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Constraints and opportunities in peri-urban and urban agriculture system in Addis Ababa, Ethiopia

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ABSTRACT

Peri-urban and urban agriculture have the potential in achieving food security for many people in Addis Ababa in Ethiopia. Available evidence indicates that there has been a lot of focus on peri-urban agriculture with less attention given to urban agriculture despite the many barriers that make it less productive. Given the rapidly increasing population in urban areas in Ethiopia, addressing constraints to urban agriculture has high prospects of improving the food and malnutrition challenges. This study was conducted to analyse the barriers to urban agriculture through application of five of the seven steps in Soft System Methodology (SSM). The SSM entailed components of Force Field Analysis for which individual questionnaire interviews is widely accepted for generating qualitative priority rankings. Data were collected using open-ended (non-structured) questionnaires. Findings from force field analysis indicated that growth in the industry and service sectors, lack of land, farm equipment and input, farmers' and policy makers' knowledge, public health issues and market shade access were the restraining forces to urban agriculture growth. Results reveal that poverty reduction initiatives, farmer motivation, market and labour force availability, are the major driving forces for peri-urban and urban agriculture.

Key words: Food security, force field analysis, soft system methodology

RÉSUMÉ

L'agriculture périurbaine et urbaine a une potentialité pour atteindre la sécurité alimentaire pour de nombreuses personnes à Addis-Abeba en Ethiopie. Les données disponibles indiquent qu'il ya eu beaucoup d'accents qui ont été mis sur l'agriculture périurbaine avec moins d'attention accordée à l'agriculture urbaine, en dépit de nombreux obstacles qui font d'elle moins productive. Compte tenu de la rapide croissance démographique dans les zones urbaines en Éthiopie, et pour porter des solutions aux contraintes agricoles urbaines, il faut des perspectives élevées pour l'amélioration des défis alimentaires et de malnutrition. Cette étude a été menée pour analyser les obstacles liés à l'agriculture urbaine par l'application de cinq des sept étapes de la Méthodologie de System Souple (MSS). Les MSS est un ensemble des composants de l'Analyse de Forces de Terrain (Force Field Analysis) pour lequel un questionnaire Individuel d'interview est largement accepté pour générer les classements prioritaires qualitatifs. Les données ont été recueillies à l'aide des questionnaires ouverts (non structurés). Les résultats de l'Analyse de Forces de Terrain ont indiqué que la croissance dans les secteurs industriels et de services, le manque de terres, de matériel agricole et l'entrée, les connaissances des agriculteurs et de décideurs, les questions de santé publique et l'accès au marché, étaient les forces de retenue à la croissance de l'agriculture urbaine. Les résultats révèlent que les initiatives de réduction de la pauvreté, la motivation des agriculteurs, le marché et la main-d'œuvre disponibilité, sont les principales forces motrices pour l'agriculture périurbaine et urbaine.

Mots clés: la sécurité alimentaire, l'analyse de la force de terrain, la méthodologie du système souple

INTRODUCTION

Urban and peri-urban agriculture as defined by Baumgartner and Belevi (2001) comprise the production, processing and distribution of diversity of food, including vegetables and animal products within

the city (urban) or at the fringe (peri-urban) of a city. Thus the main motivation is food production for consumption or sale and /or income generation. Globally, about 800 million people are engaged in urban and peri-urban agriculture; of these, 200 million are

market producers, employing 150 million people full time (Smit *et al.*, 1996). Urban and peri-urban farming has been well recognized in the developed world for decades, and is getting new momentum in developing countries. In Africa, it supports the livelihood of many urban and peri-urban low income families. Attributed mainly to such factors as rapid urbanization, ineffective agricultural policies, inefficient food-distribution systems, soaring inflation, rising unemployment, and careless urban land use regulations, urban agriculture has shown significant growth in East Africa since the 1970s (Mireri *et al.*, 2006). Thus, peri-urban and urban agriculture is becoming an important means of response to food insecurity, and is playing significant role in achieving adequate nutrition and livelihood for the poor communities.

