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## Physiological and agronomic efficiencies of corn under Conservation Agriculture Practice Systems (CAPS) in a sloping upland oxisol in southern Philippines

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n Southern Philippines, the last remaining frontiers for agricultural expansion are the sloping uplands. This ecosystem is considered to be fragile, vulnerable and has delicate resource. Owing to physiography, soil erosion is prevalent and excessive. In this agro ecosystem, corn is a major crop grown both for food and feed. Present cropping system is counterproductive to long term sustainability, hence soil erosion is destructive and rainfall is intensive. Conservation Agriculture Practice Systems (CAPS) is a tailor-fitted approach for successful adoption and implementation of Conservation Agriculture. The three main pillars of CAPS, namely: 1) continuous crop rotation 2) minimal tillage and 3) continuous ground cover were tested in synchrony using corn as test crop in this sloping oxisol. A one year study (November 2011 to November 2012) was conducted to determine and evaluate key physiological and agronomic parameters of corn under CAPS such as net assimilation ratio (NAR), crop growth rate (CGR), partitioning coefficient (PC), harvest index (HI), dry matter and yield and yield components. Five cropping systems (CS); CS<sub>1</sub>- (corn + Arachis pintoi - corn + Arachis pintoi) CS<sub>2</sub>- (corn + Stylosanthes guaniensis - corn + Stylosanthes guaniensis)  $CS_3$ - (corn + cowpea -upland rice- corn + cowpea)  $CS_4$ - (corn + rice bean - corn + rice bean) and  $CS_{c}$  (corn- corn) were implemented. Physiological parameters were measured at 30, 65 and 85 days after planting (DAP). HI, yield and yield components were determined during harvest. NAR values at 30-60 and 60-85 DAP differed among cropping systems and between growing seasons. CGR was not affected by cropping systems at 30-60 DAP in both cropping seasons. However, cropping systems influenced CGR at 60-85 DAP. Partitioning coefficient was influenced by the interaction effects of cropping systems and growing seasons at 65 and 85 DAP, wherein results followed similar trend especially for the dry matter allocated to the leaf and straw in both cropping seasons. Between cropping systems, CS, and CS, showed peculiar trend of dry matter partitioning. Corn intercropped with S. guianensis had more dry matter partitioned to the stem at vegetative stage (30 DAP) and had the second highest PC to the ear at 85 DAP (active grain filling stage). Similarly, when corn was intercropped with rice and bean, the corn plant invested more on its leaf organ at early stage (30 DAP), while more to the ear at 85 DAP. HI of 0.43 was obtained in CS, which is significantly higher than the rest (CS,-CS<sub>5</sub>) of the cropping systems, having values of 0.3-0.33, respectively. Higher grain yields were obtained in cropping systems under CAPS or corn intercropped or sequenced with legume) compared to the conventional ( $CS_e$ ) cropping system. Highest yield was obtained in CS, which is comparable with the recorded grain yields of CS, and CS, respectively. Highest grain yield (mean between seasons) was obtained in CS<sub>2</sub>. Initial results indicated viable adaptation of CAPS and its sub-components under local condition drawing special inferences for the tropical sloping areas.

## Analysis of rangeland productivity of lidder valley using geo-spatial techniques

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The study area selected for this research is Anantnag district of Jammu & Kashmir, India. Commonly known as Lidder valley one of the best tourists destination in Kashmir. There are extensive rangeland in the upper stretches of Lidder, the livelihood of semi and migratory grazers locally called Gujars and Bakherwals is linked the sustainability of these rangeland lands. The once lush green regime lands have deteriorated in quality, due to excessive tourism pressure and unmanaged grazing activity. The productivity of these rangeland lands would have to be estimated by using remotely sensed and field data. Results show that Rangeland lands increases 16% because of deforestation. The two approaches were used in this research on is on the 'basis of NDVI i.e. high NDVI indicates High productive rangelands and moderate NDVI indicate and low indicates low productive or degraded, Another integrated approach is on the basis of slope, NDVI and other soil properties i.e. high NDVI and low slope indicates high productive, moderate NDVI and moderate slope indicates low productive or degraded. The overall aim of this research is to demonstrate the usefulness and applicability of remote sensing, GIS and geo-spatial modeling techniques.

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