showing the hard work required to create bridges (commensurability) between knowledge traditions. See Michael Bravo, "The Accuracy of Ethnoscience: A Study of Inuit Cartography and Cross-cultural Commensurability," communication to the Nature's History conference on History of Science and Environmental History, Max-Planck Institute for the History of Science (Berlin, Aug. 1997).

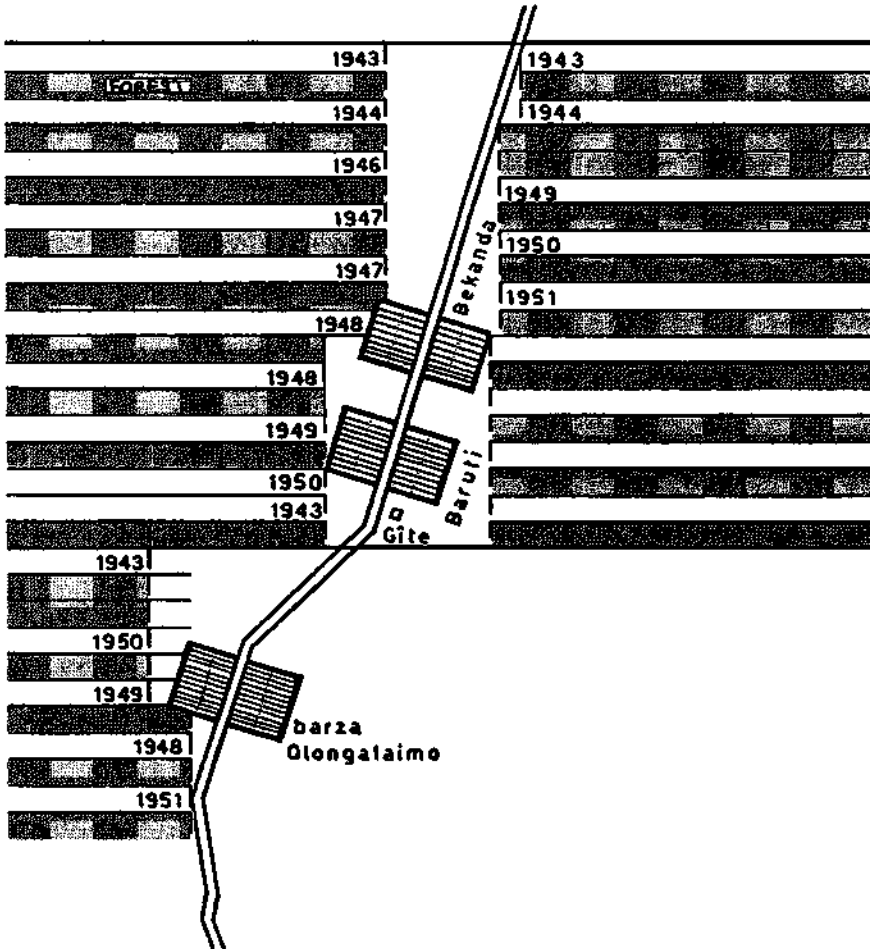
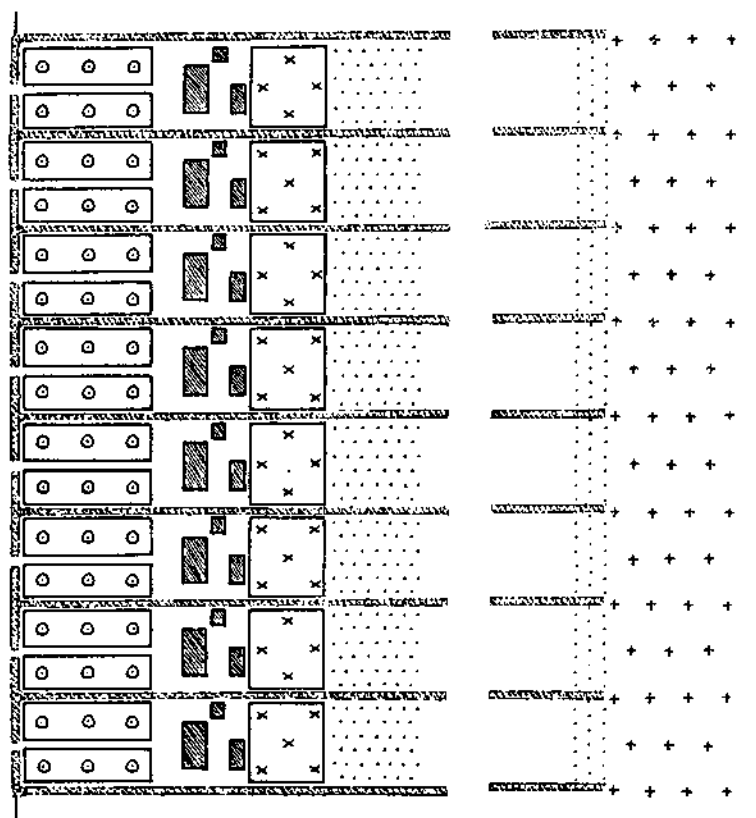


