Labor Time Requirements Associated with Pest and Crop Management Packages for Peanut Production in Ghana

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In Ghana, peanut pod yield is often 76% lower than the minimum potential of 2.5 tons/ha in compared with improved recommendation practices from research outputs. To improve peanut yield nearer to the minimum potential, pest and crop management packages at three different levels were investigated in Kumasi, Tamale, and Wa in the Ashanti, Northern and Upper West Regions of Ghana, respectively. Production packages consisted of low input package (LIP), medium input package (MIP), and high input package (HIP) with a range of financial and labor commitments. To determine the time and labor investment required for the different pest and crop management packages, three separate experiments arranged in a 2 × 3 factorial were established in the 2019 cropping season and were continued in 2020 and 2021 in the same plots with different cropping sequences. The factors included two levels of peanut varieties that included Yenyawoso (improved variety with pest resistance) and Shi-Tao-Chi (local standard variety). The three levels of inputs for the two varieties consisted of: 1) the LIP including high quality seed, timely planting, and 1 manual weeding; 2) the MIP of high system that included high quality seed, timely planting, 2 manual weedings, 2 or 3 applications of local soap; and fertilizer (15:15:15, N-P_2O_5, K_2O) applied 3 weeks after planting (WAP); and 3) the HIP of high quality seed, timely planting, preemergence application of pendimethalin followed by 1 manual weeding, 2 applications of fungicide (azoxystrobin plus difenoconazole), application of fertilizer described previously, and calcium fertilizer applied 6 WAP. Data collected on the time required for each practice from planting to harvesting were converted to hours/hectare with six hours considered as one-person day (one labor day). Data were analyzed with Statistix 9 data analysis software; ANOVA was generated and means separated by SED at $p = 0.05$.

When data was pooled over locations in 2019, both Yenyawoso and Shi-Tao-Chi produced greater kernel yields in the HI (1.7 and 1.7 metric tons/ha, respectively) followed by the MIP (1.3 and 1.1 metric tons/ha, respectively), and the LIP (1.0 or 0.7 metric tons/ha, respectively). At Wa, 35, 42, and 23 person days were required for the LIP, MIP, and HIP, respectively, for Shi-Tao-Chi. For Yenyawoso, 32, 38, and 21 person days were required for these respective production packages. At Kumasi, 50, 58, and 29 person days were required for Shi-Tao-Chi in the LIP, MIP, and HIP, respectively, with 41, 56, and 28 person days required for Yenyawoso. At Tamale, 49, 57, and 30 person days were recorded for Shi-Tao-Chi while 41, 52, and 28 person days were required for Yenyawoso for LIP, MIP, and HIP, respectively. Generally, weed management was the most time consuming activity requiring 28 to 37% of time in the HIP, 48 to 59% in MIP, and 43 to 52% of time in the LIP when pooled over all locations. Sowing was the second most time consuming input followed by harvesting. Analysis on the time required to remove pods from vines after harvesting, indicated that additional time was needed for this practice in the HIP compared with the MIP and LIP. Within each production system, Shi-Tao-Chi required more time for removing pods from vines than Yenyawoso, principally due to its smaller pod size. Farmers, most notably women and in some cases men, are likely to adopt technologies that are less time consuming but lead to greater yield and financial return. Therefore, technologies that reduce

labor needed for weeding, sowing, and harvesting could be useful for the adoption of improved production packages.