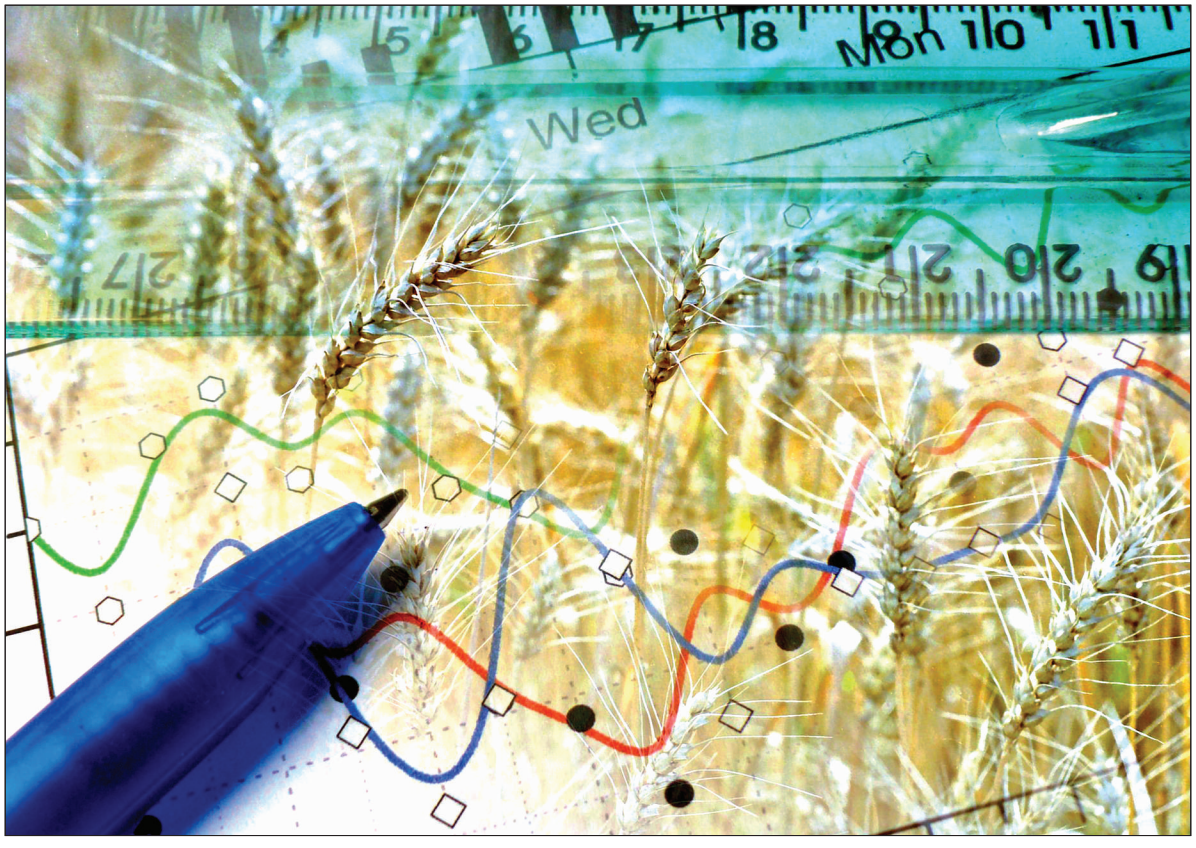

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Research Article
Assessment of Irrigated Wheat Production in Western Oromia, Ethiopia: The Case Constraints and Swot Analysis

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Abstract

Background and Objective: The population growth and changing food preferences in Ethiopia have resulted in an increasing demand for wheat which results in the expansion of irrigated wheat production to ensure food self-sufficiency. This expansion of irrigated wheat production for sustainability needs the identification of potential stakeholders with their roles and constraints. Besides, Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis is also very important. **Materials and Methods:** The study was conducted at Jimma, Bunno Bedelle and East Wollega Zones of Western Oromia. Focus group discussions and key informant interviews with farmers, experts and unions were used. Descriptive statistics were employed to analyze the collected data. **Results:** Further expansion constraints like unavailability of inputs with skyrocketing prices, poor irrigation schemes performance, biotic stresses, insufficient farmers' skills and knowledge of the technologies, lack of financial sources, lack of local reliable market and shortage of modern schemes were identified as the major constraints to irrigated wheat production. The SWOT analysis has been done, showing the strengths, weaknesses, opportunities and threats of irrigated wheat production. **Conclusion:** This new initiative knowledge should be useful through developing a regular input supply system, improving farmer's skills and knowledge, credit access to farmers, developing modern schemes, developing new disease-resistant varieties and strengthening market linkage by experts, policymakers, researchers and seed enterprise for better orienting investments on irrigated wheat production.

