

Theory-based Innovation Platform management. A contribution of sociology to agriculture research and development.

Nicolay, Gian L.

Research Institute of Organic Agriculture (FiBL), gian.nicolay@fibl.org

Abstract

Farmers and peasants in the Global South are among the most vulnerable people and constitute the largest segment of their societies of food insecure. Farmers in the Global North are either costing large amount of taxpayer's money and or causing serious environmental threats. But is it fruitful to pinpoint the farm as the relevant system? Could it be a false problem? If so, which system should be at the center of attention of science and practice in order to transform farms and livelihoods towards sustainability and resilience? In order to answer this question, we have to agree that farms are human fabrics, which have evolved in time and space within specific socio-ecological conditions. They are embedded within people's communities and nations, and globally connected through markets. Human societies have become large and complex, but all of them depend on food in order to sustain its members. No state can afford hunger riots without being destabilized, neither can a state ignore threats caused by unhealthy food and ongoing environmental deterioration. If this thinking is correct, then we have to deduct that societal parameters, combined with economic, agronomic and ecologic ones have to be considered in every design intending to transform such systems. This requires interdisciplinary teamwork and involvement of practitioners covering local to at least sub-national levels. But more important, a new understanding of the evolutionary nature of socio-ecological forms is required, which breaks with the artificial boundaries between nature and culture and considers concepts and ideas like "life", "conscious", "memory", "right", "person" and "freedom" as truly scientific ones which can and shall be applied scientifically when dealing with food and agriculture. We propose therefore as a first prerequisite of implementing successful design methods a broader scientific concept of our object, which enlarges the scope for social and human sciences within the sector. Secondly, as the phenomena studied and treated are forms of life and unique creations in time and space, only locally knowledgeable stakeholders as part of the local society can solve the concrete problems with the eventual support of science and research. Beforehand, the stakeholders need to properly identify the real problems; a process, which is often done too hasty and superficially. Innovation platforms are proposed as an innovative institution capable to manage these processes. The performance conditions of such platforms are discussed as equally important as their structure. We should finally give up the hope to find easy top-down solutions and rather realize the value of the concerned people and institutions on each scale, but particularly at local society level.

Keywords: Innovation platform, farming system, socio-ecology, systems theory, sociology, local society, district level agrifood systems, local actors, transformation

1. Introduction

Social and technological transformations of farming systems happen on a continuous base, as they are embedded as processes within larger societal contexts. Our understanding on these processes depend hence on our theoretical or practical perceptions of history, society and economy. This narrative is proposing a theory based on sociology but crossing its borders in order to highlight the function and role of innovation platforms (IP) as a means to practically transform and adapt farming systems at sub-national level. We built the arguments on realities from Southern countries with a colonial history. Farming systems of this context are the first to experience the effect of globalization.

Food and agriculture are contentious issues in modern times. Globalization and world markets are reshaping communities, nations, trade regimes, production technologies and human destinies all over the planet. Rural poverty, weak states, hunger, deteriorating landscapes, depleted soils, diminished water tables, declining biodiversity and climate change pose grim pictures after over 60 years of development work at international level (IAASTD, 2009; Luhmann, 2004; Ziegler, 2011). Farmers and land laborers working on shrinking land resources have become the people most vulnerable to food insecurity in African societies. Their voices are politically marginalized and rarely heard by the state, thus farmers do not participate in technology development policy discussions. Agricultural technologies are dominated by multinational agro-industries that often control global market channels. Agricultural economics was dealing as a specialized discipline with the market and policy dimensions, mainly within national boundaries or covering specific value chains. Rural sociology, strongly developed in the USA and later in Europe, has covered mainly the societal conditions of farmers and rural populations since the early 20th century. Since about the 1980ties, environmental, social, political and cultural dimensions have multiplied the research complexity. Interdisciplinary and transdisciplinary research is growing fast since, but with unsatisfactory results (Alrøe & Noe, 2014) . The body of science itself is divided since the 17th century into natural and moral or cultural sciences. Natural sciences produced a huge body of knowledge, which was instrumental for modern technology. It shaped modern civilization and was instrumental for a tremendous growth of material wealth. Moral, cultural, social and historical sciences dealing with food and agriculture lacked the prestige and were never able to provide an effective body of scientific knowledge.

