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Agroecology as a vehicle for contributive justice

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Abstract: Agroecology has been criticized for being more labor-intensive than other more industrialized forms of agriculture. We challenge the assertion that labor input in agriculture has to be generally minimized and argue that besides quantity of work one should also consider the quality of work involved in farming. Early assessments on work quality condemned the deskilling of the rural workforce, whereas later criticisms have concentrated around issues related to fair trade and food sovereignty. We bring into the discussion the concept of contributive justice to welcome the added labor-intensity of agroecological farming. Contributive justice demands a work environment where people are stimulated to develop skills and learn to be productive. It also suggests a fairer distribution of meaningful work and tedious tasks. Building on the notion of contributive justice we explore which capabilities and types of social relationships are sustainably promoted and reinforced by agroecological farming practices. We argue that agroecological principles encourage a reconceptualization of farm work. Farmers are continuously stimulated to develop skills and acquire valuable experiential knowledge on local ecosystems and agricultural techniques. Further, generalized ecological studies recognize the significance of the farmer's observations on natural resources management. This contributes to the development of a number of capabilities and leads to more bargaining power, facilitating self-determination. Hereby farm work is made more attractive to a younger generation, which is an essential factor for safeguarding the continuity of family farms.

Keywords: Meaningful work, Knowledge-intensive farming, Capabilities, Peer recognition, Mutual influence, Self-determination, Empowerment

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Introduction

There is a protracted debate in the literature about the merits of conventional versus agroecological agriculture (Pretty 1999; de Ponti et al. 2012; Seufert et al. 2012; Tittonell 2013). This debate commonly overlooks an important dimension: labor. We aim to show by making use of the recently developed concept of contributive justice that agroecological farming has a considerable non-alimentary advantage for farmers; it strongly stimulates the provision of meaningful work by also incentivizing the involvement in less interesting tasks. Agroecological farming demands close attention to all processes occurring on the farm and requires farmers to have a notion of how the farm works as an ecosystem (Gliessman 2007), thereby providing incentives to rotate work stations and team up for problem-solving.

We first explore how agricultural innovation has affected work quality since the first steps taken to industrialize agriculture in the late 19th century. Subsequently we offer a brief overview of the arguments put forward to improve rural labor conditions used during the last century. Then we discuss the added value of using the concept of contributive justice to argue for a fairer provision of meaningful work in agriculture. We do so by exploring which capabilities1 and types of social relationships are sustainably promoted and reinforced by agroecological farming practices and defend the added labor-intensity of this farming style for the number of advantages it brings to society.

When discussing labor, we should keep in mind that people spend a considerable amount of time working;2 indeed so much that the types of work people are engaged with not only affect their well-being while working but also during leisure time. Both remunerated and non-remunerated work leave deep marks on people's lives, especially when undertaken over a prolonged period of time or when experienced as intensive. Agriculture is the trade that employs

1 Capabilities are the real opportunities people have to do and be what they have reasons to value (see Robeyns 2011).

2 We use the term "work" in a very broad sense, mostly as a medium to secure one's livelihood or that of others. A crucial characteristic is therefore commitment, instead of mere spontaneous devotion (as with individual hobbies).

the largest amount of people in the world, involving 2.5 billion smallholders (Holt-Giménez and Altieri 2013). Any improvements in labor conditions will therefore have an enormous effect on overall human welfare.

Agricultural yields, labor intensity, and the loss of skills

It is difficult to reach an agreement on when exactly what we now call conventional agriculture began. The industrial revolution brought a steep rise in population and an increasing number of people working outside farms had to be fed. This created a strong incentive for scientists to dedicate time and efforts to increasing agricultural yields while decreasing the required amount of labor. In the late 19th century three major technical and scientific innovations were introduced in the fields at an increasingly large scale: steam-powered machinery, chemical fertilizers, and high-yield crop varieties bred outside farms (Louwaars et al. 2013). Steam-powered machinery reduced the necessity of manual labor, mass-produced chemical fertilizers substituted farmer-made fertilizers and commercial seed varieties replaced farmers' seed varieties. These changes were implemented to increase harvest yields and were often welcomed by farmers in view of increased productivity. The growing demand also gave rise to a highly profitable industry dedicated to producing agricultural tools and inputs (Mazoyer and Roudart 2006). Feeding the rising population was perceived as a central goal in this period and science was at the service of agriculture to assist in increasing the production of food.

A second movement within industrialization came in the early 20th century and here we can name Frederick W. Taylor as the main protagonist. Although he himself did not concentrate on agriculture, the school of thought he gave rise to—scientific management—had strong influences on agriculture (see Schlett 2012; Bonilla and Ribas 2011; Gibbon and Riisgaard 2014). Scientific management sought to increase efficiency by ensuring that the individual worker "can do (at his fastest pace and with the maximum of efficiency) the highest class of work for which his natural abilities fit him" (Taylor 1911 [1998], p. 3). Many followers tried to achieve this goal by establishing a strict division of labor (Fitzgerald 2003). Workers had to specialize in a small number of tasks; this reduced training costs and made it easier to counter absenteeism. Improving labor conditions was commonly promoted as a means to boost

production (Wood 1987). This movement characterized by its strong emphasis on increasing agricultural production and success was usually measured by a single metric: higher yields.

Already in the 1930s people started to notice the negative effects of strict division of labor and criticized the deskilling of the overall workforce (see Braverman 1974 [1998]). With the disuse of a large number of skills, many became lost. Efforts that had the target of making agricultural work less difficult had the negative drawback of creating a workforce that was strongly dependent on agricultural inputs increasingly controlled by a small number of corporations (Gliessman 2007). Monotonous work led to boredom; increasingly absentminded workers caused accidents, while others sought excitement through acts of sabotage (Braverman 1974 [1998]). Apart from making much of the work in large-scale farms monotonous, the new technologies and organizational changes contributed to making agroecosystems simpler and thus more vulnerable to external pressures and dependent on the availability of external fossil energy. This dependency was augmented by decades of technical and scientific progress as more machinery was developed for employment in agriculture and synthesized chemical pesticides became available.

As the Green Revolution showed its first major successes towards food security, the environmental and social costs of this achievement became difficult to ignore. The wide use of agrochemicals has had a huge impact on human and environmental health (McIntyre et al. 2009; Muñoz Quezada 2011). The ratio of skilled farmers to hired seasonal workers decreased drastically with the expansion of large-scale conventional farms (Altieri and Toledo 2011). The social recognition of farm work has been devalued to such levels that it is becoming difficult to attract a younger generation to the fields (see Iles and Marsh 2012).

