Farmers' perception about skills of extension workers for enhancing Peach production in Afghanistan: (A case study of Goshta district, Nangarhar)

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ABSTRACT

Agricultural extension providing necessary information and skills to farmers for significantly contribute to increasing peach production. study investigated the farmers' perceptions about the abilities and efficiency of extension agents in enhancing peach production in the District Goshta of Nangarhar, Afghanistan. The research investigation used a pretested interview schedule and proportional allocation approach, Peach growers were randomly selected from six villages during the coldest months of the year in District Goshta. The results indicate 55.8% of farmers perceived the activities of extension workers to be poor, while 25% rated them as good and 19.2% evaluated them as average. several issues still exist, such as restricted accessibility, insufficient educational opportunities, and low farmer participation. To improve the effectiveness of agricultural extension services, the study highlights the need for targeted policy interventions, increased farmer participation, and initiatives aimed at building the capacity of extension personnel. Enhancing the effectiveness of extension agents could significantly boost peach production, which in turn would help strengthen the local economy.

Keywords: Perception of Farmers', Extension services, Peach Yield**, Goshta District

INTRODUCTION

The peach (Prunus persica L.), one of the members of the Rosacea family, is thought to have originated in China before 2000 B.C. It is currently grown in several global temperature zones between the latitudes of 30° and 45° north and south. It is very nutrient-dense and full of health-promoting phytochemicals (Hans *et al.*, 2020). Afghanistan is known for growing excellent crops, especially peaches, and has a long history of horticulture. However, the nation's problems—such as instability, violence, and authoritarian rule—lead to low peach production and productivity. Lack of improved cultivars, poor soil health, inadequate irrigation, poor pollination management, shifting climatic conditions, unsuitable post-harvest procedures, and inadequate storage and transportation facilities are some of the factors causing the scarcity. China and Pakistan, on the other hand, have better transportation infrastructure and average peach yields per hectare. In comparison, China and Pakistan have higher average yields of peaches per hectare. Despite these challenges, Afghanistan's climate is conducive to growing various fruit trees, presenting an opportunity for horticulture to once again become a source of export income due to the region's reputation for high-quality produce and global market demand.

According to surveys conducted in 2006-07, 1546 nurseries of stone and pome fruit were registered, producing 12,924,928 saplings annually. Peaches are the most important deciduous fruit crop farmed in Afghanistan (Khademi, 2013). From 2016-17 to 2021-22, the production of peaches in Afghanistan exhibited notable fluctuations. During 2016-17, the country produced approximately 15.02 thousand tons of peaches. This figure saw a gradual increase in the following years, reaching 16.00 thousand tons in 2017-18 and further rising to 18.12 thousand tons in 2018-19. The upward trend continued, with production peaking at 20.20 thousand tons in 2019-20. However, in 2020-21, there was a significant surge, as production jumped to 27.93 thousand tons. Yet, this was followed by a decline in 2021-22, with production falling back to 15.31 thousand tons. Overall, the data shows that Afghanistan's peach production landscape has been dynamic over the past five years, distinguished by both expansion and ensuing difficulties. (Source: Tridge, 2021).

The Department of Agricultural Extension introduces innovative farming techniques to the farming community in order to spread cutting-edge knowledge. it offers target farmers technical help to raise their level of living through increased agricultural output. (Sanaullah and Pervaiz., 2019).

A variety of instructional and communication programs created for the farming community by experts in agriculture, health, trade, and commerce are now part of the discipline of extension. The goal of agricultural extension is to inform farmers and incorporate current knowledge and scientific studies into farming methods. (Sanaullah *et al*., 2020). highlights the vital role that model farm service centers play in enhancing peach production in isolated parts of Pakistan's northern region. These centers give farmers access to resources that involve high-quality seeds, cutting-edge farming methods, and professional guidance that boost agricultural productivity. They enable farmers to implement cutting-edge techniques, leading to increased yields and higher-quality fruit, by simplifying training and knowledge transfer. These facilities also foster community cooperation by enabling farmers to exchange insights and solutions for shared problem. According to the results, similar programs might be very helpful in areas like Afghanistan, where peach production and rural development depend heavily on access to agricultural resources. In general, model agricultural service centers are a smart way to increase agricultural productivity, guarantee food security, and enhance the standard of living for farmers in rural areas. Khan *et al*. (2019). Afghanistan's peach output has been improved by government and non-governmental organizations, however the results have been inadequate. Because previous studies frequently ignore the unique difficulties faced by local farmers, there is a significant study gap on farmers' perceptions of extension workers' abilities in peach growing,

