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# Effectiveness of Agricultural Human Resource Development Interventions in Iran (Three Cases in Fars Province)

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## ABSTRACT

**Literature review indicates that systemic agricultural Human Resource Development (HRD) interventions are rarely carried out in developing countries, and limited knowledge exists about how successful they have been. A comparative study was carried out to investigate the effectiveness of three multi-project HRD interventions including Extension Plans, Adaptation Plans and Diffusion-Push Plans in Fars Province of Iran, and to determine factors correlated with their effectiveness. The research population consisted of 41 target farmers of HRD interventions, whom were all interview surveyed. 41 farmers were also randomly selected from non-plan partners of the same communities as the comparison group. Data were gathered through two separate questionnaires. Face validity was verified by a panel of experts, and reliability was obtained through pilot test. Wilcoxon Test revealed significant differences in HRD levels of interventions partners, before and after the programs, and Mann-Whitney Test showed significant differences between HRD levels of partners and non-partners. Statistically significant correlations were observed between some variables such as supportive environment or plans characteristics and plan effectiveness. The results could improve the understanding of HRD effectiveness and its influencing factors.**

**Keywords:** Adaptation plans, Agricultural human resource development, Diffusion-Push plans, Effectiveness, Extension plans.

## INTRODUCTION

Many authors (e.g., Karbasioun, 2007; Karbasioun and Mulder, 2004; Rivera and Alex, 2008; Zamani-Miandashti *et al.,* 2008) have noted the importance of developed and trained human resources in agricultural and rural development; therefore, developing human resources has been addressed in many agricultural and rural development practices. However, evaluation is often overlooked when organizations create and run HRD programs (Wang and Wilcox, 2006). Many reasons have been noted for failing to conduct systematic evaluations, such as lack of commitment to evaluation (Swanson, 2005), concern about evaluating what has already been done in the organization (Spitzer, 1999), lack of resources and expertise, lack of organization culture that supports such efforts (Desimone *et al.,* 2002; Moller *et al.,* 2000). Although several agricultural HRD interventions have been made in the agriculture sector of Iran, no comprehensive research that address all HRD outcomes (including reactions, knowledge, attitudes and behavior) has been carried out. As a result, it is difficult to judge the success and quality of Iranian agricultural HRD practices by the existing knowledge. Uncovering the effectiveness of agricultural HRD interventions and factors

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that could influence them will assist in understanding what HRD practitioners must be aware of, in order to run effective HRD practices. The present study therefore, seeks to investigate the effectiveness of some agricultural HRD practices in Fars Province of Iran and identify the factors which are associated with their effectiveness. To achieve the former objective, HRD levels of participating farmers will be compared before and after participation, and HRD levels of participating farmers will be compared to those of non-participating farmers (control group). To achieve the latter objective, the relationships of independent factors with interventions effectiveness will be examined.

## Theoretical Background

### Agricultural HRD

Although HRD academics (e.g., McLean, 2000) have spent considerable time to develop a definition for HRD, all HRD scholars agree that there is no agreement on what HRD means (Roth, 2004). McLean (2000) argued that HRD differs from country to country, that different organizations view it in different ways, and different individuals see it differently. Lee (2001) referred to an attempt to ensure that each person develops his/her own emergent view of HRD, and encourages learners to rely on their own experiences to make sense of the concept of HRD. After reviewing the definitions provided by HRD scholars, and based on our work in the field of agricultural HRD (e.g., Zamani-Miandashti, 2008; Zamani-Miandashti *et al*., 2008; Zamani-Miandashti and Malek-Mohammadi, 2010) we propose that HRD is "a set of systematic and planned activities which provides appropriate opportunities for all actors of human/social systems to achieve desired changes in knowledge, skills, attitudes and behavior of the actors, for the purpose of improving the performance of individual and group actors, process and human/social system as a whole." Focusing on learning interventions that promote agricultural productivity and development, agricultural HRD covers a broad range of agricultural programs including: the formal agricultural education, science and technology system of curricula, the non-formal agricultural and extension education system of programs, the in-service training and development system of programs, and the mass-media/distance learning system (Rivera and Alex, 2008). Agricultural HRD covers a broad range of members in agricultural workforce which include pre-employment workers, farmers, institutional personnel, and people in transition toward re-employment in agriculture sector (Rivera, 1995). The major components of agricultural HRD interventions in Asia and the Pacific region, as well as in Iran, include education and training, research and extension (Miller, 2002).

