

## Alternative discourses around the governance of food security: A case study from Ethiopia

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### ABSTRACT

Global discourses on the governance of food security span competing approaches. For example, a neoliberal approach advocates commercialized, industrial agriculture, while food sovereignty and resilience are part of an alternative discourse to food security that prioritizes locally-based agroecological food production. Understanding how global discourses play out locally and how they impact the environment and biodiversity is important to identify appropriate pathways towards sustainability. In addition to their effects on food security, different approaches could reinforce or impede the success of biodiversity conservation because of the strong interdependence of food security and ecosystems. We applied the Q-methodology to examine alternative approaches to food security and biodiversity conservation pursued by 50 stakeholders from local to national levels in southwestern Ethiopia. We identified four distinct approaches, focusing on (1) smallholder commercialization, (2) agroecology and resilience, (3) local economy and equity, and (4) market liberalization. All approaches prioritized smallholders, but perspectives on how to achieve food security varied. Agricultural intensification, commercialization, and profit were widely considered important, while support for agroecology and resilience was largely restricted to non-government organizations. With the exception of supporters of the agroecology and resilience approach, biodiversity conservation was considered as a secondary goal. We conclude it is important to acknowledge plurality of food security approaches because local conditions are characterized by a multiplicity of stakeholder interests, and because food security is a complex problem that requires a multidimensional approach. However, major contradictions among existing approaches need to be reconciled, and the agroecology and resilience approach should be strengthened to ensure the sustainable achievement of food security and biodiversity conservation.

### 1. Introduction

Ensuring food security is a central aspect of the sustainable development goals (UN, 2015) and of the development agenda of the African Union (FAO, 2012; African Union Commission, 2015). The World Food Summit defined food security as “a condition that exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life” (WFS, 1996). In the context of this study, we conceptualized food security as universal access to sufficient, safe, and culturally acceptable food, without negative effects on biodiversity.

Here, we included the issue of biodiversity because food security and biodiversity goals are strongly interdependent (Chappell and LaValle, 2011), and thus approaches that address food security could either reinforce or impede achieving the goal of biodiversity conservation (Fischer et al., 2014). Hence, our study sought to uncover how approaches to ensuring food security could also affect biodiversity conservation. Universally the goal of food security is widely agreed upon, uninterruptedly ensuring the availability and accessibility of food to all people. However, the approaches to achieve this goal remain deeply contested (Shilomboleni, 2017). Current literature indicates two influential but opposing approaches: a green revolution and

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commercialization approach versus a food sovereignty and social-ecological resilience approach (McKeon, 2015; Wittman et al., 2016).

In Africa, the green revolution approach has become prominent since the beginning of the new millennium, supported by major corporations and humanitarian organizations such as the Rockefeller Foundation and the Bill and Melinda Gates Foundation who established the Alliance for a Green Revolution in Africa (Blaustein, 2018; Shilomboleni, 2017). The approach aimed to achieve food security through increasing crop output per unit area, a transformation from subsistence to commercial agriculture, and the adoption of hybrids and genetically modified crops (DeVries and Toenniessen, 2001; Rockefeller Foundation, 2006; Blaustein, 2018). This approach focuses on the supply of agricultural technology and extension services, arguing that efficiency gains can be achieved through technology adoption by farmers and improved access to inputs such as crop breeds, irrigation technology and fertilizers, and output markets (Toenniessen et al., 2008). Despite considerable success in transforming rural economies in Asia and Latin America (Dawson et al., 2016), important downsides of the green revolution approach have been, for instance, greater income inequality, high costs of inputs, community conflicts and environmental degradation and biodiversity loss (Shiva, 2011; Amir, 2013). Initially, the green revolution approach had not been successful in Africa, primarily due to its incompatibility with local cultures and ecological conditions (Dawson et al., 2016). However, it has once again gained prominence due to infrastructural development (Dawson et al., 2016; Ejeta, 2010), institutional support such as through the Alliance for a Green Revolution (Bill and Melinda Gates Foundation, 2017), the need to produce more food for a growing population (Shilomboleni, 2017), and the belief of African governments in yield increases as a panacea for food security (Africa Development Bank, 2014).

An alternative to this corporate based neoliberal approach builds on the discourse of socially inclusive, sustainable and biodiverse systems to ensure food security. This is often captured by the concept of food sovereignty, which focuses on the right of local people to determine what to produce and consume, values local experiences and local control of resources and food systems, and seeks to work with nature through diversified farming systems (Nyéléni Declaration, 2007). The food sovereignty approach is most prominently supported by civil society organizations such as La Via Campesina or the Alliance for Food Sovereignty in Africa (La Via Campesina, 2013; Alliance for Food Sovereignty in Africa, 2014). Inclusive decision making involving diverse stakeholders is integral to the food sovereignty approach (Shilomboleni, 2017). Despite its social-ecological focus, the food sovereignty approach has been criticized because it poorly considers the pressures stemming from exponential human population growth (Shilomboleni, 2017).

While these two opposing approaches dominate food security discourses, additional, slightly different framings also exist. For instance, especially in Africa, some policies specifically favor agricultural commercialization (NEPAD, 2003). This overlaps with a green revolution framing but is subtly different because it specifically aims for the efficient production of marketable crops based on the principles of comparative cost advantages. In addition, an agricultural commercialization approach sees markets as a source of agricultural transformation, whereas the green revolution approach often considers the state as a key agent of agricultural transformation (including providing training and advice on the choice of crops, inputs and production methods). In contrast, an agricultural commercialization approach views farmers (including smallholders) as critical agents, who make production decisions based on cost efficiency and contract extension services as required (Van Den Ban and Hawkins, 1996). Similarly, a resilience framing can be identified as distinct from a food sovereignty framing. This approach typically takes a complex adaptive systems perspective, emphasizing feedbacks, slow drivers of systems behavior, and emergent system dynamics resulting from self-organization (Fischer et al., 2015). A food sovereignty approach, in contrast, is more explicitly concerned

with the power relations between actors than traditional resilience thinking is (West et al., 2014).

