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Selection of Mathematical Modeling For Forecasting of Jute Production in Bangladesh

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Abstract: Forecasting of jute production by using time series analysis may be helpful for its contribution to the upgradation of the socio economic status of the nation as jute palys an vital role in the development of economy in Bangladesh. In this matter the concerned authority if required may adopt appropriate action in order to reach the estimated production.

Key Words: Time series analysis, Model, Jute, Production, Forecasting, Scientific, etc

Introduction:

Bangladesh is placed in second position in jute production all over the world. Ninety percentage of jute produced by Bangladesh is exported as per Rahman(2001). In Bangladesh during 1970s, the jute was popularly known as golden fibre due to its extraordinary contribution to the economy by earning huge foreign currency.

During post independence period, eighty percentage of total foreign currency was earned from the products of jute. But due to certain decline in jute production, the income of foreign currency was hampered. It is very much interesting that the jute industry in Bangladesh alone generates ten percentage of the total employment. Now Bangladesh government is trying to promote the jute industry in order to recovery the lost status in the world market.

Jute is now become an industrial raw material for production of packaging materials. The livelihood of farmers and industrial workers in millions are dependent on jute.

As per report of Mahbubul Islam et al. (2017), the overall annual production of jute and its allied fibres is almost three million tones due to its high demand all over the world. Jute fibre is mainly used in the field of domestic, agricultural, industrial and commercial and domestic.

Twine and rope are made from jute as stated by Maulik (2001).Inexpensive clothes are made from the butts of jute. Pulp and paper are also can be made from the fibres of jute. Jute gets its application in the carpets, sackings, wrapping fabrics and in the manufacturing industry of construction fabric.

In 2017, Mahbubul Islam et al. stated that in earlier days jute got its application in traditional textile machineries as textile fibres having cellulose and lignin. Currently jute and its various products are used by pulp and paper, furniture and bedding industries for manufacturing of nonwovens, technical textiles and composites.

Jute being the most important commercial crop plays a major role in agriculture sector of Bangladesh (Maulik, 2001). Jute is environment friendly due to its biodegradable nature and thus hold an important place in the industrial sector.

Bangladesh earns foreign currency mostly from jute. As per Sikdar and Banerjee (1990), jute industries contribute a lot to the revenue of government in the form of taxes, levies, sales tax, octroi and custom duties.

Bangladesh was recognized as one of the best jute producing and exporting countries of the world (Islam et al., 2013). But over the last two decades, the position slided down to the seventh position.

Background of the study:

Global warming is mainly caused by the emission of green house gases into the atmosphere. Global warming caused glaciers melting, raising sea levels, cyclones, tornados, flood, drought Tsunami etc. Incremental raising of the temperature these calamities intensified many folds and thus causing havoc to wealth and life. The reality of climate change due to global warming is being faced by Bangladesh. It will impact on the composition of atmosphere, hydrology, geomorphology, ecology, soil, land use, biodiversity, vegetation etc. As a result many natural ecosystem may be changed. Emergence of climate change would affect Bangladesh in two ways in two major contrasting regions. First one, the southern region would be in drainage congestion with rise of sea level and intrusion of saline water. Secondly the north-western part will be subjected to scarcity of water leading to drought condition, both will impaired the agro-ecosystem of the country.

Due to multifunctional nature of the agricultural sector, it has a multiplier effect on any nation's socio-economic and industrial fabric (Ogen 2007). Jute has the potential to be the springboard of industrial and

economic development by boosting up the country's development (Stewart 2000). The principal fibre of Bangladesh is jute.

Agriculture is the main concern due to changes in climatic factors such as temperature, humidity, precipitation, wind flow, solar radiation; evaporation etc has direct effect on the productivity of crop.

Methodology:

With the help of the following type of primary and secondary data, the mathematical modeling for forecasting of jute production may be used to get the output.

1. Primary data:

Primary data will be collected in the following way by preparing two types of Questionnaire:

i. House Hold Questionnaire
ii. Village Schedule Questionnaire(Village Head):

The questionnaire will be prepared by comprising various information highlighting soil area under cultivation for jute production, amount of jute production in last ten years, pattern of rainfall, temperature records of past ten years with other related informations.

iii. By Focus Group discussion

2. Secondary data:

Secondary data like given below will be collected from the government office of Bangladesh like Bangladesh Bureau of Statistics, Jute Research Institute, Ministry of Agriculture, Bangladesh Metrological Department etc

i. jute production of last ten years
ii. area under cultivation for jute production
iii. rainfall of last ten years
iv. temperature of last ten years
v. soil pH,
vi. soil Conductivity,
vii. soil NO_3^-,
viii. soil SO_4^{2-}.
ix. Demographic Data

Selection of Mathematical Model For Forecasting of Jute Production:

There are many methods available in the existing literature to investigate the impact of climate change on agricultural productivity. These are production function model, Ricardian cross sectional regression model, Agronomic-economic model, Agro-ecological zone model and integrated assessment.

