An Analytical Study of Urban Agriculture Projects: Prison-Farm Initiatives in Kermanshah

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Abstract

Urban agriculture promotes sustainable development and fosters societal participation, including the rehabilitation of various groups, such as inmates. Therefore, this research aimed to analyze the effectiveness of prison-farm rehabilitation programs in Dizel Abad Prison in Iran. The research population consisted of two groups: one with 130 inmates, of whom 97 were selected and studied through systematic sampling via Cochran's formula, and the second group included 14 managers, offenders, and prison experts interviewed through a census. The data collection instrument was a researcher-developed questionnaire based on the Kirkpatrick evaluation model. The reliability of the questionnaire was confirmed using Cronbach's alpha coefficient, while its face and content validity were validated by a panel of experts. The findings at the first level of evaluation (i.e., reaction) showed that, with a confidence interval of 99%, the inmates were satisfied with participating in the urban agriculture training course. At the second level (i.e. learning), results indicated a significant increase in the inmates' knowledge, with a statistically significant difference between their pre- and post-test scores (p<0.01). At the third level (i.e., behavior), the findings suggested that urban agriculture in prisons could lead to significant behavioral changes in inmates, with 95% confidence. At the fourth level of evaluation (i.e., results), the findings showed that although the urban agriculture training course in Dizel Abad Prison caused moderate changes in the inmates, the difference in pre-and-post-test scores was not statistically significant. Overall, the findings demonstrated that the urban agriculture training course in Dizel Abad Prison could bring about changes in inmates' behavior, knowledge, and attitude. These findings support the potential of prison-farm programs within urban agriculture initiatives as viable methods for rehabilitation.

Keywords: Agricultural rehabilitation, Correctional education, Kirkpatrick model, Prison-farm, Urban agriculture

Introduction

The concept of agricultural rehabilitation in prisons has been in existence since 1948, following World War II (Langat, 2016). These programs primarily aim to reintegrate inmates into society and support their transition to a productive and healthy life (Wormith, 2007; Mburu & Gathitu, 2022; Zivanai & Mahlangu, 2022).

The literature suggests that urban agriculture programs in prisons not only engage inmates with agricultural education but also provide therapeutic benefits. Asokhia and Agbonluae (2013) argue that agricultural rehabilitation programs equip inmates with various skills, enhance their competencies, and allow them to develop their talents. These programs are designed to reduce crime rates, develop skills, engage inmates in productive activities, and transform their knowledge and attitudes (Ajah, 2019; Listiana & Hastjarjo, 2021).

This study focuses on Dizel Abad Prison in Iran, which has been a prominent institution for urban agriculture programs since its establishment in 1975. The prison operates under the supervision of the National Prison Organization, adhering to national security and educational standards (Correctional Facilities Organization of Kermanshah Province, 2021). The National Inmates' Cooperative Foundation, which was initially established in 1949 as Shahrbani Prison Factories and later renamed, currently oversees these programs. After the Islamic Revolution, it was renamed the National Cooperative and Vocational Training Enterprise and is now known as the National Inmates' Cooperative Foundation. This foundation aims to create employment and generate income for inmates while promoting production, agriculture, and community service. Inmates receive agricultural training on 570 hectares of land (28 hectares of which are irrigated), provided by the government. This initiative focuses on rehabilitating barren lands and enhancing agricultural efficiency, thus increasing income for inmates' families and benefiting both the organization and the prison.

The study addresses several key questions regarding the urban agriculture programs at Dizel Abad Prison. Do these programs effectively change inmates' behavior and learning outcomes? What benefits do they provide to the prison? Are these programs managed effectively? To address these questions, the study utilizes the Kirkpatrick evaluation model (1996). A review of national databases revealed no prior research on rehabilitation through urban agriculture in Iranian prisons, positioning this study as a pioneering effort and a foundation for future academic research.

Literature Review

Prison farm and Relevant Programs: A Prison farm is a large correctional facility where inmates work on agricultural and production tasks. These activities primarily occur outdoors and include farming and mining. Unlike labor camps, the products generated in Prison farms are mainly used for feeding the inmates and supporting other organizations like orphanages, with any surplus sold to generate income for the inmates and the prison (Uddin et al., 2019; Oshinsky, 1996).

Prison farm programs encompass various activities, such as nature therapy programs. The literature indicates that most prison campuses are not designed to incorporate natural elements, with facilities typically made of concrete and wire, leading to dark, overcrowded, and isolated environments. Inmates have limited access to nature, but nature therapy programs offer an opportunity for relaxation and escape from these harsh environments (Granger, 2017). Longitudinal studies in environmental psychology and cognitive neuroscience demonstrate that exposure to natural environments can be restorative, enhancing physical and mental health, improving cognitive performance and psychological well-being, and reducing stress and hypertension. Nature can also foster cooperative behavior and social values (Van der Linden, 2015). Another significant program within Prison farms is garden

therapy, which involves activities like gardening, planting seeds, and removing weeds. This program started in the 1930s and evolved into a recognized discipline by the 1950s (Mattson *et al.*, 2004). Garden therapy can improve inmates' diets and positively impact their mental and emotional states, self-esteem, and sense of purpose. It has been shown to reduce depression and aggression (Lee et al., 2020; Brown *et al.*, 2015; Zelenski *et al.*, 2015).