Rearing cattle, sheep, and chicken, or growing rain-fed crops such as maize and vegetables on plots found adjacent to their houses and away along river sides are traditional urban and peri-urban farming practices in Addis Abeba (Gebre/Egziabher, 1994). Much of the outputs of urban and peri-urban agricultural practices in Addis Abeba are mainly meant for household consumption, with some portions for sale (Degefa *et al.*, 2006). Of the total 54,000 hectares of land area in Addis Abeba city, 10773, 7900 and 2943 hectares of land are used for cultivation, forests and grazing, respectively. Moreover, the annual milk supply to Addis Abeba city is estimated to be 55 million liters, of which 70% is produced within the city, mainly from hybrid cows (Nigussie, 2010). The city also possesses suitable soil, altitude and year round small rivers that are tributaries of the Akaki River, which is the source of irrigation water for most vegetable growers in the city. Although urban and peri-urban agriculture has multifaceted economic, social and environmental benefits, stakeholders also raise issues of human health and environmental hazards because of the contamination of pathogens, bad smell from animal farms and depositions of heavy metals used in the agricultural systems mainly due to intensive use of agrochemicals and using polluted irrigation water. Thus, in order to understand the urban and peri-urban planning process, it is important to know the major constraints, and how stakeholders manage to have their interests reflected in the plans that are implemented. A major step in this regard, is to carry out a through participatory situation analysis, recognizing the interrelated nature of food, agriculture, health and ecology to deal with food issues from a total system perspective. This study was, therefore, conducted to analyse the barriers to successful implementation of urban and peri-urban agriculture in Addis Abeba, Ethiopia

METHODOLOGY AND APPROACHES

Description of the study area

This study was conducted in Addis Ababa, the capital city of Ethiopia during February to June, 2012 period, in 02/04 district, located at the southern tip of the city. It is among 11 districts in Akaki-Qality sub-city administration, located in the plain type topography with mostly peri-urban agriculture setting.

Soft System Methodology (SSM)

The SSM was used in this study. The approach involves four stages and a seven steps learning cycle. It allows a more flexible definition of the system in response to the particular objectives of the study (The OR Society, 2012). This study covered five of the seven steps in SSM in order to get a holistic understanding about urban and peri-urban agriculture in the study area. Step one and two would help to understand the problematic situations and expressing it by a rich picture, Strength, Weakness, Opportunity and threats (SWOT) analysis and Force Field analysis; step three and four would help in thinking about innovative human activity systems which may be used in the situation, involving identifying root definitions and creating conceptual models of the system.

Sampling and data collection

Based on a multi-stage sampling approach, one representative sub-city administration (Akaki Qality) with criteria of both urban and peri-urban agriculture setting was selected purposely to accommodate both urban and peri-urban situation. Then, one representative district (02/04 district) was selected using the same criteria. From the district, one vegetable cooperative (with 23 women members), one mixed crop-livestock farming cooperative (43 women and men members), three small scale poultry enterprises organized under small and medium enterprises (SMEs), three individual vegetable farmers, three small scale dairy enterprises and one home garden were included in the sampling. Five-individual mixed crop livestock farmers were selected randomly from the farmers list in the district. Thus in total, 81 urban and peri-urban farmers in the district, either personally participated or were represented by their organizations. Participation in the study was entirely based on informed consent.

Data were collected using participatory discussion with two open ended questionnaires; one was a questionnaire for primary stakeholders, who mainly included individual farmers, farmers' cooperatives, SMEs and distributors. The participatory discussions focused on some major issues like: characterizing crop, livestock production subsystems, natural resource management, market chains of major products and if there was

environmental or personal health impact encountered. The second was a questionnaire for stakeholders’ problem priority rating, which mainly included issues like the perception of stakeholders on market, land and input access situation in the district. One stakeholder workshop at district level was conducted after data collection. In addition, experiencing the situation through field work participation, field observation through transect walks and gathering some facts about urban and peri-urban agriculture led to inferences about the whole picture of the system using “tree metaphor” as a “rich picture”. Moreover, participatory learning and action (PLA) tools such as Force Field analysis, and SWOT analysis (analysis of strength, weakness, opportunities and threats) were used to describe the problematic situation in urban agriculture.

The rich picture, SWOT analysis and force field analysis

The first step in describing a problematic situation by applying SSM was drawing a rich picture using tree as “metaphor”. A rich picture is an iterative process of understanding a situation and then refining that understanding with the concerned actors (Monk and Haward, 1998). The SWOT is a PLA tool that can help to identify the strength and weakness as internal driving forces of a system; and opportunity and threats as external pressures that can be used to bring a change (opportunity) or needs to be careful of the negative

effects (threats). The four categories: strength, weakness, opportunity and threats were analyzed from multiple perspectives as environmental, economic and social elements. The environmental, economic and social elements were also analyzed, in reference to the main components of agricultural practices such as the land use system, small scale vegetable production, small scale dairy and egg production, and mixed crop-livestock productions in the district.