### HRD Effectiveness

HRD effectiveness must be determined with respect to the goals of the program or programs being examined. Many HRD professionals (e.g., Campbell and Graham, 1988) have not mentioned any differences when talking about HRD evaluation and effectiveness, and easily defined HRD evaluation as meeting program goals. However, some other HRD experts such as Kirkpatrick (1967; 1987, 1994), have suggested HRD evaluation framework which is mainly a HRD effectiveness framework, because it only considers program outcomes (Bates, 2004). Among the many HRD evaluation frameworks, and in spite of its many problems mentioned by some scholars (e.g., Bates, 2004; Wang *et al.,* 2002), Kirkpatrick's framework is the most popular and influential one for HRD and training evaluation (Werner and DeSimone, 2006), and because this framework has been employed for our study, it will be explained here briefly. Kirkpatrick argued that HRD efforts can be evaluated





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according to four criteria: reaction, learning, job behavior and results. The reaction level (first level) concerns the trainees' perceptions of the program and its effectiveness, and their feeling about the program and its values; at the learning level (second level), the extent to which learning goals have been reached is emphasized; the behavior level (third level) concerns the use of what was learned in training back on the job and refers to training transfer; and finally at the results level (forth level), the effect of HRD program on organization effectiveness is measured.

**Factors That Affect HRD Effectiveness**

With regard to the factors influencing HRD effectiveness, Wognum (2000) believed that three elements can impede or enhance HRD effectiveness: strategic HRD aligning, organizational factors and HRD related factors. The size and structure of the organization, the economic sector that organization belongs to, and the degree of organization innovation are organization characteristics that, according to the literature (e.g., Wognum 1998; Mulder *et al.,* 1989; Wexley and Latham, 1991; Useem, 1993), are expected to have an impact on HRD effectiveness. In addition, the HRD intervention design and transfer conditions may influence HRD effectiveness (London 1989; Mintzberg, 1983). Russ-Eft (2002) reviewed HRD professionals' views about factors influencing HRD effectiveness and finally introduced a taxonomy which included situational elements (transfer environment), pre-training elements, training design and post-training elements. Motivation to transfer, personal capacity to transfer and perceived content validity are among individual factors which influence HRD effectiveness (Holton *et al.,* 2000). Werner and DeSimone (2006) introduced three categories of factors which affect trainees learning (meaning and knowledge acquired, skills developed, and change in behavior), including trainee characteristics, training design and transfer of training. Zamani-Miandashti *et al*. (2008) also found that agricultural HRD intervention design, situational elements or interventions environment and participants' characteristics are major factors influencing the effectiveness of HRD interventions.

According to the literature, the effectiveness of HRD interventions could be evaluated at four levels including reactions, learning (knowledge, skills and attitudes), behavior and final results. The authors identified major factors that influence HRD interventions effectiveness and that had been identified in previous studies. These factors were conceptualized and categorized into three types: intervention characteristics, environmental supports (intervention environment), and participants'/trainees' characteristics (Figure1).

**Purpose of the Research**

Earlier research (e.g., Eghbalian, 2001; Kalantari, 2004; Movahedi and Chizari, 2005) reported on attempts to evaluate agricultural HRD interventions in Iran. Reviewing existing research shows an apparent lack of progress in the practice of

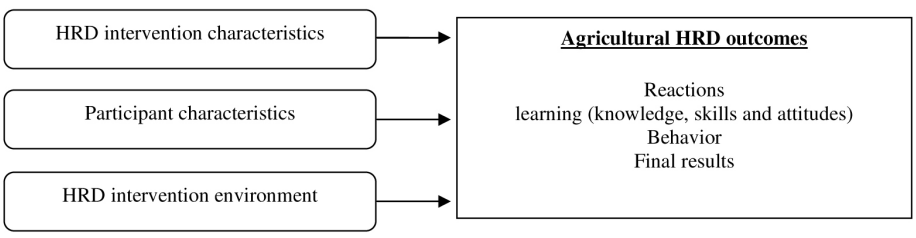


**Figure 1.** Theoretical model.





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agricultural HRD evaluation. Agricultural HRD evaluation has a lack of systematic and holistic view of HRD interventions, HRD outcomes and literature-based influencing factors. A systematic effectiveness evaluation of HRD interventions is necessary in order to serve both faculty and practitioners who evaluate HRD programs and the administrators and practitioners who design and implement them. The present study addressed this issue. The main purpose of the study was to investigate the effectiveness of systematic research-extension joint HRD interventions in the agriculture sector of Fars Province in Iran, and to determine the factors correlated with their effectiveness. From a broader perspective, this research addressed both the questions of whether agricultural HRD works and why it works. More specifically, this study addressed the following research questions:

Research question 1: How effective are agricultural HRD interventions in Fars Province of Iran?

Research question 2: Which factors are significantly associated with the effectiveness of agricultural HRD interventions?