The above discussion thus shows four different potential pathways towards food security, which could be seen as four separate and independent approaches – the green revolution, food sovereignty, commercialization and resilience approaches. These four approaches differ in how to achieve food security, particularly with regard to issues such as food production methods, the role of biodiversity, marketing and governance. Making these different pathways with their specific discourses and different levels of policy and institutional support explicit is, in turn, crucial to successfully navigate contradictions and to collectively work towards sustainable ways of achieving food security. In addition, understanding who supports which approach gives an understanding of current power relations around food systems, making explicit which aims and goals different system actors pursue, and hence, allowing for the identification of promising and widely acceptable interventions.

Here, we examine the extent to which different food security discourses are invoked by different stakeholders in southwestern Ethiopia. Ethiopia is a highly food insecure country, and has engaged various approaches to overcome food insecurity (Järnberg et al., 2018). Moreover, the country is also characterized by high rates of biodiversity loss (Husen et al., 2012), driven among others, by population growth, deforestation, and climate change. Ethiopia could be considered as an important case study area because of growing food insecurity and frequent changes in approaches designed to address the problem of food insecurity (Jiren et al., 2018). Different approaches were adopted sequentially, following various political and economic changes (e.g. from command-and-control policies to capitalist policy, and recently to a developmental state policy that puts the state at the center of ensuring food security), but several approaches to food security currently co-exist. Under the present Developmental State development paradigm (Brems et al., 2015), policy goals include: increasing the production and productivity of commercial crops, smallholder transformation through increasing incomes and market integration, sustainable management of resources, and protection of rural communities from natural disasters and market risks. These approaches have been embedded in various policy frameworks, including the Rural Development Policy and Strategy of Ethiopia (MOFED, 2003), the Comprehensive Africa Agricultural Development Program (NEPAD, 2003), the Climate Resilient Green Economy (CRGE, 2011) and Growth and Transformation Plans (MOFED, 2010).

This paper seeks to delineate existing discourses on food security in southwestern Ethiopia, while paying particular attention to the different roles ascribed to biodiversity conservation in these discourses. To this end, we applied the Q-methodology. Our specific aims were to: (1) identify and characterize different approaches to food security pursued by stakeholders from local to national levels; (2) examine the rationale and narratives behind these approaches; and (3) identify ways to bridge gaps between the different discourses, so that meaningful communication among stakeholders is possible. In addition to its contribution to the study area, this study has global relevance because it provides insights on issues of global relevance that have only been scarcely treated to date. Our work shows how existing global food security discourses influence smallholder dominated rural landscapes in practice, and how different framings around food security influence environmental resources. These general findings are likely to be of relevance not only to Ethiopia but to many countries and landscapes in the Global South.

## 2. Methods

### 2.1. Study location

The study was conducted in southwestern Ethiopia. Ethiopia has a federal government structure with five levels of administration:

national, regional and zonal levels, districts (hereafter “woredas”), and municipalities (hereafter “kebeles”). We interviewed stakeholders from three woredas (Gumay, Gera, and Setema), and from the zonal (Jimma), regional (Oromia) and national levels (Table S1). Jimma zone exhibits strong interactions between food insecurity and biodiversity, and the three woredas were selected to represent social-ecological diversity within the zone (Jiren et al., 2017).

## 2.2. Design

We used the Q-methodology to elicit different discourses on ensuring food security, including their implications for biodiversity. The Q-methodology assists in exploring varied discourses about a particular topic in a structured way through a combination of quantitative and qualitative methods (Zabala et al., 2018). The method is useful particularly to capture the diversity of perspectives on a given topic through allowing each stakeholders to rank proxy statements or visual items that represent existing views on the identified issue or topic (Zabala et al., 2018). Q-methodology has been applied to numerous fields (Bredin et al., 2015; Milcu et al., 2014). We applied the method through following five main steps: (1) identifying the range of discourses around food security, i.e. existing discourses on how food security is pursued (as known as framing the discourse); (2) development of proxy statements that represent various aspects of each of the previously identified discourses (known as Q-set or items to be ranked by the stakeholders); (3) selection of sample stakeholders who are thought to hold different views around ensuring food security (known as P-set); (4) collection of data resulting from a ranking of proxy statements carried out by the stakeholders (known as Q-sorting); and (5) analysis and interpretation of the result (Brown, 1986; Watts and Stenner, 2005; Zabala et al., 2018).

As highlighted in the Introduction, we initially identified four primary discourses relevant to food security, namely framings around: (1) green revolution (Shiva, 2011; Dawson et al., 2016), (2) agricultural commercialization and efficiency optimization (IFAD, 2003; FAO, 2013), (3) food sovereignty (Nyéléni Declaration, 2007; McKeon, 2015), and (4) resilience (Folke, 2006). The Q-set can be designed through visuals—e.g. the use of photographs that represent different aspects of the discourse (see Milcu et al., 2014) or proxy statements that represent each of the discourses (Zabala et al., 2018). For our particular study, we used proxy statements to elicit various aspects of each of the food security discourses identified at the initial stage. Accordingly, drawing on literature, policy documents and with the help of Ethiopian and international experts, we iteratively formulated statements that together captured each of the four discourses—including their aims, principles, practices and core values. Following an initial brainstorming, we reviewed and merged statements that had similar meanings. Through a subsequent refining process, we ultimately formulated eight written statements representing each of the four primary discourses labeled above to define a 32-item Q-set (Table 1).

In designing Q research, stakeholder selection should cover a diversity of actors, to ensure multiple discourses are captured. Stakeholders who have both dominant as well as less dominant views on approaches to food security (see Zabala et al., 2018) were considered as sample respondents. Our samples were stakeholder organizations represented by their senior personnel. These stakeholders were purposively selected from the sectors around food security sector involving stakeholders in the availability, access, utilization and stability dimensions of food security and biodiversity conservation operating at different governance levels (woreda, zone, region, and national). Also, the sample stakeholders represented different organizational types including governmental organizations, non-governmental organizations and community-based organizations. The selection of stakeholders was guided by prior knowledge of the actor network around food and biodiversity issues (Jiren et al., 2018), and aimed to capture a variety of viewpoints. The P-set size in Q-methodology is often kept lower than

the Q-set because the Q-methodology primarily seeks to elicit a diversity of perspectives in the sample rather than ensure that the sample is representative of the population. Stakeholders therefore should have a perspective on the problem under investigation, and if they do, this makes them eligible to be considered in a P-set (Brown, 1986). For this study, we sampled 50 stakeholders, which was a larger sample than the number of statements covered in the Q-set (Table S1). Although this approach is less common, it has been successfully used in other studies (Steelman and Maguire 1998; Clarke, 2002), and can be helpful when the diversity of participants involved (and thus the views held by them) is expected to be large (Milcu et al., 2014).