Animal breeding programs, including horse breeding, beekeeping, and dog breeding, are also effective rehabilitation tools in prisons. These programs aim to develop inmates' personal and emotional skills, enhancing self-confidence, responsibility, and professional abilities (Davis, 2007; Strimple, 2003; Turner, 2007). Dog breeding, in particular, has therapeutic effects, reducing anxiety and stress in inmates, and facilitating interpersonal communication (Leonardi *et al.*, 2017). Overall, human-animal interaction provides physical, psychological, and social health benefits (Beseres, 2017).

Rehabilitation of Inmates through Urban Agriculture: Rehabilitation in prison integrates the concepts of rehabilitation and correction. Dissel (2007) views rehabilitation as a process where individuals recognize themselves as integral parts of society. Howells and Day (1999) and Darmawati *et al.* (2020) define rehabilitation as empowering individuals to reintegrate into society and abide by social laws. In the context of prison, rehabilitation often equates to urban agriculture, encompassing inmates' social relations, employment, education, and professional skills development. The primary goal of prison-farm programs is to prevent recidivism and address antisocial behaviors. Studies by Listiana and Hastjarjo (2021) and Uddin *et al.* (2019) highlight the importance of evaluating inmates' participation in urban agricultural activities, given that many inmates are socioeconomically and educationally disadvantaged and struggle to find employment. Engagement in these programs improves health and fosters a sense of responsibility within society.

The Rehabilitation Theory: This study is grounded in the theories of social learning and rehabilitation. Rehabilitation theory posits that criminal behavior is not innate but results from social, economic, and environmental factors (Fedyunin & Peretyatko., 2020; Howard, 2017). The theory aims to prevent future crimes by developing individuals' socio-economic skills, enabling them to play active roles in society. According to these theories, therapeutic measures within prison rehabilitation programs can lead to positive behavioral changes in inmates (Criss & John, 2023).

Methodology

This cross-sectional descriptive study utilized the Kirkpatrick model (1996) to assess the effectiveness of prison-farm programs in Iran for the period 2016-2021. The study encompassed two groups: inmates at the prison (N= 130) and officials working at either the prison or the Kermanshah Cooperative Foundation (N= 14). Due to the COVID-19 pandemic, the prison housed 130 inmates during the study period. A sample of 106 inmates was selected through simple random sampling, while the officials were included in the study via a census. Data were collected using a researcher-developed questionnaire comprising two types of questions: general and specific. The general questions gathered demographic information (e.g., gender, age, education level, place of residence), while the specific questions were designed according to the four levels of the Kirkpatrick model.

The Kirkpatrick model, initially proposed in 1959 and refined in 1976, is a widely recognized framework for evaluating educational programs (Alsalamah & Callinan, 2021). It divides the evaluation process into four levels:

i) Reaction: This level assesses participants' satisfaction with the training. It includes 28 questions about course content, facilities, material usefulness, and trainers.

ii) Learning: This level assesses the skills and knowledge acquired. It includes 23 questions designed to measure the extent of learning, based on comparisons between pretest and posttest results.

iii) Behavior: This level examines the behavioral changes resulting from the training. It includes 13 questions answered by managers and experts to evaluate changes in inmates' behavior in their natural environment.

iv) Results: This level focuses on the overall impact of the program, including goal achievement and problem resolution. It is assessed through 14 questions addressed by managers and experts.

The third and fourth levels of evaluation were conducted four years after the completion of the training programs. A 5-point Likert scale (ranging from 1 = "to a low degree" to 5 = "to a large extent") was used for scoring and quantitative analysis of responses.

The reliability of the questionnaire was confirmed using Cronbach's alpha coefficient, and its face and content validity were established by a panel of experts, as shown in Table 1.

Data Description

Descriptive statistics showed that about half of the participants in urban agriculture programs were married. The participants' average age was 33 years, ranging from 19 to 60. More detailed information indicated that those in the 19-40 age group had a higher participation rate in the prison's urban agriculture programs than others. As the results showed, two-thirds of the participants were under-educated. Moreover, 52.8% of the participants had no prior farming experience.

The average length of their sentence was 69 months, with a standard deviation of 6 months, and a minimum and maximum length of 5 and 300 months, respectively. Descriptive statistics of the officials and inmates showed that the former had an average age of 43 years with a standard deviation of 6 years. The minimum and maximum ages in this group were 30 and 52 years, respectively. The work experience variable revealed that 42.6% of the officials had less than 14 years of work experience, while 43.1% had more than 21 years of work experience. Regarding education level, 64.3% of the officials held a master's degree, 28.6% a bachelor's degree, and 1.7% a doctorate. According to the results, 85.7% of the officials believed that prison-farm programs could succeed in changing the inmates' behavior.

