## **Background and Justification**

In Ethiopia, onion (Allium cepa L.) has produced throughout the year, unlike shallot and garlic, which is rain-fed,Onion produced under rain-fed conditions in the rainy season, and under irrigation in the dry season, is considered an important crop produced by small-scale farmers. The crop is produced in home gardens and commercially in different parts of the country. There a 734,921 onion holders in Ethiopia and they operate onion production under 36,373Ha and also onion yield 75 qt/ha (CSA, 2019). From production point of view, onion is comparatively easy to produce, provided it is grown in the dry season when diseases are less prevalent (FAO, 2019). It is essentially produced by smallholder farmers as a source of income and it is believed to be more frequently consumed. The area under onion cultivation is increasing mainly due to its high profit per unit area and expansion of small-scale irrigation. Despite increased production area for onion; its productivity is lower than in other African countries (Nigussie *et al.,* 2015). This is due to out of date farming techniques, lack of knowledge on the efficient utilization of available and limited use of modern agricultural technologies, out of date farming techniques, poor complementary services such as extension, credit, marketing, and infrastructure, poor and biased agricultural policies in developing countries like as Ethiopia (FAO and WFP, 2012).

Moreover, a review of the past research works by different scholars in different region of Ethiopia mainly focused on economic importance of onion (Akililu et.al 2015). Some scholars also focus on technical efficiency of male and female as irrigated onion (Haregu et al, 2019). However, these studies did not address the economic efficiency onion production under irrigation by smallholder farmers. Given the economic importance of this crop, scientific search on economic efficiency and source efficiency in onion production under irrigation is over sighted. Regardless of significance the crop, empirical evidence about level of efficiencies and its determinants is missing. Specifically, in West shewa zone economic efficiency of small holder farmers in onion production with irrigation is not studied in anyway. To fill the existing knowledge gap this study was initiated with an objective of to estimate the level of technical, allocative and economic efficiencies of onion production under irrigation and to identify the determinants of technical, allocative and economic efficiencies of onion producers by irrigation in the study area.

# **2. RESEARCH METHODOLOGY**

## **2.1. Data Types, Sources and Methods of Data Collection**

Both primary and secondary data from different source will be used. Primary data was collected from selected producers from three district found in the zone and three kebeles from each district using pre-tested semi-structured questionnaire. Secondary data relevant for this study was gathered from Zonal and district irrigation Authority, published and unpublished materials.

## **2.2. Sampling Technique and Sample Size Determination**

A purposive and three stages sampling method was used to draw appropriate sample. In the first stage, from zone three districts was selected purposively based onion production potential (irrigation better water and irrigable farm access, better volume of production and more number of producers). In the second stage, three kebele administrations (KAs) was selected purposively in the same way from each district. In the third stage, representative onion producers will randomly selected. Total sample size will obtained from the population through a sample size calculator using Yamane formula.