## 2.3. Data collection

Data collection for the Q-method (Q-sort) included the ranking of the Q-sets into a forced quasi-normal distribution reflecting a priority of rankings. The selected 32 statements of the Q-set were carefully translated into the local language Afaan Oromo. We then randomly assigned a number to each statement and placed each statement on an individually laminated card that could be placed on a scoreboard by the respondent (Fig. S1), without disclosing the a priori category of food security discourse each statement represented. The scoreboard represented a quasi-normal distribution in a double pyramid (diamond) shape, ranking from +4 (most important) to −4 (least important; see Fig. S1).

Before the start of the interview respondents were given information about the study and the interview procedure, and were asked for consent for recording the interview. Respondents were first asked to read all the 32 statements and prioritize them into the three categories ‘most important’, ‘medium important’ and ‘least important’, according to the priorities of the stakeholder being represented. Second, after pre-sorting, we asked the respondent to place the cards on the scoreboard according to their priorities of importance. Instead of placing the cards from top (most important) to bottom (least important), we asked them to switch between the most important and then the least important statements. Thus, respondents would first place the most important statements (+4 and +3), then the least important statements (−4 and −3), and lastly the medium important statements (+2 to −2). This helped the respondents to focus on the extremes, rather than getting lost at intermediate importance scores early on. Third, after the completion of the sorting exercise, respondents were given time to re-read and re-order the statements if they wanted to change their original sorting. Fourth, after finalizing the Q-sort, we asked respondents three qualitative follow-up questions: (1) What are the justifications for the eight most and the eight least important statements? (2) What are the challenges for the implementation of these prioritized statements? (3) Are there any other issues worth mentioning regarding food security that were not included in the Q-set?

## 2.4. Data analysis

To identify variation in the approaches explained by the 50 stakeholders (Q-sorts) regarding the approaches to food security, we performed both quantitative and qualitative analyses. First, a multivariate analysis of the Q-sorts was performed in order to identify distinct approaches towards food security (so called factors) (see Akhtar-Danesh, 2017). For the multivariate analysis, we chose principal component analyses (PCA) using the “qmethod” package in R software. We applied PCA because it considers both commonalities and specificities among the 50 Q-sorts (Webler et al., 2009), gives similar results to other plausible methods such as centroid factor analysis (Watts and Stenner, 2012), and is readily implementable in statistical software. We applied a varimax rotation (factor rotation) to the PCA, which is a standard approach to improve clarity and interpretability of the factors; and we flagged Q-sorts that were representative of the resulting factors (Zabala, 2014). In this process, after an initial exploration of three, four and five

**Table 1**

Four approaches to food security by southwestern Ethiopian stakeholders, as identified by Q-sorting of pre-defined statements, and their associated weighted average Z-scores that indicate the relationship of statements to each approach. The first column indicates the initial category of pre-defined discourse statements that were Q-sorted by stakeholders, i.e. the resilience discourse (RS); the food sovereignty discourse (FS); the green revolution discourse (GR); and the agricultural commercialization discourse (AC). The second column indicates the 32 statements (Q-sets) used to identify different approaches by stakeholders to food security, where eight statements were provided for each initial discourse category. The Z-scores, the weighted average value of how each statement associates with the four approaches, are presented in the final four columns. A double asterisk (\*\*) indicates the eight highest ranked statements in each of the approaches, a single asterisk (\*) indicates the 26 intermediate-ranked statements in each of the four factors, and no asterisk indicates the eight least important statements for each approach.

#	Initial discourse category	Statement (Q-sets)	Z-score of statement in the four approaches			
			Smallholder commercialization	Agroecology & resilience	Local economy & equity	Market liberalization
1	RS	Social-ecological systems are unpredictable and should be managed so that they can cope with unexpected changes.	-0.87	1.33**	0.72**	1.61**
2	FS	Community culture, values and traditions should be considered as integral parts of local development.	0.49*	1.01**	1.06**	-1.09
3	FS	Farmers should be supported technically and financially, so that they are empowered to independently manage their own resources.	-0.52*	0.81*	-0.55*	-1.03
4	RS	Food should be produced in diversified systems, using agro ecological methods rather than conventional intensification methods.	-1.96	1.31**	-2.41	-0.76
5	FS	Recognition, respect and appropriate compensation should be given to smallholder farmers, including in national policies and strategies.	-0.43*	0.62*	0.59*	-0.13*
6	AC	The primary goal of farmers should be to maximize profits from agriculture.	1.35**	-0.24*	-0.21*	0.85**
7	RS	Agricultural methods should be continuously improved and updated on the basis of the experiences of the local community.	-0.08*	0.89**	-0.39*	-0.13*
8	GR	Land and other production resources should be controlled by government agencies.	-1.98	-1.61	-0.37*	-1.90
9	FS	Food should be considered a human right, and everyone has a right to access it.	0.89*	0.46*	1.64*	-0.24*
10	RS	Local governance should be pluralistic and participatory, involving government actors, non-government actors and community groups.	-0.35*	1.11**	0.12*	-0.26*
11	FS	Farmers should have full autonomy to decide what to grow and how to grow it.	0.32*	0.43*	-1.91	-1.61
12	AC	Policies and strategies should focus on the expansion of trade, investment and economic growth, by paying careful attention to export and import dynamics.	-0.27*	-1.45	-0.64	1.05**
13	RS	Social cohesion, networking and information sharing should be promoted for local development.	0.05*	0.86*	-0.02*	0.07*
14	GR	Government should help to stabilize markets, including by setting input and output prices.	-2.18	-1.02	-1.60	-1.94
15	GR	Expansion of financial and infrastructural services and capital assets should be a key priority.	0.79**	-0.26*	-0.59	0.08*
16	GR	Food security should be ensured through increased agricultural production and through raising farmers' incomes.	1.15**	-0.05*	0.16*	0.23*
17	FS	Farmers should be able to set the market price of their produce without the influence of external forces.	0.32*	-0.09*	-0.82	-1.04
18	AC	Land use efficiency should be enhanced through the promotion of commercial farming.	-0.67	-1.42	-0.97	0.03*
19	FS	Locally produced foods, not imported foods, should be the primary source of food in Ethiopia.	-0.52*	0.25*	1.41**	-1.33
20	GR	Farmers should transform to modern agriculture through use of fertilizer and herbicides, insecticides, improved varieties and farm mechanization.	1.13**	-1.38	1.55**	0.19*
21	GR	Research and science should focus on developing high yielding varieties to be diffused to farmers.	1.33**	-0.64*	0.45*	0.76*
22	AC	Private investment should be encouraged and expanded in the agricultural sector.	-1.24	-0.83	-0.39*	0.13*
23	AC	It is important to grow marketable crops and increase the yield of these crops.	0.5*	-0.43*	0.13*	1.03**
24	FS	Farmers should have the full right to access and control production resources and assets, such as land, capital and labor.	1.11**	0.52*	-1.33	-0.67*
25	AC	Large-scale agricultural investment and large farms should be promoted to facilitate economic growth	-0.91	-1.32	-0.15*	0.58*
26	GR	The primary task of extension agents should be dissemination of new scientific knowledge in order to enhance its adoption by farmers.	0.45*	-0.77*	1.48**	1.79*
27	GR	Government should supply and control agricultural and extension services.	0.83*	-0.66*	0.55*	-0.56*
28	RS	Diversified income sources and livelihood strategies should be encouraged.	0.58*	1.14**	0.50*	0.14*
29	RS	Social and ecological changes that affect local development should be identified, monitored and managed – including slow changes such as population growth or soil degradation.	-0.47*	1.50**	1.20**	1.14**
30	AC	The income of farmers should be increased through the promotion of commercial farming and agricultural intensification.	1.59**	-0.99	0.31*	1.32**
31	RS	Social and ecological systems are complex systems, and should be managed through integrated, cross-sectoral solutions.	-0.67	1.70**	-0.18*	1.23**