To assess the impact of climatic factor on jute productivity, one of the following model may be suitable in the present study.

1. Simple linear regression model (LR Model):
2. Ricardian productivity regression (non-linear regression) model (RP Model):
3. Cobb-Douglas production function model (C-D Model):

By considering the following points, an appropriate model may be selected.

i. Hypothesis Testing and Selection of Appropriate Model*:*
ii. Testing for random effects:
iii. Testing for fixed or random effect:
iv. Testing for cross-sectional dependence/contemporaneous correlation:
v. Testing for heteroskedasticity:
vi. Testing for serial correlation:
vii. Final Estimation:

Anticipated Outcome

1. Relationship of jute production characteristics with climatic change
2. Model predicting the probable jute production in future.

Conclusion

Since jute is very important from the view point of economy, it is very much true that a predictory value based calculation system like mathematical modeling will help the concerned management authority to take proper steps to reach the expected jute production under non favorable climatic condition. The forecasting system by choosing the correct mathematical modeling may lead the country towards the developed nation.

Reference

[1]. Islam, M.M., and Ali M.S., "International Journal of Economic Theory and Application", 2017, 4(6): 45-57, ISSN: 2375-298X
[2]. Maulik, S. R., 2001. "Chemical Modification of Jute. Asian Textile Journal", 2001, 10: 99-107.
[3]. Islam, M.R., Rana,M., Hoque,M., Ahmed, M.M.H.A., and Ahmed, M.K., "Causes and consequences of labour unrest in jute mills of Khulna division in Bangladesh: An empirical study" Int. J. Business Management Rev., 2013, 1: 57-68.
[4]. Ogen, O., "The agricultural sector and Nigeria's development: Comparative perspectives from the Brazilian agro-industry economy 1960-1995", 2007, *Nebula,* 4(10): 184-194.
[5]. Rahman, M.M., "Policy and prospect of jute and allied fibers with special reference to Bangladesh", Bangladesh Institute of Labor Studies For *Jute Production in Bangladesh: A Time Series Analysis, 2001.*
[6]. Sikdar, M.F.S., and Banerjee, B.N., "Jute Cultivation in India and Bangladesh: A Comparative Study", 2001, 1st Edn., Mittal Publications, New Delhi, ISBN-10: 8170992125, 121.
[7]. Sikder,F. S., Saha, C. K., Rahman, M., Alam, A.K.M.M., and Haque, S., "Jute production inBangladesh- An overview", Abstracts of papers, International Symposium on Jute and Allied Fibres Production, Utilization and Marketing, National Library, Kolkata, India, January, 9-12. p. 7.
[8]. Stewart, R., " Proceedings of the 7th World Sugar Conference" Durbar.
[9]. Hoosain, M.M., and Abdulla F., "Jute Production in Bangladesh: A Time Series Analysis", Journal of Mathematics and Statistics ,2015
[10]. https://www.otexts.org/fpp/8/1; 11th August, 2018
[11]. Kumar, K. S. K. & Parikh, J. (2001). Socio-economic Impacts of Climate Change on Indian Agriculture.
[12]. *International Review for Environmental Strategies*, 2(2), 277-293
[13]. Kumar, K. S. K. (2009) . Climate Sensitivity of Indian Agriculture does Spatial Effects Matter. SANDEE Working Paper 45-09, Kathmandu.
[14]. Kumar, V., Sharma, Y. & Chauhan, S. (2011a). Impact of Climate Change on the Growth and Production of Saccharum Offcinarum and Magnifera Indica. *International Journal of Science Technology andManagement*, 2(1), 42-47.
[15]. Kumar, S. N., Aggarwal, P. K., Rani, S., Jain, S., Saxena, R. & Chauhan, N. (2011b). Impact of Climate Change on Crop Productivity in Western Ghats, Coastal and Northeastern Regions of India (Special Section: Climate Change: Projections and Impact for India). *Current Science*, 101, 332-341.
[16]. Kar, J. & Kar, M. (2008). Environment and Changing Agricultural Practices: Evidence from Orissa, India.*Indus Journal of Management and Social Sciences*, 2(2), 119-128.