



INTRODUCTION

# Planting Seeds of Knowledge

## *Agriculture and Education in Rural Societies in the Twentieth Century*

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In June 1914, forty white farmers from South Africa travelled across the United Kingdom to obtain first-hand knowledge on modern farming techniques. Marvelling at the research stations and admiring the pedigree livestock at various breeding centres, the 'Boer farmers' concluded that the days of the 'old-type farmer who thought whatever his grandfather had done was good enough' were over.<sup>1</sup> A year earlier, D.D.T. Jabavu, a prominent black educator from South Africa's Cape Province, had embarked on a journey to the United States to visit the famous Tuskegee Institute in Alabama. He closely observed the Institute's outreach activities, which included short courses, conferences and the work of so-called Negro Farm Demonstrators, who were trying to free African-American farmers from the exploitative cotton plantation system.<sup>2</sup> Upon his return, Jabavu lobbied the South African government for the establishment of agricultural colleges and demonstration services that would contribute towards improving the eroding so-called native reserves.<sup>3</sup> In 1962, seventeen-year-old Erdal Pakünlüer left his village near the Turkish city of Bursa to travel to Switzerland as part of a Turkish government programme designed to give young farmers the opportunity to observe mechanized farming techniques.<sup>4</sup> However, soon after his arrival, Erdal realized that his Swiss hosts were quite reluctant to share their knowledge and were only interested in him as a casual labourer. With his work obligations for the farmers leaving him with no time to study or attend classes, it became clear that disseminating knowledge was not in the interests of all the participating parties. It was only after the Turkish ambassador intervened that the Swiss farmers started to share some of their insights with Erdal and other participants in the programme.<sup>5</sup>

The Boer farmers, Jabavu and Erdal were not eccentric scientophiles, but formed part of a broad movement promoting agricultural education and the application of scientific knowledge in farming that was profoundly transnational. For centuries, agricultural knowledge travelled alongside crops and

livestock breeds as they were exported to new environments.<sup>6</sup> Centuries-old trade schemes as well as European imperial expansion, colonial domination and frontier management all gave rise to and promoted such exchanges.<sup>7</sup> However, we argue in this volume that important quantitative and qualitative shifts unfolded in the late nineteenth and twentieth centuries. In this period, not only were agricultural techniques at the centre of transnational knowledge transfers, but broader conceptions of rural social engineering in a modernizing world also became the subject of transnational conversations. As such examples show, farmers and rural dwellers across the world increasingly sought out scientific knowledge – including from abroad – in order to improve local farming practices. Revolutions in transport and communications, a deeper international integration of markets for agricultural produce, rising mass literacy and a growing belief in improvability through scientific knowledge at least partially accounted for the global proliferation of agricultural and rural education initiatives in the late nineteenth and early twentieth centuries.<sup>8</sup>

Agricultural research and education emerged out of shared experiences of fundamental transformations in the countryside, as the rise of industrial capitalism, the commercialization of farming, intensified global trade and rapid urbanization challenged existing agricultural practices and rural livelihoods. Experts, government officials and rural producers all sought out new and improved agricultural methods that would boost farmers' outputs. Meanwhile, poorer farming families found themselves increasingly squeezed off the land that they had worked, unable to muster the inputs and capital required to compete under the new, commercialized agrarian regimes. Formalized knowledge, building on claims to universal applicability, was invoked by governments, experts and farmers to respond to the imperatives of production increase and global economic competition. At the same time, rural education also constituted one strategy to ameliorate the condition of those whom agricultural commercialization had left behind. Many governments and urban elites, driven by fears of social unrest or eugenic concerns, sought to contain these struggling producers in the countryside rather than allow them to crowd the cities. The dramatic changes affecting agrarian labour regimes throughout much of the world impacted billions of rural dwellers, who constituted the world's demographic majority until as late as 2007.<sup>9</sup> Agricultural and rural education offer unique insights into the ways in which farmers, rural elites and agents of the rising nation states attempted to manage these transformations. Although they were among the earliest responses, rural and agricultural education initiatives have rarely been studied, and even less so from a transnational perspective.

This volume examines the rising importance of formalized agricultural knowledge and its transnational circulation in the twentieth century. Various food emergencies, in conjunction with the global political conflicts and eco-

conomic crises of the twentieth century, make the previous century, especially its first half, one focal point of the chapters in this volume. Across the world, agricultural colleges, village schools, farmers' associations, home economics movements, children's clubs and agricultural extension services mushroomed with the broadly shared aim of transforming both farming practices and rural living conditions. Sharing the conviction that farming should be subjected to rational and universally valid principles, rural elites, farmers, scientists and governments developed forms of education that were strikingly similar in otherwise very different parts of the globe. The latter half of the twentieth century witnessed significant advances in agrarian knowledge and science, as well as an increase in state intervention, including through training and advisory services for farmers. At the same time, the history of agricultural knowledge and education evades straightforward periodization and is not easily absorbed into a grand narrative of the increasing dominance of mechanized, capital-intensive and large-scale farming advocated in the programmes of the mid-twentieth century's Green Revolution. These developments were always reversible to some degree and played out very distinctly in different countries. Furthermore, collectivist agriculture did not lose its appeal, while projects of land reform proliferated in the second half of the twentieth century with the aim of undoing land concentration and/or promoting family farming as an economically favourable alternative to large-scale farming. Various postcolonial governments also experimented with repeasantization schemes.<sup>10</sup>

This volume foregrounds different forms of agricultural education and knowledge communication in order to undercut overly simplified categorizations such as 'experts' and 'laypeople' or 'scientific' and 'practical' knowledge. Rather than examining knowledge-making in laboratories, universities or other institutions associated with the rise of science, it explores the ways in which knowledge has been communicated on the ground. As the chapters in this volume show, farming is not simply an economic activity, but a culturally charged way of life that has often been seen as a nation's last bastion of traditional values and true identity. As such, this volume investigates both the circulation of technical agricultural knowledge, which underpins the pursuit of rational economic goals such as increased production,<sup>11</sup> and the broader social and political intentions that this has entailed.