Results

Goal 1: the first level of evaluation (i.e., reaction) in Kirkpatrick model

The results of the one-sample T-test for the reaction variable showed that, as perceived by the inmates, with 95% confidence, the training program had an average to high level of achievement. The program adequately served its purpose (t=0.15, df=105, Sig=0.000). The ranking revealed that the training course received positive feedback on aspects such as satisfaction with the trainer's respectful and commendable behavior, the course's structured plan, the trainer's management skills, and the program's ability to enhance participants' knowledge. Among these, inmates ranked their satisfaction with the trainer's admirable behavior highest, while the lack of equipment and facilities ranked lower.

Table 1- Validity and reliability of the measurement instrument

Kirkpatrick model levels of evaluation	Number of items	Cronbach's alpha
Reaction	28	0.96
Learning	23	0.97
Behavior change	13	0.88
Results	14	0.95

Table 2- Results of Friedman Test and One-Sample t-Test for the First Level (Reaction)

Items	Mean	Mean difference	t	Sig.	Rank
Trainer's behavior and respect	4.24	1.24	22.65	0.000	1
Trainer's competence in answering questions	4.16	1.16	19.78	0.000	2
Satisfaction with course schedule	4.16	1.16	20.30	0.000	3
Course quality vs. expectations	3.9	0.99	14.09	0.000	17
Increasing inmates' agricultural knowledge	3.9	0.99	12.06	0.000	13
Holding training sessions at the right time	4.00	1.00	12.98	0.000	14
Trainer's knowledge of advanced methods	4.03	1.03	14.15	0.000	10
Trainer's awareness of the course content	4.00	1.00	12.61	0.000	11
Trainer's consideration of inmates' well-being	3.80	0.80	9.52	0.000	23
Selecting the right place to hold classes	3.99	0.99	12.76	0.000	16
Trainer's patience in responses	4.02	1.06	14.63	0.000	12
Trainer's expertise	4.06	1.06	15.51	0.000	6
Trainer's reaction to feedback	3.95	0.95	12.89	0.000	20
Trainer's management skills	4.15	1.15	18.39	0.000	4
Trainer's ability to motivate	3.98	0.98	13.15	0.000	18
Trainer's impartiality	3.75	0.75	8.70	0.000	24
Follow-up of training results	3.83	0.83	10.39	0.000	22
Availability of educational equipment	3.65	0.65	7.15	0.000	25
Availability of work equipment	3.52	0.52	5.21	0.000	27
Timely input usage	3.46	0.46	4.44	0.000	28
Encouragement to learn farming	3.51	0.51	4.43	0.000	26
Utilization of inmates' experiences	3.91	0.91	11.35	0.000	21
Real-life applicability of knowledge	4.01	1.01	15.85	0.000	15
Overall satisfaction with the training course	4.06	1.06	18.60	0.000	7
Increase in knowledge	4.07	1.07	15.24	0.000	5
Recommendation of the course	4.02	1.02	14.13	0.000	9
Effectiveness in agricultural skills	3.95	0.95	15.37	0.000	19
Increase in practical experience	4.07	1.07	18.55	0.000	8
	X^2=323.66		t=0.15	Sig=0.000	

Goal 2: the second level of evaluation (i.e., learning) in Kirkpatrick model

As the findings indicated, there was a statistically significant difference between the inmates' mean learning scores before and after the urban agriculture training course (Z = 0.000, Sig = 8.029). This demonstrates that the training course had a significant impact on increasing the inmates' level of learning. Consistent with these results, Weber *et al.* (2015) reported a significant improvement in inmates' knowledge following an environmental education course, emphasizing its positive effect on environmental knowledge. Similarly, Mattson *et al.* (2004) found that training inmates in greenhouse plant production and horticulture significantly enhanced their horticultural knowledge. These findings suggest that such training programs are highly motivating for inmates. On the other hand, Omoni and Ijeh (2009) found no significant relationship between formal education and inmate rehabilitation, highlighting that informal training methods like urban agriculture can be particularly effective in rehabilitation. Listiana and Hastjarjo (2021) also supported the idea that prison-farm programs provide valuable skills for life after prison. Zautorova (2019) emphasized the importance of environmental education in prisons, noting that a modern individual should possess a basic level of ecological knowledge and high ecological culture, which can be fostered through such educational programs. Furthermore, Kaye *et al.* (2015) highlighted an additional benefit of prison-farm programs: their role in engaging inmates in conservation efforts to protect endangered species, which contributes to reducing habitat destruction and preserving biodiversity.

In the next step, the Friedman test was conducted to evaluate the importance and value of items as perceived by the inmates. The analysis showed that before the course (the pretest), the inmates were most skilled in plowing and irrigation and had the most knowledge of agricultural tools and equipment (mechanization). The lowest-ranked skills were knowing how to sell and market the products and teamwork skills. It was observed that 52% of the participants had prior experience in agricultural activities. Naturally, they had better basic agricultural skills before the course. However, due to their low education/literacy levels, they knew less about marketing and selling the products and had less teamwork skills, likely due to distrust in others.

