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An Assessment of the Impacts of *Elaeis guineensis* (Oil Palm) Cultivation on Ground Water Table in Sri Lanka

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Abstract

Oil palm is a profitable crop in the wet zone of Sri Lanka. It currently occupies the topmost position in the international vegetable oil market worldwide. However, after the expansion of Oil Palm, it shows severe problems in those areas such as declining ground water table. People faced lack of quality drinking water and they have complained about drying of their wells. But, the contribution of Oil palm to these problems is highly controversial. Some myths have arisen about negative impacts of this cultivation with lack of scientific details. Therefore, the main objective of this study is to assess the impacts of oil palm cultivation on ground water table and well water depth, relative to the land use of rubber plantations and natural forest in Sri Lanka. For that, study area was selected in the Nakiyadeniya oil palm estate which is located in Udugama, Galle district. Data were collected from May to October, 2019. Study area consists of 6 study sites such as 1 year old (OP1), 7 years old (OP7), 19 years old (OP19) oil palm cultivation, 14 years rubber cultivation (RB14), Kanneliya natural forest (NF) and an abandoned site (ABND) in Nakiyadeniya. Groundwater table was evaluated by measuring the well water depth which is the distance between the mouth of the well and the water level in the well, using a measuring tape. Monthly rainfall data from each study site were collected and the data was analysed using one-way ANOVA in minitab software. A face to face interviews with families from each study site using a pre-tested questionnaire survey was conducted to get the peoples' attitudes and experience about the oil palm cultivation. Random 20 households from each site except abandoned site as there were no households around, were selected as the respondents of the questionnaire. The data were analyzed using Excel software. 71% of the respondents are female and they employed as laborers in the Nakiyadeniya oil palm estate. 70% of the respondents are uneducated and 75% of them have been living there for 40 years in each site. 70% of the wells are older than 20 years, in each site. More than 50% of wells are deeper than 20 feet in each site.

λ 70% of the respondents representing all the sites except NF stated that, their wells get dried in the dry season and the problem occurs only in the dry months of the year. λ More than 80% of the respondents, around OP19 and OP7 sites, said that although their wells are fully or half filled before 10 years, now they are filled only with less than quarter with water. 50% residents living around OP1 and RB14 sites, are also said that the water levels of their wells are decreasing. λ percentages of well water reduction in OP19 and OP7 sites are higher than other sites. Further, average annual rainfall from 2010 to 2019 in the study area does not show gradual decline in any study site. Well water level of the houses located around the oil palm sites has decreased more than RB14 and NF sites. Least well water decline was recorded in the houses located around NF site. Finally it can be concluded that, there is a negative impact of oil palm cultivation on ground water table and well water depth.

Keywords: Oil palm cultivation, Impact assessment, Well water depth, Ground water table