In the period under investigation, governments around the world grew increasingly interested and interventionist in relation to questions of agricultural knowledge, especially at a time of rising international conflicts over food and corresponding attempts to enhance agricultural productivity through the introduction of new technologies.<sup>12</sup> This became obvious with the mid-twentieth century's Green Revolution, but similar tendencies could already be observed for earlier mechanization initiatives or cooperative movements that enjoyed the support of a growing number of international expert networks and

organizations.<sup>13</sup> This new interest of national governments and transnational expert networks was not confined to Europe and North America, but also extended to the colonial world.<sup>14</sup> Reflecting how agrarian knowledge dissemination was for many experts a global goal, each contribution in this volume highlights transnational borrowings and exchanges while zooming in on parts of Europe, the Americas, the Indian subcontinent or Africa. In this manner, they are able to show that the observable similarities between different rural knowledge regimes were not, or at least not primarily, the result of the diffusion of hegemonic North Atlantic theories of modernization to the rest of the world, as large sections of the existing historiography suggest. Instead, they can be traced back to multidirectional forms of knowledge exchange that were just as likely to see local experiences redefining global approaches.

## **Agricultural and Environmental History, the History of Knowledge and Global History: The Chapters in This Volume**

This volume addresses key debates in agricultural history and the history of knowledge, as well as colonial and global history, bringing bodies of literature into conversation that have remained surprisingly distinct. In examining agrarian transitions, agricultural and rural history have traditionally focused on the classic means of production: land, labour and capital.<sup>15</sup> Knowledge, as an increasingly important production factor valued by farmers, experts and governments alike, has received far less attention. In his history of the scientization of German agriculture in the twentieth century, Frank Uekötter has described how the increasing appreciation of knowledge as a ‘key resource’ (*Schlüsselressource*) in modern agriculture contributed to the establishment of new types of educational institutions.<sup>16</sup> Similarly, Auderset and Moser have discussed the ‘agrarian-industrial knowledge society’ (*agrarisches-industrielle Wissensgesellschaft*), examining the ways in which agricultural research and development changed farming practices and boosted outputs in different Western European contexts.<sup>17</sup>

Our volume broadens the history of science and knowledge in agriculture by highlighting their profoundly transnational character, showing that innovations in agricultural practice were seldom the result of narrow national developments. Furthermore, our focus on education and communication adds fresh perspectives to the historiography of agrarian knowledge and science. By relying mainly on the information that state institutions have collected, such as statistics, censuses and other macrolevel data,<sup>18</sup> much of the existing research disproportionately favours top-down understandings of knowledge flows, assigning peasant knowledge only a residual and rarely active character. Peasants’ perspectives have been notoriously difficult to investigate, given a

lack of sources. At the same time, there have been branches of peasant studies, often focusing on colonial contexts, that have applied innovative methodologies to overcome this bias and study agricultural production and rural politics from below. Such studies, often relying on oral history and ethnographic fieldwork, have tried to invert dominant perspectives on agricultural development by emphasizing peasant knowledge and innovation.<sup>19</sup> Rather than siding with either ‘top-down’ or ‘inversion’-oriented perspectives, this volume focuses on education as a hinge between science and practice, politics and farming, as well as experts and rural dwellers, with the aim of studying the practical application of formal knowledge. Our emphasis on the *communication* of knowledge allows us to study the interface between experts, state actors, farmers and rural communities. The multiple tensions that official interventions almost invariably caused provide important insights into prevailing local practices, conversations and movements in the realm of agricultural education. In many sociopolitical contexts around the world, agricultural education schemes were a coproduction of local actors – including farmers’ associations and rural cooperatives that were often led by regional economic elites – and representatives of the state.

Debates around agricultural knowledge have always, at least implicitly, also been about farmers’ use of soil, animals, plants and water. This volume contributes to innovative strands of environmental history that have explored this nexus by shedding light on forms of environmentalism that emerged from or in response to agricultural practices. As agricultural production intensified, rural producers searched for what are today called sustainable methods to ensure that future generations would also be able to live on and from the land.<sup>20</sup> On the other hand, conservation also became a platform for the (colonial) state to intervene in rural areas, especially in arid contexts, with officials blaming peasant producers for their allegedly harmful agricultural practices, such as shifting cultivation or overstocking.<sup>21</sup> Another prominent strand of research has explored the environmental impact of intensive, commercially oriented farming as it spread across the world. This has included deforestation, desertification, erosion and a loss of biodiversity, the consequences and associated challenges of which affected farming populations have been forced to confront and contain in order to save their deteriorating livelihoods.<sup>22</sup> Environmental as well as knowledge history offer us the opportunity to question narratives that present agrarian modernization as a one-directional, teleological process by shifting our attention to the multiplicity of potential bodies of knowledge or technological solutions. Given that there have always been many possible trajectories for processes of mechanization or innovation, environmental history allows us to evaluate and question the specific models over which stakeholders fought or negotiated.<sup>23</sup> While our focus on knowledge prioritizes social over environmental dynamics, the chapters in this volume also address the ways in

which agricultural education has moderated farmers' interactions with their material environment.

Global history has largely neglected farmers and rural contexts, typically seeking transnational entanglements and exchanges in urban or industrial settings.<sup>24</sup> This volume demonstrates the ways in which rural areas became 'globalized', including through farmers comparing themselves with their counterparts in other countries, experts exchanging problem diagnoses and solutions across borders and governments looking abroad in their search for new ways to integrate rural producers politically and economically. We thereby build on a recent and increasingly robust historiography on rural reform, development and agricultural science from a transnational perspective. Studies in this field have explored the various ways in which national governments have attempted to integrate rural populations through development initiatives.<sup>25</sup> Furthermore, by highlighting the manifold entanglements between different geographical contexts and/or comparing the application of agricultural knowledge or technologies in different locations,<sup>26</sup> such studies have demonstrated the merits of looking beyond national frameworks of analysis – albeit largely in relation to a European or North American context.

Although rural development interventions were in many respects foreshadowed by agricultural development schemes in colonial contexts, the continuities between imperial and international agrarian development have only been partially explored.<sup>27</sup> As previous scholarship has shown, imperial governments intervened in agricultural production from the late nineteenth century onwards with an interest in increasing colonial revenues, often violently enhancing productivity through mandatory quotas or taxation.<sup>28</sup> The interwar period saw a first phase of colonial 'development' policy, during which colonial governments drew up comprehensive plans to increase cash crop production and simultaneously 'uplift' rural producers.<sup>29</sup> In relation to this context, this volume builds on debates on the broader relationship between science and colonialism. While earlier research cast science as an integral component of authoritarian colonial rule – focusing on how important it was for officials and experts to construct colonized populations as backward and inferior, as well as how local bodies of knowledge were systematically misunderstood and eclipsed in the process – more recent studies have questioned this dichotomizing perspective. As Beinart, Brown and Gilfoyle, among other scholars, have argued, colonial science drew on the knowledge of the colonized to a significant degree, sometimes quite consciously. Various studies have since pointed to the interdependent and hybrid character of knowledge production in the colonies.<sup>30</sup>