Figure 3a. The "corridor system" at the Paysannat Turumbu (Belgian Congo).

communities and the otherness of farmers' practices. This allowed a cognitive penetration of African agrarian societies by an analytic/experimental expert-knowledge system. In this way (and at these costs), the farmers' world was made amenable to an experimental world view, and indigenous knowledge was translated into a format that allowed its circulation and accumulation within the academic community.

Legible Households

The subject of the new system of domination that was at work in the settlement schemes was the individual household head rather than the village community. His name and the composition of his family (the model of the nuclear family was usually favored) were recorded when he was granted a tenancy, and he gained access to land not through a chief but through the managers of the scheme, to whom he paid charges. The household head also had the legal responsibility for conducting the



LÉGENDE

- HABITATION
- CUISINE
- POULAILLER
- HAIE VIVE
recou, cocoyons,
muzea exotica,
muziers, musaenda.
- CITRUS
ET
PASPALUM
NOTATUM
- ARBRES FRUITIERS
(porager et compostière)
ramboutans, avocattiers,
arbres à pain
- CAFÉIERS
- PALMIERS

Figure 3b. Village layout in Yalibwa.

agricultural operations on his plot according to the experts' and inspectors' prescriptions. An individual relationship between the individual household head and the state was therefore established.⁵⁶

One cannot underestimate the novelty of this direct relationship. Basically, the early colonial state in twentieth-century Africa had no grasp on individual inhabitants of rural areas. Very few possessions had a genuine census until late in the

⁵⁶ This was also not without consequences for the balance of power at the household level itself. Victoria Bernal notes that the exclusion of women from tenancy reinforced or instituted a position of dependence of women within the family in the Gezira Scheme (British Sudan) and promoted the model of a patriarchal peasant household. See Bernal, "Cotton and Colonial Order" (cit. n. 16), pp. 104 and 109.

colonial period (or even after independence), and the estimates of population were unreliable. The budget of most African colonies supposedly rested on income from either an individual head tax or a hut tax. But in fact tax collection looked in many areas rather like the taking of a collective tribute from village communities. For gathering information and ruling at the village level, colonial administrators depended heavily on local African intermediaries (interpreters, village headmen) who had their own agendas.⁵⁷ At the opposite extreme from this mysterious collective entity represented by more or less reliable spokesmen, the village in development “blocs” was a grouping of well-known families, each member of the household being recorded and receiving food rations or regular medical assistance. In tenancy systems (in use in most irrigation and mechanization schemes), it was possible for the scheme managers, who controlled the marketing of crops, to document in detail the incomes and expenditures of farmers. This cleared the way for farm budget studies, which became a key object for rural economics.⁵⁸ Time spent in each agricultural operation by each member of the household (a key object in the rise of economic anthropology as a field of research in the 1960s) was also more easily recorded in such schemes, where households were intensely scrutinized by researchers attached to the scheme.⁵⁹ In planned-development schemes, the individual household had in this way become at once the subject of the colonial (and then postcolonial) state and a legible object of its expert knowledge (Figures 4a and 4b).

