Journal of Nutrition and Food Security
Shahid Sadoughi University of Medical Sciences
School of Public Health
Department of Nutrition

eISSN: 2476-7425 pISSN: 2476-7417 JNFS 2026; 11(2): 213-221 Website: jnfs.ssu.ac.ir

Household Food Insecurity and Coping Strategy in War-Torn Hawzien District, Tigray Regional State, Ethiopia

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ARTICLE INFO

ORIGINAL ARTICLE

Article history:
Received: 21 Aug 2025
Revised: 29 Sep 2025
Accepted: 20 Nov 2025

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Keywords:
Food security; Food coping strategy; Tigray war; Thematic analysis.

ABSTRACT

Background: The Tigray war, characterised by the deliberate targeting of food systems, created a severe humanitarian crisis. However, empirical evidence on household-level food security during the conflict is limited. This study aimed to examine the food security status and coping mechanisms of households during the war. **Method:** Primary data were collected from 219 households from the Hawzien district, which were randomly chosen from three peasant associations within the district. Furthermore, data were collected from a household survey and focus group discussions. Data were analysed using descriptive statistics and thematic analysis. **Results:** The findings reveal a catastrophic level of food insecurity: 94.1% of households were classified as food-insecure. To survive, households resorted to negative coping strategies, most notably relying on less preferred foods (97.2%), selling productive assets (90%), and consuming seed stock intended for planting (62.5%). **Conclusion:** The war has not only caused immediate, widespread food insecurity but has also forced households into survival strategies that actively erode their productive base and long-term resilience.

Introduction

Food security emerged as a significant issue in the 1970s and has since garnered substantial attention (Bashir and Schilizzi, 2013). Food security exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life (Practical, 2008). Food insecurity and malnutrition are interconnected issues, deeply rooted in several of the UN's Sustainable Development Goals (Bahn *et al.*, 2021).

In Africa and Asia, where more than 88% of the world's undernourished people live, war has posed a significant challenge in Africa over the past few decades (Bashir and Schilizzi, 2013). Notably, since the mid-2000s, there has been a resurgence of more localised and fragmented wars across the continent (Nadia, 2024). Violent wars threaten food security and household welfare in sub-Saharan Africa (Chagomoka *et al.*, 2016, Muriuki

This paper should be cited as: Gebretinsae G, Addisu A, Weldegebrial G, Beyene A. ***Household Food Insecurity and Coping Strategy in War-Torn Hawzien District, Tigray Regional State, Ethiopia.*** *Journal of Nutrition and Food Security (JNFS)*, 2026; 11(2): 213-221.

[DOI: 10.18502/jnfs.v11i2.21442]

et al., 2023). Eastern Africa is the least developed region, the most food insecure, and faces the most difficult development challenges in the world (Bedasa and Bedemo, 2023, Silvestri *et al.*, 2015).

The conflict in Ethiopia's Tigray area, which started in November 2020, has severely damaged the health system and made matters worse for the populace (Gesesew *et al.*, 2021, Weldegebriel *et al.*, 2024). The Tigray war is widely regarded as one of the most devastating conflicts in 21 century, with estimates of up to 800,000 fatalities and millions who got displaced (Weldemichel, 2025). Beyond the human toll, the conflict deliberately targeted food systems: crops were burned, livestock slaughtered, seeds looted, and humanitarian aid blocked, creating what scholars term "weaponised hunger" (Araya and Lee, 2024, Weldegebriel *et al.*, 2024). Eritrea deployed military forces, composed of traumatised citizens serving indefinitely, to support the Ethiopian military. Notably, they have been accused of massacres in Aksum and Humera, as well as sexual violence, extrajudicial killings, and the forced deportation of refugees (Van Reisen, 2021).

While the macro-level impacts are documented, there is limited empirical understanding of the food security status of households during the war. Hence, this study aims to (1) assess the food security status of households in Hawzien District during the Tigray war using the Food Consumption Score (FCS), and (2) identify the coping strategies employed, with a focus on their implications for long-term resilience. The objective of this study is to examine food insecurity coping strategies used by households in Hawzien District during the Tigray war. This study contributes to the growing body of literature on war-induced food insecurity by offering new empirical insights into the coping strategies adopted by rural households during the ongoing war.