The ranking of items after the course (the posttest) showed that the inmates gained the best skills in areas such as knowing different types of fertilizers, knowing the right tools and equipment (mechanization) for agriculture, and knowing how to sell and market the products. It can be concluded that this course successfully improved the inmates' specialized knowledge and skills in agriculture. Similarly, Uddin et al. (2019) showed that inmates can integrate newly acquired agricultural skills with their previous knowledge and live an easier, crime-free occupational life outside prison. Consequently, the two items of irrigation skills and soil preparation skills were assigned the lowest rank.

The training course significantly improved the inmates' agricultural skills. In all cases, the post-course mean score for knowledge and skills reached an acceptable level compared to the pre-course scores.This is also confirmed by the findings reported by Harkrader et al. (2004). The research findings reported by Coppedge and Strong (2013) showed that training for professional skills can be an effective way to reduce recidivism.

Table 3- Comparison of the learning level before and after the training course

		N	Mean Rank	Ranks sums	Z	Sig
Pretest-posttest	Negative signs	9[a]	18.28	164.50	-8.029	0.000
	Positive signs	89[b]	52.66	4686.50		
	Ties	7[c]				
	Total	105				

a. pretest > posttest   b. pretest < posttest   c. pretest = posttest

Table 4- Friedman test and one-sample t-test results of the second level (learning)

Items	Before the Course (Pretest)		After the Course (Posttest)	
	Rank Mean	Rank	Rank Mean	Rank
Soil Preparation	6.37	7	6.13	11
Plowing	7.04	1	6.40	6
Planting	6.60	5	6.30	8
Irrigation	7.03	2	6.15	10
Pest Control	6.18	10	6.35	7
Weed Control	6.38	6	6.65	3
Teamwork	6.20	11	6.19	9
Use of Inputs	6.32	8	6.61	4
Fertilizer Knowledge	6.28	9	7.22	1
Equipment Knowledge	6.88	3	6.92	2
Timing for Planting and Harvest	6.86	4	6.42	5
Marketing Knowledge	5.85	12	6.65	3
X^2	33.36		31.76	
Df	11		11	
Sig.	0.000		0.001	

Goal 3: Testing the normal distribution of the third level (behavior)

The analysis showed a statistically significant difference (Z=0.001, Sig=3.297) between the mean score of the inmates' behavior before and after the course. The urban agriculture training course in the prison managed to significantly and positively change the behavior. Similarly, the findings reported by Brown *et al.* (2016) showed that the horticulture training intervention managed to have a significant and positive effect on drug offenders' behavior. The reason was that, in the training, the garden was described as a realistic image of a place where humanization is formed, self-esteem is increased, a socialization occurs and human is bound to the nature.

Table 5- Wilcoxon test results of the second level (learning)

Variable		Mean	Std	z	Sig.	Test result
Soil preparation skill	Pretest	2.41	1.07	-7.38	0.000	Acceptable
	Posttest	3.76	0.83			
Plowing skill	Pretest	2.56	1.05	-7.24	0.000	Acceptable
	Posttest	3.80	0.80			
Planting skill	Pretest	2.44	1.07	-7.41	0.000	Acceptable
	Posttest	3.79	0.85			
Irrigation skill	Pretest	2.55	1.06	-6.88	0.000	Acceptable
	Posttest	3.76	0.87			
Pest and disease control skills	Pretest	2.34	1.05	-7.471	0.000	Acceptable
	Posttest	3.79	0.91			
Weed control skills	Pretest	2.41	1.12	-7.54	0.000	Acceptable
	Posttest	3.86	0.87			
Team work skill	Pretest	2.31	1.09	-7.48	0.000	Acceptable
	Posttest	3.70	0.93			
Use of seeds, fertilizers and other inputs	Pretest	2.36	1.08	-7.68	0.000	Acceptable
	Posttest	3.85	0.81			
Knowledge of different fertilizer types	Pretest	2.38	1.12	-7.72	0.000	Acceptable
	Posttest	4.00	0.85			
Knowledge of agricultural tools and equipment (mechanization)	Pretest	2.51	1.13	-7.52	0.000	Acceptable
	Posttest	3.92	0.82			
Knowledge of the right time to plant and harvest	Pretest	2.50	1.12	-7.38	0.000	Acceptable
	Posttest	3.83	0.87			
Knowledge of how to sell and market the product	Pretest	2.26	1.10	-7.61	0.000	Acceptable
	Posttest	3.87	0.85			