Repression and Invention of “Indigenous Knowledge”

Driven by high modernist, top-down diffusionist, and narrow experimentalist concerns, prepackaged development schemes acted as powerful mechanisms to repress indigenous knowledge and initiatives. Farmers living in settlement schemes saw their interactions with the environment oversimplified. Their subsistence relied on loans, stable prices, technical assistance, and expensive inputs, and they were usually deprived of the local and flexible strategies that allowed farmers to cope with risk and prevent food deficit (diversification of crops, lowland cultivation, complementing farm income with wage labor, and private gardens).⁶⁰ In these state spaces, the peasantry was deskilled, and the autonomy of the village community was reduced. The local capacity for innovation was diminished. A division of labor between innovation and execution was reinforced. “Developers” now had the power

⁵⁷ In remote regions, a district officer on a tour of inspection in a village could not even be absolutely sure that the man who welcomed him was the genuine village head! Delavignette reports such a situation when he was district officer in the French Sudan. Cf. *Les Vrais Chefs de l'empire*, pp. 124–25. See also the novel by Amadou Hampaté Bâ, *L'Etrange Destin de Wangrin ou les roueries d'un interprète africain* (Paris: Union Générale d'Édition, 1973).

⁵⁸ See, for instance, W. P. Cocking and R. F. Lord, “The Tanganyika Agricultural Corporation's Farming Settlement Scheme,” *Tropical Agriculture*, 1958, 35, 2:85–101, which contains a study of the income and expenditures of the tenants of the Nachingwea scheme.

⁵⁹ In Senegal, thanks to tight administrative control, it was in the Terres Neuves scheme that agricultural statistics developed in the 1930s: the first statistical data on average per-crop acreage cultivated by an adult male were collected there, and the first land-use maps were drawn there.

⁶⁰ See Henrietta L. Moore and Megan Vaughan, *Cutting Down Trees: Gender, Nutrition, and Agricultural Change in the Northern Province of Zambia, 1890–1990* (Portsmouth, N.H.: Heineman, 1994), pp. 138–9 (on the prohibition of *citemene* gardens in successive schemes in northern Rhodesia); Beinart, “Agricultural Planning” (cit. n. 27), p. 124 (prohibition of lowland cultivation at the Nyamphota Village Land Improvement Scheme in late colonial Malawi); Bernal, “Cotton and Colonial Order” (cit. n. 16), p. 114 (prohibition on selling sorghum).