Force Field Analysis is a step by step analysis of factors either driving or blocking a movement towards a goal. Individual questionnaire interviews are widely acceptable approach for generating ratings in the force field analysis. Some of the steps include defining the desired state, identifying the driving and restraining forces, and evaluating and prioritising of the forces by stakeholders (Change-Management-Coach.com, 2008). Driving forces are those forces affecting a situation that are pushing in a particular direction; they tend to initiate a change and keep it going, while restraining forces are forces acting to restrain or decrease the driving forces. From the SWOT analysis, lists of supporting and hindering forces that affect urban farmers in achieving their goals were identified. These forces were then discussed in groups and rated individually by district urban and peri-urban farmers in the workshop facilitated by the researcher. Each force was weighted with the scale of 1 (weak) to 5

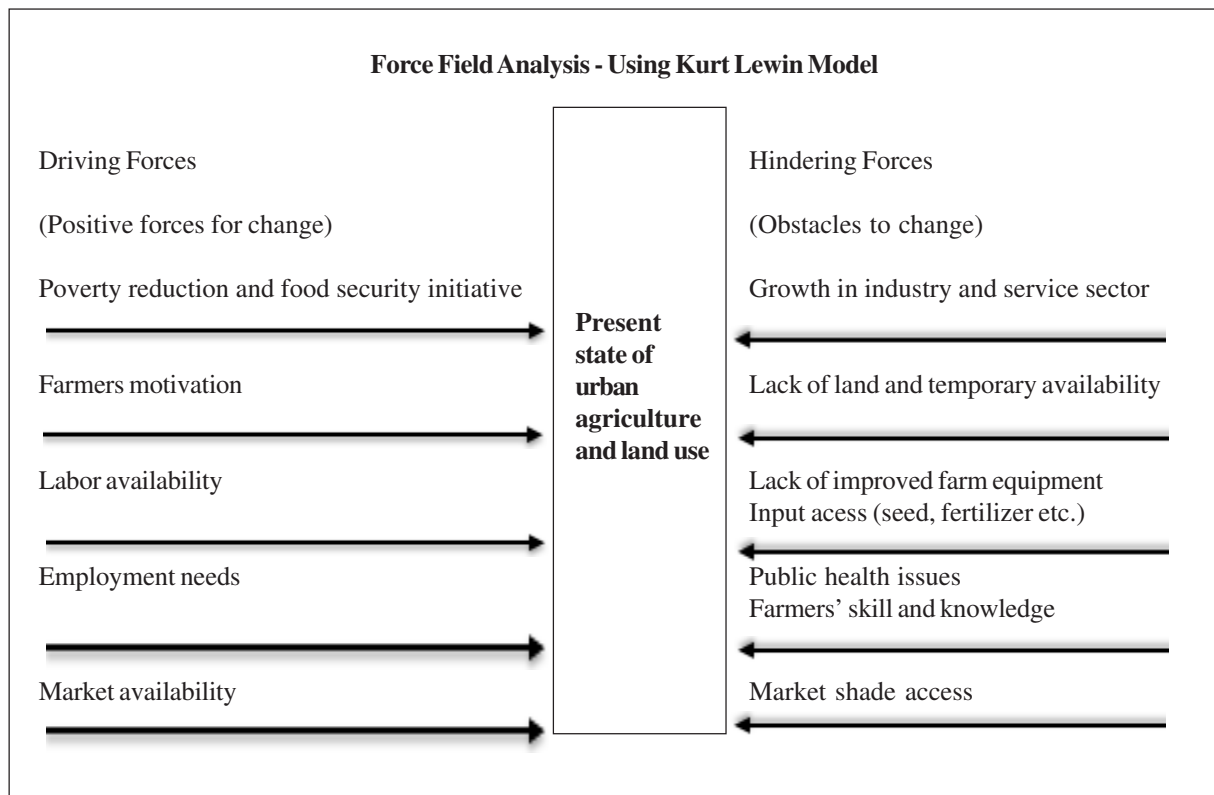


Figure 1: Force field analysis showing the driving and hindering forces for urban and peri-urban in Akaki-Quality sub-city in Addis Ababa, Ethiopia

(strong). Ten stakeholders were given their opinion, which were multiplied by the level of priority and added, that is divided by the number of stakeholders to get the average value.