These changes led to an ongoing debate around deskilling in agriculture, which has concentrated around three main issues. (1) Farmers are increasingly dependent on externally produced agricultural inputs, such as seeds, fertilizers, and pesticides, many of which they were able to produce themselves in the past (Kloppenburg 2010; Bernstein 2014; Gilbert 2013). (2) There is a huge loss of tacit knowledge as people are increasingly alienated from the different stages of food production and preparation, augmenting reliance on processed food (Jaffe and Gertler 2006). (3) While the reduction of skills needed to participate in a work environment allows wider inclusion, it comes at the cost that individual farmers become increasingly

replaceable. Landless farmers thereby lose bargaining power to demand better work conditions and a stronger voice in management decisions (Erenstein and Thorpe 2011).3

The appeal to reduce deskilling has had a considerable weakness as a policy instrument. Its objectives are mostly utilitarian; stimulating the acquisition of skills is a means to counter increasing dependency, combat the loss of tacit knowledge, and strengthen the ties of the laborer to the workplace. The appeal is therefore vulnerable to being undermined by higher societal goals, such as food security, or by alternative measures that cap some of the negative effects, such as offering subsidies for agricultural inputs, incentivizing initiatives to record farming practices that are coming into disuse, and drafting more protective labor laws.

In the international politics arena, as hunger started to disappear from some regions of the world (Evenson and Gollin 2003), food security slowly became a target that had to be balanced with other societal goals: the protection of the environment and improving the welfare of those involved in food production. Farmers have objected to being a mere part of the machinery that produces food and their demand for a more powerful voice in the choice of food production methods and the type of crops that should be cultivated grew stronger (see Ploeg 2010). This demand echoed in civil society movements. In the 1990s we can thus observe the rise of the food sovereignty movement, demanding greater autonomy in the food production sector (Beuchelt and Virchow 2012; Holt-Giménez and Altieri 2013) and a number of fair trade certifiers, seeking to guarantee better wages and work conditions (Raynolds 2014). Advocates of sustainability increasingly claim that society cannot reach sustainability without being socially sustainable (Food Ethics Council 2010). Fighting hunger should not continue to serve as an overruling rationale to limit autonomy in decisions concerning food production and fair returns on labor. The utilitarian reasoning affirming that hunger is worse than bad jobs should stop serving as an excuse to undermine labor rights. These first two movements changed the discourse by shifting the discussion to an issue of rights, and most importantly, by demanding a central freedom upheld by liberal societies: more autonomy (see Gonzalez de Molina 2013).

Globalization brought major societal changes from the early 1980s onwards attracting the attention of a large number of researchers in the humanities and social sciences, contributing to important progress in the philosophy and sociology of labor. Workplaces were displaced and

3 For example, seasonal farm workers without a valid work permit have little or no bargaining power (for the United States, see Oxfam America 2004).

automatization continued to replace workers with machines. More and more people searched for an occupation that they were unable to find. The idea of full employment became something that had to be given up (Lerner 1994; Van Parijs 1997). The establishment of welfare states allowed a large number of people to perceive work as something else than an absolute necessity to secure basic needs. Once work was sought not only out of necessity, but also to gain a profession—a distinctive role in which to play a constructive function in society—society started to gain a deeper understanding of the benefits of work beyond securing livelihood. Quality of work thus became a subject of increasing attention.

The loss of skills that came with industrialization did not occur without stimulating the development of new skills. Here we use the opportunity to draw the first conceptual distinctions between agroecology and industrial agriculture. Conventional farming systems outsourced much of the production of agricultural inputs to a specialized industry, relying heavily on standardized solutions developed by specialists in agrochemical companies and research institutes (Borlaug 2007). Agroecological systems, in contrast, aim to reduce the dependence on non-renewable external inputs for the production of food, fiber, and medicines, requiring major individual ingenuity to mimic ecological functions into their own environmental and social conditions (Ewel 1999; Altieri 2003; Funes-Monzote et al. 2009). Due to an increased division of labor, conventional agriculture displaced many tasks outside the fields, creating new, albeit fewer, workplaces in agrochemical, seed, and agro-machinery industries. A number of farmers became much more knowledgeable in the technical and scientific dimensions of what now has become conventional agriculture. Agricultural inputs had to be administered and machinery serviced, tasks that demanded new skills. Larger farms needed managers, also requiring new skills. However, these newly demanded tasks were taken over by only a small group as farms grew in size. Hence, when assessing the overall loss of skills within the agricultural workforce it is essential to take into consideration the size of the farm and the amount of labor the cultivated crops require. When a crop needs little attention, a large harvest can be done by a small number of highly skilled farmers relying on the help of a larger number of low-skilled day-workers (Fitzgerald 2003; Mazoyer and Roudart 2006). In these latter cases, when considering the number of skills mastered by the average farmworker, we can indeed speak of a deskilled rural workforce.

An additional factor affecting agricultural labor was that the negative environmental effects caused by food production forced farmers to adapt their production methods to the changing conditions throughout the World. Pesticides and fertilizers had to be used in higher doses than at the beginning of the Green Revolution to maintain harvest yields (Gliessman 2007; Glare et al. 2012; Rashid et al. 2013). Agriculture is also being pressured to become multifunctional and focus on more than high yields (McIntyre et al. 2009; Popp et al. 2013). Rising transportation costs and sophisticated consumer demands provide incentives to produce out of seasons and in adverse climate regions, stimulating farmers to innovate. Necessity and opportunity made farmers switch to alternative farming styles and develop new paths. Some farmers have opted to rely even more heavily on the advancement of science and the development of new technologies, following a trend coined "precision agriculture" (Bongiovanni and Lowenberg-DeBoer 2004; Gebbers and Adamchuk 2010; Paarlberg 2010). Others opted to continue employing the techniques of conventional agriculture but substituted many of the inputs with variants permitted by organic certifiers (Rosset and Altieri 1997). Another group of farmers has adopted agroecological principles. We dedicate our attention to this latter farming practice, as it is the direction that can be followed by a much larger group of people, and has included the ecological, technological, and socio-economical factors from an early stage of its new rise (Gliessman 2013; Méndez et al. 2013).

While keeping in mind that jobs are a scarce good, we show how the concept of contributive justice can build on the latest achievement in shifting the discourse to an issue of rights and argue for opportunities to meaningfully contribute in the field of agriculture through agroecological farming.

What is contributive justice?