The chapters in this volume explore the communication of agrarian knowledge in both colonial and international contexts. Highlighting transnational entanglements while also offering comparative perspectives, they analyse

the often strikingly similar ways in which methods of education and knowledge dissemination – model villages and farms, extension services, schools or publications – were implemented in heterogeneous local contexts. The volume thus makes a case against Western-centric perspectives of knowledge dissemination from a North Atlantic core. Rather than comparing the ‘West’ and the ‘rest’ or focusing on the ways in which ‘Western’ models have been supposedly imposed without challenge on colonial and postcolonial settings, the volume examines rural and agricultural knowledge circulation as an opportunity to overcome dichotomies that have informed the historiography on modernization in the twentieth century. Whereas identifying a ‘great divergence’ that pits Europe and the United States in opposition to the rest of the world might be helpful for explaining the dynamics of the industrial world, it offers only limited analytical value when examining how rural lifeworlds have changed.<sup>31</sup>

## **Renegotiating Global Knowledge in Rural Societies in the Twentieth Century**

The chapters in this volume advance existing research on several key themes in the field of rural and agricultural knowledge circulation. First, they analyse the role of the (nation or colonial) state as well as international organizations in generating and communicating knowledge relevant to agriculture and rural issues. Science and education have never been neutral endeavours, but are always embedded in specific – and contested – visions of what role agriculture should play within the modern nation and in the development of rural society. Second, they analyse the mechanisms through which knowledge has been negotiated among and between different social groups – farmers, rural inhabitants, scientists and state officials – as well as the ways in which supposedly universal scientific truths have travelled between societies, and been modified and adapted to the very different social and environmental contexts in which they have been applied.

### *The Governmentality of Agricultural Knowledge: The Nation State and the Colonial State*

As recent historiography has shown for various countries, rural areas came into the focus of attempts to govern populations in a more centralized manner and subject them to novel forms of social engineering.<sup>32</sup> Since at least the late nineteenth century, emerging nation states have developed a profound interest in expanding their authority by modernizing supposedly backward rural peripheries. Rural dwellers’ access to education was often markedly inferior to that of their urban peers, and they frequently remained effectively excluded

from higher education institutions. The opening of village schools, vocational training centres and other rural educational institutions were evidence of government efforts to offset these disparities and at the same time extend the state's reach into remote areas and political constituencies.<sup>33</sup> Moreover, governments intervened in rural economies in order to control and boost food production, with many departments of agriculture in the nineteenth and early twentieth centuries founded with the explicit goal of increasing agricultural productivity.<sup>34</sup> This became particularly evident in times of crisis. As several chapters in this volume (Geronymaki, Ribi Forclaz and Hartmann) show, the two World Wars and the food shortages they caused became major catalysts for state-led agricultural education initiatives.

Various examples suggest that agricultural and rural education programmes could also form part of an attempt by government or transnational elites to stifle rural radicalism. As Olsson has shown for Mexico and the US South, agrarian populist movements of the late nineteenth and early twentieth centuries, which demanded land reform and redistribution, were displaced by much more conservative, reformist agendas – for instance, in the form of the US-based country life movement – that hailed science and production increase, but shunned questions of social justice.<sup>35</sup> Similarly, South African agricultural policy from the interwar period became increasingly shaped by white officials and experts who believed that starving black rural dwellers, who had been squeezed into entirely inadequate reserves, did not need more land, but only had to be taught how to farm better.<sup>36</sup> Rural education interventions could even serve as a counterinsurgency strategy, as Geronymaki (in this volume) shows in the case of the Greek state's post-Second World War conflict with communist rebels and their supporters among the peasantry. Compared to land reform or other possible strategies for addressing the 'agrarian question', agricultural and rural education often constituted a more cautious and conservative response. The chapters in this volume draw out the ambiguities inherent in agricultural and rural education, which oscillated between the encouragement of change and the containment of social unrest.

Previous historiography has discussed the ways in which 'the rural' became a constitutive imaginative space for rising nation states.<sup>37</sup> Many agricultural schools and village teachers constructed particular notions of 'the village' and 'the rural', and invited new scholarly perspectives on the countryside, for instance, by conducting or encouraging anthropological and sociological surveys. Young farmers' clubs in the United Kingdom, for example, played an important role in the conducting of surveys, while Turkish village institutes promoted the idea of the village as a stronghold of Turkish culture (see Hartmann in this volume). In Latin America, members of the rural middle class assumed the strongly moralist agendas of 4-H programmes to distinguish themselves from urban elite culture (see Pernet in this volume).<sup>38</sup> This



double-edged process – governments and elites spreading education in rural areas, yet at the same time defining rural societies as remote, backward and uneducated – has been observed for different societies around the world and points to the tensions and ambiguities inherent in nation-building processes. The orientalizing of rural societies, which often accompanied delineations of class, ethnicity and/or race, could be a transnational process in which urban-based elites and experts in different countries exchanged analyses of common rural problems and proposals to address them (see Grunert in this volume). Urban orientalist projections were particularly tangible in rural development programmes. To other reformers, the ‘remote countryside’ represented a repository of alternative forms of knowledge, with the rediscovery of traditional knowledge feeding into antimodernist agendas that promoted the village as a utopian societal vision.<sup>39</sup> From the perspective of othered rural communities, the sense of being part of local counterknowledge advanced against the universalizing impositions of science could even strengthen local or regional identity constructions (see Fischer and Hartmann in this volume).

In many contexts, farmers came together to advance the agricultural science movement themselves. Although demonstration agents and agricultural schools could be met with a significant degree of scepticism, as the chapter by Horrocks, Martin and Merchant shows in the case of the postwar United Kingdom, many farmers also attached hopes of social advancement and citizenship to the idea of improved agriculture. One prominent example of the inherent ambiguities of agricultural education was the aforementioned Tuskegee Institute in Alabama, which became a global model for the education of black or colonized peoples. While its founder, Booker T. Washington, a former slave, promoted agricultural education as a path to black emancipation, his opponents denounced his pedagogy as a basic labour education designed to uphold white supremacy in the US South as well as in colonial Africa (see Mark-Thiesen in this volume).<sup>40</sup> Similarly, agricultural education projected patriarchal gender norms, with demonstrators and schools usually catering exclusively for men and boys, who were seen as the agents of modern, commercial farming.<sup>41</sup> Women and girls, by contrast, were relegated to a separate sphere of rural domesticity that often sat uneasily with their actual responsibilities on the farm. However, as the example of rural women in South Africa (see Tischler in this volume) shows, many found ways to appropriate rural education to their own ends in their efforts to enhance the wellbeing of their families as well as their own social status. Domestic training, which in many countries formed an integral component of the rural education package, thus sheds light on the construction of – and contestations over – gendered norms that increasingly defined rural divisions of labour and responsibilities.