Key words: Irrigated wheat, constraints, SWOT analysis, stakeholders and Western Oromia, irrigation, import substitution, agro-ecologies, biotic stresses

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

The Ethiopian economy as a whole is highly correlated to the agricultural sector which contributes 34.1% to the Gross Domestic Product (GDP), 79% of export earnings, 79% workforce for the population and 70% of raw materials for industry[1-5]. The country's agriculture is mainly dependent on rainfall[6] and small scale, dominated by limited access to technology, extension support, market information and credit access which have contributed to the low agricultural productivity[7,8]. Indeed, the agricultural production growth in the country is less than the population growth rate over the last four decades[9]. The food requirements of the higher population growth rate have been projected to increase over the year, with a doubling of stable crop production required[10,11]. To ensure this food requirement expansion of agricultural growth and achieving food security through irrigation using the major stable crops is an alternative potential[12]. Wheat stands out as a success of the ambitious agricultural product development goals of the country to improve the food security status of millions of populations[13].

Ethiopia is the second largest wheat-produced country in Africa next to Egypt[14,15]. Wheat is one of the strategic crops in and pia for food security, import substitution and supply of raw materials for the agro-processing industry[16]. This crop is produced by 4.58 million smallholder farmers on 1.80 million hectares of land with an estimated annual production of 5.78 million tons and average productivity of 3.05 t ha^{-1} in the country during 2020/21 cropping season[17]. This wheat average productivity is much lower than the world average and far below research yield[18].

The demand for wheat in the country is growing faster than any other food crop[10]. This high demand gap is due to the rapidly increasing population in urban, changing preferences toward wheat-based food items, the rising price of wheat and global climate change. The increasing self-sufficiency production in Ethiopia is using horizontal and vertical expansion[19]. Wheat production transformation and productivity increasing rapidly to enhance self-sufficiency in Ethiopia is a high national priority which expands lowland and midland areas as a double crop where water sources are available[20].

Recently, the Government of Ethiopia has adopted a policy of wheat irrigated, focusing on radically improving production by developing best-bet wheat technologies in the major wheat-growing agro ecologies[21]. This prospect of wheat self-sufficiency can be possible with increasing wheat productivity in the rain-fed and expansion of production to the irrigable lowland and midland areas as double crop water resources are available to irrigate wheat[22]. Horizontal expansion is production area expansion while, vertical expansion is increasing crop productivity by increasing resource use efficiency and increasing the number of crops grown per year on the same land, thus rising yield per unit area-time[11].

Irrigation is the main source to ensure food security, alleviate poverty and promote the economic growth of the country by increasing the yield of wheat[23]. Small-scale irrigation schemes in particular make a massive contribution to the national economy which accounts for about 80% of the total irrigated land[1]. This small-scale irrigation area of lower than 200 hectares[24,25]. Oromia is one of the largest regional states in the country concerning arable land and practices irrigated wheat production[17,26,27]. Based on the land and water potential the government is highly given priority for lowland and midland irrigated wheat production in the region. For the success of the project identification of existing irrigation systems in the area, constraints, opportunities and threats are critical issues. Therefore, this study was aimed at the assessment of irrigation potential stakeholders, constraints and SWOT analysis of irrigated wheat production in western parts of Oromia.

MATERIALS AND METHODS

Study area description: The study was conducted in East Wollega, Bunno Bedelle and Jimma Zones which are located at a distance of about 330, 431 and 359 km, respectively from the centre of Finfinne, the capital city of Ethiopia. The East Wollega zone has seventeen rural districts and one urban district. It is found on the 8°31'52"-10°19'44"N latitude and 36°07'51"-37°11'52"E longitude with an altitude range between 1200-2960 meters above sea level. The main agroecology classification of the zone is highland (20.50%), midland (50.90%) and lowland (28.60%). The daily temperature ranges from 14-25 with annual rainfall ranging from 1000-2400 mm. This zone's entire land area is about 14,102.50 km^2 with 1,954,369 populations[28].

The Bunno Bedelle zone has nine rural districts and one urban district. The zone is found on the 7°27'40"-9°02'10" N latitude and 34°52'12"-41°34'55" E longitude with an altitude range between 1600-1940 meters above sea level. The daily temperature ranges from 10.6-26 . This zone's entire land area is about 5,964 km^2 with 838,172 populations[29]. The majority of agroecology classification of the zone is midland and lowland with a high potential for rainfall[30].

The Jima zone has twenty rural districts and two urban districts. It is found on the 7°13'17"-8°53'16" N latitude and

35°51'07"-37°36'16"E longitude with an altitude range between 500-3500 meters above sea level. The main agroecology classification of the zone is highland (12%), midland (78%) and lowland (10%). The daily temperature ranges from 18-23 with annual rainfall ranging from 1300-2100 mm. According to Sime and Demissie[31], the zone's entire land area is about 18,696.70 km^2.

The crop-livestock mixed farming system is the farmer's livelihood activities which are mainly dominated by crop production for family home consumption and income sources. The crop production is mainly dependent on rain-fed-subsistence agriculture like maize, tef, sorghum, wheat, barley, faba bean, field pea, nug and sesame are the principal crops farmed in the areas. The study zones have a river potential for irrigation like Baro, Gibe, dhidhessa, etc., which are more potential for large-scale irrigation systems[26,30,32].