RESULTS AND DISCUSSION

Rich picture using tree metaphors

The present situation of district urban agriculture was expressed by the rich picture below, using the tree and its component parts as a metaphor. **A** represents root, the internal conditions, may include the agronomic, husbandry, economic and social elements. **B** represents soil, the external or outside influences, include urban agricultural policies, extension services. **C** represents production branches like cereal crops, vegetables, dairying, and egg chicken production. **D** represents fruits, that is the food and services rendered from the farm and includes questions connected to food (yields, quality, processing and consumption).

The rich picture was presented to district workshop participants including farmers for discussions. They saw their situations clearly and made an important analogy of the tree growth from roots to branches and producing fruits, with their aim of development from small to large scale businesses. Some of them were envisioned upgrading to involve in processing and industry sector in the next five to ten years. This is in line with Arne Stjernholm (1997) thinking and explanation that let the well-known concept function as “stand-in” for the unknown. When metaphors are introduced from the outside, it’s crucial that people be encouraged to find and elaborate meaning for themselves.

The only way to access land for urban and peri-urban agriculture in the study area in particular, is either through private land as home garden or public lands such as open spaces, road sides and land along river

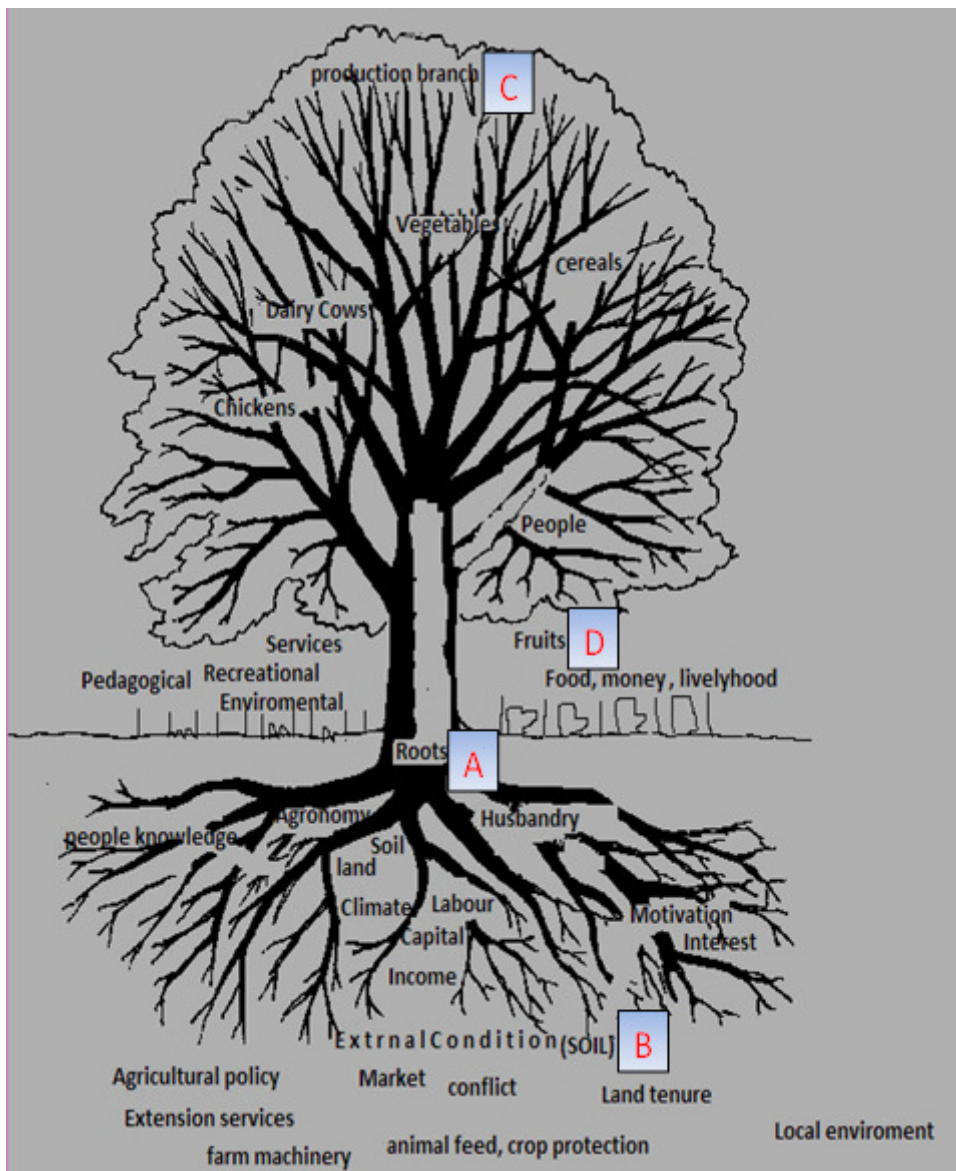


Figure 2: Rich picture for district urban agriculture situation using a tree metaphor

Table 1: Strengths, weaknesses, opportunities and threats analysis

| | Internal forces | | External forces | |
|------------------------------|---|---|--|---|
| | Strengths | Weakness | Opportunities | Threats |
| Agricultural land use | Environment open spaces river sides | Environment policy | Environment poverty food security | Environment land speculation land tenure |
| | Economy market labour Social skill development works | Economy loan service temporary use Social culture in land use | Economy efficient land use Social population increments | Economy industry and service sector development Social urban planners knowledge |
| | Vegetable production | Environment river side | Environment policy | Environment Poverty reduction & food initiatives |
| | Agronomy manual weeding Economy available land own labour Social motivation organization | Agronomy soil fertility mgt Economy input provision market shade Social training technical skill | Agronomy solid waste Economy market availability Social HIV/AIDS reduction Youth initiatives | Agronomy flooding Economy land availability Social urban planners knowledge |
| Small scale dairy production | Environment peri-urban | Environment UA policy | Environment poverty food security | Environment land tenure waste mgt |