Table 6- Comparison of the behavior level before and after the training course

		N	Mean Rank	Rank sums	Z	Sig
Pretest-posttest	Negative signs	0[a]	0.00	0.00	-3.297	0.001
	Positive signs	14[b]	7.50	105.00		
	Ties	0[c]				
	Total	14				

a. pretest > posttest   b. pretest < posttest   c. pretest = posttest

The results of the Friedman test for ranking behavioral items before the training course showed that the most significant behaviors perceived by the trainer and experts were aggressive behaviors, focusing solely on discharge from prison, prejudice and pride, and sufficient sleep and rest. Similarly, Granger (2017) found that inmates lacked constant access to nature and outdoor areas. Most prisons were not artistically designed to appreciate nature, with existing facilities mainly consisting of brick and wire. This researcher added that most prisons were dark, chaotic, overcrowded, and isolated, with inmates having little access to nature. These conditions seem to significantly increase aggressive behavior and isolation among inmates. However, urban agriculture and nature therapy programs can significantly modify such behavior. According to Van der

Linden (2015), nature is restorative. Even brief exposure to the natural environment can improve physical and mental health. In agreement with the present findings, Lee *et al.* (2020) found that horticulture training programs in prisons managed to reduce inmates' depression, increase self-esteem and life satisfaction, and improve mental health. Sachitra and Wijewardhana (2020) also showed that rehabilitation programs in prison can moderate potentially negative emotions such as anger, despair, and loneliness. As the findings showed, the two positive behaviors, inmates' confidence in their abilities and thinking about a healthy life, were at the lowest recognition level before the course. Moreover, Farley and Pike (2016) showed that inmates' participation in education could decrease monotony and boredom and improve critical thinking skills.

The Friedman test also showed improvement in many of the inmates' positive behaviors and a decrease in their negative behaviors. Social learning theory can probably explain this behavior change. Arguably, the inmates managed to improve their behavior within the socio-cultural context of the urban agriculture training course. This finding was also ratified by O'Connor and Perreyclear (2002). In general, after the implementation of the urban agriculture training course in the prison, group work and cooperation increased among inmates compared to before the course, and this increase was statistically significant. A body of research by Tett *et al.* (2012), Zelenski *et al.* (2015), Leonardi *et al.* (2017), and *Mims et al.* (2017) also showed that during correctional programs, inmates learn to work more effectively with each other and enhance their interpersonal communication. In other words, exposure to nature will improve their cooperative behavior and socialization values. These studies showed that horticulture curricula for inmates managed to strengthen their social ties with the community, subsequently leading to a change in attitude.

Another behavior that showed significant improvement after the training course was the inmates' farming skills. This finding was

confirmed in a body of research by Davis (2007), Strimple (2003), and Turner (2007). These researchers believed that horticulture and agriculture training programs in prison could improve inmates' skills, qualifications, and work experience. Concerning the importance of the acquired farming skills, Timler *et al.* (2019) contended that gaining significant work experience would lead to increased self-esteem and personal values in the future. Robinson and O'Callaghan (2008) confirmed this finding and added that although these programs in prisons face many challenges, they can positively affect individuals. These programs can provide the basis for job training and free education for inmates as a trained workforce. These professional training programs seem to be immensely successful for inmates. According to Ross (2011), inmates are mainly considered a vulnerable population in society.

The third behavior that showed significant change after the training course was the inmates' knowledge and experience. This finding was also confirmed by Harkrader *et al.* (2004), Baybutt *et al.* (2018), and Anderson and Leal (1997). The judicious use of time was a highly ranked behavior by the trainers and officials. It was suggested that inmates spend their free time actively engaged in these programs rather than just wasting it. This approach could help reduce depression and improve mental and physical health. Generally speaking, it could have beneficial outcomes.

Among behaviors such as aggressive behavior were at a lower ranking level, although the t-test results showed this change was not statistically significant. Yet, the mean score was reduced in the posttest compared to the pretest. This finding is similar to the results reported by Lee *et al.* (2008). Their research on anger control in female inmates using horticulture therapy showed no significant effect on reducing anger in the experimental group, but the mean score of the experimental group decreased from 67.8 to 66.3. Thus, this finding is similar to the present research. It can be argued that urban agriculture, as an instance of naturopathy, can put one's mind at rest.

Braz and Gilmore (2006) contended that this peace of mind could directly affect the body and, as a result, decrease inmates' blood pressure and internal anxiety. Thus, it can be expected to balance the behaviors.

Additionally, the findings reported by Lahm (2009) showed that correctional education programs in prison could successfully reduce violations of the law among inmates.