Data types, sources and collection methods: In the study, primary and secondary data types were used. The primary data was collected from irrigated wheat producers, experts and unions through focus group discussions. This primary data includes irrigated wheat production practice and feedback, input availability and affordability, inputs used and application methods, water management, scheme status, stakeholder's role, extension services, constraints, strengths, weaknesses, opportunities and threats that are very important for the expansion of irrigated wheat production. The secondary data was collected from districts and zonal raw data sources, published documents and unpublished policies regarding irrigated wheat production that are vital to rational conclusions.

Sampling techniques: The sample was drawn using purposive and simple random sampling methods. First, three zones via East Wollega, Bunno Bedelle and Jimma were selected purposively based on the availability of irrigated wheat production. Second, three districts from each zone (Jimma Arjo, Guto Gidda and Sibu Sire Districts from East Wollega zone, Bedelle, Gachi and Dhidhessa districts from Bunno Bedelle zone and Seka Choqorsa, Qersa and Nadhi Gibe Districts from Jimma zone) were selected randomly from irrigated wheat producers considering traditional and modern irrigation schemes. From each district, three clusters from East Wollega and Jimma zones and two clusters from Bunno Bedelle zone having 10-15 farmers were selected randomly based on the number of clusters in the district and farmers in the cluster. The focus group discussion was conducted considering the numbers of farmers in the cluster, gender and ability of farmers. Finally, 24 focus group discussions were conducted for the study.

Methods of data analysis: The quantitative collected data was analyzed using descriptive statistics such as mean, frequency, percentage and histogram graphs. The qualitative data like stakeholder roles, constraints and SWOT analysis were analyzed using narrative explanation.

RESULTS AND DISCUSSION

Irrigation practice by smallholder farmers: In the study zones, irrigation practice was very important for food security since 1992 after the military regime of the Derg which is similar in the other parts of the country[33,34]. Traditional and modern small-scale irrigation schemes in which the total irrigable command land is less than 200 hectares. The majority of smallholder farmers were grown maize, potato, tomato, onion and other crops as indicated in Table 1. The farmers grow these crops because of affordability, cultural practice, lack of other alternative technologies and availability of markets in the areas. Starting in 2020 the Ethiopian government initiative irrigated wheat initiative in the zones. In the three zones, irrigated wheat production was economically better than the previously grown crops by smallholder farmers which received better production. The irrigated wheat production used full package technologies like improved varieties, recommended inorganic fertilizer and better supervision (advice services).

Irrigated wheat production practices: The irrigated wheat production practices were started from September to April as indicated in Fig. 1 which is mainly the dry period in Ethiopia. This irrigated wheat production practice includes land preparation, planting, watering, fertilizer application, weeding, pesticide application, crop harvest and storage. The field preparation for irrigated wheat was started in September in some districts and continued through, November in three zones. Whereas, input preparation and planting were started in October to December based on input availability. This crop management is very complex and challenges the producers for high yield Wang[35]. Seeding rate, planting depth, weeding and pest management were other challenges in irrigated wheat production management which is in line with Fischer *et al.*[18], Li *et al.*[36], Riemens *et al.*[37] and Dube *et al.*[38] results. The harvesting and post-harvest activities were accomplished from February to April. The field management practices are very important in improving crop yield which was in line with Molla *et al.*[39] results.

Inputs used by irrigated wheat production: In the study area, mainly seed and inorganic fertilizer (Urea and NPSB) inputs were used by farmers which are indicated in Fig. 2. These inputs were supplied by unions, research centres and direct by

