

## 'Training Transfer' in Agricultural Research Organizations

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### ABSTRACT

*A research study was pursued to assess the 'training transfer' in National Agricultural Research System (NARS), India across Indian Council of Agricultural Research (ICAR) organizations. A questionnaire survey was conducted among the scientists who underwent capacity building programmes during 2005-2009 at National Academy of Agricultural Research management (NAARM), Hyderabad. The conceptual model proposed for the study was evaluated and the variables contributed for 'training transfer' were depicted in an empirical model. Strategies were recommended for improving the participation of NARS scientists in capacity building programmes, refining the training design and delivery efforts of capacity building programmes of NAARM and improving organizational support climate for motivating scientists to participate in capacity building programmes and respective 'training transfer'.*

**Key words:** Training transfer; Research organizations; Agriculture; NAARM;

Capacity building is the crucial but an expensive component of human resource development (HRD). Given such objective, many of the training programmes fail to inculcate 'training transfer' intent in trainees (Subedi, 2004). Training investments continue to yield deficit results, making 'training transfer' a core issue of HRD. Thus, 'training transfer' has attracted the attention of many training researchers and HRD practitioners, particularly in terms of how transfer could be enhanced. There are also increasing expectations for trainers to evaluate training, demonstrate the link between training and organizational outcomes and thereby to justify investment in training. Research on 'training transfer' has been relatively scarce, but, the available information indicates that the extent of 'training transfer' has been below expectations (Nijman *et al.*, 2006). In this context, exploring the factors associated with 'training transfer' through empirical means and thereby formulating pragmatic strategies, may be appropriate to enhance 'training transfer'.

*Concept of the study: The 'training transfer':* 'Training transfer' is the degree to which individuals effectively apply the knowledge, skills and attitude (KSAs) gained from training to job situation and maintains such KSAs over a certain period of time

(Pidd, 2004). 'Training transfer' is the critical point from where the organizational effectiveness is influenced by training effectiveness. 'Training transfer' from HRD's perspectives represents transforming learning into individual performance. However, 'training transfer' does not just occur and it needs carefully formulated and implemented strategies (Subedi, 2004). *System's approach to 'training transfer':* Trainees, managers and supervisors of the trainees and trainers of capacity building programmes are generally the role players in the process of 'training transfer'. Though, many empirical models have been proposed and tested by researchers to explain training effectiveness, the model proposed by Holton *et al* (2000) seems to be comprehensive and complete. Multiple variables constitute the domains like training design and delivery, trainees' characteristics and transfer environment and influence the transfer outcomes at work place. Hence, the assessment of 'training transfer' cannot be viewed as a factor predicted by individual traits/ domains. All the traits of training design, trainee characteristics, transfer environment and transfer outcomes constitute the 'training transfer system' as a whole and hence the 'training transfer' has to be viewed as an impact of 'a system' governed by major domains and in turn the traits of the domains.

*Assessing 'training transfer' in National Agricultural Research System (NARS), India:* The NARS, India, is one of the largest agricultural research systems in the world, employing more than 30000 farm scientists. Effective management of such a huge scientific human capital poses obviously a formidable challenge. To face such challenge, the Government of India, established National Academy of Agricultural Research Management (NAARM) at Hyderabad in 1976. Since then, the Academy through its innovative, need-based and demand-driven capacity building initiatives has been supporting the NARS to satisfy research and educational demands (NAARM, 2010). To refine such capacity building programmes in matching the emerging demands, it is essential to evaluate the overall impact and the contributing factors (Samanta *et al.*, 2004). Hence, an ex-post-facto research study was proposed with the following objectives:

- To assess the perception of NARS scientists towards self-attributes, training design and delivery of NAARM capacity building programmes and the support of organizational climate towards 'training transfer'
- To assess the contribution of 'training transfer' system domains towards transfer outcomes of NARS scientists
- To recommend strategies for strengthening 'training transfer' system with respect to capacity development and organizational performance of NARS.