Nowadays it is a less contested fact that both agriculture, food systems and rural development as well as science are co-produced by humans and their societies (Nicolay, 2016). Our agricultural and food systems are shaped by scientific and technologic development of the last 200 to 500 years. Commodity chains (like cotton, cacao, palm oil, tea, meat) established for the global market, have formed rural areas by technology innovation in plantations and worker migration attracted by fabrics and urbanism. The wealth created with industrialization has contributed to an explosion of scientific workers, disciplines and journals. Since some years, the majority of people live in urban settings, in both industrialized and so-called developing countries. Farming systems research, trying to cope with this new dynamics, grew up in the 1970's, partly as a response to the failure of conventional positivist and reductionist research to address the agricultural problems and livelihood strategies of small farmers in the least developed countries mainly. Hunger in the global society appeared as a scandal and required answers and response from the agriculturalists. Farming system was trying to deal with complexity, sustainability and the same time in integrating natural and social sciences (Giller et al., 2011). However, the systems theory applied was limited to the farm level. "Society at large", including economy, politics and innumerable social systems and organizations, remains mainly ignored. Based on Luhmann (1995), we propose a theory of sociology adapted to the food and agriculture sector in order to fill the gap of our understanding

and handling of the societal “factors and processes that shape and constrain farming systems” (Nicolay, 2016). The Luhmannian system provides two advantages: it captures global society (national societies become sub-systems) and allows the systematic observation with its related environment at local level. Compared with socio-ecological based methods (Kok et al., 2015), it provides factors from social systems within (global) society in order to explain farming transformation. By proposing a method including the full range of factors, from natural environment over farming system, technology and economics to society- including the human factor-, we hope to provide a tool for researchers in the agriculture and food sector, which is robust enough to strengthen the position of science in order to inform policies (Rasmussen et al., 2015).

2. Demystification of Innovation platforms

Farmers are under social influence not only by actors of the agriculture sector, but as well outside it; therefore these key actors should be included by extension approaches, particularly local governments and rural dwellers (Wauters & Mathijs, 2013). Ideally, all “key actors” influencing both adopters and non-adopters of a given area should constitute a platform in the form of an organization in order to identify factors impeding and promoting an adoption or innovation. We then call this platform an IP or Innovation Platform. IP are functional organizations with the potential in dealing with factors going beyond the narrow boundaries of the agriculture sector and farming systems approach but reducing complexity and opening new potentials for creative solutions for the agriculture actors. The challenge from a practical point is to identify the “key actors”. The assumption is that an IP with the complete set of key actors (as individuals) has a high probability to address the relevant “enabling environment” and reduce the risks that participatory technology development between farmers and researchers will fail after a certain period (Bennett & Cattle, 2013; Sterk, Christian, Gogan, Sakyi-Dawson, & Kossou, 2013). Here we believe that sociology can contribute by predicting the key actors in a given context within a country. This requires however sociological competency, which is rarely available within food and agriculture projects and programs. Without a proper sociological understanding, i.e. conceptualizing society and social systems as communication, the risk is high that the key factors will not emerge in the discussions and solutions developed. Sociological bottlenecks will persist and solutions elaborated hardly become effective.

Why is it so hard to understand complex issues within society? Luhmann was of the opinion that a theory of society and therefore of global issues, including agriculture, economy, politics, ecological deterioration, climate change and social discrepancies, was blocked within the discipline of sociology through the distinctions made on national, cultural, regional and politics notions (Luhmann, 1998)¹. These distinctions can be seen as internal societal differences. He then proposed to conceive society as the enclosing social system with the capacity to observe. Through observation, the internal sub-systems are reproducing communication with communication, and operating as autopoietic systems. Society today has reached such a complexity that it can produce many self-descriptions of sub-systems, like food and agriculture, and observe observers of such sub-systems. If we accept this idea, then we have to renounce on only true descriptions- i.e. propositions that are objectively true independent from the perceptive or the observer- of our sector, food and agriculture, and discuss about the meaning of scientific propositions in given time-and

¹ Luhmann’s last publication is used here for most explanations on his theory of society. It summarizes a large body of publications over a span of 30 years. For a shorter overview of the Luhmannian system see also Luhmann (1997)