*The Rise of the Agricultural Sciences and Their Local Contestations*

By the late nineteenth century, farmers, governments and experts in many parts of the world were convinced that '[t]he era of self-taught or parent-taught farmer ha[d] gone' and that agriculturalists required institutionalized instruction by formally qualified teachers.<sup>42</sup> However, this view has sat uneasily with longstanding, and still-enduring, understandings of being a farmer as an inherited identity rather than an acquired capability. As the chapters in this volume show, the claimed universal validity of scientific agricultural knowledge was in fact often disputed. Knowing how to farm was, and still often is, the result of intergenerational knowledge transmission within the family.<sup>43</sup>

The rise of formalized agricultural knowledge coevolved with novel channels of knowledge exchange. Besides village schools and rural colleges, farmers' associations and cooperatives emerged as new agents of knowledge transmission in many regions of the world, some of them filling the void left by the dissolution of older feudal structures.<sup>44</sup> In the late nineteenth and early twentieth centuries, under the impact of transport and communications revolutions and a phase of globalization that had seen the integration of widely dispersed agricultural markets, farmers, governments and experts began looking beyond the borders of their own countries to an unprecedented degree.<sup>45</sup> They sought insights and inspiration via new opportunities for exchange, such as on expert tours, in specialist journals, in partnership with international organizations or at international exhibitions and conferences.<sup>46</sup>

However, farming had long been cold-shouldered by established scientific institutions. Well into the twentieth century, many farmers and rural communities were still being left to develop their own methods of generating and disseminating knowledge. While initiatives like the Danish folk schools, South African agricultural societies, British young farmers' clubs, 4-H clubs in the United States or Turkish village institutes sought to systematize and empower such efforts,<sup>47</sup> the academic world of the classical university remained reluctant to take up questions of plant breeding, animal husbandry or rural sociology. Established disciplines and institutions, including departments of economics and social or natural sciences, regarded agriculture and rural societies as remnants of the past. Agriculture, as an example of applied science and a mix of different disciplinary approaches, did not fit into the classical divisions that defined existing higher education systems. Agronomists had never been fully part of the *Bildungsbürgertum* (the educated middle class), nor did they invariably integrate into the new economic elite who had built their prosperity on industrial production. In many countries, original institutional forms, such as the Canadian agricultural colleges or the US land-grant colleges (see Part I in this volume) thus evolved outside of or in parallel to conventional academic

institutions.<sup>48</sup> While these new institutions were testament to the nation state's increased interest in matters of agricultural research and education, their proponents would frequently have to fight for the recognition of agriculture as a genuine scientific field.

As the chapters in this volume illustrate (see Part III especially), the communication of scientific knowledge was never a one-way street. While several chapters take official programmes run by (colonial) governments or international organizations as a starting point, they emphasize the significant impact of local appropriation and negotiation. The tensions that official interventions almost inevitably caused offer important insights into local practices of and engagement with agricultural education. While experts and officials tried to teach rural families supposedly rational ways of farming and living, rural dwellers brought their own logics to agricultural education and innovation. In her seminal book on the industrial ideal in US agriculture, Deborah Fitzgerald points to the nonlinearity of rural knowledge production and asks where and how historians can locate rationality<sup>49</sup> – whether on the macrolevel, where government agents and experts strive to optimize productivity and secure societal benefits from agriculture, or on a more individual level, where farmers attempt to secure their own subsistence in the long run. Similarly, examples of knowledge being contested at farm demonstrations show that it could make perfect sense for a farmer not to undertake recommended investments, not to pursue the latest technological advances or not to listen to advisers, demonstrators or village teachers.<sup>50</sup> The chapter by Horrocks, Martin and Merchant on farm demonstration in the United Kingdom as well as Doyle-Raso's chapter on the technological choices made by farmers in Uganda when confronted with global regimes of wetland knowledge reflect the dialogic character of rationality in rural contexts. With their priorities set on securing their own subsistence or commercial future, farmers' frequently alleged conservatism was often the result of rational risk calculation.<sup>51</sup>

Examples of local resistance or appropriation point to the contradictions that arose between the universalist claims inherent in scientific knowledge and the highly place-specific nature of agricultural production, which varies according to local soil types and microclimates as much as according to prevailing labour arrangements, family structures, cultural preferences and land tenure practices. As Auderset (in this volume) illustrates, experts frequently confronted these tensions when they favoured industrial models of modernization and adhered to a Taylorist illusion that cast agriculture as one modern profession among others, and conceptualized technical knowledge as a tradable commodity that is interchangeable across time and space.<sup>52</sup> By contrast, the chapters in this volume consider 'global' knowledge to be socially and spatially embedded in local contexts in the same way as 'local' bodies of knowledge.<sup>53</sup> What has distinguished scientific agricultural knowledge is

less how it has been shaped into government programmes than its inherent universalizing claims and the positions of power it has consequently adopted. Analysing formalized processes of knowledge communication does not mean playing off the global against the local, but critiquing these positions without presupposing that power is to be found on only one side. ‘Transnationalism’ itself, as several of the chapters in this volume illustrate (Pernet, Ribi Forclaz, Fischer and Auderset), became an important distinguishing factor with which experts could legitimize their authority on the basis of their international careers and foreign experience.<sup>54</sup> Indeed, many of the individuals discussed in this volume modelled their actions on the experience they had gained in or from other countries. The chapters all explore mechanisms through which individuals established themselves as experts, thereby challenging frequently invoked concepts – foremost, the notion of dissemination – to show that on the ground, it was often far from clear who was actually the expert and who was on the receiving end of expertise. Not only did agriculturists often initiate improvements or technological innovations themselves, but their experiences also fed into the bodies of knowledge that were being curated by formally qualified experts and officials. As Horrocks, Martin and Merchant as well as Grunert show in this volume, agricultural extension, demonstrations, shows and competitions were also opportunities for state actors to keep themselves informed about farmers’ problems and problem-solving methods.