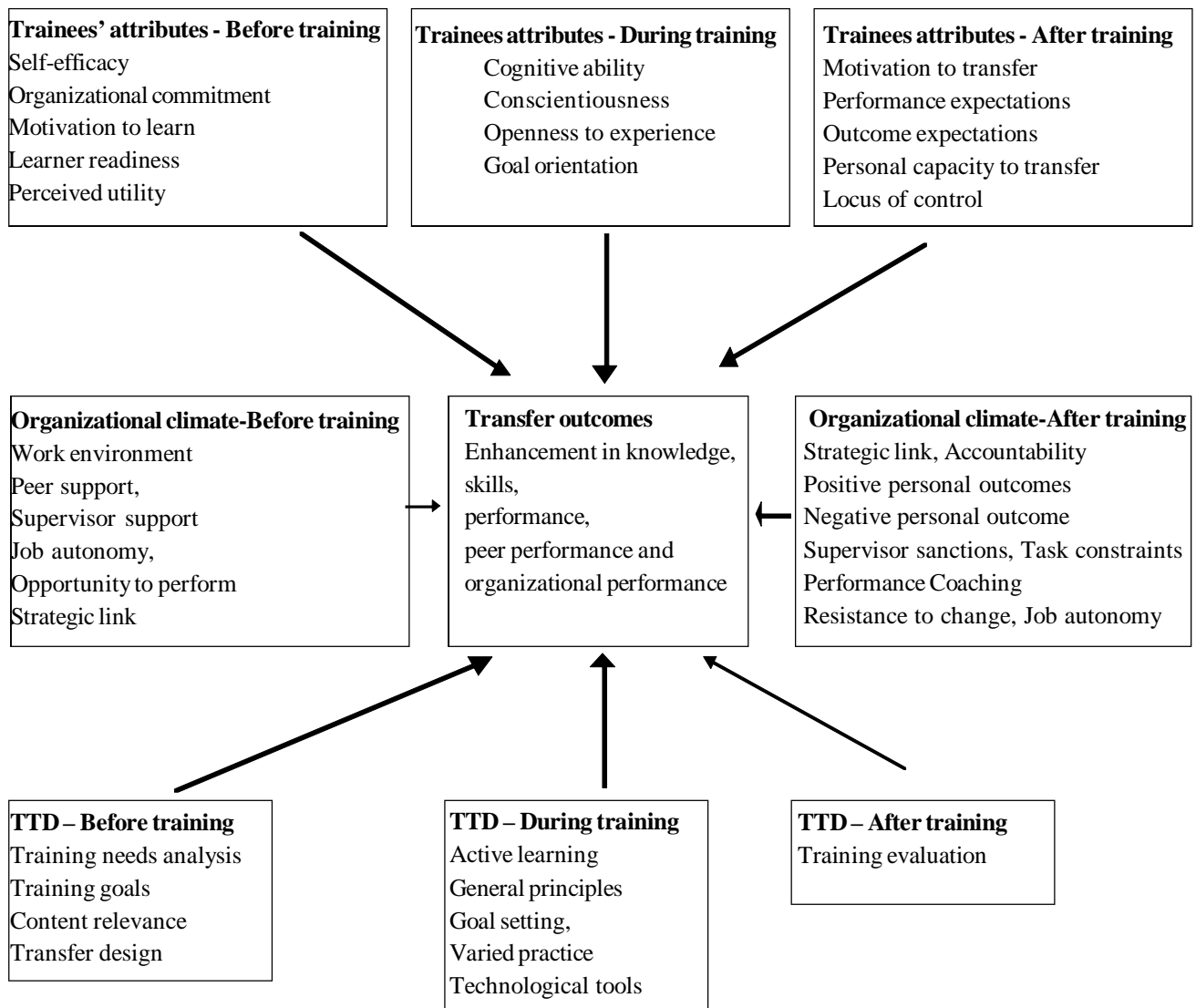
## METHODOLOGY

Indian Council of Agricultural Research (ICAR) organizations comprise the major component of NARS India, it was decided to have scientists of all ICAR organizations who underwent capacity building programmes at NAARM, Hyderabad as the target population. The criteria identified for considering the ICAR scientists as the respondents of the study are: the scientist should have participated in capacity building programme/s at NAARM, Hyderabad other than Foundation Course for Agricultural Research Service (FOCARS) that has been imparted only for the entry level scientists; the period of programme/s must fall from 2005 to 2009. The early limit of the period was set as 2005, so that the scientists as respondents can remember

the comprehensive proceedings of the capacity building programmes to an extent that they can respond to the items and the latest year of the period was fixed as 2009 to provide sufficient time for the respondents to apply KSAs back at their parent organizations.