space bound contexts. We then have, instead of the objective truth, which can be recognized and authoritatively proclaimed, only temporal sequences of communications and evolutionary selections of convincing propositions within specific (social) boundaries. If the target of science is to find regularities in order to understand patterns and make predications, we have to identify and focus on systems rather than elements constituting these systems. This can lead to meaningful scientific knowledge helping to reduce complexity. Farming systems and agricultural operations as communication happen within society. The same can be said for communication related with food processing, retailing and consumption. Structures constituting the food and agriculture sector, like soil fertility management, farming households, sustainable livelihood systems, markets, value chains, transnational corporations, food policies, farmer movements, innovation platforms, agricultural colleges, food security conferences, yam systems or organic cotton systems, R4D² programs and even complex production systems like organic agriculture, can then be observed as differences of social systems. Unfortunately, the concept used for “system” is still the classical one, understanding it as an object rather than a relation of system/environment. Luhmann believes that this fact is due to the European bias in putting people at the center of the worldview, assuming that only people can observe and think (Luhmann, 1998). Value chain systems are understood as objects and they are approached as entities with related elements, treated as social variables. The environment is only seen as context and narratives are describing its function or non-function³. The best we can expect from this object-based method is an infinite accumulation of empirical facts, but hardly any explanatory power. We can assume that this can be prevented, if sociology of agriculture does not perceive its “object” – the food and agriculture sector with its many elements- as an object, but rather than a system/environment difference, in which systems are autopoietic sets of communication. It was clear already from the beginning of the young science of sociology of agriculture, that “agriculture depends on the social, economic and political factors shaping it” (Buttel, 1990). A relatively simple way to visualize society or aspects of it are social network analyses (Brunori et al., 2013; Thuo et al., 2013). However, they cover only one dimension and might be too simplistic for our purposes. Innovation platforms (IP) have become a fashionable concept within agriculture for development, particularly in Africa (Sanyang, Taonda, Kuseu, Coulibaly, & Konaté, 2016; van Rooyen, 2009). In most cases, the members and topics of discussion within them are not guided by social theory but rather by the interests of the initiators of the IP, which reduces their lifespan and the effectiveness. We have worked for years with the concept of learning circles including farmers researchers and extensionists (G. L. Nicolay, Dabire, Fliessbach, Glin, & Sissoko, 2014). We consider them as equivalent to the concept of IP. Another concept used is Rural Resource Centre or RRC, understood as community-based centers used as venues for training and demonstration of new practices which function as a hub for stakeholders interactions (Bertin, Zacharie, Ann, Ebenezar, & Alain, 2014). This concept comes close to the Farmer Field School (FFS) promoted and used since longer time by FAO (EA, 2010). In contexts where adoption is at the center rather than innovation, management areas or bodies are used as a concept (Eakin et al., 2015). In both cases, institutional context, social capital and individual capacities are key variables. All these forms are in principle equivalents of IPs.

We resume hence that innovation platforms constitute a special form of social systems, i.e. organizations. Innovation platforms (IP) are networks or simple social systems with the purpose of solving its member's problems through concrete and systematic communication (and nothing else than communication) in order to produce or construct desired innovation. The platform adopts innovation as a systemic and dynamic institutional or social learning process and recognizes that

² Research for Development

³ See for example (Carolan, 2012)

innovation can emerge from many sources (science, practice, indigenous knowledge or else), complex interactions, and knowledge flows. It comprises the information and understanding of stakeholders and collaborators of diverse societal (economic, media, social, politics etc.) actors as members and the organizations that govern their behavior, all working towards a common objective and a transparent interest. IPs have become a common tool and concept in development in order to facilitate the innovation process (Adekunle & Fatunbi, 2012; Mapfumo P.; Mtambanengwe, 2014; Misiko, 2014; WB, 2012). Experiences with IPs are both positive (Dror, Cadilhon, Schut, Misiko, & Maheshwari, 2015; G. L. Nicolay, 2014; Posthumus, 2014) and critical (Dabire, 2014). Conceived with the proposed sociological method, IP's provide a logical advancement of the farming system perspective and have the promise to supporting sustainability transitions in food and agriculture.

3 Embedding the IP simultaneously in the function systems of global society and its “local society”

We propose to read the “object” social system or society including its natural environment as a text, which has been constructed by many actors, actor-networks and narrated by them to different audiences in various social systems and contexts and social fields. Only on a specific local space and time can it be realistic to understand and “predict” meaningfully phenomena and possible changes with more probabilistic accuracy (Lamine, 2015; G. L. Nicolay, 2016). We might call this a territorial agrifood systems perspective. It is obvious that apart from institutional factors, cultural aspects⁴ are included in such analyses (Kolawole, 2013) as well as multi-level perspectives, including the niche-innovation, the indigenous regime as well the exogenous context of the socio-technical landscape (Geels, 2011). The theoretical base is deduced through a “triangulation” of four theories and concepts (G. Nicolay, 2013b): Luhmann’s social system theory (Luhmann 1998), Bourdieu’s (1994) concept of the capitals, Latour’s concept of actor-networks (Latour, 2005) and Wittgenstein’s language game concept (Wittgenstein, 2010 (1953)). The complexity of today’s food and agriculture systems require adequate tools in order to observe and understand them meaningfully. We use here the term “local societies” in a pragmatic way, going beyond the sociological meaning of social system (just communication), but including relevant “elements” for our purpose like infrastructure, people and land⁵. Our world and society is highly segmented, differentiated and globalized. However, people live locally, act mainly locally and perform their lives in social patterns, which can be unveiled by local people, journalists, artists, politicians, entrepreneurs and scientists just to name some prominent actors in our context. The same is true for our “object” of interest, society/social system within the context of food and agriculture. We hypothesize that every “local society” can be characterized in a meaningful and holistic way by a set of 14 parameters and 82 variables as listed in Tab 1. Seven function systems are proposed as highly relevant for the food and agriculture sector: Economy, Politics, Law, Civil Society, Culture, Mass media and Science.