## MATERIALS AND METHODS

### Sample and Descriptive Statistics

The purpose of this study was to investigate the effectiveness of agricultural HRD interventions, and to determine specific factors significantly associated with their effectiveness. To fulfill the objectives, this study used interview surveys. Thus, all instruments were returned to the researchers.

The cases investigated in this research included a set of planned multi-project interventions aimed at improving farmers' knowledge and attitudes towards technologies, and adopting such technologies (change in behavior). However, skill improvement was not included in the interventions objectives. These plans are usually carried out on farms of progressive farmers, with varying objectives that are strategically formulated to complete the same mission. When technologies are created by scientists in research farms, they are adapted to the farmers' conditions through joint cooperation among researchers, extension agents and farmers (Adaptation Plan), and will be communicated to farmers by researchers and extension agents through Extension Plans, and Diffusion-Push Plans depending on technology and local conditions. Progressive farmers who are participating in these plans are called "Partner Farmers" (PF), and those without participation are referred to as "Non-Partner Farmers" (NPF). These plans are important as they are among the main interventions seeking agricultural development through technological development in Iranian farms. These interventions were simultaneously studied in this research because they are the sub-systems of a broader system (Agricultural Knowledge and Information System), carry out the same mission of developing agriculture and improving farmers' quality of life simply on a linear way (technology creation, adaptation and adoption), are jointly organized and implemented by public extension and research departments and farmers, potentially have the same HRD outcomes (changes in knowledge, attitudes and behavior), and could be influenced by the same factors that were addressed in this study. The research population consisted of 41 target farmers of HRD interventions, whom were all interview surveyed. 41 farmers were also randomly selected from non-plan partners of the same communities as the comparison group. Table 1 shows the number of each type of the interventions, their purposes, and the number of farmers included in each type of the cases.





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**Table 1.** Case descriptions and number of projects and subjects from each one.

| Cases | Purpose | No. of projects | No. of subjects | |
|---|---|---|---|---|
| | | | N | % |
| Adaptation plans | Adapting new technologies to local farmers through joint cooperation among researchers, extension agents and farmers | 3 | 6 | 14.63 |
| Extension plans | Introducing new technologies to local farmers through research-extension-farmer partnerships | 3 | 5 | 12.20 |
| Diffusion-push Plans | High-speed participatory transfer of new technologies to target farmers | 2 | 30 | 73.17 |

PF and NPF were, on average, around 44 years old. No female farmers were among respondents, and in terms of the professional experience, PF had, on average, approximately 22 years of experience, whereas the NPF had around 30 years of experience. A comparison of NPF and PF revealed that there were more illiterates among NPF than PF. Since standard deviations of PF' farms acreage were high, mean scores could not be appropriate criteria to compare farm acreage of the two groups; therefore, the median was employed for comparison. Results indicated that PF (Median= 12 ha) had larger farms than NPF (Median= 8 ha). PF' farms were, on average, 5km far from Agricultural Services Center (ASC), and those of NPF were, on average, 7 km away.

## Measure Development and Validation

Data were collected through two well structured questionnaires, and follow-up interviews were also conducted where extra information was required for detailed discussions in the paper. The research population consisted of 41 target farmers of HRD interventions as experimental group, and 41 randomly selected farmers from non-plan partners of the same population as the comparison group. The PF' questionnaire covered: farmers' characteristics, farmers' perceptions of the interventions characteristics (24 statements were measured using a 5-point Likert-type scale which ranged from 1(nothing) to 5 (very much)), farmers' perceptions of environmental supports (five statements were measured using a 5-point Likert-type scale ranging from 1(nothing) to 5(very much)), farmers' attitudes towards learning, and extension programs, in general (seven statements were measured in a 5-point Likert-type scale ranged from 1(strongly disagree) to 5(strongly agree)), farmers' HRD levels including: reactions level which was investigated through 19 statements measured using a 5-point Likert-type scale; knowledge which was measured through 5 questions related to the technologies suggested in each one of the projects (a multiple choice test); knowledge and attitudes which were investigated using farmers' views about their knowledge and attitudes about technologies before and after the programs, in a 5-point Likert-type scale ranged from 1 (nothing) to 5 (very much); and behavior level which was investigated through farmers' views on the extent to which they used technologies before the programs and the extent to which they were going to use suggested technologies in their farms, both investigated using a 7-point Likert-type scale ranging from 1(not using on the farm) to 7 (using on the whole farm). Direct observations were also carried out to confirm self-reported behaviors. Final results were not investigated in this study, mainly because the interventions were 6 months old at the most. The intervention characteristics included farmers' (participants') control on intervention, technologies characteristics, justifying intervention to farmers (participants), organizers' professional characteristics, organizers' participation, and follow-up activities. The farmers' (participants') characteristics included attitudes of farmers (participants) regarding





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learning, and their attitudes towards extension programs. The environmental supports included only one factor namely social support. Table 2 shows the list of factors investigated in this study. It also presents the operational definition of each factor, number of items and alpha ratings.