Methodologically, historians’ quest for rural *Eigensinn* (stubborn self-reliance) and non-elite knowledge has often been hampered by a lack of documentation, as farmers have rarely spoken for themselves in the sources at hand. Existing research has thus tended to focus on the formal side of agricultural knowledge and rural education, but most agricultural knowledge is transmitted informally – within families or by learning on the job.<sup>55</sup> As social historians who share an interest in the history of knowledge, the authors in this volume address the challenge of examining different bodies of knowledge by reading relevant administrative records, newspapers, project reports, school records and letters both with and against the grain to discern farmers’ perspectives. Moreover, as several chapters in this volume demonstrate (especially that by Horrocks, Martin and Merchant), oral history is a particularly constructive methodology for addressing such deficits.<sup>56</sup>

## **The Structure of the Volume**

### ***Part I. In Institutions: Brokering Contested Knowledge***

The first part of this volume investigates specific institutions and programmes that were established to improve rural production and livelihoods, including their scope and contested nature. In colonial situations (Preeti and

Mark-Thiesen) as well as in the post-Second World War development era (Ribi Forclaz and Hartmann), new programmes to improve rural life proliferated, with their implementation brokered by a multitude of local agents, including government officials, demonstrators, schoolteachers and village headmen. Although such programmes provoked counterreactions, these did not always take the form of open resistance. Local actors expressed their discord with proposed or newly introduced measures through various responses, including refusing to adhere to prescribed techniques, declining to apply a technology in the suggested manner or formulating local alternatives to top-down programmes.

All of these aspects contributed to the negotiation of *métis* in the sense of James Scott, a form of knowledge derived from practical experience and embedded in local contexts, between peasant and expert populations.<sup>57</sup> Part I focuses on the ways in which processes of negotiation and contestation defined the limits of development programmes, thereby challenging common historiographical perspectives on the expertise that steered such plans. Instead of understanding expert knowledge as exclusive and all-powerful, Part I sheds light on its ephemeral nature and instrumentalization in the competition between different institutional settings. Whereas in some cases (Preeti and Ribi Forclaz) a general lack of trust between outsiders and local populations prevented a constructive dialogue between different knowledge regimes, in other cases social cleavages within rural populations accounted for the limits of rural development projects.

Focusing on the Imperial Agricultural Research Institute in the remote village of Poosah in Bihar, India, Preeti discusses the imperatives and limitations of agricultural research and training in British-ruled India. While the Institute promoted plants and techniques that were intended to maximize colonial revenues, its geographical isolation and top-down approach to transmitting scientific knowledge significantly undermined its capacity to meet its aims. The Booker Washington Institute in Liberia, which Mark-Thiesen explores in her chapter, was founded in 1929 and constituted an unusual case of agricultural knowledge circulation whose aims were shaped by imperialism, but were presented as fostering national self-determination. While its white US philanthropic sponsors supported the Institute as a means to promote the advancement of African rural dwellers through practical training, Liberian leaders were suspicious – not least because the expansion of agricultural and industrial education in Liberia coincided with an emergent US-owned rubber empire in the country and the related fear that the black-led state would be effectively turned into a US protectorate. Arguably, it was not until agricultural (and manual) education became firmly associated with the ‘traditional’ Indigenous population that the fears of urban dwellers and Liberian officials were assuaged and support for the Institute was won.

Discussing the role played by wartime relief agencies and early postwar international organizations in agricultural development, Ribi Forclaz shifts the focus to a European case study, albeit one that bears some similarities to colonial interventions. Ribi Forclaz unpacks the social and political challenges faced by the agricultural rehabilitation programme that was introduced by the United Nations Relief and Rehabilitation Administration (UNRRA) in war-ravaged, postfascist Italy. Trusting that the importation of farm machinery, cattle, fertilizers, pesticides and seeds would lead to the rehabilitation of Italian agriculture, UNRRA officials ignored structural conditions on the ground, the enduring influence of regional agricultural institutions inherited from the fascist regime as well as the needs and wishes of Italian farmers themselves. The UNRRA's short-lived programme, Ribi Forclaz argues, thus exemplifies the lack of control that international aid organizations had over the actual trajectory of Italian agricultural development.

Hartmann's chapter examines programmes to turn Turkish farmers into modern entrepreneurs with the capacity to compete on the global market after the Second World War and two decades of protectionism. The efforts of the government of Prime Minister Adnan Menderes to modernize Turkish farming by inviting international experts to serve as advisers on rural development and by disseminating scientific knowledge via new educational institutions confronted a myriad of existing institutions – foremost the so-called village institutes, whose foundation dated back to the Atatürk era. Considered an independent, anti-authoritarian instrument of grassroots rural development, this uniquely Turkish approach to modernization attracted international interest and was eventually co-opted into the Marshall Plan-funded agricultural extension service and educational programmes for the rural middle and lower classes. As such, the village institutes represent an example of how local institutions in Turkey and beyond had the potential to shape large-scale, international programmes.

## *Part II. Across Borders: Transnational Expertise and Entangled Bodies of Knowledge*

The chapters in Part II address the question of how knowledge moves in space – across national boundaries as well as within societies and cultures. While several chapters focus on the translation of knowledge – highlighting the ways in which specific bodies of knowledge have been transferred from one national context and adopted in another (Plantinga and Zwarts, and Pernet) – others foreground more circular movements of knowledge back and forth between different countries (Auderset and Grunert). All chapters engage with visions of modernization in agriculture as well as the specific policies associated therewith. Rural communities were defined as backward

and subjected to wide-ranging reforms, while experts increasingly modelled agricultural production on industrial ideals of efficiency, mechanization and commercialization. All chapters discuss specific schemes for improving agricultural practices, interventions that often ran counter to the idiosyncrasies of the local contexts in which they were applied.

Grunert analyses rural reforms implemented in the period from 1910 to 1940 in Poland and Yugoslavia, where measures targeting peasant self-organization, agricultural production, and the processing and selling of agricultural products in countries such as Denmark, the Netherlands, Norway, Germany and Switzerland served as examples for rural development. Grunert's chapter investigates several proposed or completed model facilities – including model villages, model farmhouses and experiment stations – as didactic tools through which knowledge on specific aspects of rural life such as housing, education, healthcare and agrarian work was communicated. Rural models were often a reflection of how academics and urban elites orientalised rural communities. However, it is also true that rural inhabitants valued the orientation provided by models and that experts, in turn, recognized the necessity of local adaptation. As such, model facilities were never exact copies of pre-existing facilities abroad.

In a similar vein, Plantinga and Zwarts discuss the adaptation of international bodies of knowledge – in this case, mainly from Germany and the United States – in Dutch farming from 1890 to 1970, a period when agriculture in the Netherlands was undergoing rapid specialization. Zooming in on the examples of fertilizer use as well as the application of business economics and scientific work management to commercial farming, Plantinga and Zwarts' chapter analyses the ways in which the emerging Dutch agricultural knowledge infrastructure, despite its openness towards scientific knowledge from abroad, also took into account local variations in farming practice and soil type. But after the Second World War, they argue, the decentralized infrastructure of local schools, extension services and farmers' societies was superseded by national organizations that often disregarded local specificities.