Based on the comprehensive model proposed by Holton *et al* (2000), the domains proposed for the study were decided as trainees' attributes, training design and delivery, organizational climate and transfer outcomes. Trainees' attributes pertain to profile of trainees of NAARM capacity building programmes exhibited before, during and after the capacity building. Training design and delivery pertains to efforts taken by NAARM before, during and after the capacity building programmes to effectively impart training content and inculcate 'training transfer' behaviour among the respondents. Organizational climate refers to support environment that prevails in organizations to motivate the scientists to prepare and participate in capacity building programmes of NAARM and transfer the training content back at job. Transfer outcomes refer to improvement in knowledge, skills and attitude about the theme of the capacity building and resultant training-induced improvement in job performance of the participants, peer group and as a result, improvement in the organizational performance. Based on the review of relevant literature through exhaustive desk study, different variables were considered for the above-mentioned domains as proposed in the conceptual model (Fig.1). The variables selected for domains were operationalized as explained in the earlier literature as well customized based on the requirements of the study.

The selected variables, based on their conceptualization, operationalization and utility in assessing 'training transfer' were made into statements/items against-which the scientists had to express their response. The scientists of NARS as respondents of the study had to express their responses against a five-point continuum (Strongly agree, agree, undecided, disagree and strongly disagree). The 90 statements/items comprised 81 positive and 9 negative statements. Apart from the items pertaining to perception of scientists towards 'training transfer', the questionnaire had provisions for recording the responses of scientists against a set of personal variables that depicted the profile of the respondents. The instrument thus constructed was distributed to all the organizations (97)



**Fig.1. Conceptual model proposed to assess ‘training transfer’ in agricultural research organizations**

of Indian Council of agricultural Research (ICAR) that constitutes the major component of NARS as distributed questionnaire during May, 2011. A total of 110 scientists of 34 ICAR institutes (35%) responded for the survey. *Data analysis:* The responses were coded, tabulated and analyzed. While coding the responses, 5,4,3,2,1 value were assigned to strongly agree, agree, undecided, disagree and strongly disagree categories respectively for the positive statements and reverse coding was assigned to above-mentioned categories for the negative statements. The data analysis was done using descriptive statistics such as percentage and simple correlation. Canonical correlation was used to measure relationships between two sets of variables and carried out to find significantly contributing variables using SAS 9.3. Thus,

the relationships between the items of Domain IV (transfer outcome) and the variables other three Domains were examined by Canonical correlation analysis.

**RESULTS AND DISCUSSION**

*‘Training transfer’ system: Trainees’ attributes (Domain-I):* The average response of the ICAR scientists pertaining variables selected for ‘before training’ part viz, self-efficacy (4.52), organizational commitment (4.71), learner readiness (4.22) and perceived utility (4.17) was ranging from ‘agree to strongly agree’ (Table 1). The respondents’ average response (3.56) towards ‘motivation to learn’ was ‘undecided to agree’. However, the overall average response (4.23) of the respondents towards the variables