Contributive justice can be defined as what people are expected and able to contribute in terms of work (Sayer 2009).4 This demands collective responsibilities to facilitate work and training environments that allow productivity and participation (Britz and Lipinski 2001). It also demands individual responsibilities, such as doing one's share to maintain the social institutions

4 Andrew Sayer builds on the concept of contributive justice elaborated by Paul Gomberg (2007).

one relies on. The functioning of society depends upon the fulfilment of both tasks that are perceived as tedious and work that is considered meaningful. Acknowledging this reality, contributive justice demands that both tedious tasks and meaningful work be distributed fairly among capable individuals without indefensible discrimination.

The moment we think about meaningful work and tedious tasks as something that have to be distributed, we also need to have an understanding of how work is to be understood as a resource (see Walsh 1994). Is work an exhaustible or an unlimited resource? People have a limited capacity to undertake work, something that varies strongly between each individual and the type of work the individual engages in. Furthermore, some types of work can only be reasonably undertaken a certain number of times. It only makes sense to clean something that is dirty. Watering a plant a second time in a row can be counterproductive. Other types of work share the nature of positional goods, namely only a restricted number of people can play the heroine (or hero) of a movie. In sum, much of the work that is necessary for the functioning or well-being of society is finite.

Research is a type of work in which a far greater number of people could get involved, but here we find a different type of constraint. Research needs to be sustained by people undertaking other types of work (e.g., food production, maintenance of sanitation systems, transportation, etc.). This kind of work is only sustainable when others or oneself also carry out additional work. The challenge we thus face is to incorporate opportunities to stimulate people's creativity and ingenuity while undertaking less attractive tasks.

Recognizing that reasonable and sustainable work is a limited good—current unemployment rates are vivid proof thereof5—obliges us to consider an institutional order that offers a more appealing assortment of work.

This leads us to the main problem, how can we justify a larger provision of meaningful work? This is of special concern when creating additional work opportunities conflicts with other social and individual interests. While some find work as fulfilling, others opt for time off (Van Parijs 1991). The idea of contributive justice starts with the assumption that people are searching for more ways to positively contribute to society than there are opportunities to engage in meaningful work. Highly competitive labor markets are evidence that meaningful work is a

5 As far as subsistence goes, it is important to note that only 12% of the world's unemployed receive any kind of unemployment benefits (International Labour Organization 2014).

scarce resource. Contributive justice demands that this scarce resource be distributed fairly and that efforts are made to create reasonable meaningful work if socially advantageous. There are two main arguments to justify this demand: (1) work promotes the development of capabilities and creates an atmosphere that enables recognition, and (2) society owes people opportunities to work under fair conditions for recognizing pre-established institutions.

The first argument is strongly rooted in social agreements and human rights declarations.6 Humans, by virtue of their humanity, deserve opportunities to flourish and develop their potentials (Nussbaum 1997). This was a decision made in a number of societies around the world and societies that take this goal seriously should undertake a series of steps to progressively secure this right to citizens (Beitz 2009). Work as the conscious activity that takes most of people's time has to provide a minimum of opportunities to develop people's potential and recognize people's effort.

Somewhat more complex is the reasoning behind the second argument. Land ownership makes work for hire mandatory. There is simply not enough land so that every person can be her own boss. Because today's workers had no possibilities to influence past land ownership arrangements, they can demand decent work conditions for their recognition of previously established institutions. But, what do "decent" work conditions amount to? At a minimum, the quality of the hired workers' lives should be better than had these institutions not existed. A higher threshold can be demanded if we rely on the concept of cooperative justice (De Briey and Van Parijs 2002). A number of institutions can only function efficiently when people cooperate, thus whoever participates in a joint endeavor should be entitled to a fair share of benefits and assume part of the involved costs. Through the recognition of property titles many social advances have been possible, such as the development of labor-saving technologies and machinery. We cannot provide an answer on how much those benefiting from commonly established institutions should return to society, as this is a centuries-old debate (see Simon 2001). It is important to note however, that there is widespread agreement that those participating in cooperative endeavors are entitled to more than what they would have received living on their own in nature.

6 See, for example, the Universal Declaration of Human Rights (1948), article 22 (on dignity and development of personality), article 23 and 24 (on work), article 26 (on education), and article 27 (on participating in scientific and cultural life).

Appealing to majority rule, there is a substantial demand for quality labor and agriculture is an area that could employ a far greater amount of reasonable and sustainable work. Reasonable work, in the sense that society could profit from higher yields and a greater variety in agricultural outputs, and sustainable work, in the sense that higher outputs justify and secure more labor. Especially because of its self-sufficiency, its low impact on neighboring ecosystems and knowledge-intensity we discuss agroecological farming as a worthwhile alternative to be promoted. After a short introduction of the basic principles of agroecology, we discuss how agroecology can support contributive justice.

Agroecology and the benefits of knowledge-intensive farming

Already in 1930 the Russian scientist Basil Bensin advocated the need to consider the effects of the intensification of agriculture on the entire ecosystem (Gliessman 2013). Since then a number of researchers explored how the scientific disciplines of agronomy and ecology could complement each other (Francis et al. 2003; Dalgaard et al. 2003; Gliessman 2007). A new rise of agroecology emerged in the 1970s in Latin America as researchers moved beyond studying the ecosystem from a natural science perspective and started to examine the socioeconomic, sociocultural, and political dimensions of agriculture (Méndez et al. 2013; Sevilla Guzmán and Woodgate 2013). While some research institutes continue to focus primarily on the natural sciences perspective (Wezel and Soldat 2009), we concentrate on the branch of agroecology that has adopted the social and economic dimension in its research agenda, also known as the food systems approach (Altieri and Nicholls 2005; Gliessman 2007; Tomich et al. 2011).7 Taking this broader perspective allows us to appreciate agroecology as a science, a practice, and a social movement (Wezel et al. 2009).

After recognizing some of the major problems in the food production sector, agroecology has adopted a different rhetoric, as it aims for the peaceful coexistence of production systems and their internal and adjacent ecosystems. Agroecological practice seeks to transform agriculture into an agroecosystem that is interwoven to the other neighboring communities and ecosystems,

7 Three strains within agroecology have been identified: the food systems approach, the agroecosystem approach, and the plot or field approach (see Wezel and Soldat 2009).

creating a matrix of ecological elements in the landscape (Perfecto et al. 2009). Agroecology as a farming system is guided by a set of principles (Gliessman 2002) that need to be adapted to different socio-ecological contexts (Nicholls and Altieri 2011), thereby demanding farmers' own initiative to innovate. The following are the most accepted principles of agroecology (Altieri 2002; Reijntjes et al. 1992; Ewel 1999; Méndez et al. 2013):

- Diversify species and genetic resources in time and space;
- Enhance flows and cycles of energy and matter by increasing capture, retention, and recycling of resources (water, nutrients);
- Maintain and improve soil quality conditions for proper biological activity, including plant growth;
- Maximize intergenerational benefits (not only annual profits) and secure intergenerational (knowledge) transfers;
- Optimize beneficial interactions and synergies between system components, including livelihoods and quality of life for farm workers.