Table 7- Friedman test and one-sample t-test results of the third level (behavior)

Items	Before the Course (Pretest)		After the Course (Posttest)	
	Rank Mean	Ranking	Rank Mean	Ranking
Friendly Relationship with Trainers & Officials	6.43	7	6.57	12
Improving Knowledge & Experience	6.57	6	8.25	3
Inmates' Aggressive Behavior	9.18	1	4.96	10
Obsession with Discharge	8.54	2	7.14	7
Rest & Sleep	8.11	4	7.29	6
Group Work & Cooperation	6.57	6	8.54	1
Inmates' Patience	6.57	6	4.86	11
Confidence in Capabilities/Skills	5.36	11	7.46	8
Prejudice & Pride	8.29	3	7.04	8
Thinking about Healthy Life	5.71	10	5.82	12
Judicious Use of Time	7.14	5	8.21	4
Agricultural Skills	6.29	8	8.39	2
Feeling Responsible	6.25	9	7.04	8
X^2	22.41		26.19	
Df	12		12	
Sig.	0.03		0.01	

Table 8- One-sample t-test results of the third level (behavior change)

Items		Mean	SD	t	Sig	Test result
Friendly relationship and interaction with trainers and officials	Pretest	2.00	0.78	-5.47	0.000	Acceptable
	Posttest	3.35	1.00			
Increasing the inmates' knowledge and experience	Pretest	2.00	0.78	-6.76	0.000	Acceptable
	Posttest	3.85	0.53			
Inmates' aggressive behavior	Pretest	2.92	1.20	-0.135	0.890	Unacceptable
	Posttest	3.00	1.17			
Obsession only with discharge from the prison	Pretest	2.42	0.85	-4.05	0.000	Acceptable
	Posttest	3.64	0.63			
Rest and sleep	Pretest	2.35	0.92	-3.08	0.000	Acceptable
	Posttest	3.57	1.08			
Group work and cooperation among inmates	Pretest	2.07	0.47	-5.96	0.000	Acceptable
	Posttest	3.85	1.03			
Inmate's patience	Pretest	2.14	1.09	-2.26	0.042	Acceptable
	Posttest	3.21	1.12			
Inmate's confidence in capabilities	Pretest	1.78	0.80	-4.60	0.001	Acceptable
	Posttest	3.64	1.15			
Prejudice and pride	Pretest	2.28	0.82	-3.34	0.005	Acceptable
	Posttest	3.57	0.94			
Thinking about living a healthy life	Pretest	1.85	0.77	-4.84	0.000	Acceptable
	Posttest	3.35	1.00			
Judicios use of the inmate's time	Pretest	2.21	0.89	-5.78	0.000	Acceptable
	Posttest	3.78	0.89			
Inmate's skills in agriculture	Pretest	2.00	0.96	-5.14	0.000	Acceptable
	Posttest	3.85	0.86			
Feeling responsible	Pretest	1.92	0.61	-4.84	0.000	Acceptable
	Posttest	3.65	0.84			

Goal 4: the fourth level of evaluation (i.e., results) in Kirkpatrick model

The one-sample t-test analysis of the results showed, as perceived by the trainers and experts in agricultural training, with 95% confidence, the performance was moderate, but the goals were not achieved as expected (t= -0.106, df=13, Sig=0.917). There can be several reasons for this finding. First, not much time had passed since the operation of these programs, so we could not really expect significant outcomes. Second, these programs do not generally follow the standard steps, and according to Bachi (2013), the low experiential knowledge of the planners, experts and trainers in these programs can have a significant effect on the results.

The ranking of items using the Friedman test showed the training course had managed to achieve a moderate to high level of achievement by empowering the inmates to work on farms. This finding was also consistent with the data collected from the inmates. The findings reported by Bozick et al. (2019) and Hunter and Boyce (2009) also confirmed that correctional education could contribute to inmates' employment in their post-prison life.

The major outcome of the training course was the development of individual and social skills in inmates. Similarly, the findings reported by Han et al. (2021) showed that educational programs such as dog breeding in prison can increase self-concept, develop skills, increase participation, enhance perceived control, and positively affect life after prison. Evaluating the outcomes showed that urban agriculture programs managed to partly improve the inmates' health. The prison farm programs include various agricultural activities. Nature therapy programs and animal therapy are subsets of these activities, as are horticulture, fish therapy, and beekeeping. The benefit of fish therapy lies in the fact that watching and raising fish in water can be relaxing and can reduce stress and blood pressure. Nature therapy has certain benefits such as a psychological effect, depression reduction, and risk-taking reduction (Richards & Kafami, 1999). Bowlby (1969) contended that communication can be a source of increased comfort, security, and less stress. Nature therapy also helps regulate the mind and strike an emotional balance. Maintaining human relationships with animals is well-known in many domains. It can be concluded that these programs positively affect individuals' mental and physical health. Brown et al. (2016) also pinpointed the effectiveness of these training courses in improving inmates' mental health. Mitra and Agarwal (2016) defined well-being as a state of physical, mental, emotional, and social happiness. Baybutt et al. (2019) believed that prison farm programs, including gardening, can have the greatest effect on the participants' health and mental well-being.

The present study showed that during the prison farm program, the inmate participants' behavior improved. This is in agreement with Vandala (2019), who showed that rehabilitation programs transform criminals, promote self-esteem, humanity, and turn them into decent law-abiding citizens. As the ranking showed, the prison farm training course was not enormously successful in earning an income for the inmates. Further analysis showed that most of the income of the prison farm projects is provided for the participating inmates and their families. It seems these projects mainly seek the inmates' behavioral and social changes, and earning an income is not a priority.