(continued on next page)

Table 1 (continued)

#	Initial discourse category	Statement (Q-sets)	Z-score of statement in the four approaches			
			Smallholder commercialization	Agroecology & resilience	Local economy & equity	Market liberalization
32	AC	Farmers should transform towards market-oriented production systems, including smallholder commercialization.	0.21*	-0.82*	0.66**	0.45*
<b>Variance explained (number of Q-sorts that defined this factor)</b>			12.8% (16)	12.8% (7)	12.7% (9)	9.4% (7)

factor solutions, we finally extracted four factors because the patterns of explained variance as seen in the scree plots was optimal, the eigenvalue was high, and the four factors coherently explained the variation in perspectives regarding how to achieve food security across the Q sorts (interpretability of the factors) (see Zabala, 2014).

Thirty-nine of the 50 Q-sorts significantly loaded on one of the four approaches. The Q-sorts loading on a particular approach were treated as having a similar opinion concerning the approaches towards achieving food security. Only Q-sorts that significantly loaded onto one of the four approaches were used for the subsequent analysis (see Brown, 1986; Watts and Stenner, 2012; Zabala, 2014). The four approaches identified were then interpreted in terms of commonality of Q-sorts within the approach, and the classifications of statements that loaded highest and lowest on a given approach.

The qualitative data obtained from the follow-up questions were transcribed from field notes and audio recordings. The transcribed data were analyzed through content analysis in NVivo 11. We first created one node for the justifications and one node for the challenges. Under each of these nodes, we created four sub-nodes representing each of the four identified approaches. We then inductively coded justifications and challenges from the transcribed sources under each of the approaches.

### 3. Results

#### 3.1. Overview of discourses

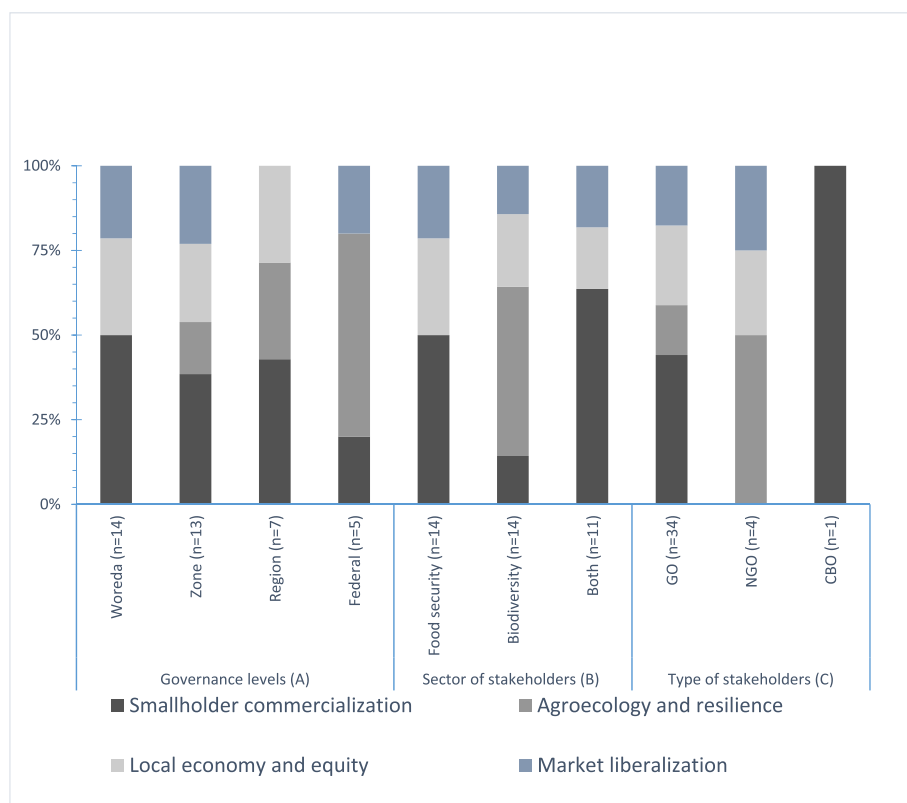
We identified four approaches that reflected alternative discourses for how to achieve food security in southwestern Ethiopia: *Smallholder commercialization* (16 stakeholders), *Agroecology and resilience* (7 stakeholders), *Smallholder economy and equity* (9 stakeholders), and *Market liberalization* (7 stakeholders). The 39 stakeholder opinions that characterized these approaches (Table S1) collectively explained 47.7% of the variance (Table 1). Correlations between the four approaches were low indicating that they differed distinctly (Pearson correlation  $\leq 0.4$ ). In the following, we characterize each approach regarding its main focus, stakeholder support, problem framing, as well as highlighting justifications and challenges for implementation.

