ABSTRACT

IRWAN SUKRI BANUWA. The Development of Coffee Based Farming Systems for Sustainable Upland Agriculture Development in Upper Sekampung Watershed. Under the supervision of NAIK SINUKABAN as chairman, SURIA DARMA TARIGAN and DUDUNG DARUSMAN as member.

Land degradation is a serious problem in the Upper Sekampung watershed because the farmers cultivated coffee based farms on steep land without adequate soil and water conservation technologies and fertilization. Land degradation caused by erosion was generally greater than the local tolerable soil loss. Erosion on site washed the most fertile top soil, decreased land productivity and in turn declined farmer’s income. The existing condition of coffee based farming systems in the Upper Sekampung watershed was suspected perform unsustainable farming systems indicators. Therefore, this research was aimed: (1) To study biophysical conditions, types and characteristics of coffee based farming systems (2) To study impacts of coffee based farming systems on run off and erosion rate and (3) To develop alternatives sustainable coffee based farming systems in the Upper Sekampung watershed. The results of this research showed that: (1) Upper Sekampung watershed was dominated by land capability class III-l2, which are also classified as class S3 for coffee, pepper, banana and cocoa in land suitability classification system. Types of coffee based farming systems are monoculture of coffee (UT1), mixed farming of coffee and pepper (UT2), mixed farming of coffee, pepper and banana (UT3), mixed farming of coffee, pepper and cocoa (UT4), and mixed farming of coffee, pepper, banana and cocoa (UT5). (2) The existing condition of coffee based farming systems in the Upper Sekampung watershed did not perform sustainable farming indicators. Rate of erosion (52,5-451,7 t/ha/yr) on slope >15% was generally greater than the local tolerable soil loss (TSL, 38,7 t/ha/yr) and farmer’s income (Rp 6.954.000,00-Rp 16.223.000,00/ household/yr) was less than the income that can support a life worth living (KHL, Rp 18.000.000,00/ household/yr) (3) The improved coffee based farming systems (UT2, UT3, UT4 and UT5) by the application of new agrotechnologies performed sustainable farming systems indicators. (4) UT5 is the most optimum farming system. Optimum results of UT5 on slope <15% could be achieved by the application of new agrotechnologies including balance fertilization using Urea, SP-36 and KCl; on slope 15-30% by the application of balance fertilization plus adequate soil and water conservation techniques including traditional terrace or silt pit; and on slope >30% by the application of balance fertilization plus adequate soil and water conservation techniques including traditional terrace or silt pit and mulch of 6,0 t/ha/yr. UT5 is the most effective farming system to decrease erosion down to the lowest level (2,9-27,1 t/ha/yr) and to increase farmer’s income up to the highest level (Rp 19.790.300,00/ha/yr). (5) Protected zone in the Upper Sekampung watershed has to be kept as conservation area and should not be recommended for agriculture development.

Key Word : coffee, conservation technology, erosion, income, run off, sustainable agriculture