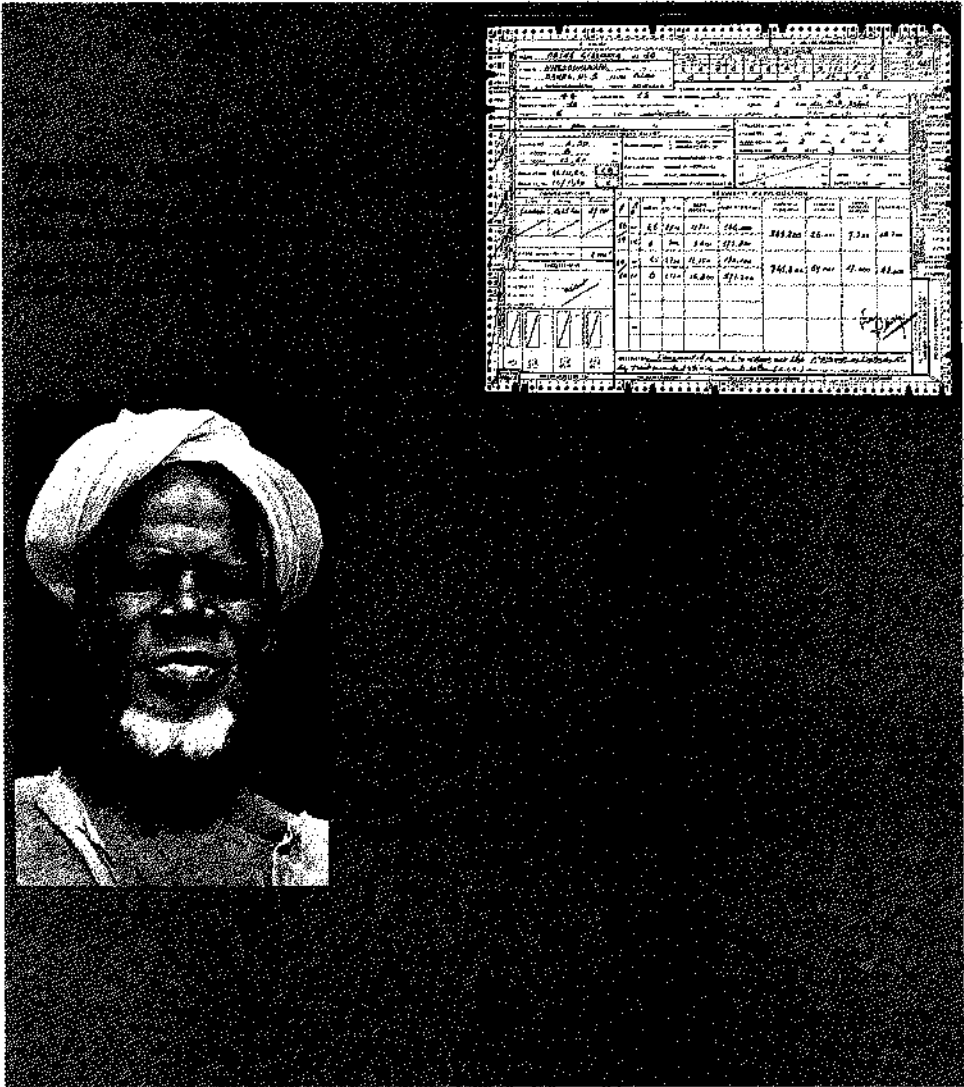


Figure 4a. *The farmer as an object of knowledge and control. (a) A tenant farmer as described in a leaflet from the Office du Niger just after independence. [Translation of the text: "Faina Cissouna, farmer of the village of Niessoumanaba Sahel sector and Nioro Center (of the Office du Niger), 44 years old, 3 wives, 6 children, 1 servant, 4 plows, 8 oxes, 4 cows, 6 ovins, 1 cart, 2 hoes, 3 bikes, 1 gun. He cultivates 12.5 hectares (31 acres) of irrigated land and 3 hectares (7.5 acres) of millet, corn, and vegetables. This year he has harvested 12 metric tons of paddy and 16.8 metric tons of cotton, which he sold for 711,000 francs CFA and out of which he paid 250,000 francs CFA in taxes, dues, and loan repayments. His net income amounted to 650,000 francs CFA, which comes to 60,000 francs CFA per person. This is six times more than the income from his land six years ago. Faina Cissouna works hard, twice as hard as he used to, but he does not regret it."] (From the Office du Niger, Le Delta ressuscité [Ségou: Mali, 1960]).*

FAINA CISSOUNA

NISSOUNANARA

SABBE UE 5

RESULTATS D'EXPLOITATION

Surface	Produit	Produit en valeur	RENTES (1000/ha)	CHARGES (1000/ha)	RENTES NETTES (1000/ha)	CHARGES (1000/ha)	RENTES NETTES (1000/ha)
Jardin 0,25 ha	27,000	8,000	65	4,000	11,300	146,000	325,200
TOTAL			65	700	5,600	179,300	46,700
			45	2700	12,150	170,100	741,200
			6	2100	16,800	571,300	59,000
							49,000
							42,000

Observations: *Longue durée de l'entretien des terres, présence de l'entretien de travaux agricoles sur la culture (c.v.c.)*

Figure 4b. Closeup of the information card shown in (4a), which documents the structure of Faina Cissouna's family, his belongings, and his farming budget.

to experiment with development on the "developed." Read from a political perspective, the repression of indigenous knowledge was therefore not merely a consequence of ignorance, blindness caused by the scientist faith, the colonial bias, or the professional ethos of experts: the deskilling of African farmers was also an intrinsic element in the affirmation of the state, its institutions, and its agents (whether European or African). Read from an epistemic perspective, the repression of indigenous knowledge helped to subordinate the farmers' sphere of knowledge and practices to the realm of experimental design (whose keystone was the isolation and control of individual variables). Farmers' practices were considered invalid until their scientific validity was proven by controlled experiment.⁶¹

