

## **Comments on the Paper**

### **Impact of Climate Variation on Agricultural Productivity and**

### **Food Security in Rural India**

The main focus of this paper is on construction of food security index (FSI) and to estimate effect of various factors, classified as climatic and non-climatic, on various aspect of food security. The FSI is taken as sum of three indices representing food availability, food stability and food accessibility. The paper also estimates effect of FSI on poverty and effect of various socio-economic and agro climatic variable on aggregate and crop wise productivity. The cause and effect relationships are estimated using multi variable regression framework.

Food security index and the index for its three components for major states of India are constructed using UNDP methodology for Human Development Index which is based on maximum and minimum value in the set and specific value of a variable in each state. The paper uses 6 to 13 variables to construct indices of food availability, stability and accessibility. The paper does not explain the rationale for choosing different variables for constructing various indices. Also, there is considerable overlap among the variables in each indices. For instance, variables included in food availability include per capita food grain availability, per capita calorie availability and per capita consumption expenditure which are generally highly correlated. It also includes per hectare labour used and per hectare Government expenditure as the constituents of food availability. Strange variables like ratio of literate population to gross sown area and ratio of forest area to net sown area in a state are used as component of food stability. Most of the variables used in the index for stability in fact matter for production not for stability. The index for accessibility to food is also found to include very funny kind of variables like worker to population ratio, urbanization, sex ratio. This index also uses urbanization percent and percent of rural population as two different variables though they represent same thing. No hypothesis or a prior reasoning is given for including various variables in an index.

Population density and rural population per unit land are included separately in the index for food accessibility though the latter is part of the former. Thus, instruction of indices is not found to have any sound basis and most of the variables used to construct FSI are devoid of any reasoning.

The most objectionable aspect of this paper is econometric model used to estimate effect of various factors on FSI and other equations. Equations 12 to 14 of the econometric model include many variables as explanatory variable which are already included in the FSI indices used as dependent variable. In equation 12, livestock intensity, foodgrain availability, government expenditure are used as explanatory (exogenous) variables and they are also the component of index of food availability. Do me variables like infant mortality rates are also used as explanatory variables in the equation for food availability without explaining the connection. Thus, in specifying econometric model the authors did not take any care of various conditions to be followed to get reliable estimates from an econometric equation. Similar kind of violations are there in equation 15.

As expected from a poorly specified model, the resulting regression co-efficient show funny signs and magnitude. Some variable which shows positive affect on production show negative affect on food security and vice-a-versa. Climate factors like rise in maximum temperature show negative affect on rice which is a summer crop and positive affect on wheat which is a winter crop in India, whereas entire literature says it otherwise. Similarly, rainfall show negative affect on crops grown in monsoon season and positive affect on wheat which is almost entirely integrated and sown in winter season.

This paper is an exercise of a statistical nature and it just plays with numbers representing socio economic and climatic variables. The authors have tried to establish relationships without any understanding and basis for establishing relationships. Econometric estimation is totally non-scientific and regression co-efficient can be treated as some random number from an exercise in number.

This paper does not make any scientific contribution and most of what is written in this paper does not make any sense. It will be a wastage of time for any reader to read this paper. I could not find even single merit in the paper. The write-up also shows that the authors do not have basic knowledge of the theme. The title refers to rural India whereas most of the variables do not keep any such distinction.