⁴ In the logic of systems theory: this means memory

⁵ To note that the differentiation process of society –particularly in the Global South- is less advanced at local level, leading to divergent paths of development. Our method is therefore limiting the Luhmannian system only at national to global level. But the global level impacts every local level on earth. This is reflected in Table 1.

Tab.1: List of parameters and variables characterizing a “local society” at sub-national level

Parameter	Variable						
demography	pop density	structure					
infrastructure	health	roads	schools	water	electricity	credit	processing
human capital	age	health	knowledge	dignity	food security	family	migration
economic capital	legal property	agr. markets	investments	farm type	techn. dev	poverty	
financial capital	% HH with cred. Access	incomes (HH, other)					
social capital	customs	trust	education status	networks	cities	clans	Organizations
cultural capital	languages	values	norms	innovations	myths	ritual	collect. memory
symbolic capital	influence	rights	territoriality	governance			
Economy^f	Ag sector	Industry	Services	land market	production	Consumption	land
Politics^f	coherent ag pol	coh. rural dev pol.	security	leadership			
Law^f	property rights	land laws	human rights	labor rights	customary law		
Civil Society^f	local communities	tribes	age groups	CBO	NGO	Move-ments	gender
Culture^f	languages	custom and habits	education	art	collect. stories	religion	
Mass media^f	radio access	TV access	mobile phones acc	internet/ soc.media	press access	wordsOf-mouth	
Research/ Science^f	ag and social sciences	ag research	innovations	higher edu.	farmer research		

^f stands for function system (see Luhmann 1995). The colored fields are considered key variables in the case of the Machanga society survey (Kenya, December 2015)

We complement these function system with the concept and six different forms of capital (human, economic, financial, social, cultural and symbolic) and with the main forms of infrastructure. Each of the 14 parameters is defined by a set of variables, whereby the majority are latent (hence they are further defined by indicators). Now each IP is situated within such “local societies”, which are not concepts or models but real⁶. The main task is to identify the critical variables in respect to the adoption process respective the interests of the IP members. Only by addressing them, sustainable solutions can be found and transformation succeed. The seven function systems⁷ are by “nature” global, but in most cases with outreach up-to local level. Empirically, in each concrete local society we will find a unique constellation of these phenomena, depending on how we make the distinctions (Spencer-Brown, 1972). More decisive is the choice of theses seven function systems, particularly the contested ones: laws, politics, culture and science. We can hypothesize their existence and

⁶ For more details see Nicolay (2015) on ResearchGate

⁷ Each function system has to fulfill a specific function in society. More in Luhmann 1998 and 1995.

even their influence on the food and agriculture sector. Important is to be aware that they are always influenced by a global dimension.

The six forms of capital are less abstract and can be treated as local or national. They are somehow complementary from the globalized function system and include the human factor⁸. Let's take for example the variable "custom". In the social capital form, we can focus our observation on the most striking forms of custom, which we hypothesize that it affects the sector. Here we base our assessment on qualitative and quantitative surveys. The results will provide probabilistic propositions on the specific influence of each identified custom. On the other side, looking at "customs" from the function system perspective, we always need to reflect the global aspect of it; respectively we need to observe customs, which may have their origin outside the locality. Another example are the variables "influence" and "rights" from the symbolic capital parameter. They differ mainly from the "property rights" (Law) and "leadership" (Politics) variables through the nature of the perspective, whereby the capitals include the human factor.

The "local society profiling" defined as capturing its main features is best done by a team of trained sociologists or social scientists; conducting a sort of peer assessment. A team can do the profiling in 2-3 days, if available literature and statistic data is collected beforehand. This team will highlight only the critical variables and parameters and explain them in a report written for non-sociologists. This pragmatic method seems more convenient than conducting a costly (in time and finances) survey of over 300 households in order to get a representative picture of previously elaborated assumptions. The outcome, a report on the societal factors impeding a given adoption by households or farming systems, will then be discussed within expert groups and the IP. The method of using the pre-defined matrix of parameters/variables reduces the subjective differences amongst the experts or peers and facilitates the dialogue and the mutual understanding. Our proposed focus on "local society" might be a neglected sphere of research, as it shows co-effects of the complexity of a globalized world society (Luhmann 1998), but at the same time the specificities of its own territoriality, farming systems, culture and history. Considering that the large majority of people live and work at this scale, including and particularly farmers, land laborers, peasants and consumers, we should better understand this reality and social dynamics, but always in relation to the interest of our research. If not, the overwhelming complexity would make any trial of understanding futile. We have proposed a scientific method based on the concept of "local society" as an element of the global society in order to improve the performance of the IPs. However, understanding the context of the IP is just one of the requirements of a successful transformation. The other part is even more complex and beyond research: it is the management or performance of the IP process.