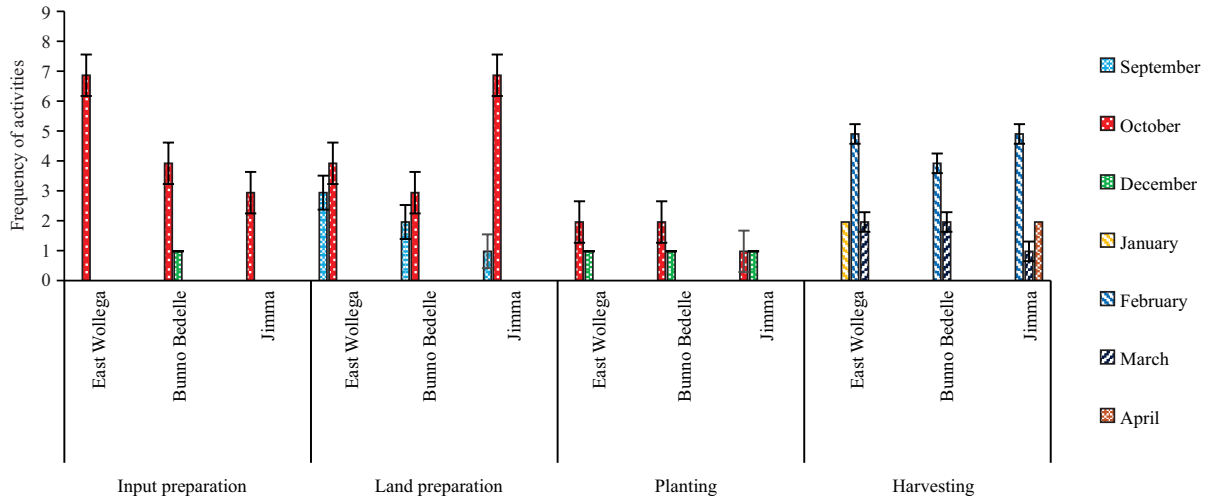

Fig. 1: Irrigation wheat production calendar in the study area

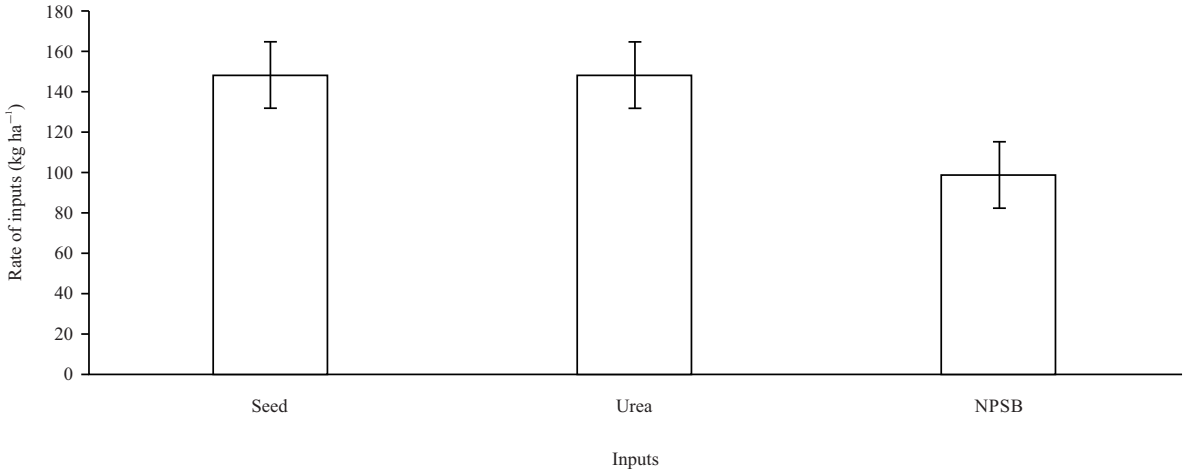

Fig. 2: Rate of inputs used for irrigated wheat production

Table 1: Smallholder farmer's irrigation practices from 1992-2019

Zone	FGD	Percentage	Major crop grown
East Wollega	9	100	Maize, potato, anchote, cabbage, hot-pepper, etc.
Bunno Bedelle	6	100	Maize, potato, tomato, onion, cabbage, coffee seedling, etc.
Jimma	9	100	Maize, potato, tomato, cabbage, soybean, etc.

the regional government. The result showed that the farmers used bread wheat seed at a rate of 150 kg ha^{-1}. While, NPSB and urea fertilizer was applied at the rate of 100 and 150 kg ha^{-1}, respectively. This result shows that the wheat yield and production responses were affected by recommended inputs and methods as well as the time of water application which were in line with Shikur[13], Li *et al.*[40], results that stated yield and production responses are affected by policy interventions. The grain yield of irrigated wheat was affected by input rates and methods which is in line with Yuan *et al.*[41] results who, stated that fertilizer rate was a vital factor influencing agriculture yield.

Yield obtained from irrigated wheat: The analysis of yield was done at the zonal level with their varieties. In three zones Kingbird, Wane, Denda'a, Ogolcho and Hulluka improved varieties were used as indicated in Fig. 3. In the East Wollega zone Wane variety was the more yielder than the kingbird