NPF' questionnaire was developed purely for comparing knowledge, attitudes and behaviors in NPF and PF. Because they had not participated in the interventions, they were not expected to show any reactions to the interventions. Thus there were no sections for investigating reactions level, farmers' perceptions about the plans characteristics, farmers' perceptions about environmental supports and farmers' attitudes, in NPF' questionnaire. All statements of the questionnaires were developed through the literature review, previous empirical studies (such as Eghbalian, 2001; Islam *et al.,* 2007; Kalantari, 2004; Monfared, 1999; Movahedi and Chizari, 2005) and interviews with agricultural HRD academics and practitioners.

The initial instruments were reviewed by seven researchers, who are experts or have great interest in HRD effectiveness. The instruments were revised based on their comments. Also, the face validity of the instruments was verified based on in-depth interviews with these professionals, the generation of constructs based on an extensive study of prior literature in related fields such as HRD effectiveness and learning transfer systems, and the adaptation of measurement items validated in previous empirical studies. Pilot test was conducted prior to the actual tests. The initial PF' questionnaire was given to 30 subjects who reported that they had participated in similar plans. The reliability scores, based on the report of Cronbanch's alphas, ranged from 0.701 to 0.936, which indicates that the scales were reliable.

### Data Analysis

Collected data were analyzed using SPSS and appropriate statistical tests were employed. To investigate interventions effectiveness, the authors used Wilcoxon and Mann-Whiney tests. Wilcoxon Test was employed to investigate differences in HRD levels of interventions partners before and after the programs, and Mann-Whitney Test was utilized to investigate differences between partners' and non-partners' HRD levels. In order to determine factors association with intervention effectiveness, Pearson's correlation coefficient was used.

## RESULTS

### Partner Farmers' Perceptions and Attitudes

With regard to plans characteristics, respondents reported that the plans were satisfactory in terms of farmers' control on them and technology characteristics. But some troubling issues were also apparent in the results. Our findings suggest that professional qualifications of organizers and their participation in the plans were not satisfactory. In addition, the respondents were dissatisfied with follow-ups.

Concerning environmental supports, farmers were satisfied with the encouragement given to them by extension personnel to continue using technologies, but, all in all, they did not find the intervention atmosphere very supportive. Regarding farmers' attitudes, high attitudes scale scores represent a favorable attitude. It can be said that respondents recognized learning and agricultural extension programs as something crucial and beneficial to their progress. Table 2 presents the mean scores of factors.

### Effectiveness of the Interventions

#### Reactions Level

With regard to the farmers' enjoyment from participation in plans, although respondents were not very satisfied with the





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**Table 2.** Factor descriptions, structure, and reliability ratings (n= 41).

| Factors (Scales) | Operational definition | No. of items | α [a] | Mean (SD) |
|---|---|---|---|---|
| Environmental supports | | | | |
| Social support | The degree to which local community supports and reinforces learning and use of learning on the job | 5 | 0.872 | 3.71(0.66) |
| Plans characteristics | | | | |
| Farmers' control on plans | The extent to which farmers make decisions and contribute to intervention planning, implementation and evaluation | 5 | 0.825 | 4.30(0.72) |
| Technology characteristics | The extent to which proposed technology is cost-effective and useful | 2 | 0.712 | 4.06(0.90) |
| Justifying plans to farmers | The degree to which plan importance and procedures are explained to farmers | 3 | 0.936 | 3.96(0.37) |
| Organizers' professional characteristics | The extent to which organizers are reputable and qualified professionals | 3 | 0.732 | 3.93(0.71) |
| Organizers' participation | The degree to which organizers participate in intervention planning, implementation and evaluation | 6 | 0.718 | 3.41(0.85) |
| Follow-up activities | The extent to which follow-up actions are taken after intervention | 2 | 0.840 | 3.09(0.49) |
| Farmers' characteristics | | | | |
| Attitudes towards learning | The degree of positive feelings and good opinions that farmer has about learning in general | 3 | 0.911 | 4.51(0.53) |
| Attitudes towards extension programs | The degree of positive feelings and good opinions that farmer has about extension programs | 4 | 0.762 | 4.16(0.46) |

Scale: Strongly disagree=1; Disagree= 2; Neither agree or disagree= 3; Agree= 4, Strongly agree= 5.
[a] Cronbach's alpha (a coefficient of reliability).

relationships between researchers and extension personnel, organizers' awareness of farmers' needs and their use of farmers' experiences, they received positive enjoyment from voluntary working with plans. With respect to the content easiness, where the mean scores of all items were above 4, farmers stated that they found it easy to understand technologies. Table 3 reports number of items, alpha ratings and mean scores of different dimensions of reactions level.

