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The new wave in agricultural research literature has spawned many new words. System orientation, need-based, relevant, prioritization, project-based budgeting, accountability, evaluation, etc. are some examples. These define the new paradigm of agricultural research and have fairly specific and operative meanings. Unfortunately, these words are not common in the vocabulary of scientists and most of them use a commonsense meaning; sometimes different people mean different things depending upon their inclination. It is important to achieve a semblance of order in our understanding of these concepts. This note makes an attempt. We first describe the general concepts and then define the specific terms which are relevant for organization and management.

Eco-regional research: There is consensus that an eco-region (or agro-ecological zone) is a better and more logical domain for research planning. It is a stable concept, whereas commodity or problem-based stratification is fluid. For example, wheat was not important in eastern India in the fifties, it became important twenty years later. At the eco-region level, problems and opportunities can be quantified and defined more sharply. This was the rationale for the NARP initiative on zonal research stations, but the concept has not yet been seriously implemented. The PSR component of NATP also attempts to provide this orientation. Synthesis of programmes on this basis operationalizes the bottom-up concept of research planning.

Relevance: Several terms are interchangeably used to distinguish purposeful research from 'academic' research. The terms basic and applied research also convey this distinction. 'Problem-solving', 'need-based' research are

well-understood, but 'market or demand-driven' ideas are non-technical. A problem or need is interpreted variously. A farmer's need may be to get more profit, a researcher would look at the problem in a technical sense—pest or disease, soil fertility, salinity, yield barrier, etc. For example, if a scientist does research on disease resistance, which, in turn, results in higher output or profits to the farmer, his research is relevant. When research resources are scarce, relevance must be sought; research for the sake of satisfying some obscure scientific curiosity is not desirable.

Scarcity of resources also necessitates research which maximizes pay-off. Market or demand-driven agenda ensures translation of benefits into high economic returns. It is useful to note that while all the connotations imply benefits, these need not always be monetary. For example, improving vitamin A content in rice is relevant and need-based, even though there are no *direct* economic benefits. Private sector research is always profit-oriented and market-driven. Public research may have non-profit goals. Both are relevant. Nevertheless, relevance is not a sufficient criterion, almost all research can be 'justified'. Prioritization helps in identifying the most important ones.

System orientation: Incompatibility of innovations with farmers' needs, resource endowments, existing practices, market conditions, etc. often leads to rejection or lack of acceptance. Component-based research is often so inflicted. This realization spawned concepts like farming systems research, and research with a system perspective. The former has been very difficult to operationalise in field research because, in reality, each farm has a unique system and it is impossible to replicate it for experimentation. System modeling, simulation, and other synthetic tools are

* National Professor, NCAP, New Delhi

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helpful but we have been amiss in neglecting this. On-farm research is a more useful simulation of reality, but such trials are also usually component-based. What we really need is research, disciplinary or component-based, with a farming system perspective. This implies a different approach to design, analysis and interpretation of experiments, incorporating realistic farmer conditions. The concept is most appropriate at micro level (say, at the agro-ecological zone level). The centralized structures like commodity institutes or coordinated projects which dominate our research system, need to be reoriented to bring in this change. Otherwise this will remain as a telling weakness.

Efficiency: Efficiency implies producing more from same or fewer resources, i.e. a decrease in the unit cost of production. For a very long time the research system focused on increasing production. This led to the emergence of production per hectare or animal as the primary choice criterion for research. Protected markets for inputs and outputs insulated agriculture from competition. In the changed economic environment, efficiency of production has become the key parameter; the new *mantra* is not more production but more efficient production.

Organisational issues: A number of concepts are in currency, dealing with organisational reforms to improve the efficiency of the research system.

(a) *Decentralisation:* Efficiency gains from decentralised research are high. Relevance is sharply focussed and priorities are clearly defined. That is why PSR under NATP emphasizes this. All improved management practices require decentralisation.

(b) *Accountability:* Non-performance is a problem with all public systems, agricultural research is no exception. Hence the need to initiate measures to instill accountability. A set of initiatives like constraint analysis, prioritisation, monitoring and evaluation, flexible procedures and budgeting, decentralisation, transparency, reward and incentive system, etc. are relevant in this regard.

(c) *Prioritisation:* Growing scarcity of resources forces the system to choose the research portfolio wisely and prioritisation helps in this process. It identifies areas/themes/constraints where research benefits are likely to be high. Scientists have difficulty in understanding what is new about it. They believe that their efforts are already directed towards the most important (high priority) constraint in their area of interest and specialisation. The problem is that there are not enough resources to cover the full range of researchable problems and research managers will have to choose. Economists provide objective criteria and analysis which add value to scientific information and improve resource allocation decisions.

(d) *Project-based budget:* Existing budget and financial procedures do not permit proper tracking and monitoring of research resources. A project-based budget explicitly links resources to specific research programme or projects. This imposes accountability, generates competition and improves efficiency of the system.

(e) *Programme/ matrix mode of research organisation:* Historically, research projects are organised by departments or disciplines. This yields sub-optimal results as inter-disciplinary synergies are missed. Research, therefore, needs to be organised in a programme mode involving relevant disciplines/departments. Such matrix framework is theoretically superior. However, sensible protocols will need to be developed to implement this idea so that issues like sharing of credit and resources, administrative control, etc. are sorted out at the outset. The point is that research will need to move from largely individualized to team-based endeavor. The idea is not to stifle individual excellence, but to encourage complementarity wherever relevant.

Finally, we need 'new look' institutions which embody these ideas. Before that happens, basic changes will be required in the system.