Materials and Methods

The study was conducted in Tigray's eastern zone, specifically in the Hawzien District. Hawzien District is located in the eastern part of the Tigray Regional State, at a distance of 950 km from Addis Ababa and 84 km from Mekelle town (Berhe and Gebremariam, 2020). The district has an overall population of 142,784 (68,145 males and 74,639 females), with a total of 21,708 households. The average annual rainfall of the district is 580 mm, and the temperature ranges between 14 °C and 27 °C (Central Statistical Agency of Ethiopia, 2023). Moreover, the economic activity of the people living in Hawzien District relies predominantly on agriculture. Mixed farming is the major economic activity in the area, with more than 90 percent of the population relying on it (Yirga *et al.*, 2011). **Figure 1** shows map of the study area.

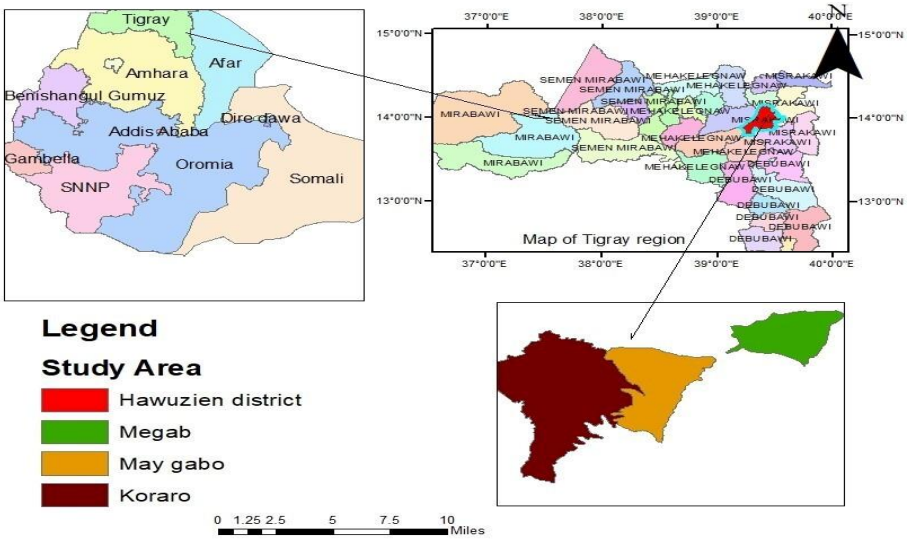

Figure 1. map of the study area.

[DOI: 10.18502/jnfs.v11i2.21442]

Sample size and sampling techniques

The study employed a multi-stage sampling technique to select respondents from the study areas. In the first stage, a purposive sampling method was used to identify the Hawzien District. Hawzien was selected because it is significantly affected by food insecurity and war. In the second stage, three *Tabies*, *Megab*, *May-gobo*, and *Koraro,* were chosen through simple random sampling from a total of 24 *Tabies* in the district. Finally, 219 respondents were randomly selected from these three *Tabies*, ensuring representativeness of the household population in each. Households were included if they resided in the selected *Tabies* for at least six months and were headed by a consenting adult (18+ years); households were excluded if they were displaced into temporary shelters or if the head was unable to provide informed consent due to severe illness or trauma. The sample size was determined using the Cochran formula (Cochran, 1977), a widely accepted method for estimating sample sizes required for proportion estimation in populations. This formula applies to both heterogeneous and homogeneous populations, ensuring the sample remains representative of the overall sampling frame.

$$n = Z^2 \frac{p(1-p)}{e^2}$$

$$n = 1.96^2 \frac{.17x.83}{.05^2} = 219$$

Where: Z=95% degree of confidence (1.96), P=population proportion of target population, Q=1-p, n= the sample size, e=allowable error (5%)

Data collection and analysis method

A cross-sectional, mixed-methods study design was employed to provide a comprehensive snapshot of household food security status and coping strategies during the acute phase of the conflict. This design was selected to simultaneously quantify the prevalence of food insecurity (via survey) and explore the context and meaning of coping strategies (via focus group discussions).