#### 3.2. Characterization of different approaches

##### 3.2.1. Approach 1: Smallholder commercialization

The smallholder commercialization approach supported smallholder economic growth through intensive production of commercial crops. The approach was supported by stakeholders at all levels—i.e., stakeholders at the woreda, zone, region and federal levels (Fig. 1A), dominantly by the food security sector stakeholders (Fig. 1B), with only governmental and community-based stakeholders loaded to the smallholder commercialization approach (Fig. 1C).

The smallholder commercialization approach entailed a discourse of smallholder income and profit maximization from agricultural intensification (i.e. use of agro-chemicals) and agricultural commercialization to ensure food security. Statements of profit maximization and green revolution were ranked as most important (Table 1). “Increasing farmers’ income through commercialization” and “Shifting smallholders from subsistence to profit maximization” were the two highest ranked statements (Statements 30 and 6 in Table 1). Stakeholders in the smallholder commercialization approach believed that food insecurity could be resolved by increasing production through agricultural intensification, farmers’ ownership of production assets such as land, and adoption of agricultural technologies supplied by the government (Statements 20, 24 and 27 in Table 1). Considered as not important by stakeholders in this factor were statements around diversified and agroecological production (Statement 4 in Table 1), social-ecological resilience (Statements 1 and 31 in Table 1), large-scale private agricultural investment (Statements 18, 22 and 25 in Table 1), and



**Fig. 1.** Frequency distribution of factor defining Q-sorts (n = 39) for the different approaches to food security. Governance level (A) indicates the distribution of approaches to food security across the four administrative levels (woreda, zonal, regional or national level). Sector of stakeholder (B) indicates stakeholder composition within the four food security approaches according to sector (food security, biodiversity, both sectors). Type of stakeholder (C) indicates the distribution of approaches to food security based on the type of stakeholder, namely governmental organization (GO), non-governmental organization (NGO), or community based organization (CBO).

government interference in market and resource control (Statements 8 and 14 in Table 1).

Qualitative results showed that all stakeholders pursued the smallholder commercialization approach because it aligned with the national growth policy and their official mandate (Table S2). Stakeholders also felt that smallholders constituted a large population, and transforming their livelihoods therefore was a key priority. A woreda-level respondent explained: “Development interventions that disregard the vast majority of smallholders risk failure. Increasing smallholders’ financial capacity and access to resources is the right way to develop the nation”. Belief in positive associations between modern agriculture, commercialization, smallholder growth and food security were important justifications (Table S2). Consequently, priority was usually given to food security over biodiversity conservation. A woreda-level respondent explained: “People conserve biodiversity, but first people need to be fed by all possible means”. Finally, poor capacity of farmers (lack of land and unwillingness to change) and policy implementers (lack of expertise), and costs of agricultural modernization (e.g. fertilizer) were perceived to hamper the successful implementation of the approach (Table S3).

### 3.2.2. Approach 2: Agroecology and resilience

The agroecology and resilience approach argues for the application of agroecological methods for improving food production and social-ecological resilience as a pathway to ensure food security. The approach was supported only by stakeholders above the zonal level, mainly at the national level, where most of the sampled stakeholders were affiliated with the biodiversity sector—i.e., none of the woreda level stakeholders supported the agroecology and resilience approach (Fig. 1A). Moreover, in terms of sector, all stakeholders loading onto this approach were from the biodiversity conservation sector (Fig. 1B), and mainly non-governmental stakeholder types supported this approach (Fig. 1C).

Important statements involved sustainable management of social-ecological resources and enhancing the resilience of the system, focusing on three main issues in particular (Table 1). First, the interdependence and complexity as well as the need for collaborative

management of social-ecological systems were recognized and prioritized (Statements 31, 29, 1, and 4, Table 1). Second, agroecological methods such as diversified agricultural production and diversified livelihoods were seen as a means of achieving food security (Statement 28, Table 1). Third, participatory and pluralistic local governance, and respect for local knowledge, cultures, experiences and value systems were emphasized (Statements 10, 2, and 7, Table 1). In contrast, the expansion of large-scale private commercial agriculture (Statements 22, and 14, Table 1) and state control of resources were ranked very low in the agroecology and resilience approach. Agricultural modernization, intensification and commercialization, and liberalization of markets were also considered unimportant for food security (Statements 18, 12, 28, Table 1).

Stakeholders loading onto agroecology and resilience approach indicated the importance of ecosystems and biodiversity to provide essential products and services for ensuring food security, and hence rejected the notion of agricultural intensification (Table S2). Moreover, 86% of stakeholders supporting this approach believed that by utilizing local people’s experience, knowledge and capacity, they can change their condition and ensure food security (Table S2). Institutional gaps and a lack of coordination between stakeholders, a policy emphasis on intensification, and lack of proper policy and institutional support were seen as main limitations to implement agroecology and resilience approach (Table S3).

### 3.2.3. Approach 3: local economy and equity

The local economy and equity approach integrates aspects from the two previous approaches—i.e., the smallholder commercialization approach, and agroecology and resilience approach—but had a stronger focus on local development and equity as means to achieve food security. The approach was supported by stakeholders from all governance levels except the national level (Fig. 1A); from both food security and biodiversity conservation sectors (Fig. 1B); and from both governmental and non-governmental organizations (Fig. 1C).

The local economy and equity approach integrated agricultural

intensification and smallholder commercialization (Statements 20, 26 and 32, [Table 1](#)) with the need to identify and manage unpredictable and complex changes affecting social-ecological systems (Statements 1, and 29, [Table 1](#)). In addition, local production, local marketing and a closed market system that protects local products from external competition were other distinctive features of the local economy and equity approach (Statement 19, [Table 1](#)). Proponents of the local economy and equity approach focused on the importance of culture, experience and value systems of the community, and strongly acknowledged the right of all people to have sufficient and preferred food (Statements 2, and 9, [Table 1](#)). Diversified production was considered the least important for achieving food security (Statement 4, [Table 1](#)). Farmers' ownership of production resources such as land, the determination of market prices by farmers or the state, and market liberalization were also considered unimportant (Statements 11, 12, 14, 15, 24 and 17, [Table 1](#)).