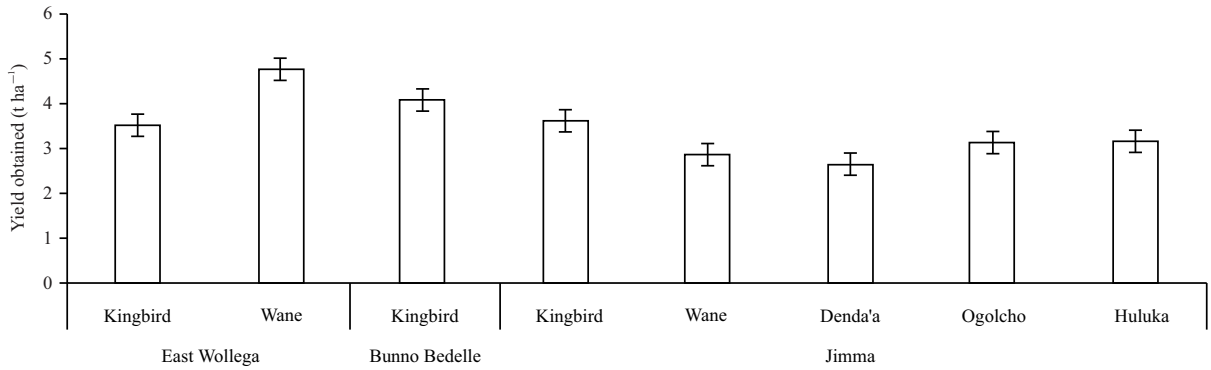

Fig. 3: Irrigated yield of zones with varieties

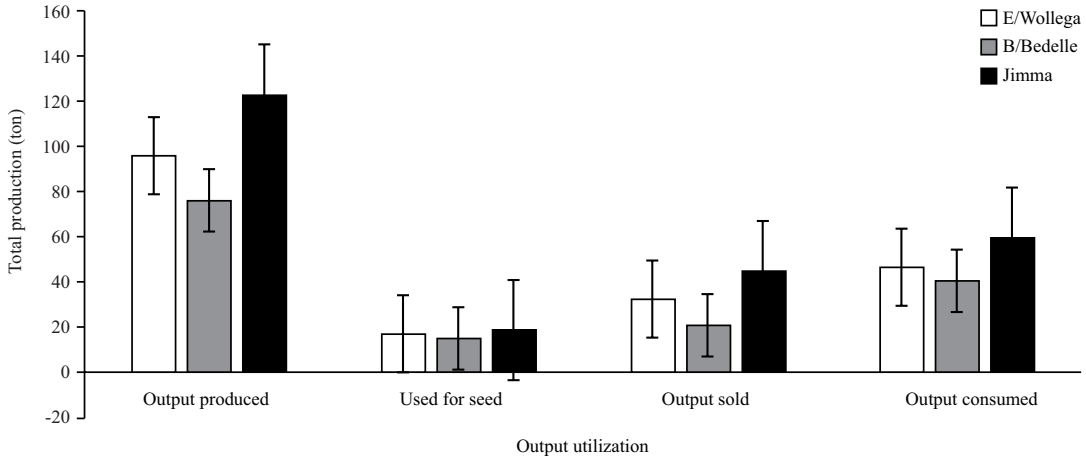

Fig. 4: Utilization of produced irrigated wheat by farmers in the sampled clusters

variety with a mean yield of 4.81 t ha^{-1} while the Kingbird variety was the highest yielding with a mean yield of 3.65 t ha^{-1} than others in the Jimma zone. The yield obtained from Denda'a improved variety was the least with a mean yield of 2.67 t ha^{-1}. The yield varies may be due to agroecology response to variety, watering frequency, disease, soil fertility and other management practices. Similar results were reported by Shikur[13], Amiri *et al.*[42], Zewde and Purba[43], Sosibo *et al.*[44]. The improved wheat variety yield response for irrigated and rain-fed production depends on agroecology Araya *et al.*[45] result. In some areas, farmers minimized watering frequency due to water shortage which reduce the productivity of the crop Yohannes *et al.*[46] result.

Purpose of irrigated wheat production: The farmers allocated their total wheat product to different purposes which include home consumption, market (income source) and seed as indicated in Fig. 4. This result indicates the majority of the farmers were used for home consumption followed by income sources. The majority of the wheat grain was consumed at home which is to ensure family food security and the left supply to the market which was in line with Zegeye *et al.*[3], Atinafu *et al.*[27] results.

Roles of stakeholders in irrigated wheat production: A diverse group of stakeholders like farmers, agriculture office and admiration leaders, research centres and unions were involved in the irrigated wheat production as described in Table 2. The smallholder farmers serve on crop management and information sources for experts and researchers. Farmers were also involved in field day organizing and experience sharing with other farmers on the irrigated wheat production system. In addition, they participated in the supply of wheat grain to the market and end users. Experts and leaders were responsible for providing training for the farmers, input supply, field supervising and organizing field days. This stakeholder works with the collaboration of research centres

Table 2: Roles of stakeholders in irrigated wheat production

Stakeholders	Roles	Members
Farmers	Land preparation, sowing, crop production management and information sources	Smallholder farmers
Public sectors	Training providers, inputs supply, advisory service, organising field days and field supervision and conflict resolution	Regional BoA, zonal and district agricultural offices and administration leaders
Unions	Storage and transportation facilities and fertilizer supply	Unions and primary cooperatives
Researches	Training providers, inputs supply, organising field day and supervision	Bako, Nekemte, Bedelle, Jimma Agricultural Research Centers