Auderset similarly examines efforts to transplant knowledge from one country to another, highlighting how agricultural work became a subject of intense interdisciplinary scientific inquiry after the First World War. Focusing on the circulation of scientific knowledge on agricultural working practices between Western Europe and North America, he explores the ways in which knowledge claims were constantly reinterpreted, redesigned or re-embedded within specific patterns of agricultural thought and practice as they travelled back and forth across the Atlantic. Offering in-depth insights into efforts to apply Taylorism and scientific management to the United States' Farm Work Simplification Program in the 1940s and to postwar European agriculture, Auderset's chapter shows how knowledge on farm labour became a field of

contestation between different visions for aligning agriculture with industrial modernity.

In Latin America, US institutions and experts were not only influential as producers of knowledge, but also actively intervened in rural reform. Pernet's chapter discusses attempts in Costa Rica to replicate the US 4-H agricultural youth clubs, foremost through the Inter-American Program for Rural Youth (PIJR), an effort that was spurred on by fears of social upheaval in rural Latin America in the wake of the 1959 Cuban Revolution. Pernet's analysis adds nuance to previous studies that have examined the PIJR as one of a number of US interventions in Latin America during the Cold War or as a mere instrument of capitalist expansion, arguing instead that the Costa Rican 4-H clubs (or 4-S clubs, as they were known nationally) were not simply a top-down imposition by powerful external actors. The development approaches of Latin American modernizers were closely interlinked with US programmes, but they were also embedded in distinct sociopolitical contexts. As such, despite their underpinnings in US ideology, rural youth clubs could gain popularity in Latin America because they offered their members a much-needed space for sociability as well as a chance to acquire practical, income-generating skills. When the PIJR was dissolved in the 1970s, the 4-S movement in Costa Rica had become sufficiently entrenched in the fabric of rural life to continue without US support.

### ***Part III. On the Ground: Translating Bodies of Knowledge in Rural Communities***

Part III emphasizes the perspectives of rural dwellers during their encounters with various experts – government officials, scholars and representatives from international organizations – who were attempting to transform how rural communities farmed and lived. The chapters in Part III highlight how outcomes on the ground could be radically different from the results that experts had envisaged. In so doing, they also foreground methodological concerns and make use of alternative, nonstate sources, read official records or expert accounts against the grain (Tischler and Fischer) or turn to oral history (Horrocks, Martin and Merchant). Because translations often – quite literally – failed, language and linguistic evidence can be extremely insightful when exploring the limits and implications of rural education programmes, as the different case studies show. Through such perspectives, the chapters not only highlight the ways in which some rural education programmes failed, were misunderstood or were rejected wholesale, but also show that 'targeted populations' often appropriated outside interventions, tweaking them to fit their own interests.

Tischler's chapter discusses the ways in which rural women in South Africa responded to domestic training programmes that state authorities promoted



as a counterpart to agricultural education initiatives for men. Domestic training promoted distinct and hierarchical gender roles that limited rural women to reproductive work within the home. Notions of domesticity, which were heavily derived from North American experiences, contradicted traditional gender roles in many African cultures, according to which women were assigned the main responsibility for agricultural production. Furthermore, by juxtaposing the experiences of black women in the eastern Cape Province with those of women in white farming communities in the Free State and triangulating these with research on other parts of the globe, Tischler's chapter also shows that emerging contestations were rooted in the processes of agricultural labour itself. Aware that their productive labour was crucial to the viability of farming, black and white rural women in South Africa, as in many other parts of the world, refused to have their existence reduced to reproductive work within the home.

Sally Horrocks, John Martin and Paul Merchant discuss the interactions between scientists, farmers and agricultural advisers in the United Kingdom from 1950 to 1990, a period that saw dramatic productivity increases. Analysing extended biographical interviews, the authors highlight the importance of sociability, arguing that knowledge communication relied on the advisers' development of personal relationships with farmers, as the advisers were well aware. For farmers, the advisers' lectures and meetings offered an opportunity for social interaction as much as for learning about the latest agricultural science. The close relationships between farmers and agricultural advisers ensured that the agrarian knowledge that was generated and refined in their interactions flowed in both directions; nevertheless, as the authors highlight, it was rare for this knowledge to 'travel back to centres of agricultural science' (p. 286).

Analysing the spread of rice farming across southeastern Uganda in the colonial and postcolonial periods, John Doyle-Raso focuses on aspects of language in the interactions between local farmers and Ugandan and foreign officials. After the British colonial authorities had established demonstration farms and intensified their promotion of rice cultivation during the Second World War, the post-independence Ugandan government collaborated with China to construct new demonstration farms. Doyle-Raso argues that changes in the landscape, languages and markets of southeastern Uganda are evidence of how farmers used their knowledge – sometimes as an instrument of cooperation, sometimes as a means of asserting control – to influence the development and operation of demonstration farms and the spread of rice farming. By analysing place names, translations and other aspects of language that were relevant to local rice production, the chapter also reveals the power dynamics that characterized the farming of rice. As Doyle-Raso argues, farmers were empowered by access to translations of scientific knowledge, which they

combined with local bodies of knowledge, but their knowledge also subjected them to exploitation by successive governments intent on boosting Uganda's position in the global rice market.

Georg Fischer's chapter examines the role of agricultural knowledge in domestic and international agendas of development, agrarian colonization and Indigenous 'integration' in Bolivia in the 1950s. The Cotoca settlement programme, which formed part of the United Nations' Andean Indian Project (AIP) and was vigorously supported by Bolivia's revolutionary government, combined the goals of increasing agricultural production by settling underpopulated areas with 'modernizing' the Indigenous population of the Bolivian highlands through their migration to the agriculturally fertile lowlands, where agricultural education and community development measures were also to be implemented. Fischer's chapter highlights the broader governmental aims that came with agricultural education as well as the unforeseen consequences of social engineering as experts and settlers negotiated their own visions of rural development. Agricultural knowledge communication in Cotoca, Fischer argues, was a 'constant [attempt] to reconcile the high modernist ambition ... [of] agrarian colonization ... with the experiences and expectations of the communities that were supposed to become the bearers of a self-sustaining development process' (p. 340).