4. IP management and performance

The purpose of the IP is to induce change, to install a new technology or innovation or to transform parts of the economy and society in order to solve specific problems or to achieve a targeted aim. It is not about producing knowledge, but it has to take a decisive step: to perform a narrative, to act at a collective level in order to assure a socio-ecological transformation. The IP then is like a collective actor reaching out with its performance to a given audience (Alexander, Giesen, & Mast, 2006). This function of the IP is decisive and needs major attention once the IP is installed. The consciousness of its members and the clarity of the social boundaries (decide on tribe, clans, administrative unit etc.), internal rules (of the IP) and identities (symbols) become key factors of

⁸ To recall that humans constitute one form of the environment of society in the Luhmannian system. The other main form is ecology.

success. Moreover, here we leave the safe ground of science and are fully on the stage of development and (performing) action. It goes beyond management as the audience is always in majority representing public interests⁹ and various organizations; food issues are in foremost cases public issues. It is therefore important to have at least one member and leader within the IP who is strong in performing, culturally competent and authentic within the audience. As our audience is in most cases within the range of a “local society” with eventually 10- to 100’000 people, the competency to reach out is key for the success of the IP. What counts at the end is the communication and performance of the needed transformation by the actors; it is not limited on the technical solutions proposed and its knowledge and information.

The most important skill of an “IP facilitator” is to imagine the “local society” which embeds or “hosts” the IP and in which the adoption and transformation process is supposed to happen. This sociological imagination would be an asset in order to steer the process of the IP. Most important is to capture the various dimensions and function systems, which are important in the given process. It can be the visioning of shifting priorities, like economy>politics or then culture>mass media. The time dimension and the dynamics of the group discussions as well as of the surrounding “local societies¹⁰” need to be taken into account. If the empirical part, the previous observation of the local society has been done properly, the issues of the debates will in principles be easier to deal with. This requires both agricultural and sociological understanding of the “context” and skills by the facilitator and high social competency. This performing act is always related to intuition and is so closer to art than to science. But as long as the foundation is based as well in scientific reflection and theory, the following discourses should allow transparent and fruitful dialogs. Fruitful as the situational and subjective dimension will break the artificial boundaries of scientific disciplines or practical routine. Sterile monologues and silo thinking can be minimized and the living phenomena, as they are at stake during the debates, discussions and performances, should be at the center. Mega-topics like SDGs (sustainable development goals), gender and climate change have so better chances to be addressed as important cross-cutting issues. The IP facilitator needs support by various organizations having a solid status and influence in the “local society”; ideally universities and the Ministry of Agriculture are part of them. One element of the support is a shared vision on the current dynamics of both the sector and larger socio-economic development by the involved organizations and involved leaders. More universities should become active in developing joint curricula and research projects between agriculture and social science departments. In Kenya, the Kenyatta University (KU) has embarked on such a program but will need more support in order to train MSc and other students in better integrating agronomics, economics, sociology and rural development.

IP success requires therefore theory and practice, research and development, hard and soft, written and oral skills. This may become a challenge if the moderation of the IP is under the responsibility of an organization, which is not encouraging managerial and action-performance but rather academic production. In order to induce (societal) change, science and research based knowledge needs translation and discussions within social groups and amongst real people in real settings. Books and manuals alone are just not enough.

⁹ Like food security, justice, peace, sustainable development, fairness, soil and biodiversity preservation etc.

¹⁰ To note that we have to deal with many “local societies” within a nation, over 100’000 worldwide (according on how we draw the line or boundary), but only one (1) Global Society.