Table 3: Extension service provides for irrigated wheat production

Type of services	Zone	Mean	Sources
Training	East Wollega	3.33	BoA (regional SMSs, zonal SMSs, woreda SMSs, DAs) and research centres
	Bunno Bedelle	3.33	
	Jimma	3.88	
Supervision and advancing per week	East Wollega	3.22	BoA (leaders, SMSs and DAs), research centres and political leaders
	Bunno Bedelle	2.67	
	Jimma	2.63	
Field days	East Wollega	1.78	Collaboration of BoA and research centers
	Bunno Bedelle	2.17	
	Jimma	3.00	

and cooperative unions. This cooperative union was responsible for input supply and transport services to the farmers. They were also involved in grain buying from farmers and supplying to other agro-processing and end users. The public research centres work closely with district experts and farmers by driving force for innovation and technology in irrigated wheat production. They also undertake applied research and generate evidence for other stakeholders. Besides, this stakeholder was responsible for providing training for experts and farmers, input supply for the farmers, field supervising and organizing field days with the collaboration of district experts. This result indicated that stakeholders are the central tendency for irrigated wheat production which is a critical component of setting future direction in wheat production as sustainable which is similar to Jambo *et al.*[23], Francis[47] and Seifu *et al.*[48] results.

Extension services for irrigated wheat production: Agricultural extension services for irrigated wheat production were reported as the most important through providing training, availability of inputs on time, advising farmers on technology and giving different information on marketing as indicated in Table 3. This shows that agricultural extension services were basic for the development of irrigated wheat production and marketing linkage sustain ability and it is in line with the results finding by Tadesse *et al.*[49], Anteneh and Asrat[50]. Among these services training at least three times, field supervision and advising more than two times per week during the production season and two to three times organizing field days were conducted during the production season. As the farmers reported the services focused on the current production situation. The result showed that different agents including BoA experts, research centres and leaders have participated in this extension service.

Irrigated wheat production constraints: The irrigated wheat production constraints of the smallholder farmers were summarized in Table 4. According to the farmer's report, these constraints were presented across the three zones. This result shows that farmers in the area have been facing these different constraints.

Limited agricultural inputs with high prices: Irrigated wheat production was constrained by the unavailability, accessibility and affordability of inputs including fertilizers, improved wheat seed and the high price of pumps. The cost of fertilizer and seed are increasing over time which is in line with Tadesse *et al.*[14] results. The study also shows that there is no regular input supply system for irrigation which results in untimely deliveries and a shortage of input supply for the farmers. This access to improved agricultural inputs including fertilizer, seed, chemicals and motor pumps advances subsistence farmer's shift to marketable farmers.

Poor performance of irrigation: The majority of the modern-small scale schemes were reported as performing under their capacity performance. The majority of farmers reported sedimentation of canal head work, shortage of the main canal and lack of canal up to their field problems which cause water scarcity Gurmu *et al.*[24] results. This constraint was directly related to the water use system adjusted by the farmers. The majority of these problems occurred due to a lack of timely scheme management (maintenance and repairs). The majority of the irrigation beneficiaries reported that there was no financial saving system for scheme maintenance, weak linkage with relevant stakeholders, poor coordination and inefficient control system. This increases the water shortage due to sediment deposits or large volumes of sand in the canal

Table 4: Irrigated wheat production constraints

Constraints (n = 24)	Frequency	Rank
Limited agricultural inputs with the high price	24	1
Poor irrigation schemes performance	19	3
Biotic stresses (diseases and weeds)	13	6
Lack of local reliable market	21	2
Lack of financial sources for irrigation	17	4
Inadequate farmer's knowledge and skill in irrigation technologies	11	7
Shortage of modern scheme	15	5

system[23,51]. Due to these poor schemes management land productivity is declining from year to year[23]. In addition, there was inadequate community involvement in scheme planning and implementation which is a very important aspect of scheme sustainability[52]. Besides, the modern irrigation schemes were constructed with very short-lined canals huge amount of water is lost in the form of seepage as a result earthen canals have more seepage loss. This shows that the lined canal should be expanded over the command area of the scheme to use water and land effectively.

Biotic stresses: The most biotic stress constraints which affect irrigated wheat production include disease and weeds. Common diseases like rust and smut were reported and the grass family weed was the most important in irrigated wheat production. These biotic stresses may be causing high yield losses[38,43]. The majority of varieties including Ogolcho and Hulluka were susceptible to disease (rust and smut) which caused loss of crop yield[45].

Lack of local reliable market: The other constraint reported by farmers was the lack of a local reliable market and transport. In the study areas, local market access, price instability and market facilities like transportation systems were reported as the major constraints in irrigated wheat production. The lack of access to market information on price has greatly reduced the farmer's income gained from irrigated wheat production[27]. The majority of the farmers reported that market network (linkage) and transportation due to lack of road facilities as the main constraints in irrigated wheat production. The market linkage constraints with the lack of road facilities the market price was dropping during harvesting season resulting in farmers often selling at a low price which does not cover the costs of production.