Table 9- One-sample t-test analysis of the fourth level (results)

Variable	t	Df	Sig	Mean difference	Lower limit	Upper limit
Results	-0.106	13	0.917	-0.025	-0.54	0.49

Another item ranked lowest among the program's outcomes was the reduced rate of inmate recidivism. The expectation is that the prison farm program equips inmates with skills to earn an income for their families, which would reflect a positive behavioral change. If they can earn a living properly, there is little chance that they will return to criminal acts. Thus, it is expected that the rate of crime will be reduced. Brewster and Sharp (2002) showed that rehabilitative training programs are an effective means of reducing recidivism. Also, a meta-analysis by Bozick et al. (2018) covering 1980-2017 showed that rehabilitation training for inmates can reduce recidivism. Thus, there will be more chances that these individuals will return to prison. To confirm the present findings, it is necessary to conduct a comparative study between inmates who have taken part in rehabilitation programs and those who have not to have a more reliable evaluation of the effectiveness of the programs. Descriptive statistics indicate that for approximately 95% of the inmate participants, this was their first experience in a training course. Therefore, a comprehensive evaluation would require a parallel study on discharged inmates to assess the impact of the training on their likelihood of recidivism. Another item that got a low rank in the results was the food security level. This finding can be discussed in at least two ways. One is that agricultural products of these programs are sold outside the prison, and the earnings are used to cover expenses. This can, in turn, lighten the financial burden on the government. In other words, the income earned from the prison farm project helps to cover the costs of the prison or a similar organization. Moreover, the towns nearby may prefer to buy the farming products from the prison rather than from distant villages. This can also significantly contribute to the agricultural sector. In order to ensure food security, policymakers should focus on three important factors: 1) subsidies for prisons, 2) allocation of strategic resources, and 3) food production. Although these programs were expected to increase food security in the prison, this goal was not achieved. Research by Listiana and Hastjarjo (2021) and Moloko et al. (2018) showed that prison farm programs can ensure food security. It can be argued that Dizel Abad Prison has no plan for using the generated products as food. Also, as mentioned previously, the income from selling the products is used for inmates and their families. Obviously, these programs cannot lead to an increase in food security within the prison.

Conclusion

This study demonstrated the effectiveness of the prison-farm program at Dizel Abad Prison in inducing positive behavioral changes among inmates and enhancing their knowledge and attitudes. The success of this program underscores its potential benefits for both inmates and society, making it a viable solution for inmate rehabilitation and urban agriculture development. Furthermore, as highlighted by Darke and Aresti (2016), such programs can foster improved collaboration between correctional facilities and institutions like universities, which can support the needs of this vulnerable population. Similarly, Richards and Kafami (1999) found that universities can assist in the reintegration of inmates by offering educational opportunities and reducing barriers.

Based on these findings, several recommendations are proposed. First, prison regulations should be revised to remove barriers to urban agricultural programs, enabling greater integration and effectiveness. Additionally, increasing the available space for agricultural activities within prisons is essential to support more extensive and productive participation. Additionally, allocating increased funding to support urban agriculture rehabilitation programs can enhance their sustainability and impact. Strengthening partnerships between prison officials and relevant institutions can help secure necessary financial support, while recruiting agricultural experts to train inmates would provide them with valuable skills. Forming agreements with agro-industrial

complexes could ensure a steady supply of agricultural products and create employment opportunities for inmates.

The implications for future research are substantial. This study enhances the understanding of urban agriculture within the context of prison-farm programs in Iran, providing valuable insights and establishing a foundation for future research in this field. As a pioneering study in Iran, it has the potential to influence national prison-farm programs and guide subsequent investigations. It also applies and validates the theory of rehabilitation and change (Miriti and Kimani, 2017), demonstrating its practical utility. The innovative use of the Kirkpatrick model to evaluate the effectiveness of the prison-farm program provides a new approach for future studies. Furthermore, the prison-farm program can generate financial benefits by creating income for both the prison and the inmates, helping to offset costs and provide necessary support. The program's connection with nature not only improves behavior through nature therapy but also contributes to the preservation of endangered plant and animal species. However, the study has limitations that must be acknowledged. Security concerns restricted access to the prison, complicating the administration of interviews and questionnaires. The program's focus on male inmates limits the generalizability of the findings to female inmates. The study's reliance on quantitative methods means that a qualitative component could offer more in-depth insights into the program's impact. Additionally, the COVID-19 pandemic restricted access to some participants, potentially affecting the results. Finally, the absence of a control group calls for cautious interpretation of the findings, and future research should consider employing true experimental or quasi-experimental designs to more accurately assess the program's effectiveness.