Strategies and practices that promote these principles are subject to the farmer's starting motivation and the effects these changes have on the overall productivity and the capacity to obtain revenues. Agricultural production is embedded in a complex set of social, cultural, political, and economic networks that affect the farmer and her family. The benefits and challenges derived from producing food are often much broader than the set of technical indicators used by agronomists and researchers in their multi-criteria assessment tools that take into account the services of (agro)ecosystems and their contribution to human well-being (López-Ridaura et al. 2002; López-Ridaura et al. 2005; Ginkel et al. 2013).

Because the demand for labor in bigger industrialized farms requires a lower number of skilled workers, farm workers have to migrate, drastically reducing the number of people living in rural areas and limiting rural labor availability for both large and smallholder farms. Especially in Europe, expanding farms absorb smaller ones, resulting in fewer farms, farmers, and farming families, thus contributing to decreased rural labor (Ellis 1998). In Sub-Saharan Africa, shrinking farm size has been observed and interpreted as signs of increasing land scarcity (Otsuka and Place 2013; Tittonell 2014). One may defend these outcomes as desirable, yet economic crises dictate otherwise. In cases where agriculture is the main source of income, agricultural produce need to be sold in order to generate income to sustain livelihoods. Without

any source of income, goods may not be bought and social investment becomes null (De Schutter 2009).8 Farming communities need to be creative and inventive in order to produce commercial goods and develop strategies to sell these goods in sufficient quantities and at a convenient price.

Farms are inherently heterogeneous (see Pacini et al. 2014), changing with age and environmental circumstances. Acknowledging this fact, agroecology promotes principles rather than rules to develop an agroecological production system out of a conventional farm in a step-wise transition process. Farmers are increasingly challenged to make use of their intellectual and communication skills throughout this period of transition because they have to optimize conventional input-use efficiency, substitute synthetic with organic inputs, and re-design the production system (Gliessman 2002). Such a transition is knowledge-intensive and requires self-study, and ideally a reluctance to take major risks, demanding three to five years for the creation of an agroecosystem. The latter step also applies when starting an agroecological farm from a natural ecosystem; e.g., a production system needs to be wholly designed in cases where deforestation is required before planting. After such transition processes have been surmounted, the challenge of maintaining a viable operation depends on the continuous capacity to innovate. This involves permanent adaptation to absorb both internal and external shocks, such as farming community disaggregation or shifts in crop prices. The maintenance of an agroecological farm stimulates farmer community's creativity in order to overcome challenging situations. It will also need long-term commitment so that tasks that are perceived as 'tedious' are taken care of, such as harvesting or weeding. In contrast to a conventional farm for which Green Revolution extension services provide straightforward instructions to be followed in any given farming situation, an agroecological farm is subject to space-time-specific technological needs that demand creativity from beginning to end.

As an example of tedious tasks, we can name weeding as one of the least attractive farm jobs. Women, in particular, are disproportionally burdened with this task (Lenné 2000). Agroecological farms can offer some diversity within this task, as this work can function as a source of inspiration contributing to the initial creativity phase. We can find an enormous amount of herbaceous species in a single plot, so that beneficial or neutral combinations of plants may be favored instead of being eliminated. For example, in organic shaded coffee farms in Costa Rica, some farmers maintain a high amount of herbaceous plants protecting the soil and

8 For the link between income and food entitlement, see the seminal work of Sen (1981).

favor some of the species with shallow root systems and rather broad leaves to limit competition with coffee roots (Staver 2001). The number of medicinal and decorative plants that can beneficially grow between the coffee shrubs and the banana trees gives the farmer a certain freedom to make beautiful compositions in each plot even when preselecting the plants according to their overall functionality (Félix and Timmermann 2013). However, more important to our discussion is that a maintenance task such as weeding, under agroecological conditions, is a task that needs, at a minimum, proper training in plant identification and selection criteria in order to reap the full benefits of this practice in resource-constrained conditions.

Scarcity induces the development of adaptive solutions to overcome external shocks. Where resources are limiting, "poor people's wisdom" will contribute to the development of inventions based on locally available materials.9 For instance, in Cuba, fuel shortage and limited access to heavy technology forced farming communities to innovate upon agroecological bases (Altieri et al. 1999; Febles-González et al. 2011). A proper extension service promoting farmer knowledge and innovation capacity (Rosset et al. 2011) proved successful at developing 'clean' and integrated agriculture on the island.

Efficient farming systems in the tropical Americas show the important role of farmers engaged in research for development agendas. Their active participation in the processes of technological innovation and dissemination through models that focus on sharing experiences, strengthening local research, and problem-solving capacities is a key element to re-design farming systems that favor ecological (internal and external) interactions (Altieri and Nicholls 2008). Agroecology as a farming approach can be more labor-intensive, but benefits such as the development of capabilities, the services to neighboring ecosystems, and the improvement of health mostly justify the extra effort the farmer puts in developing her farming operations.

Agroecology and contributive justice

Why more work? A certain paradox emerges when we contrast a picture of the inventive mind puzzling to reduce work through technology with our plea to justify more labor-intensive

9 Scarcity stimulates creativity in many other areas as well (see Gupta 2010).

farming techniques. Let us analyze the additional benefits of work before condemning this outcome.

To begin with, we have to define what we mean by appealing or meaningful work. Here we can build on some of the characteristics identified by Richard Arneson (1987). According to Arneson, meaningful work has to be interesting, allow the worker considerable freedom in determining how the tasks should be fulfilled, call for personal initiative and dexterity, and give the worker a democratic say on the work process and employer's policies (1987).10 In addition, one's work should be subjectively identifiable as a contribution to the well-functioning of society, if one so wishes (see Timmermann 2014b).

In order to place the concept of meaningful work within the wider context of contributive justice we include three further partially overlapping components. While working one should be recognized as a peer, be able to mutually influence one another, and be in a position to acquire and develop further skills and capabilities. Condensing the abovementioned characteristics of meaningful work and relating them to contributive justice, we synthetize five broad elements: acquiring and developing capabilities, recognition as peers, mutual influence, non-redundancy, and self-determination.