Lack of financial sources for irrigation: Regarding financial sources for irrigated wheat production, there was no credit provided for purchasing inputs like fertilizer, seed and chemicals required financially. For the sustainability of irrigated wheat production credit access by microfinance and banks are more crucial for input purchasing[18]. This helps farmers as operation cost to purchasing inputs and pumps for more irrigated wheat commercialization which is in line with Nakawuka *et al.*[8] results who, stated that credit access to the farmers significantly affects the use of agricultural inputs. As the majority of farmers reported this access to credit is also used to purchase a motor pump and other spare parts which are in line with Alemu and Dessale[53] result.

Inadequate farmer's knowledge and skill in irrigation technologies: The irrigated wheat production practice was a new initiative in the study areas. This new initiative was constrained by water need, application water without calculation, irrigation interval and input application methods. The agricultural extension services in the areas focused on the current performance of the crop rather than sustainability. As farmers reported there was no awareness of crop rotation to improve soil fertility and water use efficiency. The farmers reported that there was a variation in soil fertility within each scheme command area. To improve and sustain soil fertility crop rotation and other soil management are important in sustainable crop production[44]. The majority of the farmers have complained about the input supply system which was forced to buy the input rather than change the farmers' attitude toward irrigated wheat production through training and advice. The majority of the farmers need attention for sustainable irrigated wheat production. The farmers were reported to need government support on inputs, pumps, tractors and combiner services. This expectation was coming from a 1st year government organization that gives free seeds and tractor and combiner services. This shows that the agricultural extension service pays less attention to the sustainability of irrigated wheat production. The farmers have complained about the market failure of irrigated wheat. This shows that there is no network linkage between extension services and unions. In the study areas, farmers had no awareness of routine pump maintenance. This result shows that farmers need training on routine pump maintenance to effectively use a pump and reduce maintenance costs[8].

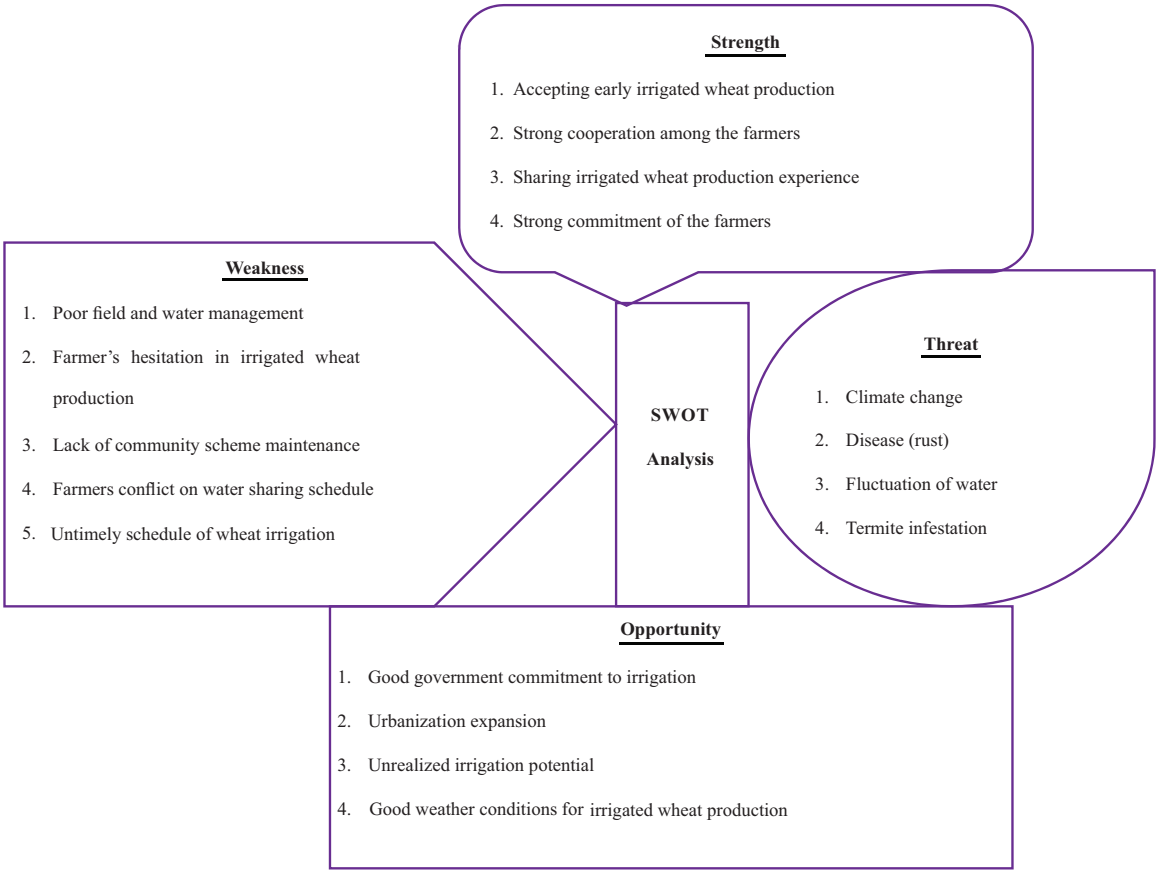

Fig. 5: Strength, weakness, opportunity and threat in irrigated wheat production

Shortage of modern schemes: The shortage of modern schemes was reported as another constraint. The majority of the farmers used traditional water diversion structures to divert water from the river for irrigated wheat production and this river water used water pumps[1]. The traditional schemes were constructed from local materials which need yearly construction of diversion structures and ha low diverting efficiency. The majority of water pumps used by farmers were not readily available nearest to the communities which incurred another cost for farmers Nakawuka *et al.*[8].