particularly in Goshta-Nangarhar. Furthermore, little research has been done on how socioeconomic, cultural, and communication constraints affect farmers' perceptions of extension services. The creation of effective training courses for extension workers is hampered by this lack of localized knowledge, which has an impact on peach production activities. This study aims to address these issues by analyzing farmers' perceptions, identifying key influencing factors, and examining challenges related to extension activities in Goshta-Nangarhar peach farming context. (Shinwari et al., 2025)

OBJECTIVES

1. Find out the demographic characteristics of peach growers in the study area.
2. Know the perception of farmers regarding the skills of extension workers in the study area.
3. To suggest recommendations for further enhancements in peach production in the study area.

MATERIALS AND METHODS

Study Area

The study was conducted in Nangarhar Province, Afghanistan, in October 2024. The Multi-Stage Sampling Technique was employed to select the sample. District Goshta, known for peach cultivation, was purposively chosen out of the twenty-two districts in the province. Six villages within District Goshta were then purposively selected for their peach cultivation. A list of 200 peach growers from these villages was obtained from the Agriculture Extension Department, and 60% of them (120 respondents) were
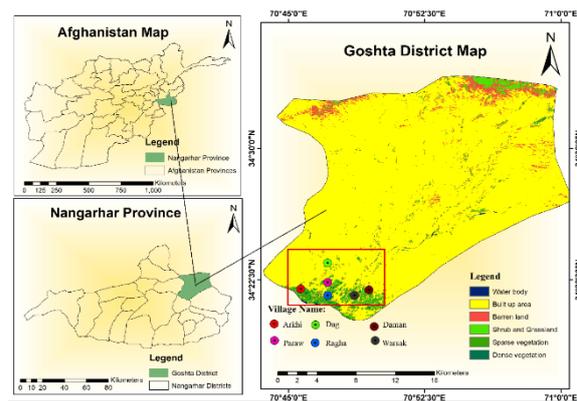
proportionately allocated for data collection.

Figure1: Study area Map

Data Collection

For the research compilation, a combination of primary and secondary data was amassed. Primary data collection utilized a pre-tested interview schedule, while secondary data were sourced from

government, semi-government publications and unpublished sources (District Agriculture Office (DAO). Data collection process encompassed drafting the interview schedule, conducting pre-tests, and interviewing the participants.

Data process and analysis

The primary data were analyzed using the Statistical Package for Social Sciences (SPSS) version 20. descriptive statistics, which consist of frequencies, percentages, mean scores, and standard deviations, were employed for data analysis. Skills were ranked according to mean values to evaluate farmers' perceived competence levels.

RESULTS AND DISCUSSION

The data Illustrate in Table 1, about Age, Education level, household size, landholding, farming experience and farmers' tenancy status.

Age has positively affected adoption process (Bran *et al*., 2000). Four age categories were identified by the researcher for this study. contains information about the age of the peach farmers. Compared to older farmers, younger farmers acquire and apply new technology more quickly. Our findings are comparable to those of Okwu *et al.* (2007) since most of the participants in the research region are ranging in age from 40 to 50, and were hesitant to embrace contemporary technology. Education effects, learning, adoption, intelligence ability, and knowledge directly and indirectly. The majority of literate individuals are polite, knowledgeable, and forward-thinking in their approach to problem-solving, interpreting results, and maintaining a positive outlook, adaptable point of view on farming activities; on the other hand, illiterate people who are tough to negotiate regarding situations, and make decisions (Iqbal and Nawab, 2013). shows the literacy level of the peach growers, (57.5%) were literate and 42.5% were illiterate. Out of total highest literate respondents, 47.8% had an educational level up to intermediate. These findings are different from those of Muhammadi *et al.* (2023), who stated that in the research region, the majority of respondents (69%) were illiterate. Household size is negatively correlated with socio-economic factors. The respondents within these households comprise individuals of all ages, including both adults and children (Belay *et al.*, 2012). Table 1. illustrates data regarding household size and show 35% of peach growers have households of 9–12 members. Depicts the landholding status of the peach growers, results show that (38.3%) of the peach growers in the study area had small land holdings, up to 2 acres. While a minimum 13.4% of farmers had above 6 acres of land holding. According to Chaudhary (2006), those who possess a smaller amount of land for agriculture are less able to gain agricultural expertise than large farmers.