It is tempting to define tedious tasks as work that has the opposite characteristics of meaningful work. Doing so is problematic. First, some virtues, such as persistence, are highly esteemed by some but perceived as dull by others. The objective categorization of meaningful or tedious work can differ greatly from the subjective perception of the given type of work (see Yeoman 2013). Differences on how people judge work often depend on the capabilities they have developed or lost throughout their lives. However if the set of characteristics here exposed are overwhelmingly absent, the person who complains that she has not received her share in opportunities to meaningfully contribute has a strong case in her defense. We should conceptualize tedious tasks as work that is missing a number of components that characterize

10 Richard Arneson (1987) builds on some of the characteristics of meaningful work identified by Adina Schwartz (1982). Because we concentrate on a knowledge-intensive type of work we have chosen to elaborate on the work of Arneson (1987). Other authors have dedicated special attention to the issue of autonomy and non-alienation (Roessler 2007, 2012), the effect on people's self-identity (Herzog 2013), and how one's work is perceived by others (Yeoman 2014).

meaningful work without offering additional counterbalancing benefits. Table 1 illustrates the main characteristics on which we base our arguments to define tedious and meaningful tasks.

<<Table 1 about here>>

We now discuss how the elements "acquiring and developing capabilities," "recognition as peers," "mutual influence and non-redundancy," and "self-determination" are encouraged in farm work applying agroecological principles.

Acquiring and developing capabilities

People who mainly engage in monotonous work are left with little possibilities to develop skills and capabilities. Complex work on the contrary generally obliges people to adapt to new challenges. In an adaptation process, new skills and capabilities are strengthened and acquired. A division of labor that leaves a group of people undertaking only trivial tasks will have the effect that some will have fewer incentives to further develop themselves. A 40-hour working week under such uneven distribution of dull tasks systematically disadvantages people in terms of future opportunities and freedoms. Studies have shown that people who engage solely in tedious tasks at work avoid complex tasks in their leisure time (Murphy 1993; cited in Sayer 2009), thus intensifying the problem in terms of future freedoms.

Work that includes a fair amount of variations helps people to develop many of the central human capabilities. Agroecological farming methods oblige farmers to identify potentials, variations, and disorders that may affect long-term food production at an early stage. Moreover, in agroecology, heterogeneity is not always seen as a burden for uniform farm operations but rather as an opportunity to spread risks, leading to more complex farm management designs. The proper use of both physical and intellectual strengths leads to benefits within one's working environment. In addition, good social relations with peers are mandatory because individual inaction or sabotage can have strong consequences for maintaining the balance of the agroecosystem.

Let us examine in detail the development of capabilities stimulated by agroecological farming. We rely heavily on Martha Nussbaum's (1997) conception of central human capabilities, as it has become standard nomenclature:

Bodily health. Agroecology avoids the use of chemical inputs; the farmer is therefore exposed to far less health risks than under conventional agriculture. This type of farming may require physical labor, with varying effects on bodily health, depending on intensity and worker's fitness. A fair division of physical labor can reduce negative effects. Noteworthy, a less invasive treatment of the farm land leads to fewer accidents with machinery. Agroecology works with biodiversity, which makes a diverse diet not only possible but also inevitable (De Schutter 2010).11 Taking into consideration malnutrition prevalence among developing world farmers we can see this as a highly welcomed outcome.

Senses, imagination, and thought. Anomalies have to be identified in early stages and for that to be possible, every farmer has to develop a capacity to search critically for dangers and potentials. Good observation skills are valuable and appreciated among peers. Farmers will have to be able to anticipate up to a certain extent future developments and take these into account when planning. They will also need to identify how different organisms relate to each other (Callicott 1988). The use of spatial and temporal memory is hereby incentivized. Farmers inspired by agroecology have to guide themselves by a series of principles. As every farm and every agroecosystem are unique, solving problems by following strict manuals is not possible. Adaptations are almost always necessary for inventions made elsewhere to match the local environment and needs. Ingenuity is encouraged to transfer solutions from one field to another. Changes in market demand and in environmental conditions also call for a constant need to come up with new solutions, as standardized solutions coming from outside the community generally do not succeed without skillful local adaptations. In contrast, conventional agriculture offers

11 In some cases, the harvest of the agroecological farmer will be a luxury product, pressuring farmers to sell all their produce from some crop varieties and buy cheaper processed food. This will affect mostly farms located in the proximity of tourist areas and markets that pay highly for organic food. On a global scale this will not be a major factor, as much of the produce needs to be eaten immediately before it spoils and is not suitable for long trips to the markets. We should also note that the farm gate prices of many cash crops are extremely low (McIntyre et al. 2009). It will be often economically unreasonable for farmers to sell their produce and buy processed food.

fewer opportunities for the average farmer to use her cognitive capacities because much of the creative work has been outsourced from the farms.

Other species. Although not an ideal shared by everyone, being able to peacefully coexist with the environment is a yearning more and more people are having. The poor living in urban areas of developing countries, for example, rarely have the opportunity to experience a clean natural environment because of high levels of pollution (see Zhou et al. 2013). A job offering proximity to a diverse natural habitat is for many appealing in itself, especially as it permits a number of recreational activities that do not require, or hardly require, additional financial resources. Areas where agroecological farming is widely practiced will be unspoiled by the agrochemical residues commonly present in conventional agriculture.

Affiliation. Besides intellectual and physical strengths, agroecological farming also demands good social skills. It is vital to maintain good relations with peers, to be able to interact smoothly, and to communicate effectively. Work has to be divided and coordinated, as well as synchronized so that farmers build on each other's efforts. A certain level of trust and a consciousness for fair play are required as well. The tasks that will have to be undertaken will require completely different levels of dedication, effort, and patience; therefore exact quantification of what each member has done to determine if everyone did her fair share will be difficult. We can also anticipate that when decisions are taken democratically, authorities will be questioned more frequently, reducing the acceptance of centrally made decisions on labor assignation.

Good relations with neighbors are needed as well. Many ecological processes relevant for agroecology operate beyond the scale of single fields (Bommarco et al. 2013). Optimal agroecosystem management needs to consider the entire landscape where the community is embedded in (e.g., for biological pest control, pollination, and water regulation). Solutions at a landscape level demand collective action, incentivizing the development of effective communication skills.