**Table 1. Perception of respondents**

Attributes	Responses (av.)	Response category
<i>Trainees' Attributes (Domain-I)</i>		
<i>Before training</i>		
Self-efficacy	4.52	Agree to Strongly Agree
Organizational commitment	4.71	Agree to Strongly Agree
Motivation to learn	3.56	Undecided to Agree
Learner readiness	4.22	Agree to Strongly Agree
Perceived utility	4.17	Agree to Strongly Agree
Before Training (Average)	4.23	Agree to Strongly Agree
<i>During training</i>		
Cognitive ability	4.46	Agree to Strongly Agree
Conscientiousness	4.38	Agree to Strongly Agree
Openness to experience	4.43	Agree to Strongly Agree
Goal orientation	4.21	Agree to Strongly Agree
During Training (Average)	4.37	Agree to Strongly Agree
<i>After training</i>		
Motivation to transfer	4.31	Agree to Strongly Agree
Locus of control	3.88	Undecided to Agree
Performance expectations	3.98	Undecided to Agree
Personal capacity to transfer	3.47	Undecided to Agree
Outcome expectations	2.93	Disagree to Undecided
After Training (Average)	3.71	Undecided to Agree
Overall Average (Domain-I)	4.17	Agree to Strongly Agree
<i>Training design and delivery (Domain-II)</i>		
<i>Before training</i>		
Training need analysis	3.98	Undecided to Agree
Training goal	4.12	Agree to Strongly Agree
Content validity	4.13	Agree to Strongly Agree
Transfer design	3.95	Undecided to Agree
Before Training (Average)	4.05	Agree to Strongly Agree
<i>During training</i>		
Active learning	3.94	Undecided to Agree
General principles	4.09	Agree to Strongly Agree
Goal setting	4.02	Agree to Strongly Agree
Varied practice	3.93	Undecided to Agree
Technological tools	4.01	Agree to Strongly Agree
During Training (Average)	4.00	Agree to Strongly Agree
<i>After training</i>		
Training evaluation	3.96	Undecided to Agree
After Training (Average)	3.96	Undecided to Agree
Overall average (Domain-II)	4.01	Agree to Strongly Agree
<i>Organizational climate (Domain-III)</i>		
<i>Before training</i>		
General work environment	4.10	Agree to Strongly Agree
Peer support	3.83	Undecided to Agree
Supervisor support	3.96	Undecided to Agree

Opportunity to perform	3.37	Undecided to Agree
Strategic link	4.22	Agree to Strongly Agree
Before Training (Average)	3.89	Undecided to Agree
<i>After training</i>		
Strategic Link	3.75	Undecided to Agree
Accountability	3.65	Undecided to Agree
Positive personal outcomes	3.31	Undecided to Agree
Negative personal outcomes	3.32	Undecided to Agree
Supervisor sanctions	3.78	Undecided to Agree
Task constraints	3.61	Undecided to Agree
Performance coaching	3.28	Undecided to Agree
Resistance to change	3.35	Undecided to Agree
Job autonomy	3.41	Undecided to Agree
After Training (Average)	3.50	Undecided to Agree
Overall av. (Domain-III)	3.69	Undecided to Agree
Transfer Outcomes Av.	3.79	Undecided to Agree

selected for the domain for 'before training' was 'agree to strongly agree'. Cognitive ability, conscientiousness, openness to experience and goal orientation were the factors considered for 'during period' part of 'trainees' attributes' domain (Table 1). The average response of the respondents towards all these variables was ranging from 'agree to strongly agree' and so the overall average response (4.37) for domain-I under 'during training' category. The average response of the respondents towards variables selected for 'after training' part was 'agree to strongly agree' towards motivation to transfer (4.31), 'undecided to agree' for locus of control (3.88), performance expectations (3.98) and personal capacity to transfer (3.47) and 'disagree to undecided' for outcome expectations (2.93) (Table 1). The overall average response (3.71) of the respondents towards 'after training' part was 'undecided to agree'. The undecided response towards variables locus of control, performance expectations, personal capacity to transfer and outcome expectations exhibited by the respondents resulted in overall 'undecided to agree' response towards after training part of domain-I. However, their overall average response (4.17) towards the domain-I (trainees' attributes before, during and after training) was 'agree to strongly agree'.

The results pertaining to opinion of respondents towards 'trainees' attributes' imply that the respondents' attributes before training was fairly adequate. ICAR scientists had favourable opinion towards the capacity building programmes of NAARM and hence they were well prepared to participate in various capacity building programmes of NAARM. The attributes of the

respondents during the capacity building programmes at NAARM was also adequate to capture the training content. Though the respondents applied themselves well during pre-training preparation and training at NAARM, Hyderabad, they were not convinced about the support climate ought to be prevailed at their institutes for 'training transfer'. Hence, their opinion towards 'after training' variables was not adequate. However, based on the overall score of the respondents, the trainees' attributes towards learning training content and transferring the knowledge back at their job environment could be considered as adequate.