On the other hand, however, through the experimentation on African women and men, some limits and blind spots of Western analytic-experimental approaches to African farming could be made visible to experts. Such binary tensions as uniformity-diversity, maximization of yield-minimization of risk, monocropping-poly cropping, permanent fields-shifting cultivation, isolation of experimental variables-monitoring of a complex and variable ecosystem, could appear as problems and be progressively acknowledged as new directions for research. The "dis-

⁶¹ "From a narrow scientific view, *nothing is known until and unless it is proven in a highly controlled experiment.*" Scott, *Seeming Like a State* (cit. n. 5), p. 305.

covery" of the rationality of shifting cultivation by Belgian agronomists in the Congo in the 1940s and 1950s exemplifies how settlement schemes worked as (heavy and oppressive but) evolutive experimental systems that helped capture elements of farmers' knowledge.

Many important data and pioneering scholarship on indigenous agricultural knowledge emerged in settlement schemes. Before anthropologist Harold Conklin's influential monograph on shifting cultivation in the Philippines, an agricultural scientist who worked in the Zande Scheme in the British Sudan (60,000 households in 1950), Pierre de Schlippé, published in 1954 the most comprehensive study of shifting cultivation and a major contribution toward its acceptance as a rational and sustainable system.⁶² One of the first agriculturalists to employ anthropology in his research, De Schlippé trained six African surveyors, each of whom studied some twenty households. (The daily activities of each adult had to be carefully reported.) Such scrutiny faced resistance from farmers, afraid that the data collected might be used against their interests. Village headmen, who feared that their authority might be diminished, also opposed this approach. But such opposition, which could have made the study impossible in a non-state space, could be overcome in the authoritarian context of the Zande Scheme. De Schlippé's influential notions of "field type" and his case for the rationality of an indigenous "system of agriculture" were therefore made possible by this particular logic of scrutinizing farmers.

In addition to De Schlippé, several other influential scholars in development studies, including David Brokensha,⁶³ René Tourte,⁶⁴ and Robert Chambers,⁶⁵ whose works around 1980 were critical influences in the turn towards the "farmers first," "indigenous farming knowledge," and "farming systems" approaches, began their careers and gained access to the field in settlement schemes. More generally, the work of dozens of agricultural scientists, demographers, rural economists, geographers, anthropologists, medical and nutrition scientists, and sociologists attached to settlement schemes proved decisive in the development of agronomy, rural economics, and economic anthropology. In the 1950s and 1960s, when quantitative analysis was fashionable and data collection painstaking, fieldwork research presupposed compliant Africans, ready to answer long series of questions and to accept intrusions

⁶² Pierre de Schlippé, "The Zande System of Agriculture," *Sols Africains/African Soils*, 1954, 3, 1:52-63; *idem*, *Shifting Cultivation in Africa: The Zande System of Agriculture* (London: Routledge & Kegan Paul, 1956). De Schlippé's work influenced Conklin. Harold C. Conklin, *Hanunoo Agriculture: A Report on an Integral System of Shifting Cultivation in the Philippines* (Rome: Food and Agriculture Organization, 1957).

⁶³ David Brokensha, coeditor in 1980 with O. Warren and O. Werner of *Indigenous Knowledge Systems and Development* (Lanham, Md.: Univ. Press of America) started his work as an anthropologist for the Volta Dam resettlement project in Ghana. See his "Volta Resettlement and Anthropological Research," *Human Organization*, 1963, 22:286-90.

⁶⁴ Tourte initiated the Unités Expérimentales in Senegal in the late 1960s. Although not a settlement scheme, this project was a tightly controlled, tightly scrutinized on-farm experiment. A decade later she founded the Department for Farming System Research (DSA) in the Centre International de Recherche Agronomique pour le Développement (the French overseas agricultural research agency). Social science research in Senegal (especially economic anthropology) owes much to the access to the field provided by the Unités Expérimentales scheme.