5. Conclusion and Outlook

We propose as a first prerequisite of implementing successful design methods a broad and systemic scientific concept of society as our object, which enlarges the scope for social and human sciences within the sector. Secondly, as the phenomena studied and treated are forms of life and unique creations in time and space, only locally knowledgeable stakeholders can solve the concrete problems with the eventual support of science and research. Beforehand, the stakeholders need to properly identify the real problems; a process, which is often done too hasty and superficially. Innovation platforms are proposed as an innovative institution capable to manage these processes. We recognize that the performance of the IP is as important as the internal processes in identifying solutions. This performance is more than communicating; it is changing the behavior of the audience. We should finally give up the hope to find easy top-down solutions and rather realize the value of the concerned people and institutions on each scale, but particularly at village to district level. A new understanding of the evolutionary nature of socio-ecological forms of agriculture and food systems is required, which breaks with the artificial boundaries between nature, humans and society and considers concepts and ideas like “thought”, “life”, “consciousness”, “memory¹¹”, “right”, “person” and “freedom” as truly researchable ones, which can and shall be applied scientifically. We propose with this method a list of parameters and variables to get as close as possible to catch these concepts, knowing that there will remain a difference between the method, its application and “reality”. However, we can make a significant improvement in catching “reality” and facilitating transformation of agriculture and agrifood systems, if we succeed to integrate in our narratives and reports variables like dignity, trust, value, collective memory, human rights, art and religion. They all relate to food and agriculture in our time.

We agree with Campbell (2015), that rather to be divided by theoretical differences, we have to agree on the political intent in order to achieve greater food security, food justice, democratic control of supply, demand and resources; and sustainability and resilience. This proposed approach in promoting IP's in a sociological intention might be close to the lenses of New Institutional Economics (Ménard, 2011), but it goes beyond the core issues of economics. At the end, the participants will realize that issues of food and agriculture are in fact issues of life, in which humans and society are included and interwoven with biological and psychological phenomena, always moving and never static (H. Bergson, 1911). The participatory nature of IP's embedded in a set of participating institutions like universities, state offices (like Ministry of Agriculture), farmer organizations, private sector actors and industry, and NGO/CBO can catalyze transformative processes in a systemic and sustainable way, at least at local level. The current state of Modernity requires major changes in order to face the manifold challenges (Alexander, 2013). Agriculture is at a cross-road (IAASTD, 2009), the future of sustainable farming, of our agricultural land, of the living conditions in rural and urban areas including the natural climate, of dignity and justice, of peace and civilization is open. The performance of agriculture, food systems and rural development will play an important role at both local/national and regional/global level. A more unified and coherent science, based on collective meaning and faith in the power of truth is indispensable for mastering this crossroad. We can collectively repair some of the many damages done since the Five centuries of Western imperialism. Sociology can provide explanations on the main strains of concern, but it can only become effective if integrated in the existing knowledge pool of agricultural scientists and practitioners. More research on the complex socio-ecological realities at local level and their relations with the function systems at global society level is required.

¹¹ Often called culture

Acknowledgements

This research paper became possible thanks to four different projects run over the last years in Africa or still ongoing. Our acknowledgement goes to EuropeAid (Syprobio), Swiss National Science Foundation and Swiss Agency for Development and Cooperation (ORM4Soil and Yamsys) and finally to the Austrian Government (ConneSSA/ERAfrica). My personal thanks goes to Rainer Weissshaidinger from FiBL Austria, Jane Wangaruro and Francis Kerre from the Sociology Department of Kenyatta University, which all participated in testing and improving the above sociological method in Kenya, as well as to Michael Hauser for his critical reading of the manuscript.