## Knowledge, Attitude and Application Levels

### Comparison of HRD levels in partner farmers before and after participation

Knowledge level of PF measured through five related questions, was found to be 3.54. Mean comparison of PF' knowledge, attitudes and application levels before and after participation in the program, which was investigated by Wilcoxon Test, showed significant differences in all the above-mentioned HRD levels before and after participation (Table 4). Comparison of the means of HRD levels before and after participation revealed that PF' knowledge of the technologies (Mean= 3.33), their positive attitudes towards technologies (Mean= 4.06) and their application of the technologies (Mean= 3.71) increased after interventions (the means were 1.92, 3.18 and 1.72, respectively, before the interventions).

### Comparison of HRD levels in partner and non-partner farmers

Results of the research showed that there were significant differences between knowledge (both investigated by questions and self-reported), attitudes and behavior (application) levels of PF and NPF (Table 5). Comparison of means of all the above-mentioned HRD levels showed that in all HRD levels, the means in PF were more than those of NPF, indicating that HRD interventions made significant differences between those farmers who had worked in the plans and those who had not.

### Factors Correlated with HRD Effectiveness (Change in HRD Levels)

Correlations between farmers' characteristics and change in their HRD levels were investigated through Pearson correlations. As shown in Table 6, supportive environment, plans characteristics, age, farm acreage, agriculture experience, number of basic agricultural information sources, and the extent to which others consult with the farmer and membership in local groups had statistically positive significant relationships with farmers' reactions to the plans. However, farm distance to ASC had a negative significant relationship with farmers' reactions to the plans. Difficulties with access to gasoline and car made a more problematic situation for farms far away from ASC. Supportive environment, plans characteristics, and the extent to which others consult with the farmer had positive significant relationships with knowledge change of farmers. Positive significant relationships were also found between plans characteristics and farmers' attitudes and membership in groups, and change in the farmers' attitudes to technologies. There were significant correlations between supportive environments and positive change in farmers' behavior. Negative significant correlations were also found between farmers' age, farm acreage, farm distance to main road, farm distance to

**Table 3**. Partner farmers' reactions to the plans (n= 41).

| Reaction | No. of items | α [a] | Mean (SD) |
|---|---|---|---|
| Enjoyment related to participating in interventions | 11 | 0.701 | 4.19(0.28) |
| Content easiness as perceived by farmers | 4 | 0.851 | 4.16(0.37) |
| Usefulness of plans as perceived by farmers | 4 | 0725 | 3.93(0.80) |

Scale: Strongly disagree=1; Disagree= 2; Neither agree or disagree= 3; Agree= 4, Strongly agree= 5.
[a] Cronbach's alpha (a coefficient of reliability).





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**Table 4**. Comparison of HRD levels in PFs before and after working in plans (Wilcoxon Test).

| HRD effectiveness levels | Mean | | S.D. | | t |
|---|---|---|---|---|---|
| | BP[a] | AP[b] | BP | AP | |
| Knowledge level [a] | 2.71 | 3.88 | 0.86 | 0.44 | -6.795** |
| Attitude level [b] | 3.35 | 3.89 | 0.41 | 0.64 | -5.601** |
| Behavior (Application) level [c] | 1.41 | 3.46 | 0.99 | 2.21 | -5.315** |

[a] Scale: Not at all aware= 1; Slightly aware= 2; Somewhat aware= 3; Moderately aware= 4, Fully aware=5.
[b] Scale: Strongly disagree= 1, Disagree= 2, Neither agree or disagree= 3, Agree= 4, Strongly agree= 5.
[c] Scale: In no part of farm= 1, In less than 10% of farm= 2, In about 30% of farm= 3, In about 50% of farm= 4, In about 70% of farm= 5, In about 90% of farm= 6, On the whole farm= 7.
[a] Before Program; [b]After Program, **Significant at 0.01 level.