*Training design and delivery (TDD) (Domain-II):*

The average perceived opinion of the respondents towards variables listed for 'before training' part viz, training needs analysis (3.98) and transfer design (3.95) was 'undecided to agree', whereas towards training goal (4.12) and content validity (4.13) was 'agree to strongly agree' (Table 1). Similarly, the average response of the scientists towards the variables selected for 'during training' part was 'undecided to agree' for active learning (3.94) and varied practice (3.93) and 'agree to strongly agree' for general principles (4.09), goal setting (4.02) and technological tools (4.01). The average response of the scientists towards the training evaluation (3.96), the only factor considered in 'after training' part of 'training design and delivery' domain was 'undecided to agree' and hence the overall response was also same. However, the overall average response (4.01) of the respondents towards 'training design and delivery' was 'agree' and such result indicates the effectiveness of capacity building programmes of NAARM, Hyderabad.

The respondents were not having sufficient comprehension about the efforts taken by the NAARM faculty towards training needs assessment, designing of training content according to the needs and transfer design. However, the respondents clearly understood the training goals and content validity. This resulted in their overall response (4.05) towards 'before training' as 'agree to strongly agree'. But efforts from NAARM faculty are needed to involve the trainees actively in the content and dealing the content with practical real-field experiences. Communication of content to the trainees, use of technological tools in the training and inculcating trainees the 'training transfer' culture were fairly adequate in the capacity building programmes organized by NAARM, Hyderabad. This was evident

from their overall average response (4.01) towards 'during training' part of domain-II. NAARM has to consider conducting pragmatic training evaluation, so that the faculty can understand the extent of training effectiveness and the possible extent of 'training transfer' as symbolically planned by the trainees at their host institutes. Such act will help in refining the future capacity building programmes. The overall response towards Domain-I indicates that the perception of participants of NAARM capacity building programmes towards 'training design and delivery', domain was adequate and indicates the quality of capacity building programmes of NAARM, Hyderabad.

*Organizational climate (Domain-III):*

The average response of the respondents towards variables selected for "before training" part was 'agree to strongly agree' for general work environment (4.1) and strategic link (4.22) and 'undecided to agree' for peer support (3.83), supervisor support (3.96) and opportunity to perform (3.37). Hence, the overall average response (3.89) for this part was 'undecided to agree' (Table 1). The average response of the scientist respondents towards all the variables considered for 'after training' part of domain-III viz, strategic link (3.75), accountability (3.65), positive personal outcomes (3.31), negative personal outcomes (3.32), supervisor sanctions (3.78), task constraints (3.61), performance coaching (3.28), resistance to change (3.435) and job autonomy (3.41) was 'undecided to agree' and hence the resultant overall response (3.5) pertaining to this part. The overall average response (3.69) of the scientists towards the domain 'organizational climate' was also 'undecided to agree'. These results imply that the organizational climate of the ICAR organizations in encouraging the scientists to participate in the capacity building programmes and to apply back the training content at their work place needs improvement.

*Transfer outcomes (Domain VI):* The average response (3.79) of the respondents towards 'transfer outcomes' as perceived by their post-training experience at their organizations was 'undecided to agree' and implies that the respondents were not sure about their training-induced outcomes at their organizations (Table 1). Though the perception of the respondents towards 'training design and delivery' of NAARM capacity building programmes and self- attributes responsible for participation in capacity building programmes of