Primary data were collected using a household survey focusing on demographics and food insecurity coping mechanisms of the household during the war in Tigray Region. Additionally, two focus group discussions (FGDs) were conducted, each with 10 participants including local farmers and community leaders. These discussions provided qualitative insights into how war has disrupted agriculture and shaped evolving coping strategies. This mixed-methods approach, combined with secondary data from local economic and agricultural offices, offered a comprehensive understanding of the war's impacts on regional food security.

The quantitative data were analysed using descriptive statistics including frequencies, percentages, and means via Stata version 16 software to summarize household characteristics and food security status.

Household food security was assessed using the Food Consumption Score (FCS), a validated metric for emergency contexts (WFP, 2024). The Food Consumption Score (FCS) is a crucial indicator of food security, referenced in various studies (Beyene *et al.*, 2024, Silvestri *et al.*, 2015). It is calculated by multiplying the frequency of consumption of each food group by a weighted value and summing these products to obtain a composite score. The FCS categorises households based on dietary diversity and consumption frequency into three groups: acceptable (35 and above), indicating good food security; borderline (21-34), suggesting a limited diet with potential food insecurity risks; and poor (below 21), reflecting very limited food variety and severe food insecurity. Accordingly, the food consumption score was calculated using the following formula.

$$FCS = \sum_1^n \alpha 1 \times f(Y1) + \ldots\ldots \alpha_n \times f(Yn) \ldots\ldots (2)$$

Where FCS=food consumption score, f=frequency of food consumption (number of days for which each food group was consumed during the past 7 days), and α=weighted value representing the nutritional value of selected food groups.

The FCS was calculated using standard nutritional weights assigned by the World Food Program (WFP) to reflect the relative dietary importance of different food groups consumed over the past seven days (WFP, 2024).

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Specifically, the following weights were applied: Staples (including cereals and tubers) were assigned a weight of 2, recognizing their role as primary energy sources; pulses (such as beans and lentils) received a higher weight of 3 due to their significant protein and micronutrient content; vegetables and fruit were each weighted at 1, acknowledging their contribution to micronutrient diversity despite lower caloric density; Meat/fish and dairy products were assigned the highest weight of 4, reflecting their high-quality protein, essential fats, and critical micronutrients like iron, zinc, and calcium; finally, oils/fats and sugar were each weighted at 0.5, accounting for their concentrated energy contribution while limiting their influence on overall dietary quality given their low nutrient density. This weighted structure ensures that the FCS accurately captures not just food frequency, but also the nutritional value of household diets in crisis settings.

Thematic analysis was applied to qualitative data, and all data from the FGD were analysed on the spot to make sense of the data and also to validate findings. Thematic analysis is a popular method for systematically analysing qualitative data, such as interview and focus group transcripts (Gebreigziabher *et al.*, 2025). Thematic analysis was carried out using Braun and Clarke's six-phase method, which includes: (1) getting familiar with the data, (2) creating initial codes, (3) looking for themes, (4) reviewing those themes, (5) defining and naming them, and finally, (6) putting together the report (Braun and Clarke, 2006, Forbes, 2022).

Ethics approval and consent to participate

Before data collection, the interviewer gave oral consent to participate in the study. Participants were fully informed and able to make voluntary decisions. Confidentiality and anonymity were strictly maintained for participant identities.

Results

Socioeconomic characteristics

The results in **Table 1** reveal that respondents are mature individuals with considerable life experience. They have attained a modest level of formal education. Family sizes are typically large, and respondents possess substantial farming experience while managing small plots of land. Livestock holdings are modest, consistent with a mixed farming system. A slight majority of households are male-headed, access to formal credit is very limited, and engagement in non-farm employment is rare, underscoring a profound dependence on agriculture for livelihood. Receipt of remittances is also uncommon, indicating negligible external financial inflow. However, a significant proportion of households participate in credit and savings cooperatives, which may provide a crucial, community-based mechanism for managing economic hardship.

Table 1. Household characteristics.

