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CAN THE INDIAN STATES' ACHIEVE A FUTURE OF THE SUSTAINABLE AGRICULTURAL DEVELOPMENT AND FACE CHALLENGES TO AGRICULTURE DURING THE 21st CENTURY?*

Jasbir Singh

The answer to these questions is in the affirmative, provided

- Fifty years of the Indian States' agriculture be studied under the following different periods:
 - ! Colonial period (before 1947),
 - ! Rehabilitation period (1947-51),
 - ! Colonisation of cultivable wasteland period (1951-66),
 - ! Diffusion of green revolution technology period (1966-1996), i.e., three decades with three sub-periods:
 - Adoption of new farm technology period (1966-76),
 - Intensification in new farm technology inputs-use period (1976-86), and
 - Stagnation in output: years of attainment of plateau or saturation period (1986-96), and
 - ! Agricultural problems and challenges period: faulty crop-sequence, fall in water-table, price mechanism, agricultural marketing etc. (1996 onward).
- Area-based agricultural planning and development following the ideology of social-justice and territorial-justice, and positive discrimination ideology be adopted vis-iz-vis political-oriented planning based on the theory of party in power, and negative discrimination be discouraged. Unfortunately,

the latter dominated the agricultural scenario in India.

- Agroecological-oriented Integrated Area Development Programme (AIADP) be formulated based on past experiences and area-problems, and faithfully implemented with the active participation of the farmers. The components of such an AIADP for sustainable growth be
 - ! *First*, to delimit agro-environmental or agro-ecosystem units; prepare inventory of natural resources, human characteristics, man-made environment, agricultural activities etc., and identify geocentric and arthropocentric constraints of each unit; and thereafter, specific recommendations be made for the redressal of regional imbalances in the level of agricultural development
 - ! *Second*, to strengthen institutional aspects, mechanisation aspects and rationalisation or bio-technological aspects in each unit based on inventory as suggested above.
 - ! *Third*, to write a slogan on walls, i.e. **diversify agriculture or perish**: Diversification in farming and cropping, healthy crop- sequence, contract farming and favourable pricing structure-cum- agricultural marketing be its constituents.

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- ! Fourth, to adopt the policy of dispersal of agro-based industry and diversification in rural economy as a two-edged weapon
 - improving employment level and accelerating socio-economic status, and
 - checking population growth.
- ! *Fifth*, since the adoption of green revolution technology created problems/challenges to agriculture and attained plateau in agricultural performance level, so consider the adoption of dryland farming revolution seriously. There is a vast scope for the adoption of dry-farming technology in drought-prone areas in particular, hence dryland farming revolution.
- ! *Sixth*, planning-oriented regionalisation be based on agricultural development levels for facing the agricultural challenges during the 21st century.
- Evolve a sound methodology for the measurement and analysis of agricultural development levels.
 - ! First, study agricultural development as a process, the outcome of the concurrent operation of two sets of forces, namely
 - Abiotic forces (natural), and
 - Biotic forces (man-made).
 - ! *Second*, assessment of agricultural development ratings in spatio-temporal perspective is essential for the
 - Classification of regional inequalities in terms of prosperous, transitional and backward areas;
 - Identification of geocentric and anthropocentric constraints responsible for regional imbalances, and
 - Specific recommendations for the redressal of inequalities.

These are the roles of an agricultural geographer during the Third Millennium.
- Procedure to be followed for the assessment of agricultural development levels:
 - ! The agricultural development or growth is an outcome of the well-defined inter-related essentials which primarily determine its ratings. So, at the on-set describe and explain the geographic patterns of the essentials, which are
 - Consolidated holdings,
 - Viable size of operational holdings,
 - Literate farmers,
 - Enterprising and receptive farmers,
 - Incentive-oriented tenurial system,
 - Access to model farms,
 - Improved accessibility, and
 - Major rural service centres (rurbans) within walkable distance having vital services, namely medical, education, banking, telecommunication, veterinary, extension service centre, and mini-regulated agricultural market.
 - ! The basic ingredients of agricultural development are
 - Assured irrigation (tubewell-cum-canal),
 - Use of high-yielding and disease resistant seeds, and
 - Application of recommended doses of chemical fertilizers.
 - ! The selection of well-defined and well-quantified indicators for the assessment of agricultural development ratings and for the delimitation of agricultural development regions, is a pre-requisite: The indicators are as under
 - **Inputs**
 - ! Intensity of irrigation,
 - ! Density of tractors,
 - ! Density of threshers,
 - ! Use of chemical fertilizers, and
 - ! Use of high-yielding seeds.
 - **Outputs**
 - ! Intensity of cropping, and
 - ! Level of agricultural performance.
 - ! The **accelerators** which help in the diffusion of basic ingredients are
 - *Agricultural Universities, and*
 - *Krishi Kendras etc.*

- ! The **facilitators** which facilitate the adoption of the green revolution technology are
 - Non-government Organizations,
 - Government Agencies,
 - Banks, and
 - Corporates etc.
- Formulate a sound model for establishing the agricultural development ratings of different enumeration units based on the Weighted Composite Rating Index, and the units be grouped with a Rating Scale into agricultural development levels, such as
 - ! Very high development level, High development level,
 - ! Medium development level,
 - ! Low development level, and
 - ! Very low development level
- To conclude, the essentials are the key factors which improve and sustain agricultural development level. In fact, without basic ingredients there would be little agricultural development. Whereas, accelerators and facilitators are the important institutions for rapid agricultural growth, and diffusion of new farm technology ushering green revolution, or adoption of dry-farming technology heralding the dryland farming revolution. The regional inequalities in agricultural development have been sharpened, and these

are to be redressed for the sake of socio-territorial justice. It needs political will and positive discrimination rather than negative discrimination for agricultural development in backward areas, where otherwise agro-ecology favours environment-friendly farming.

The geocentric and anthropocentric constraints are to be identified agro-environment region-wise. Thereafter, specific recommendations can be made for agricultural development. Moreover, for the redressal of regional imbalances, the action plans must follow area-based concept rather than political-oriented ideology of the party in power. Unfortunately, at present richers are becoming richer and poorer the poorer in terms of area and people.

On the whole, AIADP may prove useful in facing challenges to agriculture during the 21st Century, provided formulated and implemented as per the needs and problems of the different agro-environment regions/agro-ecosystems/ agro-ecological regions/agricultural development regions.

Dr. Jasbir Singh
Professor Emeritus (Retd.)
Department of Geography
Kurukshetra University
Kurukshetra.