An essential part of a farmer's learning process is farming experience. It has a significant impact on how agricultural innovations are adopted (Hidayat *et al.,* 2023). illustrates maximum farming experience 62.5% had above 15 years, while 2.5% respondents had minimum up to 5 years faming experience. Sanaullah *et al.* (2020) observed that 63% of sample respondents in the research region had worked in agriculture for the preceding 11–20 years, which is comparable to our findings. Farmers' tenancy status affects their capacity to use modern agricultural technologies (Sanaullah *et al.*, 2020). Tenants were conceptually more efficient than owners (Ali *et al*., 2019). Data regarding tenancy status were depicted in show that the majority of growers, 68.3%, were owner cultivators. Our findings are consistent with those of Aziz *et al.* (2018), who discovered that owner-cultivators made up the majority of respondents in the study area (70.83%).

Table 1. *Socio-economic characteristics of the peach Growers*

Characteristics (Scoring Method)	Category	Farmers N=120	
		Frequency	Percentage
Age (Years)	Up to 30	30	25
	31-40	31	25.8
	41-50	31	25.8
	above 50	28	23.4
Educational level	Illiterate (0)	51	42.5
	Primary (1-5)	1	1.4
	Middle (6-8)	12	17.5
	Metric (9-10)	4	5.8
	Intermediate (11-12)	33	47.8
	Bachelor & above (16 and above)	19	27.5
Household size	1-4	7	5.8
	5-8	30	25
	9-12	42	35
	Above 12	41	34.2
land-hold size in acre	Up to 2	46	38.3
	2.1-4	40	33.3
	4.1-6	18	15
	Above 6	16	13.4
Farming Experience (years)	1-5	3	2.5
	5.1-10	20	16.7
	10.1-15	22	18.3
	Above 15	75	62.5
Tenancy status	Owner cultivators	82	68.3
	Owner-cum-tenant	18	15
	Tenants	20	16.7

Source: Field data survey 2023

Skills of Extension Workers in Controlling Fruit Flies in Peach Orchard

Most fruit and vegetable crops suffer from attack by fruit flies belonging to the genus Bactocera (Diptera: Tephritidae) and losses may be up to the tune of 100 percent, if not regulated in time. They attack almost all fruit crops along with the wild ones and many vegetable crops (Khan and Naeem, 2017). About 24%

of losses due to fruit fly species (B.z onatus) were recorded in Pakistan. About 50 to 80% of infestation has been recorded in peer peach, apricot, fig, and other fruits (Hussain *et al.*, 2019).

Table 2. Peach Growers' Perceptions of Extension Workers' Skills in Educating Farmers on Fruit Fly Control

Villages	Rate of Extension workers in the education of the farmers in fruit fly control			Total
	Good	Average	Poor	
Arkhai	4 (19%)	4 (19%)	13 (61.9%)	21
Dag kale	8 (33.3%)	3 (12.5%)	13 (54.2%)	24
Damam	5 (27.8%)	4 (22.2%)	9 (50%)	18
Paraw	5 (33.3%)	3 (20%)	7 (46.7%)	15
Ragha	1 (4.2%)	8 (33.3%)	15 (62.5%)	24
Worsak	7 (38.9%)	1 (5.6%)	10 (55.6%)	18
Total	30 (25%)	23 (19.2%)	67 (55.8%)	120

Source: Field data survey 2023

Extension personnel's capacity to instruct farmers on fruit fly management was categorized as good, moderate, and poor, according to data shown in Table 2. The findings showed that while 25% of peach growers thought extension agents did a good job of teaching them how to control fruit flies in a peach orchard, the majority (55.8%) of peach cultivators fell into the category of those who said that extension workers' knowledge of fruit fly control was inadequate. It is evident that the vast majority (55.8%) require training to enhance their fruit fly control abilities since peach producers were dissatisfied with their abilities and classified them as mediocre or bad.