Key characteristics for the local economy and equity approach were the empowerment of smallholder farmers through intensive and commercial production, and enhancing income from increased production in combination with protection from international competition ([Table S2](#)). To achieve this, adoption of improved technologies supplied by the government were emphasized. In addition, skepticism on the efficiency of state and market, impacts of large-scale private investment on equity, and the recognition of the interdependence between social and ecological systems were mentioned as important reasons to support local economy and equity approach ([Table S2](#)). The implementation of local economy and equity approach was found to be hampered by internal factors such as unwillingness of the local community, poor expertise of implementers, as well as external factors such as threats of population growth and climate change ([Table S3](#)).

#### 3.2.4. Approach 4: Market liberalization

The market liberalization approach emphasized the role of agricultural research and innovation, agricultural intensification, commercial production, and smallholder integration into regional and international markets to generate income, profit and accumulate wealth. Stakeholders supporting this factor were from all the governance levels except the regional governance level ([Fig. 1A](#)), from both the food security and biodiversity conservation sectors ([Fig. 1B](#)), and from both governmental and non-governmental organizations ([Fig. 1C](#)).

The focus of market liberalization approach was on the production of marketable crops based on the comparative advantage principle to maximize profits through integration into liberalized markets (Statements 30, 12, 23 and 6 [Table 1](#)). It shared similar priorities with smallholder commercialization approach through supporting profit maximization; with agroecology and resilience approach through emphasizing the management of slow changes affecting the social-ecological system; and with local economy and equity approach through agricultural intensification. However, the focus on trade liberalization and open markets distinguished market liberalization approach from the previous three approaches. Smallholders' rights to choose what to produce and to determine the market price for their produce were typically considered unimportant (Statements, 11, 19, 2, 17, and 3, [Table 1](#)).

The emphasis and compatibility with current trade policies (i.e. focus on trade expansion via export promotion) were given as the main justification ([Table S2](#)). Similar to the other approaches, stakeholders supporting market liberalization approach did not believe in a benign state, but rather considered excessive state intervention as a market distortion. They therefore objected to state intervention in both resource allocation and market determination ([Table S2](#)). Perceived limitations of implementing market liberalization approach were weak and missing market facilities and institutions ([Table S3](#)).

## 4. Discussion

Our study indicated four different approaches to ensure food

security while also paying attention to biodiversity conservation, namely smallholder commercialization (a technological-economic discourse), agroecology and resilience (a social-ecological discourse), local economy and equity (a social-economic discourse), and market liberalization (a macroeconomic neoliberal discourse). These approaches combined and emphasized different aspects of the four pre-identified framings, that is, the green revolution, agricultural commercialization, food sovereignty and resilience approaches. Especially the local economy and equity approach represented a mixture of the pre-identified framings. It combined aspects from the smallholder commercialization approach and market liberalization approach – e.g. of agricultural intensification and commercialization – while also sharing aspects of the agroecology and resilience approach, such as the need to identify and manage unpredictable and complex changes.

Our study revealed that, although food sovereignty is rapidly gaining traction as a globally important framing ([Patel, 2009](#)), this discourse was largely absent from our results. This means that, at this point, the notion of food sovereignty was not an important priority in the study area. This could be because, in our study area and possibly other similar locations facing regular food shortages, strong priority is given to increasing food production without much concern to the right of smallholders to determine what food to produce and how. The popular belief that 'food precedes human rights and democracy' was reflected by the policy influencing national and international stakeholders, and was also popular among the local level stakeholders at the district level. In addition, dissatisfaction with existing low yielding traditional practices may have directed stakeholder preferences towards industrial farming, rendering food sovereignty a low priority.

Our findings also indicated that, while aspects of some of the approaches were clearly supported by existing institutions—the smallholders commercialization approach, local economy and equity approach, and market liberalization approach had strong institutional support—other aspects are only beginning to emerge in policy discourses—most notably, the agroecology and resilience approach had little traction among local actors. This indicates that the dominance of a given approach depends on the capacity and power of supporting stakeholders ([Leach et al., 2010](#)). Moreover, we also indicated that all approaches except the agroecology and resilience approach prioritized increasing food production, while issues of dietary diversity, its uninterrupted supply and biodiversity conservation received far less attention. In the following sections, we discuss the similarities and differences between the different approaches in relation to their priorities, institutional support and views on biodiversity conservation, as well as implications for bridging gaps between the multiple approaches.

#### 4.1. Commonalities among approaches to food security

All approaches prioritized smallholder development as an important focus to ensure food security, which is in line with the Ethiopian Rural Development Policy and Strategy ([MOFED, 2003](#)) and the regional Comprehensive Africa Agricultural Development Program ([NEPAD, 2003](#)). This could be because smallholder farmers are vulnerable to food insecurity and also occupy a large area of farmland. Moreover, in all approaches large-scale private agricultural investments were considered to be socially inequitable and ecologically unsustainable. Most importantly, this consensus contradicts with Ethiopia's current investment policy trajectory, which prioritizes expansion of large-scale private agricultural investment ([Rahmato, 2011](#); [MOFED, 2002](#)).

Whether such large-scale private agricultural investment or smallholder-based agriculture better ensures food security remains contentious ([Shete and Rutten, 2015](#)). Critics of large-scale private investment highlight its social costs such as income inequality, expropriation and biodiversity loss ([Yengoh and Armah, 2014](#)). Studies in African countries, such as Mozambique ([Aabø and Thomas, 2012](#); [Milgroom, 2015](#)), Sierra Leone ([Fatoma, 2017](#)) and Ethiopia ([Rahmato, 2011](#)) and in Latin America ([Borras et al., 2010](#)) have indicated major

social costs of large-scale private investment. In addition, expansion of large-scale private investment threatens biodiversity conservation, for instance through causing habitat loss, eradicating traditional crop diversity and leading to commercial farm expansion (Rahmato, 2011). On the other hand, large-scale private agricultural investments are often welcomed by national governments because they generate surplus production, foreign earnings, and facilitate technology transfer (Brüntrup et al., 2016; Poulton, 2012).