Household characteristics	Mean	Std.
Age of household head(year)	48.0	32.80
Education level (year of schooling)	6.1	3.70
Family size	5.8	2.30
Farm experience (year)	22.1	13.60
Land size (hectares)	0.6	0.89
Livestock size (TLU)	1.8	1.82
Categorical variables	n.	%
Male-headed household	118	53.80
Female-headed household	101	46.20
Participation in non-farm activity	4	1.80
Remittance received	6	2.70

Household food security status during war

The FCS was used to categorise the food security status of households. The results indicate a significant difference in household food security during the Tigray war **Table 2**. The findings reveal a high prevalence of food insecurity among households in Hawzien District during the war. A very small percentage of surveyed households were classified as food secure, while a small portion fell into the borderline food consumption category. The majority were categorised as food insecure, indicating severely limited access to sufficient and nutritious food. These figures underscore the devastating impact of the war on household livelihoods and food security.

[DOI: 10.18502/jnfs.v11i2.21442]

Table 2. Household food security status of respondents during war.

Food security status	n	%
Food secure (FCS>=35)	2	0.9
Borderline (FCS=21-34)	11	5.0
Food insecure (FCS<21)	206	94.1

FCS: *Food consumption score.*

Food coping mechanism during the Tigray war

Major food coping strategies during the war include relying on less preferred foods, skipping meals, selling assets, and consuming seed stock, which jeopardises future food production (**Figure 2**). A majority of households resort to consuming less preferred food, indicating severe food insecurity and limited access to nutritious options. This high percentage indicates a significant level of food insecurity, where families are compelled to choose foods they would normally avoid due to taste, nutritional value, or cultural preferences. The results from FGDs show that participants overwhelmingly reported that their families have been forced to consume foods they usually avoid. Many described this as both a physical and emotional struggle. One participant shared, '*We used to enjoy fresh vegetables, but during the war and siege, we ate whatever we could find, even if it didn't taste good.'*

A high percentage of individuals skip meals, reflecting a critical level of food scarcity. Households were reported to skip meals, underscoring a critical level of food scarcity within these households. The results from FGDs show that many individuals discussed the experience of skipping meals or reducing portion sizes. One participant noted, *'I often skip breakfast so my children can have enough for lunch.*' This sentiment was echoed by others, indicating a common coping strategy to stretch limited food supplies. Participants expressed concern about the negative effects on their health, stating that skipping meals leads to fatigue and decreased energy levels.

Many households engage in asset selling to cope with food insecurity, demonstrating desperation as they liquidate valuable resources for immediate food needs. Furthermore, FGD participants revealed that asset selling is a significant coping mechanism. One participant recounted, *'I sold my four sheep at a very low price (on average 2500 birr per sheep) just to buy some wheat. I bought 100 kg of wheat at a higher price, which was 9700 Birr, but it was not enough to feed my eight household members.'* This action illustrates the depth of desperation, as families liquidate valuable resources for immediate food needs.

A significant portion of individuals resort to eating seed stock, which jeopardises future food production. A notable 62.5% of households resort to eating seed stock as a coping strategy in response to food insecurity. Furthermore, several participants of FGDs highlighted the troubling practice of consuming seed stock. One FGD participant said, *'We know it's wrong to eat seeds, but we were so hungry. As the weeks turned into months, our family faced an agonising reality. With no food in sight, my children grew weaker, their laughter replaced by silence. One evening, as they gathered around a small fire, I looked at my wife, my heart heavy with despair. In that moment, we made a painful decision: to consume the very seeds meant for planting. It was a choice that felt like a betrayal to our land and our future, but the gnawing hunger eclipsed all else. We cooked the seeds, transforming our hope for future harvests into a temporary meal. As we ate, the taste of despair mingled with the need for survival.'*

Although a smaller percentage, some households turn to wild foods, suggesting reliance on alternative food sources when conventional options are unavailable. The results from FGDs indicate that many households in the study area turned to various remedies during the lockdown and food shortages caused by the war. They began eating leaves, vegetables, and fruits that they typically wouldn't have considered, such as *Gaba, Endurur, Kumel, and Awhi.* They also foraged for wild vegetables like purslane, *Ttetei, and Chew-mrakut.*

Almost half of the respondents reduced the quantity of meals, indicating a common strategy to stretch limited food supplies. Nearly 47.0% of