Peach Growers' Perceptions about the Knowledge of Peach Plant Density

Regardless of whether you are laying out an orchard on level or sloping land, it's crucial to maintain consistent row spacing. Ensuring equal distances between rows throughout the orchard can be achieved by placing stakes before planting (Iglesias and Echererria, 2022). uniformities are important for both straight and contoured rows. A common spacing for peach trees is 14 feet by 22 feet, accommodating roughly 141 trees per acre

Table 3. Distribution of Sample Respondents based on Plant-to-Plant Distance

Villages	Plant-to-plant distance				Total
	don't know	9 feet	12 feet	15 feet	
Arkhai	7 (33.3%)	2 (9.5%)	8 (38.1%)	4 (19%)	21
Dag kale	9 (37.5%)	2 (8.3%)	8 (33.3%)	5 (20.8%)	24
Damam	4 (22.2%)	2 (11.1%)	10 (55.6%)	2 (11.1%)	18
Paraw	5 (33.3%)	2 (13.2%)	3 (20%)	5 (33.3%)	15
Ragha	9 (37.5%)	3 (12.5%)	4 (16.7%)	8 (33.3%)	24
Worsak	6 (33.3%)	2 (11.1%)	8 (44.4%)	2 (11.1%)	18
Total	40 (33.3%)	13 (10.8%)	41 (34.2%)	26 (21.7%)	120

Source: Field data survey 2023

Our results were in line with Iglesias and Echeverria (2022) who reported that the common plant-to-plant distance in peach orchard is 2.6m (8.5 feet) to 5m (16.4 feet).

Number of Plants per Acre

Peach variety, tree spacing, and fertilization and irrigation techniques are some of the variables that affect the number of peach trees per acre (Iglesias and Echererria, 2022). For commercial peach production, a typical range is between 80 to 250 trees per acre. in order to improve fruit quality in peach orchards, Minas et al. (2018) emphasized the significance of optimizing pre-harvest parameters, such as cultivar and rootstock selection, fruit positioning in the canopy, irrigation, land management, fertilization, and pruning procedures.

Table 4. Distribution of Peach Growers Regarding Number of Trees / Acre

Villages	Trees/acre			Total
	133 Trees	160 Trees	190 Trees	
Arkhai	8 (38.1%)	9 (42.9%)	4 (19%)	21
Dag kale	10 (41.7%)	10 (41.7%)	4 (16.7%)	24
Damam	3 (16.7%)	11 (61.1%)	4 (22.2%)	18
Paraw	6 (40%)	4 (26.7%)	5 (33.3%)	15
Ragha	11 (45.8%)	9 (37.5%)	4 (16.7%)	24
Worsak	4 (22.2%)	9 (50%)	5 (27.8%)	18
Total	42 (35%)	52 (43.3%)	26 (21.7%)	120

Source: Field survey, 2023

Farmers' Perception about the Skills of Extension Workers in Plant Protection

The protection of fruit plants is essential in agriculture to prevent and mitigate damage caused by diseases, pests, and weeds. This involves the accurate application of management techniques to safeguard fruit trees. Cultural procedures are performed pre- and post-gardening activities to shield plants from diseases, requiring specific techniques for disease prevention. Knowledge of pest, disease, and insect identification is crucial for effective plant protection. Extension personnel play a vital role in aiding peach growers with plant protection strategies Alamgir (2019). our findings to Saddam (2021), similarities were found in the ranking of symptom identification for insect/pest infestation and disease causation, which held the second position in Saddam's study. However, in our research, this skill was ranked first, emphasizing symptoms of major insect/pest identification and disease causes. This difference may be due to

variations in location and crop types, as Saddam (2021) focused on tomatoes while our study pertains to peaches.