References

- Adekunle, A., & Fatunbi, A. (2012). Approaches for Setting-up Multi-Stakeholder Platforms for Agricultural Research and Development. *World Applied Sciences Journal*, 16(7), 981-988.
- Alexander, J. C. (2013). *The Dark Side of Modernity*: Wiley.
- Alexander, J. C., Giesen, B., & Mast, J. L. (2006). *Social Performance: Symbolic Action, Cultural Pragmatics, and Ritual*: Cambridge University Press.
- Alrøe, H. F., & Noe, E. (2014). Second-Order Science of Interdisciplinary Research: A Polyocular Framework for Wicked Problems. *Constructivist Foundations*, 10(1), 65-76.
- Bennett, J. M., & Cattle, S. R. (2013). Adoption of Soil Health Improvement Strategies by Australian Farmers: I. Attitudes, Management and Extension Implications. *The Journal of Agricultural Education and Extension*, 19(4), 407-426. doi:10.1080/1389224X.2013.775954
- Bergson, H. (1911). *Creative Evolution*: H. Holt and Company.
- Bergson, H. (1938 (2013)). *La pensée et le mouvant. Essais et conférences*. Paris: Quadrige.
- Bertin, T., Zacharie, T., Ann, D., Ebenezar, A., & Alain, T. (2014). Scaling-up Sustainable Land Management Practices through the Concept of the Rural Resource Centre: Reconciling Farmers' Interests with Research Agendas. *The Journal of Agricultural Education and Extension*, 20(5), 463-483. doi:10.1080/1389224X.2014.913984
- Bourdieu, P. (1994). *Raisons pratiques: Sur la théorie de l'action*: Editions du Seuil.
- Brunori, G., Barjolle, D., Dockes, A.-C., Helmle, S., Ingram, J., Klerkx, L., . . . Tisenkopfs, T. (2013). CAP Reform and Innovation: The Role of Learning and Innovation Networks
- La réforme de la PAC et l'innovation : le rôle des réseaux d'apprentissage et d'innovation
- Die Reform der GAP und Innovation: Die Rolle von Lern- und Innovationsnetzwerken. *EuroChoices*, 12(2), 27-33. doi:10.1111/1746-692x.12025
- Buttel, F. H. L., Olaf F., Gillespie, G. W. (Ed.) (1990). *The Sociology of Agriculture*: Rural Sociology Society.
- Campbell, H. (2015). In the long run, will we be fed? *Agriculture and Human Values*, 33(1), 215-223. doi:10.1007/s10460-015-9639-2
- Carolan, M. (2012). *The Sociology Of Food And Agriculture*: Routledge.
- Dabire, D. A., N.; Diallo, A.M.; Coulibaly, K.; Posthumus, H.; Djamen, P.; Triomphe, B. (2014). *Conception et mise en oeuvre des plateformes d'innovation multi-acteurs autour de l'Agriculture de Conservation (AC) au Burkina*. Paper presented at the 1st Africa Congress on Conservation Agriculture, Lusaka.

- Dror, I., Cadilhon, J. J., Schut, M., Misiko, M., & Maheshwari, S. (2015). *Innovation Platforms for Agricultural Development: Evaluating the mature innovation platforms landscape*: Taylor & Francis.
- EA, SUSTAINET. (2010). *Technical Manual for farmers and Field Extension Service Providers: Farmer Field School Approach*. Sustainable Agriculture Information Initiative
- Eakin, H., York, A., Aggarwal, R., Waters, S., Welch, J., Rubiños, C., . . . Anderies, J. M. (2015). Cognitive and institutional influences on farmers' adaptive capacity: insights into barriers and opportunities for transformative change in central Arizona. *Regional Environmental Change*, 16(3), 801-814. doi:10.1007/s10113-015-0789-y
- Geels, F. W. (2011). The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental Innovation and Societal Transitions*, 1(1), 24-40. doi:<http://dx.doi.org/10.1016/j.eist.2011.02.002>
- Giller, K. E., Tittonell, P., Rufino, M. C., van Wijk, M. T., Zingore, S., Mapfumo, P., . . . Vanlauwe, B. (2011). Communicating complexity: Integrated assessment of trade-offs concerning soil fertility management within African farming systems to support innovation and development. *Agricultural Systems*, 104(2), 191-203. doi:<http://dx.doi.org/10.1016/j.agsy.2010.07.002>
- IAASTD. (2009). *Agriculture at a Crossroads. International assessment of agricultural knowledge, science and technology for development (IAASTD) : global report*. Retrieved from
- Kok, M., Lüdeke, M., Lucas, P., Sterzel, T., Walther, C., Janssen, P., . . . Soysa, I. (2015). A new method for analysing socio-ecological patterns of vulnerability. *Regional Environmental Change*, 16(1), 229-243. doi:10.1007/s10113-014-0746-1
- Kolawole, O. D. (2013). Soils, science and the politics of knowledge: How African smallholder farmers are framed and situated in the global debates on integrated soil fertility management. *Land Use Policy*, 30(1), 470-484. doi:<http://dx.doi.org/10.1016/j.landusepol.2012.04.006>
- Lamine, C. (2015). Sustainability and Resilience in Agrifood Systems: Reconnecting Agriculture, Food and the Environment. *Sociologia Ruralis*, 55(1), 41-61. doi:10.1111/soru.12061
- Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory*: OUP Oxford.
- Luhmann, N. (1995). *Social systems*: Stanford University Press.
- Luhmann, N. (1997). Globalization or World society: How to conceive of modern society? *International Review of Sociology*, 7(1), 67-79. doi:10.1080/03906701.1997.9971223
- Luhmann, N. (2004). *Ökologische Kommunikation: kann die moderne Gesellschaft sich auf ökologische Gefährdungen einstellen ?*: VS Verlag für Sozialwissenschaften.
- Luhmann, N. (Ed.) (1998). *Die Gesellschaft der Gesellschaft (The English translation: Theory of Society)* (Vol. 1 and 2): Suhrkamp.
- Mapfumo P.; Mtambanengwe, F. N., H.; Manzeke, M. G. (2014). *Options for adaptation of Conservation Agriculture practices on nutrient-depleted soils by smallholder farmers in Southern Africa*. Paper presented at the 1st Africa Congress on Conservation Agriculture, Lusaka.
- Ménard, C. (2011). A new institutional economics perspective on environmental issues. *Environmental Innovation and Societal Transitions*, 1(1), 115-120. doi:<http://dx.doi.org/10.1016/j.eist.2011.04.002>
- Misiko, M. (2014). *Extending Conservation Agriculture benefits at landscape through Agricultural Innovation Platforms*. Paper presented at the 1st Africa Congress on Conservation Agriculture Lusaka
- Nicolay, G. (2013b). *The meaning of social and the role of social sciences in agriculture: Peasant driven research for food security in West Africa*. FiBL
- Nicolay, G. L. (2014). *Syprobio in a Nutshell. Farmer-researcher networks and North-South partnerships to transform West African agriculture and society towards sustainability, justice and wealth*. FiBL.
- Nicolay, G. L. (2015). *Scientific Foundation of "Agriculture, Food systems and Rural development" and some Practical Implications for Sociology*.
- Nicolay, G. L. (2016). *Integrated Organic Agriculture Research- African Experiences from the European Perspective*. Paper presented at the Third African Conference on Organic Agriculture, Lagos.