[DOI: 10.18502/jnfs.v11i2.21442]

respondents report reducing the quantity of meals they consume, reflecting a prevalent strategy to stretch limited food supplies. Approximately 24.1% of individuals borrow food or money from relatives, highlighting a significant aspect of community interdependence during times of food shortages. This strategy underscores the importance of social networks in coping with food insecurity, as families rely on extended kinship ties for support and sustenance. The FGD participants revealed a strong sense of community interdependence. Participants shared stories of borrowing food or money from relatives, indicating that social networks play a critical role during times of scarcity. One participant mentioned, *'We all help each other as much as we can. If someone has a little extra, they share.'*

Some adults restrict access to food for themselves to ensure that children or other family members have enough to eat, highlighting the sacrifices made in times of scarcity. About 23% of adults' report restricting their own access to food to ensure that children or other family members have enough to eat. Furthermore, households relied on remittances, which serve as a vital lifeline for purchasing food and alleviating food insecurity. These financial transfers from family members working elsewhere can provide essential support, enabling households to access necessary resources and improve their overall food security. Participants in FGDs noted that financial support from relatives abroad often helps bridge gaps in food access.

One participant remarked, *'My son sent money from Saudi Arabia, which bought food for the month. The exchange rate in the black market was 30%. Hence, we received only 35,000 Birr from the 50,000 Birr that was sent from Saudi Arabia. With the remittance in hand, my wife set off for the market. For the first time in months, she felt a sense of optimism. She purchased staple foods: grains, cooking oil, and fresh vegetables. As she filled her basket, she couldn't help but smile, envisioning the meals she would prepare for her family. That evening, she cooked a hearty stew, filling our home with the comforting aroma of food. As a result, the family shared stories and laughter, something we hadn't experienced in a long time. It was a moment of joy and gratitude, a brief respite from the surrounding turmoil.'*

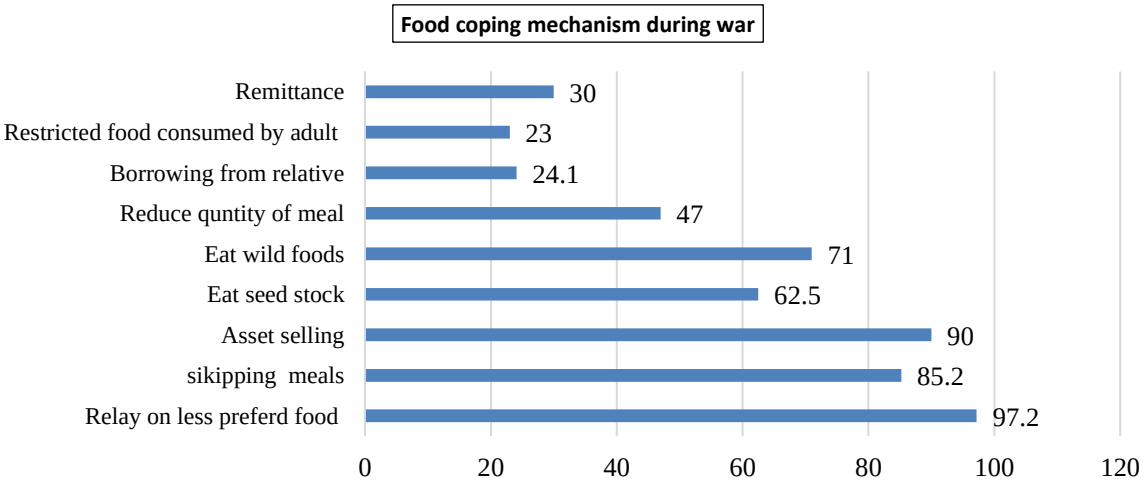

Figure 2. Food coping mechanisms.

Discussion

This study reveals a catastrophic food security crisis in Hawzien District, where 94.1% of households were classified as food insecure during the Tigray war. These findings align with regional assessments (Araya and Lee, 2024, WFP, 2022). Exposure to violent conflict has been empirically shown to depress Food Consumption Scores, and the data confirm this trend in a setting of deliberate humanitarian blockade.

[DOI: 10.18502/jnfs.v11i2.21442]

Households employed a hierarchy of increasingly desperate coping strategies, a pattern consistent with the "coping ladder" model (Maxwell and Caldwell, 2008). Initially, families reduced dietary diversity, with 97.2% consuming less preferred foods, a finding echoed in war-affected regions from Nigeria to Atsbi (Beyene *et al.*, 2024, Mukhtar, 2019). As stress intensified, 85.2% skipped meals, risking malnutrition and lost productivity (Declaro-Ruedas, 2019), while 47% reduced portion sizes, a common but nutritionally inadequate response (Chifamba, 2020, Sani and Kemaw, 2019).

