CHAPTER 1

INTRODUCTION

Cassava, manioc or yucca (*Manihot esculenta* Crantz) is a perennial crop with its apparent centre of origin in the southern rim of the Amazon Basin of Brazil (Olsen and Schaal 2001). It plays an important role in subsistence farming and contributes to food security of the poor (Ceballos et al. 2010) by providing 500 cal day^{-1} for an estimated 200 million people (Cock 1985). Cassava is also rapidly becoming an energy crop as the starchy roots are used as feedstock for ethanol production, especially in China (Rerkasem 2009). Of the world's cassava production of 234 million tonnes in 2009, 51% was produced in Africa, 35% in Asia and 13% in South America (FAOSTAT 2010).

In cassava production, after the starchy roots are harvested, cuttings from the remaining stems, called stakes, are used as planting material. However, since cassava is commonly grown by poor farmers on poor soils with minimum inputs, the crop produces low root yield and stakes are poor in quality (Cock 1985; Howeler 2002; Leihner 2002). The poor quality and low nutrient content of cassava stakes is a significant factor that limits cassava growth and productivity (Eke-Okoro et al. 2001). It has been suggested that stakes produced from mother plants grown on well-fertilized soils grow better because they have more reserves (Cock 1985; Molina and El-Sharkawy 1995). For three weeks after planting cassava growth depends exclusively on reserves stored in the stakes; sprouting of stakes is closely related to their starch content (CIAT 1988). However, sprouting of the stakes is even more closely associated with their potassium (K) content than carbohydrate or sugar content (Molina and El-Sharkawy 1995).

Priming plant propagules with nutrient solution provides mineral nutrients to plant propagules, such as seed or cassava stakes, before planting to overcome nutrient deficiency in the soil or in the propagules. For example, priming of barley seeds with

phosphorus (P) and zinc (Zn) has been reported to enhance germination and seedling growth of barley under conditions of P and Zn deficiency (Ajouri et al. 2004). In Nepal, seed priming with boron (B) effectively increased the seed B content of lentil, chickpea and wheat and increased seed yield of the chickpea (Johnson et al. 2005). In the United States rice seed has been reported to have more rapid and better germination, root length and shoot growth when treated with 1.0−4.7 g Zn kg^{-1} seed before sowing (Slaton et al. 2001). However, the conditions under which cassava stake priming is effective or ineffective are currently unclear.

The **objectives** of this study are:

1. To evaluate the effect of stake priming in nutrient solution on growth and root yield of cassava varieties.
2. To evaluate the effects of cassava stake priming in nutrient solution on germination and early growth.
3. To evaluate the effects of stakes of cassava varieties produced from three different sources, and how their performance was influenced by nutrient priming.