Table 5. Farmers' Perception Regarding Extension Worker's Skills in Plant Protection Measures of Peach Scale: 1=Very Low 2=Low 3=Medium 4=High 5=Very High S. D=Standard Deviation

Skills regarding Plant Protection	Very low	Low	Medium	High	Very high	Mean	S. D	Rank
Symptoms of major insects/ pest identification and infestation of causes of disease	1 (0.8%)	41 (34.2%)	31 (25.8%)	33 (27.5%)	14 (11.7%)	3.15	1.050	I
Knowledge of diversified Environmental effects of pesticide	5 (4.2%)	49 (40.8%)	19 (15.8%)	31 (25.8%)	16 (13.3%)	3.03	1.173	II
Identification of various life stages of peach insects	3 (2.5%)	59 (49.2%)	29 (24.2%)	21 (17.5%)	8 (6.7%)	2.77	0.994	III
Selecting the economical methods of Pest control	5 (4.2%)	62 (51.7%)	23 (19.2%)	19 (15.8%)	11 (9.2%)	2.74	1.073	IV
Biological control knowledge of pest	17 (14.2%)	71 (59.2%)	14 (11.7%)	10 (8.3%)	8 (6.7%)	2.34	1.041	V

Farmers' Perception of Extension Workers' Skills in Fruit Fly

Fruit fly is a destructive pest that damages peach trees by depositing its eggs in the fruit. This can lead to rotting and the premature dropping of the peach fruits. In order to limit the financial losses suffered by peach growers, it is critical to keep peach fruit flies under control while also preserving the amount and quality of production in peach plants (Hussain *et al.*, 2019).

6. Peach Growers' Perception of Extension Workers' Skills of Fruit Fly

Skills Regarding Fruit Fly	Very low	Low	Medium	High	Very high	Mean	S.D	Rank
Familiarity with intercropping	3(2.5%)	43(35.8%)	21(17.5%)	38(31.7%)	15(12.5%)	3.16	1.123	I
Knowledge of fruit fly	4(3.3%)	63(52.5%)	17(14.2%)	24(20%)	12(10%)	2.81	1.110	II
Knowledge of invasive fruit fly management	3(2.5%)	64(53.3%)	19(15.8%)	25(20.8%)	9(7.5%)	2.77	1.049	III
Knowledge of natural control of fruit fly	6(5%)	61(50.8%)	22(18.3%)	20(16.7%)	11(9.2%)	2.74	1.088	IV
Understanding the culture of fruit fly	5(4.2%)	66(55%)	16(13.3%)	22(18.3%)	11(9.2%)	2.73	1.098	V

Scale: 1= Very Low 2= Low 3= Medium 4= High 5= Very High S. D=Standard Deviation

Peach Growers' Perception of Extension Workers' Skills in Picking Peach Fruits

Picking is a crucial process that requires careful attention to ensure the highest quality fruit is harvested. When oranges, peaches, lemons, limes, and grapefruits are ripe and have attained their optimal flavor and texture, it is the best time to harvest them. A good peach is characterized by being heavy for its size, having a firm texture, free of blemishes or soft spots, and displaying bright coloring with a sweet, peachy aroma—these are the key criteria for selecting peaches. Peaches continue to ripen after being picked, so they should be stored at room temperature until fully ripe (Crassweller et al., 2017). This Table 7 indicates that predicting the fruit's maturity and production is one of the extension workers' fundamental, God-gifted abilities. Peach producers always value this, and it raises their standard of living in the research area.

Table 7. Peach Growers' Perception about Extension Workers' Skills in Picking of Peach Fruit

Skills regarding Picking of Peach	Very low	Low	Medium	High	Very high	Mean	S.D	Rank
Picking techniques and tools	3(2.5%)	56(46.7%)	12(10%)	33(27.5%)	16(33.3%)	3.03	1.177	I
Forecasting maturity and yield	3(2.5%)	55(45.8%)	12(10%)	36(30%)	14(11.7%)	3.02	1.156	II
Judging proper time for picking	2(1.7%)	51(42.5)	25(20.8%)	31(25.8%)	11(9.2%)	2.98	1.061	III
Collecting and processing of peach	5(4.2%)	59(49.2%)	12(10%)	32(26.7%)	12(10%)	1.89	1.151	IV

Scale: 1= Very Low 2= Low 3= Medium 4= High 5= Very High S. D=Standard Deviation

Peach producers' opinions on how extension workers assess their ability to choose peach fruits based on their mean and standard deviation are displayed in Table 7. With the highest mean of 3.03 and standard deviation of 1.177, picking techniques and tool skills were placed top. Furthermore, with a mean value of 3.02 and a standard deviation of 1.156, peach fruit maturity and yield forecasts came in second. Peach fruit collection and processing came in fourth place with the lowest mean value of 2.89 and standard deviation of 1.151, while judging the right time for selecting came in third with a mean value of 2.98 and standard deviation of 1.061. This indicates that predicting the fruit's maturity and production is one of the extension workers' fundamental, God gifted abilities. Peach producers always value this, and it raises their standard of life in the research area.