Competition and market pressures will stress individual farms to be more efficient. It is still an open question if strong competition will encourage the use of sufficient common sense to respect the voice of all members of a community to a similar degree. Unfortunately, field observations on systems that operate with traditional knowledge and conventional farming

techniques have revealed that strong competition makes it much more difficult to keep good relations with neighbors (Thrupp 1989; Harden et al. 2013).

Control over one's environment. Agroecological farming demands a very different relationship to nature than people have become accustomed to in developed countries and emerging economies. Unlike in conventional farming, one should not attempt to control nature, but instead assimilate one's cultivation methods to the different natural processes (Sevilla Guzmán and Woodgate 2013). Metaphorically speaking, if conventional farming is like driving a car to a fixed destination, agroecological farming comes closer to a hitchhiking voyage. The ability to identify opportunities in time is essential in making the journey prosperous.

It will be difficult for some farmers to give up central control over their farmland. In some regions, particularly in the Midwestern United States, farmers are proud of their ability to work the land. Farming techniques that require leaving a biomass cover over the soil are perceived as abandonment; farmland is regarded as wilderness that has been dominated by human effort through years of hard work and stewardship over generations (Wilson et al. 2003). Allowing nature time to rebuild an ecosystem is often seen as destroying the work of one's ancestors who drained swamps to build fruitful arable land.

Caring for one's community. Being able to care for someone or something should not be limited to the emotional level only. People should be empowered with means to overcome the problems of the community they live in. And here, actively helping one's community should not be limited to solely being able to use one's physical strengths, as is the case in most places nowadays. We need to create an environment where people are able to contribute with their intellectual strengths as well (Timmermann 2014b). Agroecology creates a demand for both the use of physical and intellectual strengths; people who excel in one dimension are bound to cooperate with the ones who excel in the other dimension. The diversity of tasks that have to be fulfilled gives people ample opportunities to contribute. Diversity also allows people to find their special talents and develop skills that will make them unique in their community.

The slow but incremental progress within agroecological farms is traceable for the individual farmers thus serving as a source of inspiration. While farm managers are able to contribute substantially to the welfare of the community they live in, hired workers of a large conventional farm have very limited possibilities to use their intellectual capacities for the good of the society they live in.

The acquisition and development of capabilities is a very important factor in making work meaningful. Agroecology continuously stimulates the development of a wider range of capabilities because it demands more attention from the farmer in order to maintain fragile balances within the agroecosystem. We proceed with the importance of work and those undertaking work being recognized.

Recognition as peers

A fundamental element of meaningful work is recognition. Here we have two imperatives; contributions should be recognized for their societal value after a fair assessment, and there should be no destitution of being in a position to contribute according to one's (potential) capacities. An ideal environment to ensure recognition is present when the individual members of the farming community recognize one another as peers (see Fraser 1998). Therefore we discuss five types of social relations that nurture recognition taken from the Hegelian school of thought.12 These are relations that are symmetrical, reciprocal, simultaneous, reflexive, and transitive (see Limmer 2005; Timmermann 2014a). We identify which of these relations can be sustained through agroecological farming practices.

Agroecological farms allow much more room for a proper recognition of efforts than large-scale conventional agriculture does. A hierarchical structure leaves little room to be able to distinguish contributions for their ingenuity. Broad compliance is the first goal, and while suggestions for improvements are often welcomed, little space is given to explore optimization possibilities because of well-filled, pre-established schedules. While creativity is compatible with scarcity, experimentation requires risk-taking and people will rarely take risks if the stakes are too high and the pay-offs small. Disciplinary sanctions for unsuccessful experimentation or deviations from norms are not unheard of on large farms.

12 Here we are referring to the reasoning inspired by the writings of the German philosopher G.W.F. Hegel (1770-1831). Because of the vast amount of scholarship dedicated to this thinker, we do not claim that these five elements are essential to or representative of the broad Hegelian tradition.

It is important to note that work that underlies strict schedules while fulfilling pre-established tasks has virtues of its own. The setting of industrial standards and global trade works well with such organizational structures. Human-made large structures are especially vulnerable to highly diverse uncoordinated creativity.

A type of agriculture that mimics ecological systems underlies a very distinct set of principles than the ones prevalent in conventional agriculture. The maintenance of balances is impossible to achieve through standardized solutions; the complexity of ecosystems does not allow it. Creativity has to limit itself in offering a large range of solutions that are intentionally of limited impact. People who have close and day-to-day contact to the environment are best suited to offer the plurality of low-impact solutions needed (Martin et al. 2010; Holt-Giménez et al. 2010a; Koohafkan et al. 2012). The impact of innovation on the agroecosystem has to be monitored closely and the effect of local peculiarities (e.g., variations throughout the farm in the amount of sunlight, differences of soil composition, relations to non-target organisms, humidity, and precipitation) has to be carefully studied. This will lead to a scenario where the single improvements made in an agroecological farm will be in a symmetrical relationship to each other—no invention should overshadow other contributions in their potential or influence. The complexity of the ecosystem and the variations within the farm itself will make it difficult for someone to gather an overriding power to define what should count as accepted wisdom and what should not count (see Dübgen 2014). These symmetries limit the exercise of power over others and thus make it easier to see each other as peers.

Seasonal variations and growth cycles bring about a number of tasks and opportunities. The variety of issues that have to be addressed requires different sets of skills. Variations in talents and interests will make farmers choose different sets of tasks, leading to multiple areas of expertise. Once individual farmers find it easier to undertake some tasks rather than others, people will have a natural interest to coordinate, share, and divide work, as well as to team up. This will lead to cooperation, often based on reciprocity (Speelman 2014). Others may even take up additional burdens for the social benefits and joys of teamwork. Many such interactions will be improved in the next seasons and growth cycles.

Inevitably farmers who practice agroecological farming will have to justify and defend their methods. We live in a highly competitive and globalized world and it would be illusory to think that communities that have such a vital task as the provision of food will be permitted to

live their lives free from outside interference, especially when considering that arable land is scarce. Like most other production methods, those involved in agroecology will have to sooner or later be ready to justify the continuation of their practices. We even go so far as to say that any non-conventional method that wants to survive has to gain outside supporters to counter hostile trends. Agrochemical companies form a strong lobby and gain substantial revenues when farmers start using fertilizers, pesticides, and other commercially available agricultural inputs (Rashid et al. 2013). High yields are not only the farmer's business; society has to be convinced that farmers are doing all that is in their power to improve cultivation methods. The farmer who deviates from standard practices will have to be in touch with other farmers who follow similar trends to share knowledge and know-how (Machin-Sosa et al. 2010). Being different will only be accepted as long as one is competitive, and deviating will be even more difficult as arable lands increasingly become scarce.