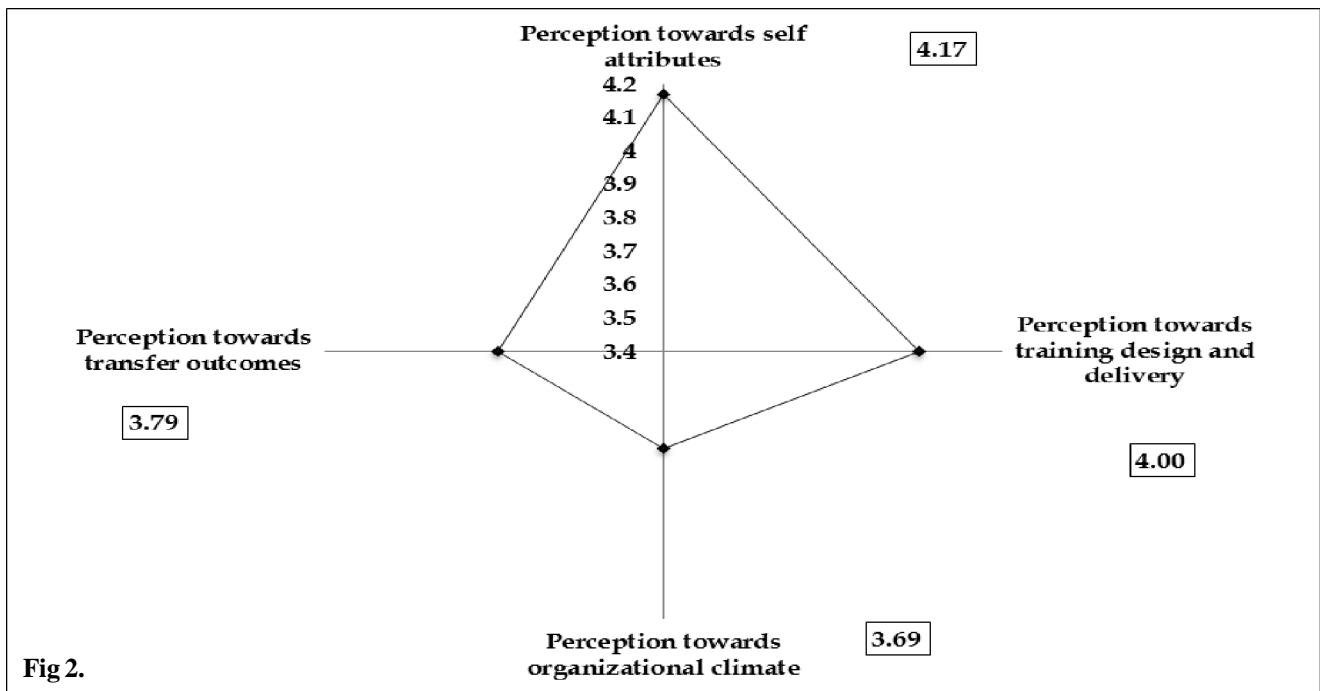


Fig 2.

NAARM were fairly adequate, such ‘undecided to agree’ response towards ‘transfer outcomes’ may be due to the fact that the respondents were not convinced about the organizational support climate of their respective organizations towards ‘training transfer’. This can be understood from their overall average response towards individual domains (Fig. 2).