**Table 5**. Comparison of HRD levels in PFs and NPFs (Mann-Whitney Test).

| HRD effectiveness levels | | Mean | | SD | | u |
|---|---|---|---|---|---|---|
| | | PF[d] | NPF[e] | PF | NPF | |
| Knowledge level | Multiple choice test | 3.54 | 0.73 | 1.61 | 1.70 | -6.31** |
| | Farmers' view [a] | 3.33 | 1.82 | 0.99 | 1.21 | -4.97** |
| Attitude level [b] | | 4.06 | 3.32 | 0.53 | 0.58 | -3.75** |
| Behavior (Application) level [c] | | 3.71 | 1.91 | 1.44 | 1.02 | -5.40** |

[a] Scale: Not at all aware= 1; Slightly aware= 2; Somewhat aware= 3; Moderately aware= 4, Fully aware=5.
[b] Scale: Strongly disagree= 1, Disagree= 2, Neither agree or disagree= 3, Agree= 4, Strongly agree= 5.
[c] Scale: In no part of farm= 1, In less than 10% of farm= 2, In about 30% of farm= 3, In about 50% of farm= 4, In about 70% of farm= 5, In about 90% of farm= 6, On the whole farm= 7.
[d] Partner Farmers; [e] Non-Partner Farmers;

**Table 6.** Correlation coefficients among factors.

| HRD level | Reactions | Knowledge change | Attitude change | Behavior change |
|---|---|---|---|---|
| | *r (Sig)* | *r (Sig)* | *r (Sig)* | *r (Sig)* |
| Variable | | | | |
| Supportive environment | 0.501**(0.001) | 0.393*(0.011) | | 0.354*(0.023) |
| Plans characteristics | 0.551**(0.000) | 0.462**(0.000) | 0.390*(0.012) | |
| Farmers' attitudes | | | 0.338*(0.030) | |
| Age | 0.382*(0.014) | | | -0.412**(0.007) |
| Farm acreage | 0.404**(0.009) | | | -0.597**(0.000) |
| Agriculture experience | 0.385*(0.013) | | | |
| Farm distance to ASC | -0.325*(0.038) | | | -0.311*(0.048) |
| Farm distance to main road | | | | -0.325*(0.038) |
| Number of basic agricultural information sources | 0.394*(0.011) | | | |
| The extent to which others consult with farmer | 0.432**(0.005) | 0.587**(0.000) | | |
| Membership in local groups | 0.500**(0.001) | | 0.470**(0.002) | -0.365*(0.019) |

* P< 0.05, ** P< 0.01.





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ASC, and membership in groups, and change in farmers' behavior.

## DISCUSSION

### Discussion of the Empirical Results

Agricultural HRD effectiveness was investigated in this study by comparing HRD outcomes in PF before and after working with the plans, and comparison of HRD outcomes of PF and NPF. Results demonstrated significant differences of HRD levels in PFs before and after working with the plans, in other words, PF were more knowledgeable about suggested technologies, more positive toward technologies and more likely to continue using technologies, after plans. It was evident from direct observations made by the authors that some farmers were storing new seeds for the next farming season, which presents strong evidence for change in the farmers' behaviors. Significant differences were also found in HRD levels of PF and NPF, in the way that PF had greater knowledge about introduced technologies, more positive attitudes towards the technologies, and stronger will to use technologies. Overall, PF showed positive reactions to the plans, apart from minor variations in related statements. Therefore, in response to the question whether systemic agricultural HRD interventions were effective or not, our results suggest a "yes" answer. But, as mentioned before, final results were not investigated in this research because of time limitations and therefore, the authors have no idea about the long-term results of the plans. Our findings are consistent with the results of earlier researches carried out by Eghbalian (2001) who reported the success of Extension Plans and Adaptation Plans from the viewpoints of extension agents; and Kalantari (2004) who concluded that Extension Plans and Adaptation Plans increased farm yield and improved farmers' livelihood. The results also confirmed that of Islam *et al.* (2007) who found that use of introduced technologies was significantly more in the villages where participatory experiments had been performed than control villages.

Our findings provide strong support for positive correlations between supportive environment and good characteristics of plans with the achievements of HRD interventions. Positive correlations of supportive environment, plans characteristics, farmers' attitudes, agriculture experience, farmers' basic agricultural information sources and the extent to which others consult with farmer with HRD levels, indicate that improvement in the above variables could result in increased effectiveness of the plans. Farmers felt that they did not receive enough environmental support during plan time and after it. Because of inadequate explanations given to some farmers, they had some unrealistic expectations. However, there were also some troubling issues pertaining to environmental supports such as crop prices and water concerns which should be discussed and agreed on by all stakeholders and policy makers. As expected, farm distance to ASC and farm distance to main road were negatively associated with the changes in farmers' behaviors, which may be interpreted as evidence that farms closer to ASC and main road received more attention from plan organizers. Plans organizers' access to the farms which were far away from ASC was more difficult, mainly because of limitations in the time personnel had at work and gasoline allocated to narrowly available cars during the period of plans. Farm distance to ASC and farm distance to main road were also introduced by Kalantari (2004) as the main influencing factors on the success of Research-Findings-Diffusion projects. Therefore, farm distance to ASC and main road should be considered when selecting partner farmers. Movahedi and Chizari (2005) suggested some other individual characteristics which should be considered when selecting partner farmers as follows: literacy, innovativeness, honesty and enthusiasm about participating in plans. Negative significant correlation between farmers' age and change in their behavior is consistent with the findings of Islam *et al.*