SWOT analysis: The Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was conducted to understand the situations for a potential irrigated wheat production, market and extension policy. This result shows that the internal factors (strength and weakness) and external factors (opportunity and threat) were taken into attention to developing strategic planning for sustainable irrigated wheat production which is indicated in Fig. 5.

Strength: The farmers and experts reported farmer's early accepting new initiatives, experience sharing with other farmers, good teamwork and strong commitment of the cluster farmers as internal strengths which can use effectively to achieve their objectives. These vital aspects of irrigated wheat production in the areas are an asset for the expansion of irrigated wheat production.

Weakness: During the production, management limited farmer's poor managed their fields, hesitation, water conflict due to poor water management and shortage and lack of community scheme maintenance was reported as weaknesses. Compared to rain-fed production, the irrigated wheat production in the areas are new and needs more extension services.

Opportunities: Irrigation potentials for the study zones as reported by the farmers and other stakeholders for expansion of irrigated wheat production government attention on improving agricultural production and productivity. They

reported the recognition of the government and others on irrigated wheat production was different from rain-fed production. The Government of Ethiopia gave special attention to the expansion of irrigated wheat production for food self-sufficiency and export through developing new schemes and making the availability of funds for irrigation research and development interventions. Expansion of urbanization and food insecurity was reported as another opportunity for expansion of irrigated wheat production. The increasing population and urbanization in the country increase the demand for a diversity of food and higher value-added product which is again a market opportunity for agricultural products Nakawka *et al.*[8]. This needs infrastructure and a market network to improve irrigated wheat productivity and reduce the market complex. Irrigation potential includes land and river water availability and suitability reported as an opportunity. The area under irrigation is lower than the potential this implies that there is a lot of potential for the expansion of irrigated wheat production. The farmers and experts reported in the three zones there are ample water resources that are unexploited. Besides, the three zones have high rain which needs attention to optimize rainwater harvesting for the expansion of irrigated wheat production where water resources are scarce to support irrigated wheat production. The result showed that the weather condition with the richest natural opportunities is the main opportunity for the expansion of irrigated wheat and increasing productivity.

Threats: In the study areas, climate change (untimely rainfall), disease (rust), fluctuation of water and termite infestation from time to time were reported as threats. The farmers reported that these threats like fluctuation of water and termite infestation were increased which decreased crop productivity.

Based on the constraints and opportunities the following recommendation should be identified:

- Regular input supply systems are the first required to enhance irrigated wheat production. Thus, inputs especially seed production and delivery system should be tackled to ensure their availability on time, afford ability and sustainability
- Strengthening the capacity of the farmers in the production system, business attitude, soil fertility, termite control, proper water use and routine pump maintenance
- Modern irrigation schemes and maintenance of the old schemes to improve the capacity of water to enhance sustainable intensification
- Establish a market system for inputs and outputs to the farmers along the wheat value chain in the areas
- Access to credit for input and pump purchasing through providing technical support is vitally crucial for sustainable irrigated wheat production
- Strengthening the interventions on promotion and dissemination of available improved wheat technology include seeds, machinery, pumps and other inputs for sustainability
- New wheat rust-resistant varieties and the availability of regular rust chemicals also need attention from researchers, unions and experts

CONCLUSION

The three zones (East Wollega, Bunno Bedelle and Jimma) have resources for irrigated wheat production which has not yet been fully utilized. In the study areas, the majority of the farmers accepted irrigated wheat production as an opportunity for ensuring their food security. The improved bread wheat varieties including Kingbird, Wane, Hulluka, Denda'a and Ogolcho were used by the farmers. The yield of the varieties varies from zone to zone which indicates the potential of varieties depends on agroecology, management, water availability, soil fertility and others aspects. The farmers in all zones used inputs: 150 kg ha^{-1} of seed and urea and 100 kg ha^{-1} of NPS based on the recommendation given by experts and obtained yields from 2.67-4.81 t ha^{-1} which were used for home consumption and income source. Various stakeholders were involved in irrigated wheat production with different aspects. Different constraints, strengths, weaknesses, opportunities and threats were identified and summarized for further recommendations.

SIGNIFICANCE STATEMENT

Irrigated wheat production assessment for further irrigated wheat production expansion and sustainability focused on irrigated wheat production stakeholder's roles, constraints, strengths, weaknesses, opportunities and threats in the study area is unique work and more important.

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