Another point of consensus was the call to limit the role of the state in agricultural markets, which might have been triggered by a perceived governance inefficiency (Devereux, 2000; Nayioma, 2016). However, limiting the role of the state contradicts with official framings of the political economy of Ethiopia – its “Developmental State” paradigm explicitly seeks and justifies a strong role for the state (Bremes and Van der BekenYimer, 2015). Clearly, this mismatch between national policy priorities on the one hand, and the preferences expressed by actual stakeholders on the other hand, requires attention in the future.

#### 4.2. Tensions among approaches to food security

The four approaches showed clear differences regarding problem framing, interventions, resource ownership, and the perceived role of biodiversity (Table 2). First, problem framing is key for justifying interventions and solutions in a given approach. In our findings, key problem framings were seen in subsistence-based farming and farm inefficiency (smallholder commercialization); pressures of slow changes such as population growth, climate change and land degradation (agroecology and resilience); institutional problems such as power inequalities (local economy and equity), and poor market integration of smallholders (market liberalization) (Table 2).

These different problem framings emphasize dynamics that are playing out at different spatial and temporal scales. Moreover, all framings can be found in current policy documents around food insecurity in Ethiopia. Also, other countries have at a different times emphasized one or multiple of these framings. For instance, in Sub-Saharan Africa, supply side challenges to food security due to the subsistence farming, and poor farm technology (Ilaboya et al., 2012; Garnett, 2013) were considered obstacles to achieving food security. Similarly, land degradation, climate change and population growth (FAO, 2017), power asymmetries between global actors (McKeon, 2015), poor market integration of smallholders (Barrett et al., 2009) and combinations of these were seen as common reasons for food insecurity elsewhere. Multiple problem framings around food security align with the complexity, multiplicity and multi-sector nature of food security, and could help in addressing different dimensions of food security. While acknowledging such plurality to address multiple facets of food security, countries would benefit when the frictions and contradictions between the problems framing of these approaches are explicitly addressed. For example, within our study area, the market liberalization approach favors the integration of smallholders into regional and global markets, whereas proponents of the local economy and equity approach fiercely oppose it.

Based on different problem framings, the approaches derived distinct interventions and solutions (Table 2). Promoting more intensive farming and improving the wealth of smallholders, for example, were priority interventions for proponents of smallholder commercialization. These priorities are associated with the Green Revolution and Agricultural Commercialization discourses, which place a high priority on production and income (Shiva, 2011) and which are consistent with the existing growth policy of Ethiopia (MOFED, 2003). Critics of this discourse have pointed out that the social and ecological aspects (e.g. biodiversity) of food security are seldom addressed (McKeon, 2015; HodbodEakin, 2015).

In contrast, the agroecology and resilience approach focused on building social-ecological resilience through diversified farming and management of slow change variables such as population growth,

**Table 2**  
Differences between the four approaches to food security in terms of problem framing (the perceived underlying causes of food insecurity), focus of intervention (perceived solutions), governance modes (mechanisms to implement interventions), biodiversity conservation (how conservation is viewed in these approaches), land ownership (entitlement and decision over the production resources), and policy prescription and normative prescriptions and assumptions (the recommendations from each approach).

#	Indicators	Approaches			
		Smallholder commercialization	Agroecology & resilience	Local economy & equity	Market liberalization
1	Problem framing	Subsistence farming, and limited use of agricultural technologies	Threats of slow changes, and conventional farming	Subsistence farming, and social inequality	Subsistence farming, and weak or missing domestic market
2	Focus	Getting smallholders wealthier through small-scale commercial and intensive farming (technological-economic discourse)	Getting smallholders resilient to shocks and uncertainties through diversified farming (social-ecological discourse)	Ensuring smallholders protection and equity through intensification and local market (social-economic discourse)	Liberalizing market, and growing national income with trickle down effects to smallholders (macroeconomic neoliberal discourse)
3	Governance modes	Market (local, regional and international)	Integrated governance	Market (local)	Market (global)
4	Biodiversity conservation	Grow crops first, then take care of biodiversity	Conserve biodiversity because it is the basis of food security	Balance between economy and ecology	Protect environment and manage changes that hamper economic growth
5	Land ownership	Local people's ownership	Joint control and decision over land	State ownership	Market determination
6	Policy prescription and normative assumptions	Smallholder commercialization and intensive farming	Strong emphasis on management of environmental resources	Social equity and balanced growth	Market liberalized and increasing GDP



climate change, and land degradation. This approach finds its support in the academic sphere of resilience thinking (Folke, 2006; Järnberg et al., 2018), usually for its balanced social-ecological outcomes, i.e., benefit both food security as well as biodiversity conservation (Berkes, 2017). Unlike with the other approaches, policy attention to the agroecology and resilience approach was minimal because of its perceived limited production efficiency which was seen to slow economic growth (Isgren and Ness, 2017). Moreover, the agroecology and resilience approach was dominantly supported by NGOs from the biodiversity sector, who have limited direct influence on policy (Järnberg et al., 2018; Jiren et al., 2018). In addition to this limitation in policy attention, we found no local level stakeholders (i.e. at the district level) supported to the agroecology and resilience approach. This finding contested the popular understanding that sees a strong association between local level stakeholders and traditional ecological knowledge (Menzies, 2006). A likely reason is that many local level stakeholders still represented (national) government interests and paradigms, which currently do not place a high importance on traditional ecological knowledge.

For the local economy and equity approach, interventions prioritized local food production for domestic markets to ensure equity and protect smallholders from external market competition. This discourse builds on smallholders' self-sufficiency, which has been criticized as limiting potential gains from international trade and foreign earnings (FAO, 2002). Highlighting poor market integration as a cause of food insecurity, the market liberalization approach endorsed neoliberal perspectives (Wittman, 2011; McKeon, 2015), seeking to integrate smallholders into regional and international markets through removing economic barriers such as tariffs and environmental regulations. Broadly, these discourses correspond to two competing views: a productivism and neoliberal view (advocating smallholder commercialization and market liberalization) versus a localized entitlement view (agroecology and resilience, and aspects of the local economy and equity approaches). Whereas the former approach entails top-down interventions and is backed by powerful global actors such as the World Trade Organization (WTO), the Rockefeller Foundation, and the Bill and Melinda Gates Foundation (Amir, 2013; Wittman, 2011), the latter intervention find its support in grass-roots initiatives such as La Via Campesina and Alliances for Food Sovereignty movements (McKeon, 2015; Wittman, 2011).