Peach Growers' Perception about Extension Worker Skills in Post Picking Processes of Peach Fruits

Part of the peach fruit's shelf life and quality after harvest depends on certain postharvest handling procedures and treatments that are maintained subsequent to harvest. Arah *et al*. (2016) found that harvesting, pre-cooling, cleaning and disinfecting,

sorting and grading, packing, storing, and shipping were among the handling procedures that were necessary to maintain quality and prolong shelf life. From the standpoint of the peach growers, Table 8. presents information regarding the post-picking skills of extension workers.

Table 8. Peach Growers' Perception of Extension Worker Skills in Post-Picking Processes of Peach Fruits

Skills regarding Plant Protection	Very low	Low	Medium	High	Very high	Mean	S.D	Rank
Understanding postharvest losses during marketing	5(4.2%)	58(48.3%)	10(8.3%)	34(28.3%)	13(10.8%)	2.93	1.172	I
Knowledge of postharvest losses	6(5%)	56(46.7%)	12(10%)	33(27.2%)	13(10.8%)	2.92	1.175	II
Understanding quality and control measures	4(3.3%)	64(53.3%)	21(17.5%)	23(19.2%)	8(6.7%)	2.73	1.029	III
Understanding various types of storage	8(6.7%)	65(54.2%)	20(16.7%)	17(14.2%)	10(8.3%)	2.63	1.076	IV

Scale: 1= Very Low 2= Low 3= Medium 4= High 5= Very High S. D=Standard Deviation

Based on mean scores and standard deviations, Table 8. shows how extension workers' understanding of post-harvest losses during marketing ranked first among the skills evaluated, with the highest mean score of 2.93 and a standard deviation of 1.172; knowledge of post-harvest losses ranked second, with a mean of 2.92 and a standard deviation of 1.175; understanding quality control measures ranked third, with a mean of 2.73 and a standard deviation of 1.029; and knowledge of various storage types ranked fourth, with the lowest mean of 2.63 and a standard deviation of 1.076.

The information shows that peach producers did not place much attention on extension staff' knowledge of post-harvest losses during marketing since they could handle this element on their own. In contrast, understanding quality control measures was of greater importance to peach growers, who had higher expectations from extension workers in this regard. Fortunately, the workers' knowledge in this area was considered satisfactory, earning top ranks for this particular aspect of post-harvest losses during marketing.

CONCLUSION

The study highlights the crucial role of extension workers in enhancing peach production in Goshta District, Nangarhar. Overall, over half of the farmers perceived the activities of extension workers to be ineffective. However, issues including poor training, minimal farmer participation, and restricted accessibility make these services less successful. The results highlight the need for better outreach initiatives, improved training programs, and more robust institutional support in order to optimize extension workers' potential. Peach output may be greatly increased by bolstering agricultural extension services, which will benefit farmers and the local economy.

RECOMMENDATIONS

- The Afghan government should organize and provide High-yielding peach cultivars, appropriate plant spacing, smart irrigation methods, effective fertilizer application, pesticide and fungicide choices, integrated pest management (IPM), and enhanced marketing facilities in the study area.
- The Afghan Government Should Organize more participatory sessions, field trips, and workshops to improve engagement and knowledge transmission.
- The Afghan government should provide subsidized agricultural inputs at reasonable prices in local markets, including fungicides, insecticides, high-quality seeds, fertilizers, and modernized farming agricultural tools.
- The Afghan government should support farmers by providing high-quality seeds, fertilizers, and farming tools while facilitating access to potential markets and agribusiness opportunities.
- The Afghan government should enhance collaboration between farmers, researchers, and agricultural policymakers to ensure that practical,

research-based solutions effectively reach the farming community.

- Agricultural Extension Agents should make frequent and regular visits to peach growers for identification of their problem.

Acknowledgments

Authors Contributions:

S. A original draft preparation Research area map, H. Z Conceptualization analysis resources, S. F Data collection, S. K. methodology, Dr. G. G review and editing, H. S Questionnaire Design, all authors have read and agreed to the published version of the manuscript

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