| | Husbandry better breed small scale Economy market family labour Social farmers motivation | Husbandry quality feed disease Economy input provision Social training | Husbandry intensive mgt waste for biogas Economy market high demand Social employment | Husbandry lack of space Economy feed source Social Planners knowledge |

Table 1: Contd.

| | | | | |
|----------------------------|---|---|---|---|
| Small scale egg production | Environment peri-urban Husbandry better breed Social motivation | Environment UA policy Husbandry quality feed Social knowledge, skill | Environment food security initiative Husbandry Intensive mgt Social employment | Environment waste mgt Husbandry bad smell to neighbors Social Planners knowledge |
| Crop-livestock production | Environment biodiversity Husbandry feed source Economy family labour Social motivation | Environment UA policy Husbandry quality feed Economy input provision Social training | Environment food security initiatives Husbandry Improved technology Economy market Social employment | Environment land tenure Husbandry available land Economy feed source Social industry and service sector development |

sides. Urban and peri-urban open spaces are also available only on a temporary basis and priority is given for cooperatives that are organized under SMEs. In addition, there is a conflict of interest between environmental and agricultural land use along river sides. Most of the river side areas in use for agriculture, especially vegetable production, were actually reserved for buffer areas for environmental purposes such as tree plantation. The long term land use system in Addis Ababa in general and in the study area in particular is therefore, not secured. This has discouraged farmers to plan for a longer-term investment and also limit the interest of farmers to conserve and develop their land for a longer term use. As one vegetable farmer in the district explained, “he had been interested to use chicken manure for improving soil fertility of his farm, however, he couldn’t do it, because his plot of land were contracted for one growing season, which was from September to May, while chicken manure needs at least one year to be mineralized and available to be taken up by plant roots”. Thus, the farmer idea is of course plausible, in that organic fertilizers have a long-term decomposition rate and their impact varies in accordance with their carbon to nitrogen ratio, content of dry matter, as compared to Nitrogen, Phosphorus and Potassium fertilizers, which have a rapid effect, as the nutrients provided can be taken up by plants and microorganisms without further transformation processes (Baumgartner and Belevi, 2001). This land use situation led farmers to a short term plan, and invariably less attention to their land productivity and soil fertility management. Moreover, as it was observed during the field visit, many small scale dairy farmers’ dry cow dung outside their compound on road sides in the urban and peri-urban centers, which is one source of conflict with district municipal authority.