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(2007). Our explanation is that younger farmers are more likely to take the risk of using new technologies in their farms than older farmers. Based on the findings, lack of follow-up activities was a sever shortcoming of the plans, and the authors observed that many farmers were dissatisfied with follow-up activities, particularly in Adaptation Plans where the researcher should report and inform the extension agent and farmer about the final research findings. They complained that no one asked them after project time whether they were continuing the use of technologies, and if so, which problems they were facing. Therefore, plans should be monitored closely through well designed and reliable follow-up activities. Farmers also reported a low participation of researchers in the plans. This finding may demonstrate a real shortcoming of researchers' participation in the plans, and/or unrealistic farmers' expectations of researchers' participation. Follow-up interviews revealed both shortcomings of researchers' active participation and attendance in the farms when needed, and farmers' unrealistic expectations of researchers' roles. It is suggested that each participant should become fully aware of his/her own roles and the roles of other actors, and the entire process should be well monitored to check if everything is going according to plan. We believe that a reliable monitoring and evaluation system should be developed for the plans, to monitor closely if every actor performs their role and have an active participation, and ensure the evaluation and follow-up activities in the system. Respondents reported weak relationships between researchers and extension agents during the period of plan. Research-extension professional relationships have been a challenging issue in developing countries for a long time. Their relations are usually affected by personal feelings of personnel, their attitude towards each other and their commitments to joint goals. For more successful collaborations, formal and informal communication mechanisms should be established, motivations should be provided, and positive and cooperative attitudes should be produced in both personnel of extension and research. According to Pezeshki-Raad and Karami-Dehkordi (2006), the following factors have positive correlations with researchers' attitudes toward collaborating with extension workers: higher research experience, greater interaction with extension workers, a lower scientific position or possessing a higher management position, greater participation in seminars and colloquiums related to extension, and the influence/thinking of colleagues and managers.

Respondents who were running larger farms showed positive reactions to the plans, but negative relationships were found between farm acreage and change in behavior. As expected, farmers did not decided to take the risk of using new technologies on the whole farm and preferred a gradual transfer to them. Local group membership showed dual correlations of positive with reactions and attitudes, and negative with change in behavior. The research results did not provide any reasonable explanations for these dual correlations. Results suggested that farmers had high positive attitudes towards learning, in general, and their attitudes to extension programs were, all in all, positive. The positive attitudes pave the way for effective agricultural HRD interventions. Although practical training should be included in the plans based on their descriptions (Velayati *et al.,* 2001), none of the projects studied in this research addressed the skills level. Follow-up interviews also revealed that many PF felt the need for skills pertaining technologies.

## Limitations, Strengths and Future Lines of Study

Although this study provides insights into the factors associated with agricultural HRD effectiveness, the results must be interpreted with caution. First, only three types of agricultural HRD interventions were studied; thus, external validity limitations exist. Furthermore, all respondents live in Iran, which may introduce a selection bias to the findings. Related to this is the issue that





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the sample included only three cases; thus, the farmers may possess specific characteristics that limit the generalizability of the research findings to other populations. Additional investigations with other types of agricultural HRD interventions and cross-country and cross-cultural studies are necessary to generate findings that are more robust and generalizable. Perhaps, new items can be developed specifically tailored for cross-cultural applications of the instrument.

Secondly, the use of self-reported scales raises the possibility that common method variance may account for some of the results obtained. On the one hand, self-report measures represent the most appropriate method for testing reactions and attitudes because they referred to subjective states. However, as with any self-reported state, this runs the risk of a response bias. The strength of the methodology employed is that we used two methods to measure respondents' knowledge, i.e. self-reporting states and written tests. Although farmers' behaviors were studied through the questionnaire, direct observations were also carried out to see if farmers' behaviors had been changed. While the results of the validity and reliability tests provided sufficient confidence in the statistical findings, similar studies that employ multi-method, multi-trait measurements should yield more powerful results.

We tend to support the idea that environmental supports or situational elements (as named by some authors), plans characteristics and trainees' characteristics are the main constructs influencing HRD effectiveness. However, for each construct, some context-based items should be considered, and more interdisciplinary research, with both quantitative and qualitative perspectives, should be conducted to enhance our understanding of HRD effectiveness and develop a valid tool for its study. Future studies are encouraged to include some other individual factors identified in other studies but not considered in this paper, such as locus of control, need to achievement, and self-efficacy.