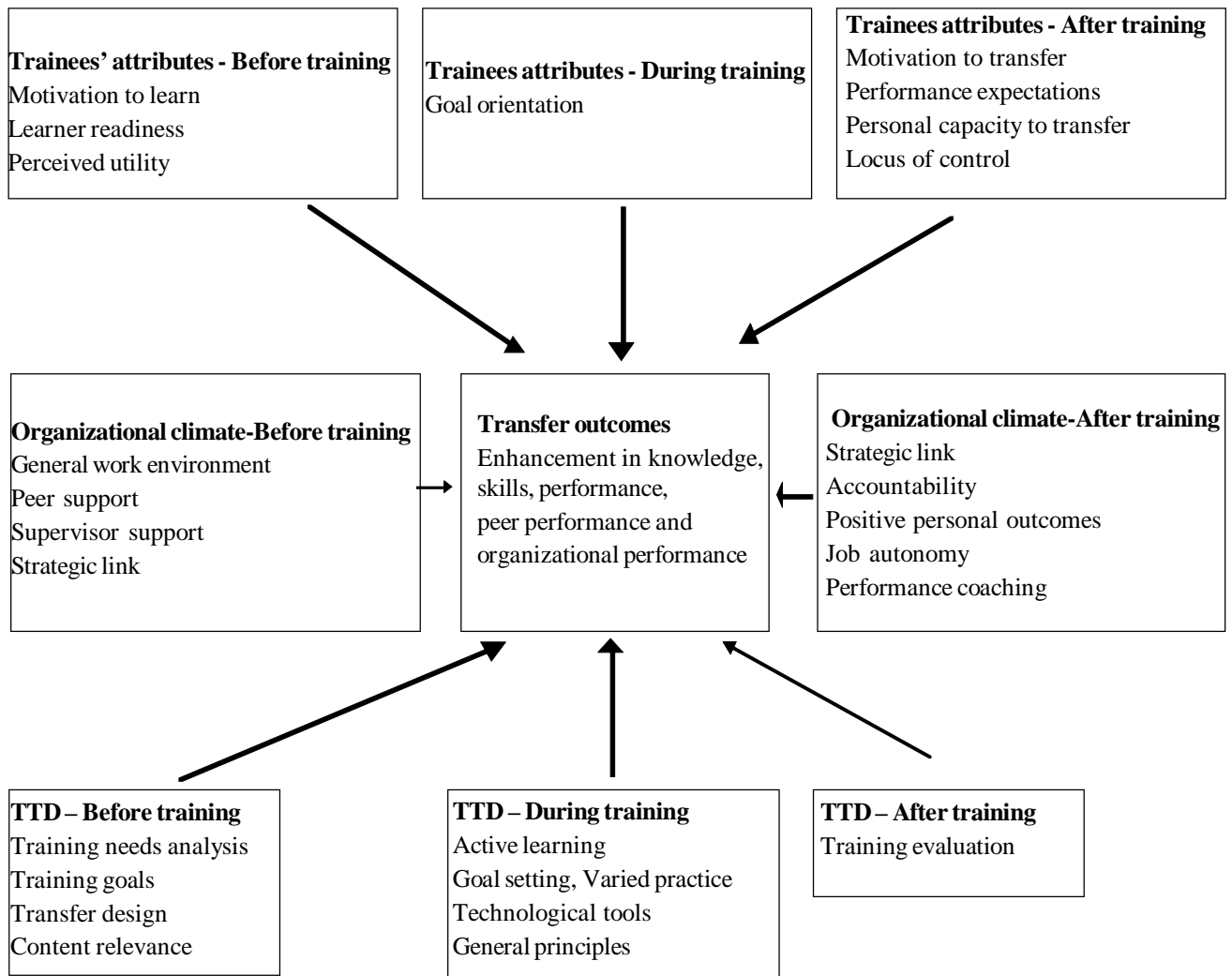
*Relationship between independent variables and transfer outcomes*

*Trainees’ attributes (Domain-I):* The variables motivation to learn, learner readiness and perceived utility at ‘before training’ period, goal orientation at ‘during training’ period and motivation to transfer, locus of control, performance expectations and personal capacity to transfer at ‘after training’ period had positive and highly significant relationship (at 1% level of probability) with transfer outcomes of the respondents, while the variable ‘outcome expectations’ of ‘after training’ part of domain-I had positive and significant relationship (at 5 % level of probability) with transfer outcomes. Among the three different parts of the ‘trainees attributes’ domain, during and after training parts had highly significant and positive relationship (at 1% level of probability) with transfer outcomes of the respondents, while before training part had no significant relationship. Such results imply that the ICAR scientists as participants of NAARM capacity building programmes ought to concentrate on the aspects pertaining to during

and after training variables in order to transfer the KSAs acquired during training effectively back at job environment and the resultant ‘transfer outcomes’. The overall relationship of ‘trainees’ attributes’ domain also had highly significant and positive relationship (at 1% level of probability) with ‘transfer outcomes’. These results imply that the scientists of ICAR institutes may have to throw adequate importance for training related attributes while undergoing capacity building.