Perspectives on resource governance such as land tenure and ownership also reflected differences between the four approaches (Table 2). Proponents of smallholder commercialization and market liberalization approaches believed that efficient allocation of land could be better addressed when the land ownership is vested to smallholder farmers. Market mechanisms such as the introduction of a land market were also believed to determine the real value of land and ensure the efficient allocation to different land uses. According to this view, state intervention in land governance was associated with smallholder expropriation. In the context of African countries a stronger emphasis on market mechanisms has been proposed because it is believed to facilitate efficient land allocation and arguably might support smallholder access to financial services through the collateral benefits of land (Holden and Ghebru, 2016). However, critics of this view argue that marketing land would mainly lead to a transfer of land from the poor to the rich elites, thereby impeding local equity. Building on this, proponents of the local economy and equity approach strongly supported state ownership of land because the state can ensure equity through land redistribution, and thus regulate elite capture (Sjaastad, 1997). The land policy of Ethiopia falls under this category (FDRE constitution 40(3)). Perspectives within the agroecology and resilience approach favored integrated governance of land by multiple actors across multiple governance levels. In this view, land ownership of land provides a basis for smallholder resilience, and therefore collaborative governance was seen as appropriate (Cotula, 2009).

Finally, the identified food security approaches also varied

regarding biodiversity conservation. In all approaches except the agroecology and resilience approach, biodiversity was either considered a secondary priority or only important if directly linked to food security. This view of biodiversity conservation largely disregards the multi-layered interdependence of food security and biodiversity (Fischer et al., 2017; Glamann et al., 2015). In addition, this view often principally focuses on the availability dimension of food security while other components such as distributional and procedural justice are neglected. Thus, in three of the four approaches identified in this paper, food security and biodiversity conservation are implicitly treated as conflicting goals, and biodiversity is considered only when it directly contributes to food security – missing the crucial supporting and regulating roles of biodiversity that are vital for the long-term sustainability of food systems. Only the agroecology and resilience approach supported an idea of food security that does not imply a trade-off with biodiversity, but rather emphasizes interdependence of the two goals. Importantly, however, the agroecology and resilience approach had no institutional support at the district or local level, and this institutional gap at the implementation level could exacerbate problems related to biodiversity loss and environmental degradation. With social-ecological resilience receiving increasing attention by scholars (Folke, 2006; Wittman et al., 2016), it is important to also pay more attention to issues of agroecology and resilience in practice.

#### 4.3. Outlook: bridging gaps

We showed that global food security discourses unfold into multiple and partly overlapping approaches at the national and sub-national levels. We also indicated that preferred food security approaches are not uniformly endorsed by all stakeholders in a given country. Even stakeholders in the same policy sector and governance level sometimes had strongly divergent preferences, clearly indicating the need to better reconcile currently competing interests. We identified four approaches that support distinct strategies for how to ensure food security. While development centered around smallholder farmers was a common denominator, the approaches differed with regard to problem framing, means or intervention strategies, resource governance, and biodiversity conservation. Acknowledging this diversity in approaches is essential to address the multifaceted aspects of food security. For instance, the smallholder commercialization and local economy and equity approaches favored the intensive agriculture and commercialization aspects of the neoliberal discourse, while the market liberalization approach subscribed to the trade and profit aspects of the neoliberal discourse. The institutional base to these three approaches involved pro-economic growth institutions ranging from local to national levels with the capacity to influence national food policy. In contrast, the agroecology and resilience approach backed diversified production and social-ecological resilience as a preferred pathway to food security. Institutions from a single sector, pro-environment and non-governmental organizations with limited power backed this approach.

In the context of the governance of food security, three main issues need further emphasis. First, the focus on intensive production, commodification and income as a pathway to food security appears to be the dominant discourse among stakeholders. This discourse has been widely accepted and will continue to dominate the institutions around food security in Africa (Africa Development Bank, 2016; Alliance for a Green Revolution in Africa, 2017), largely due to its strong support from international philanthropic organizations and the ambition of the national governments to accelerate economic growth in GDP terms. However, elsewhere this discourse has been associated with conflicts, inequality and environmental degradation (Shiva, 2011; Dawson et al., 2016). Thus, in addition to food production, it is essential that greater emphasis is given to social-ecological resilience and sustainability, for example through strengthening the institutional base of the agroecology and resilience approach.

Second, proponents of the smallholder commercialization, local

economy and equity, and market liberalization approaches, considered biodiversity conservation as a secondary goal because they rarely recognized the multi-layered interdependence between food security and biodiversity. We argue that integrating the two sectors is essential for a sustainable outcome. The proponents of the agroecology and resilience approach supported the integrated governance of both sectors but their focus was primarily on achieving ecological resilience. Here it would be important to explicitly emphasize an appropriate balance between ecological and social resilience.

Third, we indicated that multiple approaches with contradictory perspectives currently co-exist in food security governance. Harmonizing these contradictions and bridging the gaps between these alternative approaches is essential. This could potentially be achieved, for example, through systematically integrating those aspects from all approaches that are compatible with local conditions in a particular focal system. This could be possible through collaborative governance mechanisms that promote multi-stakeholder participation, collective action and coordination across policy sectors.

We emphasize that there is no panacea to food security, and solutions need to be context specific. However, it is important to design governance structures and processes that ensure institutional interactions and coordination across multiple sectors and governance levels to integrate diverse views, discourses and approaches towards food security. Adaptive co-management of food security – that is, collaboration among stakeholders with diverse interests across governance levels (Olsson et al., 2007; Plummer et al., 2013) – could be one way to harmonize contradictions, integrate divergent discourses and interests, bridge current gaps and incorporate multiple framings to open a new pathway for sustainability.

#### Declaration of competing interest

None.

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#### Appendix A. Supplementary data

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