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influence on sorghum, bajra, cotton and pulses and negative on maize. Precipitation intensity had negative influence on all crops. If temperature increases, the variance in productivity of paddy and groundnut increases. Similarly, if precipitation increases, the variability in productivity for sorghum and bajra decreases. Likewise, if the precipitation intensity increases, the variability in yield increases in case of paddy, bajra and sugarcane. The calculated coefficient from Just-Pope yield function and the projected climatic data from the Regional Climate Models (RCMs) were used to project the yield of crops in the year 2030. The results showed that in North East Zone, Western Zone, Cauvery Delta Zone and Southern Zone, out of nine crops, five crops would experience decrease in productivity. Similarly, in North West Zone there would be decrease in productivity for three crops (maize, cotton and pulses). In South Zone, only two crops (bajra and pulses) will have decrease in productivity. In addition to that, an attempt made to analyze the factors that influence farmers to adapt crop choice with respect to changed climate condition, by estimating a Multinomial Logit Model. The primary data collected from the sample respondents during the months of January and February 2012. The results showed that older farmers were more likely to select groundnut, sorghum and less likely to select maize, fruits and vegetables. Education had positive and significant impact on growing groundnut, sorghum and chillies. Owning of livestock positively influence the probability of selection of sorghum and maize. The own prices of sorghum and groundnut are significant and positive as expected. Farmers are more likely to choose these crops when the market prices are higher. When non-farm income increases, farmers are most likely to prefer sorghum, cotton, maize and groundnut. When temperature increases by 1°C, farmers tend to choose maize, cotton, fruits and vegetables less often while the farmer chooses pulses, sorghum, chilli and groundnut more often. If precipitation increases by 1 cm, farmers move away from sorghum, chilli, Groundnut to pulses, maize, cotton, fruits and vegetable. Hence, local government policies and programs in agriculture should have a built in component to address the climate change issues.

Multidimensional framework for measuring sustainability and resilience of farming systems

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Natural resources, are fundamental for the structure and function of agricultural systems and for social and environmental sustainability in support of life on earth. Historically, global agricultural development has been narrowly focused on increased productivity rather than on a more holistic integration of natural resource management with food and nutritional security. Now it is strongly suggested that a holistic, or systems-oriented approach, will be needed to address the intractable challenges associated with the complexity of food and other production systems in different ecologies, locations and cultures. In the present study we have developed and piloted a multidimensional framework for assessing farming systems sustainability and resilience (FSSR). The quantification framework is easily measurable and comparable across farm households, farming systems and beyond. It considers five major domains of the farming systems namely environmental, economic, productivity, social and human well-being. In the subsequent stages of measurement each domain is divided into different themes, then sub-themes and indicators. The indicators in our study have been finalized with rounds of stakeholders' consultations involving farmers, researches, development experts besides literature. Finally, we identified a total

of 115 indicators: environmental (34), economic (29), productivity (12), social (25) and human well-being (15) in the final framework which are measurable and would be able to provide an index value representing level of sustainability of farming systems at different scales: farm household, domain and farming system considering appropriate weights of different domains. The FSSR framework could be a very useful tool for designing the context specific strategies to address farm sustainability challenges.

Sustainable groundwater resource management in micro watersheds: Empirical evidence from Raichur district, Karnataka

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Groundwater is a strategic resource due to its high quality and perennial availability. However, groundwater management all over the world often lacks sustainability as evidenced by falling water tables, drying wetlands, increasing sea-water intrusion and general deterioration of water quality, as groundwater cannot be renewed artificially on a large scale, sustainable management of this resource is vital. They include methods for the determination of groundwater recharge, groundwater modelling including the estimation of its uncertainty, and the interfacing to the socio-economic field. The study has made a modest attempt in two micro watersheds in Raichur district, where Sujala-III watershed development program is being implemented by the Watershed Development Department, Govt. of Karnataka. Study has adopted the new approach in collection of data and information such as irrigation wells location using GPS and installation of water meters for measuring water extraction and estimation of electricity consumption by irrigation wells with installation of electric meters. Water budget technique was employed to analyze the sustainability of groundwater at micro watershed level. Results show that groundwater use efficiency is more in onion (Rs. 810/acre inch) followed by maize (Rs. 638/acre inch), groundnut (Rs. 386/acre inch), Jowar (Rs. 187/acre inch), and bajra (Rs. 166/acre inch). Efforts should be made to include groundwater management as one of the important components in watershed development programmes. In order to regulate and efficient and sustainable management of groundwater use at micro/ sub watershed, it is needed for policy for recording location (by GPS) and yield (inbuilt water meters in IP Sets) of all wells at micro watershed level.

Factors influencing the agricultural sustainability: District and farm level analysis

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This study examined the factors influencing agricultural sustainability both at regional and farm level by constructing agricultural sustainability index for North Eastern Karnataka region. Multiple Linear Regression analysis was used to know the influence of independent variables on agricultural sustainability both at district