*Training design and delivery (Domain-II):* All the variables pertaining to before, during and after training of the ‘training design and delivery’ domain had highly significant and positive relationship (at 1% level of probability) with transfer outcomes. Such results imply that the faculty of NAARM, Hyderabad must provide adequate attention and importance to all the variables of ‘training design and delivery’ pertaining to capacity building programmes, in order to bring training effectiveness and inculcate transfer of KSAs back at ICAR institutes among the scientists.

*Organizational climate (Domain-III):* General work environment, supervisor support, opportunity to perform and strategic link of ‘before training’ part and strategic link, accountability, positive personal outcomes, performance coaching and job autonomy of the ‘after training’ part of ‘organizational climate’ had highly significant and positive relationship (at 1% level of probability) towards transfer outcomes of the



**Fig. 3 Empirical model showing the factors influencing 'training transfer' in NARS**

respondents. Overall relationship of 'before' and 'after' training parts of organizational climate and all the variables of organizational climate put together had highly significant and positive relationship (at 1% level of probability) with transfer outcomes. These results imply the need for adequate attention by authority of ICAR institutes to provide and facilitate favourable organizational climate that motivates the scientists to prepare and participate in capacity building programmes and apply the KSAs back at job environment.

*Empirical framework for effective 'training transfer' in NARS:* The variables selected under three domains of the conceptual model proposed and the items under transfer outcomes were subjected to Canonical correlation analysis. The first two Canonical correlations explained 43 and 15 percent of variations and the p-

values based on likelihood ratio test for 3 more dimensions are non-significant. Out of the 8 transfer outcome items, 7 had correlation more than 0.3 with the first Canonical variate. Among the domain attributes, 27 attributes had more than 0.3 correlation with first Canonical variate. The variables identified using Canonical correlation analysis are given in Figure 3 and the model serves as a framework for effecting 'training transfer' in NARS pertaining to capacity building programmes of NAARM, Hyderabad. The model could potentially serve for empirical validation pertaining to similar capacity building platforms.

## CONCLUSION

Motivation to learn, learner readiness and perceived utility are to be inculcated among the scientists through

appropriate organizational culture. There should be sufficient motivation for the scientists to transfer the training content, providing enough freedom and capacity to apply the acquired knowledge through capacity building programmes.

The scientists of the ICAR organizations must have goal orientation during training and motivation to transfer after training to apply the KSAs. The scientists must be given an environment in which they should feel they have personal capacity to transfer and locus of control in performing the job. Efforts taken by NAARM faculty pertaining to training needs assessment in order to design appropriate training programmes and 'training transfer' need to be apparent to the participants of the capacity building programmes, so that they can comprehend the purpose of the training programmes and react accordingly.

The training goal and transfer design must be in such a way that the trainees are motivated to transfer the learning back at their work place. NAARM has to give more emphasize on providing active learning opportunities through group exercises, games and cases with a lot of real-field cases gathered from institutes of NARS, so that such efforts will enhance 'training transfer'. NAARM has to inculcate the participants, the goal of training is to apply the KSAs acquired during capacity building back at institute environment. To facilitate this, the training needs assessment, training

goal, content validity and transfer design are to be given adequate attention. Use of various training methodologies and technological tools in capacity building must be encouraged across all capacity building programmes. The training evaluation of NAARM has to be designed in such a way that such evaluation can symbolically predict the 'training transfer' plans of the participants and bring pointers for refining future training programmes.

The management of ICAR institutes need to facilitate conducive organizational support climate that encourages both peer group and supervisor support for transfer of KSAs back at job environment and provide new opportunities for the scientists to participate in need-based capacity building programmes in order to support training-induced performance improvement. Such performance enhancement will in-turn have impact on organizational performance. Appropriate strategic link must be provided for expectations from the individual scientists and HRD plan. Individuals must be made accountable for 'training transfer' by inculcating attitude towards positive personal outcomes. Supervisor sanctions and task constraints must be eliminated conveniently to facilitate 'training transfer' at the institute level. This needs adequate promotion of performance coaching and job autonomy for the individual scientists from both the peer group and authority of ICAR institutes.

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