Compliance with Ethical Standards:

Funding:

Conflict of Interest

The Authors declare that there is no conflict of interest.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Table 10- Friedman and t-test analysis of the fourth level of evaluation (results)

Items	Rank mean	Ranking	Mean	Mean difference	t	Sig	Test result
Agricultural policies and strategies	8.29	3	3.14	0.14	0.69	0.50	Unacceptable
Income from prison-farm program	6.14	10	2.71	1.37	0.93	0.36	Unacceptable
Food security level	3.79	12	2.14	0.41	4.16	0.001	Unacceptable
Improved Inmate behavior	7.89	5	3.14	0.77	0.48	0.63	Unacceptable
Better prison environment	7.25	6	2.92	0.62	0.22	0.82	Unacceptable
Positive impact on prison functioning	6.39	9	2.78	0.57	0.58	0.56	Unacceptable
Improved profile of prison in public	7.18	7	2.92	0.69	0.20	0.84	Unacceptable
Farming jobs for inmates	10.14	1	3.42	0.96	1.71	0.11	Unacceptable
Achieved training goals and better learning	9.21	2	3.28	0.76	1.29	0.21	Unacceptable
Reduced recidivism due to agricultural programs	5.68	11	2.64	0.22	1.32	0.20	Unacceptable
Improved inmate health	7.96	4	3.07	0.69	0.24	0.80	Unacceptable
Enhanced personal and social skills of inmates	10.14	1	3.5	1.16	1.61	0.13	Unacceptable
Optimal resources use and consumption correction in prison	6.69	8	2.85	0.45	0.52	0.61	Unacceptable
Support for inmates' families	7.96	4	3.07	0.99	0.16	0.86	Unacceptable

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تحلیلی بر پروژه‌های کشاورزی شهری زندان- مزرعه در کرمانشاه

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چکیده

کشاورزی شهری نه تنها امکان تحقق توسعه پایدار کشاورزی و مشارکت همه افراد جامعه را فراهم می‌آورد بلکه می‌تواند منجر به افزایش توانبخشی در اقشار مختلف جامعه از جمله زندانیان شود. لذا هدف پژوهش حاضر تحلیلی بر اثربخشی پروژه‌های توانبخشی زندان–مزرعه در زندان دیزل آباد کرمانشاه در ایران می‌باشد. جامعه آماری دو گروه از افراد بودند؛ گروه اول شامل ۱۳۰ نفر از زندانیان دیزل آباد کرمانشاه بودند که با استفاده از فرمول کوکران ۹۷ از آن‌ها به روش نمونه‌گیری سیستماتیک انتخاب و مورد مطالعه قرار گرفتند. گروه دوم نیز شامل ۱۴ نفر از مدیران و مسئولین و کارشناسان ندامتگاه بودند که به روش سرشماری (کل شماری) مورد مصاحبه قرار گرفتند. ابزار گردآوری داده‌ها پرسشنامه محقق ساخته بر مبنای مدل کرک پاتریک بود. پایایی پرسشنامه با استفاده از ضریب آلفای کرونباخ مورد تأیید قرار گرفت. روایی شکلی و محتوایی پرسشنامه نیز توسط اساتید و اعضای هیئت علمی گروه ترویج و آموزش کشاورزی دانشگاه رازی مورد تأیید قرار گرفت. به‌منظور تجزیه و تحلیل داده‌ها از نرم‌افزار SPSS استفاده شد. یافته‌ها در سطح یک الگوی کرک پاتریک نشان داد با اطمینان ۹۹ درصد می‌توان ادعا نمود زندانیان از شرکت در در دوره آموزش کشاورزی شهری رضایت داشته‌اند. در سطح دوم نیز نتایج نمایانگر آن بود که میزان آگاهی زندانیان افزایش داشته است و نمرات آگاهی آنها در دو مرحله قبل و بعد از آموزش از لحاظ آماری معنی‌دار است (p>0.01). علاوه بر این، یافته‌ها در سطح سوم (رفتار) الگوی کرک پاتریک نشان داد با اطمینان ۹۵ درصد می‌توان ادعا نمود سایت‌های الگویی جامع توانسته‌اند در رفتار زندانیان تغییرات قابل توجهی را ایجاد نماید. بررسی یافته‌ها در سطح چهارم نشان داد اگر چه دوره‌های آموزش کشاورزی شهری در ندامتگاه آباد کرمانشاه نتایج و دستاوردهای در حد متوسط به همراه داشته‌اند. اما این دستاورد از لحاظ آماری تفاوت معناداری ندارد. به‌طور کلی بررسی‌ها نشان داد دوره‌های آموزش کشاورزی شهری در ندامتگاه دیزل آباد کرمانشاه تغییرات رفتاری، دانشی، نگرشی را در زندانیان ایجاد نمایند. به گونه‌ای که می‌توان امیدوار بود این برنامه‌های آموزشی اصلاحی بتواند منافع مورد نیاز جامعه و زندانیان را تأمین نمایند. از این رو برنامه‌های زندان مزرعه در قالب برنامه‌های کشاورزی شهری می‌تواند راهکاری مناسب برای توانبخشی زندانیان و توسعه کشاورزی شهری باشند.

واژه‌های کلیدی: آموزش اصلاحی، توانبخشی کشاورزی، کشاورزی شهری، زندان- مزرعه، مدل کرک پاتریک

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