⁶⁵ Chambers started his career as a colonial district officer in Kenya and had directed several settlement schemes before he undertook a comparative study of settlement schemes as his doctoral dissertation at the University of Manchester in 1967. See Chambers, *Settlement Schemes* (cit. n. 14), and *idem*, *Rural Development: Putting the Last First* (London: Longman, 1983).

into their lives. Africans amenable to data extraction were more easy to find in planned-development schemes, where they had already been tamed as objects of intervention and experimentation.⁶⁶

Thus the promotion of indigenous farming knowledge in the 1970s and 1980s did not emerge simply from more “open” or more grass-roots-driven scholars. As paradoxical and ironical as it may seem, decades of vertical technocratic intervention and cognitive penetration of agrarian societies through prepackaged development schemes have certainly been preconditions for the emergence of the present vast scholarship on indigenous knowledge and African farming systems. Indigenous knowledge may therefore well have attained its recent intellectual significance from its appropriation by the state and experts.

CONCLUSION

The colonizers of Africa acted like and represented themselves as discoverers, proud to throw light on dark regions, to conquer and unveil rebel nature and societies. By contrast, the colonialists of the 1930s viewed themselves as experimenters. Colonizing then meant completing conquest through modernization, and the transformation of African societies and environments with the assistance of the “experimental method.” By 1900, the dominant metaphor of development was that of a continuous process (growth from childhood to adulthood) that would be guided by knowledge of laws, presented as scientific. By contrast, after the 1930s, development came to be seen as an experiment, and Africa as a laboratory. This shift from “governing, thanks to the light of science” to “governing as an experimental activity” is an essential feature of the emergence of a development regime in Africa.

The cornerstones of the experimental culture of development, planned settlement schemes, were state spaces where administrators and experts attempted to shape the natural and social environment after their own image, in ways that made them more amenable to their—Western—modes of intervention and systems of knowledge. These attempts did in fact seldom fully succeed. Farmers’ responses made the schemes far more complex systems than those envisioned by officials. And simplified standard uses of nature proved ineffective under the fragile and variable environmental conditions in Africa. Planned-development schemes of the golden age of the developmentalist era are now seen as monsters, as mammoth projects that resulted in economic, environmental, and social failures. They are used by today’s develop-

⁶⁶ David Norman, a pioneer in the farming systems approach, wrote interestingly about his early fieldwork in Nigeria: “The commitment required to do such studies and ensure complete farm records meant that spontaneous interaction with farmers often was sacrificed. Thus, the farmer tended to become an object from which data were extracted rather than a colleague from whom one can learn in an interactive mode. The major limitation of so much dependency on extracting data from farmers via enumerators was brought home to me when, after years of painstaking data collection and analysis, I concluded that farmers were rational in growing crops in mixtures. . . . I then thought, I [will simply] ask farmers why they grow crops in mixtures. After one week, I obtained answers . . . similar to those from the detailed surveys.” David W. Norman, “The Farming Systems Approach: A Personal Evolution,” in *On the History, Status, and Future Direction of the Farming Systems Approach*, ed. M. Collinson (in press), kindly communicated by the author. See also *idem*, “Rationalizing Mixed Cropping under Indigenous Conditions: The Example of Northern Nigeria,” *Journal of Development Studies*, 1974, 11:3–21; David W. Norman, E. B. Simmons, and H. M. Hays, *Farming Systems in the Nigerian Savanna: Research and Strategies for Development* (Boulder: Westview, 1982).

ers as a foil to the virtues of the new trends in development policies, which favor schemes that are small, participative, not managed by the state, and adapted to local ecologies.⁶⁷ But these retrospective judgments may miss a crucial point for the historian: that these schemes were key elements in the building of the state and the making of expert knowledge in Africa. The “experimentalization” of agrarian communities—which may be seen as a colonial mode of knowing—played a central role in gaining a better knowledge of the conditions of farming in tropical Africa, of agrarian societies, and of the way that development experts should intervene. African farmers were turned into both the subject of the state and the object of development studies. Prepackaged development schemes were laboratories where a new governmentality, whose subject is the individual household head rather than the village community, and new scholarship and academic knowledge on African societies and environments were co-constructed.

⁶⁷ See Paul Richards, *Indigenous Agricultural Revolution: Ecology and Food Production in West Africa* (London: Hutchinson, 1985); Chambers, *Rural Development* (cit. n. 66); Georges Dupré, ed., *Savoirs paysans et développement* (Paris: Karthala-Orstom, 1991).

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