Introduction
Uplands in tropical countries face high erosion rates brought about by intensive cultivation and heavy rainfall. This largely contributes to the decline in crop productivity and to the increase use of farm fertilizers to produce the same amount of farm output. Conservation agriculture with trees (CAT) offers a solution to this pressing problem through following 5 key principles: Minimum soil disturbance, continuous mulch, maintaining diverse crop species, integrated pests and nutrient management. CAT is very important in soil and water conservation, enhancing agri-diversity, improving farm carbon sequestration potential, maximizing of land area usage in the Philippines as well as the reversal of soil degradation thus improving food and nutritional security of the upland dwellers.

Methodology
Five promising conservation agriculture production systems (CAPS) were evaluated in comparison with conventional maize tillage system (Table 1) in Claveria, Misamis, Philippines (8°38'30", 124°55'49") on a sloping land of 26%. Two weeks before planting, the weeds were sprayed with glyphosate (Round up) following the standard recommendation rate. Treatments 1-4 used dibble method in planting maize seeds as well as the associated crops. All treatments were subjected to low (P1 = 0-30-0 NPKO, K0) and moderate (P2 = 60-30-30 NPK0, K0) fertility levels. Due to poor performance of F1 during the first year, it was modified to high fertility level with 120-60-60 NPK0, K0 during the subsequent year. All P and K were applied as basal. N was applied in split at 15 and 30 days after emergence. Turn around period was reduced by immediately planting the crop after each harvest except with treatments having a fallow period (T2).

Results and Discussions
Figure 3 shows the comparison of total aboveground biomass (a) and grain yield (b) as influenced by different conservation agriculture production system (CAPS) in year 2010. The conventional maize system yielded better in total biomass and grain yield compared with other CAPS. Maize with rice bean yielded lowest across all cropping patterns. The moderate fertility level (60-30-30) had higher yield across all CAPS compared to low fertility level (0-30-0). The first harvest of T5 (Cassava-Stylo) was in the following year. In year 2011 (Figure 3), Cassava + Stylo had the highest total biomass (a) which constitutes 1st crop of cassava and 3 prunnings of Stylo. It was followed by Maize + Arachis pintoi and Maize + Stylo rank third. The remaining cropping patterns were comparable in total biomass. In Figure 3b, root yield of cassava was high. In grain yield comparison, Maize + Rice bean yielded highest and the remaining cropping patterns were comparable in grain yield.

Similar trend was observed in year 2012. Still cassava rank 1st in total biomass (Figure 3) and the rest of cropping patterns were comparable except for traditional monoculture maize. The root yield of cassava was higher compared to the previous cropping. Grain yield of T3 (Maize+Cowpea-Upland rice) was also better.

Conclusion
We found that Cassava + Stylo showed higher total system productivity across all CAPS treatments. Maize + Arachis pintoi showed higher total biomass and grain yield among CAPS treatments with maize in the subsequent years. This might be due to higher N-fixing capacity of Arachis pintoi that supplemented additional N to the soil which provided N benefits both to maize and to the legume. Conventional maize monocropping system productivity declines during the subsequent years.

Figure 1. Degraded agricultural landscapes are expanding in the Philippines due to improper tillage and water –induced soil erosion on sloping lands causing low farm productivity, malnutrition and poverty.

Figure 2. Conservation agriculture with tree (CAT) with principles of minimal soil disturbance, continuous ground cover, diverse crop species, integrated pests and nutrients management and integration of trees provides alternative options.

Figure 3. Annual total dry matter yield (a) and total grain yield (b) of different CAPS evaluated in 3 years on acid upland soil. Claveria, Misamis Oriental, Philippines.