SWOT analysis

From the SWOT analysis, it was identified that availability of better public open spaces, better market and labour availability, good motivation and organization of district farmers as strong points; while lack of policy measures, poor land use and fertility management situation, poor extension and input provisioning services were identified as weakest points. On the other hand, poverty reduction and food security initiatives, youth initiatives, HIV/AIDS and employment reduction initiatives, population increment, availability of more solid waste, adoption of intensive agricultural production system, and increasing demand for livestock products provided opportunity; while planners knowledge and awareness level, bad attitude in some sectors of the society, lack of sustainable input provisioning system, temporary land tenure system, as well as fast growth in industry and the service sector were identified as threat for sustainable urban and peri-urban agricultural practices in the study area.

Table 2: District stakeholders' priority in driving and restraining forces

| Forces | Rating, 1 (weak) to 5 (strong) | | | | | Average |
|---|--------------------------------|-----|-----|-----|-----|---------|
| | 1 | 2 | 3 | 4 | 5 | |
| <i>Driving forces</i> | | | | | | |
| Market availability | - | 2*3 | 3*4 | 4*2 | 5*1 | 3.1 |
| Labor availability | - | - | 3 | 20 | 20 | 4.3 |
| Employment needs | - | - | 6 | 16 | 20 | 4.2 |
| Farmers motivation | - | - | 6 | 8 | 30 | 4.4 |
| Poverty reduction and food security initiatives | - | - | 6 | 4 | 35 | 4.5 |
| <i>Restraining forces</i> | | | | | | |
| Lack of land and temporary land availability | 1 | 2 | 3 | 16 | 15 | 3.7 |
| Input access (seeds, fertilizer, feed) chicken) | 1 | 6 | 9 | 4 | 10 | 3 |
| Improved farm equipment | 1 | 8 | 9 | 4 | 10 | 3.2 |
| Urban planners and policy makers knowledge | 1 | 2 | 3 | 12 | 15 | 3.3 |
| Farmers skill and knowledge | 3 | 2 | 6 | 8 | 10 | 2.9 |
| Market shade access | 3 | 4 | 6 | 8 | 5 | 2.6 |
| Fast growth in industry and service sector | - | 2 | 3 | 12 | 25 | 4.2 |
| Public health issues | 2 | 6 | - | 8 | 15 | 3.1 |

From this SWOT analysis, it was apparent that farmers have different perceptions and understandings concerning urban and peri-urban agriculture situations. Most farmers mentioned the advantage of urban agriculture as sources of income and food at household level, while they mentioned the land use situation and poor extension services as most important drawbacks for sustainable urban agriculture practices. However, other stakeholders focused on the advantages of urban and peri-urban agriculture for food security and poverty alleviations as a whole and they mentioned lack of urban agriculture policy issues as a drawback. Urban and peri-urban farmers need to be careful of the harmful factors by reducing the weakest points and taking care of the external threats that might happen or exist currently. In the case of helpful factors or opportunities, the practitioner or farmers need to be aware of, how long the strong points continue to be strong and continually searching for external opportunities available to be tapped for the sustainability and for the effectiveness of urban and peri-urban agriculture system.

Force field analysis

The main barriers to the success of urban and peri-urban agriculture in the study area were found to be growth in industry and service sector, lack of land and temporary availability, urban planners and policy makers' knowledge, lack of improved farm equipment, input access, farmers' skill and knowledge, public health issues and market shade access. On the other hand, poverty reduction and food security initiatives, farmers motivation, market availability, employment needs and available labour force, were the major driving forces.

CONCLUSION

The fast growth in industry and the service sector, lack of land and temporary availability, the level of urban planners and policy makers' knowledge, lack of improved farm equipment, access to inputs (seeds, fertilizer, feed, and foundation stock), farmers' skill and knowledge, public health issues and market shade access are the major restraining forces to urban and peri-urban agriculture in Akaki-Qality sub-city administration in Addis Ababa, Ethiopia. Similarly, the public sector poverty reduction and food security initiatives, farmers' motivation, market availability, employment needs and available labour force are the major driving forces.

The relevant purposeful activities (Holons) are those innovative human activity systems that need to be in place, in order to transform the present situation to future wanted states. There are four purposeful perspectives (holons) that need development attention, these are creating a system for improved productivity by using improved technology; stakeholders initiated lobbying of policy makers and planners by providing inspiring news and stories; efficient solid waste management practices to reduce negative impacts on public health by establishing biogas production plant; strengthened and sustainable input and extension services by mobilizing interested and good leadership stakeholders.

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STATEMENT OF NO CONFLICT OF INTEREST

The author of this paper hereby declares that there are no competing interests in this publication.

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