This research was part of a broader study which used other data resources such as program organizers' views to evaluate the effectiveness of agricultural HRD interventions in Fars Province of Iran. It could be also suggested that using diverse sources of data could secure more reliable results for action. Time limitations prevented the authors from investigating final results of the interventions, and HRD levels of NPF before plans. This research was carried out just after plans implementation, and it was a limiting factor for researchers to investigate final results of the plans. Because of considerable importance of long-term evaluation of impacts of HRD interventions, future studies are encouraged to address it. And furthermore, the authors were not successful to investigate HRD levels of NPF before plans. Future studies are encouraged to include before-plans data of NPF for comparison with HRD levels of PF before plans, to provide more reliable and better results.

Our instrument could be useful in practice. Practitioners can use our tool to evaluate existing HRD interventions and assess potential problems faced by HRD and transfer interventions before conducting major HRD interventions. After pinpointing factors that are potential barriers, follow-up focus groups and interviews with appropriate actors in the system are then used to help understand the meaning of findings. For example, suppose scores on the social support are low. Focus groups would reveal what specific types of support are missing and what farmers would like the community to do, and possibly would provide insights into the reasons why community is not providing support.

## CONCLUSIONS

This paper investigated and discussed the effectiveness of agricultural HRD plans which were systematically carried out through partnerships between public





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research and extension, and target farmers of Fars province in Iran. In answer to the question as to whether agricultural HRD interventions were effective, we found that they were effective in achieving their short-term objectives including producing positive reactions to the plans, increasing personal knowledge of farmers about technologies, fostering a positive attitude towards introduced technologies and encouraging the adoption of technologies. But we have no idea of the final results which were not investigated in this study because of time limitations mentioned before. In answer to the second question of the study, the results showed that supportive environment and strong plan characteristics were positively associated with positive changes in three levels of HRD. Among farmers' characteristics, farmers' positive attitudes towards learning and extension programs, their long experience in farming, the large number of their information sources and the extent to which others consult with farmers had positive correlations with positive changes in some HRD levels. Some other characteristics pertaining to farmers including their age, farm acreage, farm distance to ASC and membership in local groups showed dual relationships. For example, older age of farmers had positive association with positive reactions, but negative correlation with positive change in behavior.

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## اثربخشی برنامه های توسعه منابع انسانی کشاورزی در ایران (سه مورد مطالعه در استان فارس)

**ن. زمانی میاندشتی و ا. ملک محمدی**

## چکیده

فعالیت‌های نظام‌مند توسعه منابع انسانی کشاورزی در کشورهای در حال توسعه کمتر مشاهده شده‌اند و از طرفی اطلاعات کمی درباره میزان موفقیت این قبیل فعالیت‌ها وجود دارد. به منظور بررسی اثربخشی طرح‌های چندپروژه‌ای تحقیقی-ترویجی، تحقیقی-تطبیقی و تسریع انتقال یافته‌های تحقیقی، مطالعه‌ای مقایسه‌ای در استان فارس انجام شد تا پس از آن، عوامل همبسته با اثربخشی این طرح‌ها نیز تعیین شوند. جامعه آماری تحقیق شامل کلیه کشاورزان هدف (۴۱ نفر)در طرح‌ها بود که همگی مورد پیمایش قرار گرفتند و همچنین ۴۱ کشاورز به‌طور تصادفی از میان کشاورزان همان جوامع که شرایط حتی‌الامکان مشابهی داشتند انتخاب شدند و به عنوان گروه مقایسه مورد بررسی قرار گرفتند. برای جمع‌آوری داده‌های مورد نیاز از دو پرسشنامه مجزا استفاده شد. روایی صوری ابزارهای تحقیق از طریق نظر متخصصان مربوطه به‌دست آمد و اعتبار ابزارها از طریق آزمون پایلوت (کرونباخ آلفا) تأیید گردید. نتایج آزمون ویلکاکسون تفاوت معنی‌داری میان سطوح توسعه منابع انسانی کشاورزان همکار در قبل و بعد از همکاری در طرح‌ها نشان داد و همچنین در آزمون من وایت نی تفاوت معنی‌داری میان سطوح مذکور در کشاورزان همکار و کشاورزان غیرهمکار مشاهده شد. بر اساس یافته‌های تحقیق، میان برخی متغیرهای مستقل از قبیل حمایت های محیطی و خصوصیات طرح‌ها با سطوح اثربخشی توسعه منابع انسانی همبستگی مثبت و معنی‌داری مشاهده گردید. یافته های این پژوهش می‌تواند به بهبود درک از اثربخشی توسعه منابع انسانی و عوامل موثر بر آن کمک نماید.





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