The most alarming strategies involved the erosion of productive assets. Most households sold livestock or tools at distress prices and consumed seed stocks intended for planting, sacrificing future resilience for present survival. This "livelihood erosion" (Appiah-Twumasi and Asale, 2024, Manaye *et al.*, 2023) mirrors findings in other conflict zones (Chagomoka *et al.*, 2016, Okidim *et al.*, 2021) which underscores the long-term threat to agricultural recovery in Tigray's agrarian economy. Foraging for wild foods provided temporary relief but raised concerns about nutritional adequacy and ecological sustainability (Daninga and Ke, 2014, Mendy *et al.*, 2020).

Social networks offered partial buffers, such as those borrowed from relatives, and relied on remittances, though black-market exchange rates often diminished the latter. These findings highlight the adaptive capacity of rural communities (Monwanou and Akpa, 2025, Obi *et al.*, 2020) and their limits under prolonged siege, disrupted markets, and restricted aid (Resilience, 2011, Twigg, 2015). Notably, some adults restricted their own intake to prioritise children, a "child-first" strategy observed elsewhere (Mendy *et al.*, 2020, Okidim *et al.*, 2021) that reflects deep familial care but risks chronic adult malnutrition and diminished caregiving capacity.

Theoretically, this study reinforces that war-induced food insecurity is not a failure of supply, but of *access,* a core tenet of (Sen, 1982) entitlement theory. The famine in Tigray was man-made and systemic, driven by the deliberate destruction of food systems, looting of assets, and obstruction of aid, which (de Waal, 2024) terms "weaponised hunger." This aligns with (Weldegebriel *et al.*, 2024, Weldemichel, 2025), who document how military strategy targeted civilian food entitlements through displacement, siege, and structural violence.

While the findings underscore the severity of war-induced food insecurity and the erosion of household resilience, it is important to consider actionable policy responses.

Based on the empirical findings of this study, the authors offer the following targeted, evidence-based policy recommendations to guide humanitarian response and post-war recovery in Tigray and similar contexts:

- A significant proportion of households consumed their own seed reserves to cope with food shortages. The authors recommend urgent implementation of seed distribution programs by the government and NGOs, specifically targeting households that resorted to eating seed stock. These interventions should include both immediate seed provision and training on sustainable seed storage and management to ensure long-term resilience.
- Many households sold productive assets such as livestock and farming tools to meet immediate food needs. Policymakers should prioritise livelihood restoration programs, including livestock restocking initiatives, agricultural tool provision, and microfinance support, particularly for those who experienced severe asset loss during the war.
- Households were reported to restrict their own food intake to protect children and other dependents. Humanitarian actors should implement targeted nutrition programs that address adult dietary needs, especially among female-headed households and those with elderly caregivers.

This study has limitations, as it is a case study of a single district; the findings may not be generalizable to other conflict-affected areas. The cross-sectional design provides a snapshot in time, and the reliance on self-reported data is subject to

[DOI: 10.18502/jnfs.v11i2.21442]

potential recall and social desirability biases.

Conclusion

This study reveals a severe food security crisis in Hawzien District during the Tigray war, with 94.1% of households classified as food insecure. Households employed negative coping strategies such as selling assets, skipping meals, and consuming seed stocks that compromise long-term resilience and agricultural recovery. These findings underscore the urgent need for targeted interventions to restore livelihoods and strengthen food systems in conflict-affected areas.

Acknowledgement

The authors would like to thank all the respondents and extension agents who participated during data collection.

Authors' contributions

Gebremichael G conceptualised the study, developed the methodology, conducted the formal analysis, led the investigation, and wrote the original draft. Alemu. A contributed to the edition and review of the manuscript. Gebrehiwot. G validated results and assisted in formal analysis and data curation, and Aregawi provided resources and contributed to reviewing and editing the manuscript.

Conflict of interest

The authors declared no competing interests.

Funding

None

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