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## Notes

1. Cullen Library, University of the Witwatersrand, A73 MacDonald (vol. 1), 'Science in Agriculture', *Daily Graphic*, 27 June 1914. On the role of science in Cape progressivism, see Brown, 'Agriculture in the Natural World', 111.
2. Zimmerman, *Alabama in Africa*, 22; see also Hersey, *My Work Is That of Conservation*.
3. Jabavu, *The Black Problem*.

4. Letter, Turkish ambassador to Switzerland, Zeki Küneralp, to the head of the Swiss programme, Karl Ketterer, Archives of the Migros Genossenschaftsbund, G MT II.021.
5. *Ibid.*; see also Hartmann, “Wir wünschen Ihnen mit diesem Türken guten Erfolg”, 41–62.
6. Isett, *State, Merchant, and Peasant*, 1644–862; Brakensiek, ‘Das Feld der Agrarreformen um 1800’, 101–22; Zimmermann, ‘Bäuerlicher Traditionalismus’, 219–238.
7. Woods, *The Herds Shot Round the World*; Carney and Rosomoff, *In the Shadow of Slavery*; Crosby, *The Columbian Exchange*; Ehret, *An African Classical Age*; Maddox, *Sub-Saharan Africa*, 23–102; McNeill, ‘Biological Exchanges in World History’.
8. Some of these developments have been associated with the ‘first wave of globalization’ that began in the 1870s; see Nützenadel and Trentmann, *Food and Globalization*; Langthaler, ‘Landwirtschaft vor und in der Globalisierung’, 135–69; Krausmann and Langthaler, ‘Nahrungsregime und Umwelt in der Globalisierung’, 85–106; Jachertz and Nützenadel, ‘Coping with Hunger?’; Amrith and Clavin, ‘Feeding the World’.
9. United Nations, ‘Urban and Rural Areas’.
10. See Hartmann’s chapter on Turkey in this volume. One of the first development experts to promote reforming land tenure as a means of increasing agricultural productivity was W. Arthur Lewis; see Unger, *International Development*, 109. Two prominent examples of postcolonial land reform and peasant development are Tanzania’s Ujamaa programme and Zimbabwe’s land reforms; see Lal, *African Socialism in Postcolonial Tanzania*; Moyo, ‘Three Decades of Agrarian Reform in Zimbabwe’, 493–531.
11. Nützenadel and Trentmann, *Food and Globalization*; Langthaler, ‘Landwirtschaft vor und in der Globalisierung’; Langthaler and Krausmann, ‘Globale Nahrungsregime aus historisch-sozialökologischer Sicht’.
12. Harwood, *Technology’s Dilemma*; Mooser, ‘Moderne Landwirtschaft’, 15–22; Mooser, ‘Das Verschwinden der Bauern’, 23–35; Kluge, *Bauern, Agrarkrise und Volksernährung*.
13. Pan-Montojo and Mignemi, ‘International Organizations and Agriculture’, 237–53; Mignemi, ‘Italian Agricultural Experts as Transnational Mediators’, 254–76; Lynch-Dungy, ‘The Global Agricultural Crisis and British Diplomacy’, 297–319; Ribi Forclaz, ‘Shaping the Future of Farming’, 320–39.
14. Conte, *Highland Sanctuary*, 96–99.
15. Federico, *Feeding the World*; Tauger, *Agriculture in World History*; Bairoch, ‘Les trois révolutions agricoles’, 317–63.
16. Uekötter, *Die Wahrheit ist auf dem Feld*, 105; Fitzgerald et al., ‘Roundtable: Agricultural History’, 92, 569–604, esp. 573–74.
17. Auderset and Moser, *Agrarfrage*.
18. In Fitzgerald’s words: ‘It was numbers, not narratives, that became the dominant language in agricultural knowledge.’ Fitzgerald, *Every Farm a Factory*, 35.
19. However, few historians in this field have focused explicitly on agricultural knowledge, with most concentrating on the politics of rural resistance; cf. Williams, ‘Taking the Part of Peasants’, 131–54; Schäfer, *Guter Rat ist wie die Glut des Feuers*; Feierman, *Peasant Intellectuals*; Fliege, *Bauernfamilien zwischen Tradition und Moderne*; Beinart and Bundy, *Hidden Struggles in Rural South Africa*; Ranger, *Peasant Consciousness and Guerrilla War in Zimbabwe*; Richards, *Indigenous Agricultural Revolution*. For a recent, broad-ranging assessment of peasants in global history, see Vanhaute, *Peasants in World History*.

20. Mulwafu, *Conservation Song*; Beinart, *Rise of Conservation in South Africa*, 499–516.
21. Davis, 'Of Deserts and Decolonization'; Davis, *Resurrecting the Granary of Rome*. For an early discussion of the concept of environmental orientalism, see Sawyer and Agrawal, 'Environmental Orientalisms', 71–108. On African contexts, see e.g. Anderson and Grove, *Conservation in Africa*.
22. For a global synthesis, see Ross, *Ecology and Power in the Age of Empire*, esp. 307–350. See also Ax et al., *Cultivating the Colonies*; Jacobs, *Environment, Power, and Injustice*; Isaacman and Roberts, *Cotton, Colonialism, and Social History in Sub-Saharan Africa*; Adas, 'Continuity and Transformation', 191–207; D'Souza, 'Water in British India', 621–628; Fernando, 'Famine in a Land of Plenty', 291–320.
23. Lyautey, Humbert, and Bonneuil, 'Introduction', 7–20.
24. Unger, 'Agrarwissenschaftliche Expertise', 552–579, here 553–554.
25. Van de Grift and Ribí Forclaz have examined rural interventions in interwar Europe as a form of governance by which national governments attempted to raise food production, improve rural living standards and integrate rural populations; Van de Grift and Ribí Forclaz, *Governing the Rural*. See also Vivier, *The State and Rural Societies*. Rodgers has discussed progressive-era knowledge exchanges in the areas of rural reform and, to a lesser extent, education within a North Atlantic framework; Rodgers, *Atlantic Crossings*. On agrarianism as an Eastern European movement, see Müller and Harre, *Transforming Rural Societies*. On agrarian reform in 'the Euro-American World', see Regan and Smith, *Agrarian Reform and Resistance in an Age of Globalisation*.
26. Jonathan Harwood has compared 'Europe's Green Revolution' with the green revolutions in the formerly colonized world; Harwood, *Europe's Green Revolution and Others Since*.
27. See e.g. Scott, who has pointed to the continuities between agricultural development schemes in colonial Tanzania and post-independence Ujamaa rural development; Scott, *Seeing Like a State*.
28. See e.g. the rich scholarship on the cash crop revolution after the abolition of the slave trade in colonial Africa: Austin, 'Vent for Surplus or Productivity Breakthrough?', 1,035–1,064; Hill, *Studies in Rural Capitalism in West Africa*. Zimmerman has analysed a cotton cultivation scheme in German-ruled Togo, highlighting the degree of coercion and the racist message inherent in programmes of agricultural improvement that delegated particular forms of agrarian labour to specific communities based on their skin colour; Zimmerman, *Alabama in Africa*.
29. Tischler, 'Agriculture', 119–150; Van Beusekom, *Negotiating Development*; Hodge, *Triumph of the Expert*; Cooper, *Africa since 1940*; Moon, *Technology and Ethical Idealism*; Conte, *Highland Sanctuary*, 96–98. Beinart wrote a seminal study on rural development and the conservation movement in the settler-colonial context of South Africa; Beinart, *Rise of Conservation in South Africa*. See also Unger, *Entwicklungspfade in Indien*; Unger and Frey, 'Rural Development in the Twentieth Century'; Bernal, 'Cotton and Colonial Order in Sudan', 96–118; Bonneuil, 'Pénétrer l'indigène', 199–223.
30. Beinart, Brown, and Gilfoyle, 'Experts and Expertise in Colonial Africa Reconsidered', 413–433. Among others, the authors criticize McCracken ('Experts and Expertise in Colonial Malawi', 101–116) and Fairhead and Leach (*Misreading the African*