Agroecological farms will never be identical. Soils, environment, market demands, and differences in workforce will force the farmer to make local adaptations. Sharing knowledge with the outside world is crucial for the future of any creative enterprises and the intensification of agriculture is no exception. However, for this to be fruitful it is essential that the different farmers who have experiential knowledge along with ecologists and agronomists who have generalized knowledge all treat each other as peers. Generalized knowledge allows people to gain a certain overview of the different processes, while experiential knowledge binds such perspectives to reality (see Altieri and Nicholls 2005; De Schutter 2010; Vandermeer and Perfecto 2013). This can only be possible when a minimum capacity to make transitive deductions and undertake reflexive observations is prevalent. Crucial for such wide systems of knowledge sharing and evaluation is that participants are taken seriously for their testimonies. Here we have a major challenge. A fruitful evaluation of knowledge demands a high level of hermeneutic and testimonial justice (Fricker 2007). Hermeneutic justice refers to the problem that people generally trust and favor more the contents they are familiar with. Ecologists and agronomists will find it much easier to analyze and discuss observations and reflections from their disciplinary peers than from people coming from other disciplines or those depicting their findings in indigenous knowledge terms. People tend to use materials from sources they are familiar with, something that comes at a price for cognitive diversity. Agroecology as a vehicle for contributive justice cannot and should not avoid actively confronting this challenge. As

research on conventional agriculture is increasingly globally networked, so too research on agroecology has to match this development to be competitive (Vanloqueren and Baret 2009; Tittonell 2013).

The second challenge, testimonial justice, refers to the way each farmer is valued for her observations and reflections. As mentioned earlier, there has to be a certain parity of esteem among the observations made by the single members of the farming community. While experience or past success may justify a certain additional attention by peers, undervaluing the contributions of members because of gender, sexual inclination, family status, social class, age (independent of experience), ethnic group, or race is clearly unacceptable. Contributive justice clearly demands that such testimonial injustices are overcome. As this is still a mammoth challenge worldwide we should not only advocate testimonial justice through rights-based arguments, but also refer to the many instrumental benefits engendered by giving each person a fair audition: more eyes anticipate more problems and more voices lead to more creativity. An economically rational perspective should consider exclusion as a waste of intellectual resources.

Mutual influence and non-redundancy

Working with fragile agroecosystems allows mutual influence; this however has both advantages and disadvantages for the stability of a harmonious community. Weaker or chastened members do not have to associate first in groups before being able to exert pressure, since they are able to disrupt balances singlehandedly. While this may help some to claim their rights and due respect, it also forces the group to protect itself against irrational behavior at a considerable cost. Failure in farming results in most places of the world in hunger. Risk affinity and risk adversity vary immensely among people, making fear a strong tool to impose one's will. Maintaining the community's harmony requires a great deal of work, but it is also a skill that can be of good use for the farmer during leisure time. Situations where people want to impose their will on others are present in all fields of life. Learning to tackle such power relations is essential for a good life among others.

Agroecology aims at continuous rates of production and an overall simultaneous increase in productivity. Continuous success in agroecology depends on how farmers manage to close

cycles. Ecosystems with the highest amount of biomass are systems that manage to absorb nearly all outside inputs and leave hardly anything unused (Reichholf 2008). Especially after the five-year initiation process finishes, optimizing an agroecological farm becomes an increasingly difficult endeavor (Funes-Monzote et al. 2009). There is a strong demand for new ideas. The closing of cycles obliges farmers to focus on less attractive and less visible components of the farms. The farming community will have to rotate their attention around every component of the farm's cycle. This is a great opportunity for people specialized in less visible tasks to receive proper recognition (see Smith 2009). Exemplary for this neglect are sanitary systems. Feces and urine in high concentrations have a detrimental effect on the environment. Ingenuity in agroecology has managed to transform this hazard into a valuable resource for compost adding to soil fertility (Jenkins 2005).

A knowledge-intensive production system makes it much more difficult to replace workers. While this raises self-esteem for the individual workers, it also binds them much stronger to the community. Some may welcome this close bond to the community, but the price of this bond is a limitation of liberties, especially the freedom to migrate. We may consider this a trade-off: a skilled worker becomes bound to a community losing mobility while gaining job securities. An additional advantage in countries with lax labor laws is that a skilled laborer by being less replaceable will have fewer worries about being discharged when temporally unfit for labor. Women during pregnancy, people falling ill or being injured are regularly discharged from work without any securities, particularly in the developing world and increasingly also in the developed world (Heymann and Earle 2010). Further, with the exception of tragic accidents, the loss of work capacity comes gradually for skilled laborers. Skilled farmers can still make significant contributions in old age—a noteworthy trait because people put an enormous importance on being able to live from their own efforts.

Farms that concentrate on one or a small number of crops have difficulty providing work for farmworkers year-round. Increasing the diversity of crops and animals on the farm leads to a more even distribution of workload throughout the year, making it possible to maintain farmworkers occupied all seasons (Shreck et al. 2006). Many large-scale conventional farmers are bound by contract to offer a stable and uniform produce to retailers, limiting their ability to diversify and experiment with alternative farming methods (Iles and Marsh 2012). As a farming system reliant on diversification, agroecology cannot accommodate homogenization, demanding

alternative distribution channels (Holt-Giménez et al. 2010b). The benefit of farming styles that spread work throughout the different seasons is that they tackle a major social problem in food production by curbing the high dependence on migrating seasonal workers.

Self-determination

Gaining autonomy is a fundamental goal shared by intelligent beings. Having a high degree of freedom in determining how work is to be done is thus not surprisingly a crucial characteristic of meaningful work (Roessler 2012). Agroecological farms have three qualities that can indirectly support self-determination. First, these farms stimulate farmers to develop their abilities, becoming skilled workers that are harder to replace. Second, crop diversity leads to a pluralization of outputs, changing the producer-retailer relationships. Third, as dependency on external inputs is reduced, farmers gain more freedom in how to spend their revenue. Let us examine how these characteristics may promote self-determination.

As a knowledge-intensive production system agroecology is dependent upon farmers who have the above-mentioned qualities. Once farmers acquire these skills as well as certain knowledge of the local environment, they become more difficult to replace. A worker who has rare characteristics that are vital for the well-functioning of a production system gains substantially in bargaining power. She will have the power to negotiate according to her indispensability in the joint venture. Under these conditions a fairer balance between one's own benefits and the benefits of mutual cooperation is easier to achieve. This additional bargaining power boosts autonomy.

