Origin of proposal:

Fluoride is an essential element for both human beings and animals, and its level of concentration in drinking water is vital. Optimum content (1.5 mg/L) of F⁻ in drinking water is essential for growth of bones and formation of dental enamel. The consumption of water with higher contents of fluoride (>1.5 mg/L) pose a threat to human health, that leads to endemic disease called “fluorosis”.

The occurrence of fluoride in groundwater has drawn worldwide attention, especially in granitic areas, where high F⁻ concentration is prevalent (Saxena and Ahmed 2003; Mamatha and Rao 2010; Naseem et al., 2010; Kim et al., 2011). Fluorosis is a considerable health problem in many areas of the world including India (Teotia et al., 1981; Mambali 1982; Nanyaro et al., 1984; Dissanayake 1991; Rao et al., 1993; RGNDW 1993; Apambire et al., 1997; UNICEF 1999; Ahmed and Ali 2011). Around 200 million people from 25 nations have great health risks, with high fluoride in the drinking water (Ayoob and Gupta 2006). In Indian context, the higher concentration of fluoride in groundwater is associated with igneous and metamorphic terrains (Manikandan et al., 2012). The states of Gujarat, Rajasthan, Haryana, Andhra Pradesh, Punjab, Uttar Pradesh, West Bengal, Orissa, Assam, Bihar, Delhi, Kerala, Madhya Pradesh, Maharashtra, Jammu & Kashmir, Tamilnadu and Karnataka in India are the most affected with this problem (Ramesam and Rajagopalan 1985; Rao et al., 1993; Madhnure et al., 2007; Garg et al., 1998; Sreedevi et al., 2006; Jacks et al., 2005), where approximately 62 million people including 6 million children suffer from fluorosis because of consumption of water high in fluoride (Susheela 1999). In India, it was first detected in certain parts of erstwhile Madras Presidency in 1937 (Short et al., 1937), i.e. Kanigiri and Podili areas of Prakasam district, Andhra Pradesh. At present, 17 out of 23 districts in Andhra Pradesh have been identified with the prevalence of endemic fluorosis including Medak district.
One of the serious health problems facing the country today is the prevalence of the disease known as fluorosis involving millions of people which arises primarily due to excess fluoride in drinking water in the areas concerned. Human beings as well as livestock are seriously affected and even crippled by this dreaded disease. Endemic fluorosis is characterized by dental mottling and crippling skeletal deformation such as kyphosis (forward bending of spine, fixed and rigid thoracic cage as well as spinal cord compression). Crippling bone deformity in the form of Genu Valgum can occur in adolescents and young adults and even in children under 10 years of age among communities exposed to high levels of fluoride. WHO prescribes 1.5 mg/L fluoride concentration in drinking water as the upper limit (WHO 2004). Geology, climate, choice of water source makes Indian people vulnerable to high incidence of fluorosis.

The fluoride problem is severe in Andhra Pradesh and considerable research work on fluoride bearing waters has been carried out in Nalgonda, Prakasham, Ranga Reddy, Visakhapatnam, Guntur and Ananthapur districts (Brindha et al., 2011; Reddy et al., 2010; Reddy and Rao 2006; Ramanaiah et al., 2006; Vijaya et al., 1991; Subba Rao, 2003; Nepal et al., 2010; Rolland Andrade 2012; Rajesh et al., 2012; Subba Rao, 2009). In recent times Fluoride in groundwater was also reported in many other districts. Reconnaissance investigations carried out by Central Ground Water Board in Medak district of Andhra Pradesh (CGWB, 2007) revealed that nearly 154 villages of Northeastern parts of district falling in Siddipet, Chinnakodur and Nangunoor mandals have recorded high fluoride concentrations, where the population is approximately 1, 74, 397.

Considering the general confusion among the residents about the use of groundwater, increase of public awareness on water quality, especially with respect to health implications of fluoride content through mass media in recent times, it is worthwhile to undertake a detailed investigation on the quality of groundwater with special reference to fluoride concentration in NE parts of the
Medak district (Fig. 1 & 2). It helps in understanding possible sources of fluoride that may help in management of groundwater resources in efficient manner.

The proposed area is predominantly occupied by granitic rocks belonging to Peninsular Gneissic Complex of Precambrian age. The present proposal aims to identify and delineate high fluoride bearing groundwater zones by covering 154 villages in the northeastern parts of Medak district (Fig. 1 & 2). It is expected that the outcome of proposed investigations help in eliminating the tapping of groundwater from those zones identified with high fluoride content using for drinking and domestic purposes. Further, it may also reduce the impact of fluorosis on human beings.