- Landscape*). Studies highlighting the interdependence of 'local' and 'scientific' knowledge include, among many others, Tilley, *Africa as a Living Laboratory*; Harries, *Butterflies and Barbarians*; von Hellermann, 'Reading Farm and Forest', 89–114.
31. Pomeranz, *The Great Divergence*; Landes, *Wealth and Poverty of Nations*; Bairoch, *Economics and World History*.
  32. Van de Grift and Ribi Forclaz, *Governing the Rural*.
  33. Adams, 'Rural Education and Reform between the Wars'; Brassley, Burchardt, and Thompson, *The English Countryside between the Wars*, 36–52; Ashby and Byles, *Rural Education*.
  34. Harwood, *Technology's Dilemma*; Harwood, *Europe's Green Revolution and Others Since*.
  35. Olsson, *Agrarian Crossings*, 31–36.
  36. Tischler, 'Education and the Agrarian Question'.
  37. For instance, there is a robust historiography in relation to France, including the seminal works of Jacques and Mona Ouzouf as well as Eugen Weber; Ouzouf and Ouzouf, *La république des instituteurs*; Weber, *Peasants into Frenchmen*; see also Aldenhoff-Hübinger, 'La politisation des campagnes', 163–176. Merkel-Hess has examined the Chinese nation state's rural self-understanding; Merkel-Hess, *The Rural Modern*.
  38. Similarly, the US land-grant universities played an important role in conducting surveys; see Thompson, 'Agricultural Education in the Interwar Years'; Brassley, Burchardt, and Thompson, *The English Countryside between the Wars*, 53–72, 60; Cravens, "'Waist Deep in the Big Muddy'", 241–268; Yildirmaz, *Politics and the Peasantry in Turkey*.
  39. Treitel, *Eating Nature in Modern Germany*; Barton, *The Global History of Organic Farming*, 80–93.
  40. On Tuskegee's legacy in the US South, see Harlan, *Booker T. Washington*. On Tuskegee's colonial reverberations, see Zimmerman, *Alabama in Africa*.
  41. On gender roles in modern farming, see e.g. Jones, *Gender and Rural Modernity*; Osterud, *Putting the Barn before the House*; Neth, *Preserving the Family Farm*; Jensen, *With These Hands*; Verdon, 'The Modern Countrywoman', 86–107; Jellison, *Entitled to Power*; Jensen and Ambrose, *Women in Agriculture*.
  42. South African Dept. of Agriculture and Forestry, Division of Agricultural Education and Research, 'Vocational Training in Agriculture', SAB LON 236, A 138/1, Vol. II, c. October 1946. On agriculture's transition to a science, see Hillebrand, 'Books and Dirt in a Transatlantic World', 90–103.
  43. For an in-depth study of agricultural knowledge generation and communication among Shona women in Zimbabwe, see Schäfer, *Guter Rat ist wie die Glut des Feuers*. See also Fliege, *Bauernfamilien zwischen Tradition und Moderne*.
  44. Vári, 'Ländliche Genossenschaften in der Habsburgermonarchie', 255–98; Vári, *Herren und Landwirte*; Holec, 'Agrardemokratie als Versuch eines Dritten Weges', 41–54; Müller and Harre, 'Agrarianism as Third Way', 14–23; Bódy, 'Weder Demokratisierung noch Diktatur', 225–52.
  45. Nützenadel and Trentmann have highlighted the ways in which markets for agriculture produce and food became increasingly internationally integrated; Nützenadel and Trentmann, *Food and Globalization*.
  46. Jones, 'Seeing Is Believing', 37–51.

47. Rodgers, *Atlantic Crossings*, 354–57; Karaömerlioğlu, ‘The Village Institutes Experience in Turkey’, 47–73; Thompson, ‘Agricultural Education in the Interwar Years’, 53–72.
48. The US land-grant colleges were created as a result of the first Morrill Act of 1862, which gave each state the right to grant land for the establishment of institutions that would teach ‘practical’ science (namely agriculture) instead of instruction in the liberal arts tradition, which was widely associated with the European university system; Marcus, *Service as Mandate*.
49. Fitzgerald, *Every Farm a Factory*, 33–50.
50. Marcus, *Agricultural Science and the Quest for Legitimacy*; Danbom, ‘The Agricultural Experiment Station and Professionalism’, 246–55.
51. Scott has famously argued that the peasant moral economy has not followed macro-economic reasoning. Instead, peasants’ first priority has been to secure their own subsistence before investing in their farms. As he describes, there can be perfectly rational reasons for this seemingly antimodernist and non-innovative behaviour; Scott, *Moral Economy of the Peasant*.
52. Auderset and Moser, *Agrarfrage*.
53. Livingstone, *Putting Science in Its Place*.
54. Rodogno, Struck and Vogel, ‘Introduction’, 1–20.
55. Brassley, ‘Agricultural Education, Training and Advice’, 260–61.
56. In relation to British history, there is a strong research tradition among social historians of applying oral history methods to gain insights into the knowledge of farmers and their attempts to improve their agricultural practices; see Evans, *Ask the Fellows Who Cut the Hay*; and Evans, *Horse in the Furrow*.
57. Scott, *Seeing Like a State*, 6 and 311.

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