Crop diversity makes a farm more resilient to outside pressures. Focusing on single cash crops can have a huge financial advantage in years where the demand for the given crop is large. The risks of such a practice are well known: market prices can fluctuate enormously, there is a higher vulnerability to pests and adverse climatic conditions, and farmers may have difficulty trading their crops to get products that will diversify their diets (De Schutter 2009; McIntyre et al. 2009). Compulsory levies—from governments, armies, or rebel groups—are more likely to occur on items that are easier to sell on the market. The sale of large single-crop harvests requires bigger buyers. We have experienced worldwide a strong fusion among food retailers

(Aerts 2013). The companies have become fewer in number and have gained enormously in market power. Consequently, farmers have little negotiation power when dealing with such large companies.

Crop diversity allows farms to supply local markets and cafeterias with a wide range of products (Iles and Marsh 2012). It is easier to sell a variety of crops to a small buyer than to seek different local small buyers to get rid of a large amount of the same crop. Relying on sales intermediates can thus be largely avoided if the farmer is successful at marketing products in local markets and cafeterias.13 Efforts to sell directly to consumers pay off enormously, as the largest share of the consumers' dollar regularly goes to marketers (Gliessman 2007; Holt-Giménez et al. 2010b).

Self-subsistence is increasingly valuable for self-determination. The agrochemical industry, like many others, is becoming more and more dominated by a small number of multinational corporations (ETC Group 2008). This concentration comes with a strong ability to control prices. We can observe similar trends in the seed industry. At the same time, we have a devastating increase in income inequalities between poor and rich countries, as well as within these countries (see Pogge 2012). Humanitarian licenses granted by some industries and research institutes as well as a number of development programs are abating the problem of access to agricultural inputs, but undersupply still remains endemic (see Louwaars 2007). Once farmers realize their dependency on external inputs, it becomes difficult to escape from such a need. Knowledge of farming practices that do not rely on these inputs is often already lost when farmers want to change back to such practices (Lamine 2011).

Similarly to most other fields of life, some limits on self-determination remain. Especially in family farms, much of the food production is for self-consumption, playing a key role for food sovereignty and the securement of a basic need. This does not mean that the share sold to local markets is insignificant. This share is vital for acquiring external inputs (e.g., farming tools) and clothing, and bringing in new animal and plant species to the farm. In addition, we should not forget about the legal and social environment such farms are embedded in. Children need school materials and teenagers are very vulnerable to social pressures with

13 We acknowledge that selling a diversity of products is time-consuming and involves considerable work. Whether or not members of the farming community can undertake this task on their own depends largely on local circumstances.

regard to the possession of certain status symbols. Failing to address these realities jeopardizes the long-term success of knowledge-intensive farms. A self-sufficient farm will have to be designed to cover this extra demand, unless farmers are also engaged in other types of remunerated work.

Conclusion: why should we welcome more work?

Conventional agriculture was designed to be far less labor-intensive than other variants of crop and animal production. By reducing the number of people needed in food production, people would be free to work in other areas and farmers would have more spare time to enjoy recreational activities. In the last sections we have challenged the rationale that the overall reduction of labor in agriculture is something necessarily to be welcomed. We have examined a number of individual and social benefits brought by a cultivation method that incorporates a larger number of people in the production and optimization process. Among the individual benefits, we identified the development and acquisition of capabilities, the recognition of one's work among peers and by the community at large, the possibility to mutually influence each other, the reduction of redundancy, and the chances in gaining autonomy.

In today's world it is important to remark that workers who have developed a number of manual and cognitive skills have much higher chances in successfully switching to other types of work. Mobility in all senses is one of the best guarantees for continuous employment. Because employment has such a strong link to food entitlement, it is imperative for human welfare to create work opportunities and ensure continuous employment. There is a substantial demand for work. Countless people all around the world are eager to undertake meaningful work. Work not only helps to secure basic necessities but also plays an essential role in how one is perceived and perceives oneself within society.

Yet, we are still left with an open question, who will come to work in the fields? For those working as hired laborers in the fields, agroecological farms may offer an opportunity to improve their everyday life. In terms of the urban population, agroecology offers an opportunity for those willing to pursue a craft. The large loss of craftsmanship caused by industrialization has brought a large social vacuum that needs some kind of replacement (Sennett 2008). By

reincorporating skills and knowledge in farming practice, agriculture can become attractive for city dwellers wishing to engage in a skilled practice that can be continuously refined over time in nature. Under these circumstances agriculture may also become attractive again for the rural youth.

There are also some additional advantages of agroecology for society at large. Urban centers are becoming excessively overpopulated with disastrous consequences for the environment and human welfare. Drawing people back to rural areas is therefore important. This will alleviate many of the current problems, but it is nevertheless imperative that people in both rural and urban areas change to more sustainable diets and customs.

Agroecology can deliver meaningful sustainable work and enable people to work for their self-sustainment.14 Thus, two major global challenges are confronted: the reduction of the environmental footprint of agriculture and the securement of rural employment. Essential for combating hunger and malnutrition is the creation of quality work that allows people to buy or grow food. While human rights law recognizes a right to adequate food, the overall reduction of labor in agriculture did not bring a sufficient increase in food entitlement for those not participating in the cultivation processes (Lenné 2000; Busch 2003; De Schutter 2009).

Research in conventional agriculture has contributed to an increase in food production. Nevertheless, it has not succeeded in drastically reducing the number of hungry people or in providing sufficient quality jobs for either the urban or rural populations. Agriculture should be concerned about much more than the production of food. As the main source of work it should not neglect the social components. Throughout this article we have shown how agroecology is making major advancements in the provision of meaningful work through a fairer distribution of attractive and tedious tasks.

14 This is an often underestimated major achievement, as Andrew Sayer (2012, p. 583) notes: "The tendency to imagine that training skilled workers produces skilled jobs for them to fill is a common, though scarcely innocent, delusion in the discourse of the 'knowledge-based economy'."

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Table 1 Characteristics of tedious and meaningful tasks

Category	Tedious	Meaningful
Acquisition and development of capabilities	Single	Multiple
Recognition as a peer	Hierarchical	Horizontal
Mutual influence	Hierarchical	Horizontal
Non-redundancy	Exchangeable/expendable	Necessary
Self-determination	External (market-based)	Internal (household-oriented)