- Nicolay, G. L., Dabire, R., Fliessbach, A., Glin, L., & Sissoko, F. (2014). SYPROBIO: Driving farmer-led innovation platforms to address food security, poverty alleviation and resilience to climate change in West African cotton communities. In W.-B. A. Triomphe B, Klerkx L, Schut M, Cullen B, Kamau G & Le Borgne E (Ed.), *Innovation in smallholder farming in Africa: recent advances and recommendations*. Proceedings of the International Workshop on Agricultural Innovation Systems in Africa (AISA) (pp. 229). Nairobi, Kenya. Montpellier: CIRAD.
- Posthumus, H. M., R.; Wongtschowski, M.; Pound, B.; Misiko, M.; Andersson, J.; Triomphe, B.; Mapfumo, P. (2014). *A reflection on the role of innovation platforms for Conservation Agriculture in Africa*. Paper presented at the 1st Africa Congress on Conservation Agriculture, Lusaka.
- Rasmussen, K., D'haen, S., Fensholt, R., Fog, B., Horion, S., Nielsen, J. O., . . . Reenberg, A. (2015). Environmental change in the Sahel: reconciling contrasting evidence and interpretations. *Regional Environmental Change*, 16(3), 673-680. doi:10.1007/s10113-015-0778-1
- Sanyang, S., Taonda, S. J.-B., Kuiseu, J., Coulibaly, N. T., & Konaté, L. (2016). A paradigm shift in African agricultural research for development: the role of innovation platforms. *International Journal of Agricultural Sustainability*, 14(2), 187-213. doi:10.1080/14735903.2015.1070065
- Spencer-Brown, G. (1972). *Laws of form*: Julian Press.
- Sterk, B., Christian, A. K., Gogan, A. C., Sakyi-Dawson, O., & Kossou, D. (2013). Five Years After; the Impact of a Participatory Technology Development Programme as Perceived by Smallholder Farmers in Benin and Ghana. *The Journal of Agricultural Education and Extension*, 19(4), 361-379. doi:10.1080/1389224X.2013.782819
- Thuo, M., Bell, A. A., Bravo-Ureta, B. E., Okello, D. K., Okoko, E. N., Kidula, N. L., . . . Puppala, N. (2013). Social Network Structures among Groundnut Farmers. *The Journal of Agricultural Education and Extension*, 19(4), 339-359. doi:10.1080/1389224X.2012.757244
- van Rooyen, A. H., Sabine. (2009). Innovation platforms. A new approach for market development and technology uptake in southern Africa. In <http://www.icrisat.org/locations/esa/esa-publications/Innovation-platform.pdf> (Ed.): ICRISAT.
- Wauters, E., & Mathijs, E. (2013). An Investigation into the Socio-psychological Determinants of Farmers' Conservation Decisions: Method and Implications for Policy, Extension and Research. *The Journal of Agricultural Education and Extension*, 19(1), 53-72. doi:10.1080/1389224X.2012.714711
- WB. (2012). *Agricultural innovation systems : an investment sourcebook*
- Wittgenstein, L. (2010 (1953)). *Philosophical Investigations*: Wiley.
- Ziegler, J. (Ed.) (2011). *Destruction massive. Géopolitique de la faim (English: Massdestruction-The Geopolitics of Hunger)*. Paris: Éditions du Seuil.