



# Skills Required by Secondary School Teachers in Orange Production for Food Security in Benue State

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**Abstract:** *The study investigates Skills Required by Secondary School Teachers in Orange Production for food security in Benue State. Survey research design was adopted for this study. Three objectives, three research questions and three hypotheses were used to guide the study. The population of the study was 15,648 consist of 148 secondary school teachers and 15500 Orange farmers who participated in the year 2022 Crop Yield/Area Survey (CYAS). The sample size sample size for this study was 236 registered orange farmers and 148 Secondary school Teachers. This was determined using Taro Yamen formula for sample size determination. Sampling for the study was done in multi-stages for farmers while secondary school teachers were not sample because the researcher was able to manage the population. The reliability of the instruments was determined through a trial testing using (5) secondary school teachers and (15) farmers in Nassarawa State. The data obtained from the trial testing were subjected to reliability analysis using Cronbach Alpha method which yielded a reliability coefficient of 0.89 indicating that the instrument is reliable for the study. Data were analyzed using mean and standard deviation to answer research questions and t-test to test the null hypothesis at .05level of significant. This was done using item by item analysis. Based on the findings of the study it was concluded that farmers and secondary school teachers required skills in pre- planting operation, planting and post- planting operation as well as harvesting and marketing of oranges in Benue State. The study also concludes that pruning of the orange is not required. It was therefore recommended that Farmers and secondary teachers should undergo training and re-training in pre-planting, planting and post planting, harvesting and marketing to enhance quality and increase production of orange as a means of preventing food security in the area.*

**Keywords:** *Skills, Secondary school teachers, Orange production & Food security.*

## 1.1 Introduction

In time past, agriculture has been the backbone of Benue State economy and Nigeria as a whole providing raw materials, food, and employment for over 75% of the population (Oyodokun and Lawal,2017). Agriculture is critical to world food security, poverty

alleviation, and conservation of natural resources. And these resources are being harness by the hardworking farmers through thier various functions such as clearing, planting, weeding, staking, fertilizer application, harvesting, processing, storage, and marketing (Ibeawuchi, 2017). Development of the Benue economy cannot be achieved outside of agriculture and increasing productivity and income will require the development of appropriate skills and competence in that particular area.

It on this note Osinem and Nwoji in Akaa, Ngbongha and Akaa (2023) described skill as the capacity to carry out a task expertly. The authors further added that skill entails the development of performance capability through the repeated execution of an action. Skill is a present, observable competence to perform a learned psychomotor act. Effective performance of skills requires application of related knowledge and facilitates acquisition of new knowledge (Dooley in Julie et al, 2017). Skill is the habit of acting, thinking and behaving in specific activity in such a way that the process becomes natural to the individual through practice (Okorie in Ngbongha & Akaa, 2020). In this context, skills refer to the ability of Secondary school teachers to carry out orange production with optimum results. Skills as opine by Wever and Obiyai, (2019) are classified into the following: technical skills, human skills, conceptual skills, Occupational skills, cognitive skills, manipulative/psychomotor skills, communication skills etc. All these skills are essential for a successful production of orange by farmers.

Farmers are producers of agricultural products and traditional countrymen, who tend to be relatively modest, and most of who are autarkic (although not in complete need). That is to say, most of foodstuff and other things they produce are consumed by themselves. Therefore, farmers are autarkic agricultural producers.” This also means that, in traditional agricultural background, identity of farmers is positioned as “agricultural producers”. Zheng & Wu, (2014). The key of developing modern agriculture is the issue of farmers, since modern agriculture is in need of new types of farmers who will apply these skills to enable them function in the world production which is also expected by secondary school teachers who are the implementer of the curriculum.

Secondary school teachers are academic staff who have passed through relevant trainings and employed by relevant bodies to carryout the responsibility of implementing the curriculum of agriculture as a practical subject in secondary schools (Umeanuka, in Udie & Eje, 2020). These teachers are allowed the duty of ensuring effective implementation of agriculture in the classroom and demonstration farms as enshrined in the curriculum, they are indeed the general manager of the school farm resources. An agricultural science teacher in this study is seen as a person who has undergone training in approved institutions of learning, certified to have possessed the relevant skills required in farm resources management and employed to teach agriculture with regard to Orange production.

Citrus fruit (orange) is famous worldwide, with a production rate exceeding 100 million tons every year (Nayak et al., 2015). One of the most important and widely distributed Citrus species is orange (*Citrus sinensis*; CS). It is believed to be originated in the tropical and subtropical regions of Asia, as it is mentioned in the Chinese literature 2200 BC. The CS by-products is documented by FAO 2014 to be about the half (36 million ton) the annual production of CS (72 million tons) (Garcia-Amezquita et al., 2018). The processing of Citrus

fruit produces a considerable number of by-products with high nutritional value. The solid wastes of Citrus fruit include the peel (flavedo and albedo), the pulp (juice sac residue), rag (membranes and cores), and seeds. The residues are dried and used as raw materials for extracting its bioactives or to be used in animal feeding. The resultant waste could be introduced to produce a wide variety of phytochemicals, pharmaceuticals, food products, essential oil, pectin, and dietary fibers. The by-products produced are a rich source of many edible and health-promoting substances as polymethoxylated flavonoids, and importantly, many are found exclusively in the Citrus rind. The remnant Citrus sinesis peel (CSP) after the extraction of orange juice represents the primary waste fraction (about 50% of the fruit mass) (Hashmi, 2012; Mamma & Christakopoulos, 2014). CS by-products are considered a rich source of secondary metabolites with numerous bioactive potentials, making CS a health-benefit promoting fruit. The CS peel contains polyphenols, essential oils, dietary fibers, and vitamins and many more (Putnik et al., in shimaa et al, 2024). Therefore, it is expedient that agricultural science teacher couple with registered farmer identified and acquire these skills for quality orange production to enhance food security.

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO in Wonbo and Ngbongha, 2021). Hence this definition is based on availability, access and utilization, underlined by stability. Brussow et al, (2017) opine that these four components have to be accomplished to maintain or achieve food security. Moreover, food security can be looked at on different levels such as global, national and household food security. The Present food crisis and insecurity is evident in the heavy presence of scavengers during ceremonial parties by both young and old to scout for food in a bit to fight hunger (Ojo, 2019). In the same vein, FAO in Oyedokun & Lawal (2017) remarks that Nigeria is currently struggling with the problem of food insecurity and sustainable agriculture which is evident in its inability to feed its citizenry on a land mass that is about 80% arable.

## **1.2 Statement of Problem**

Citrus is one of the most important fruit crops widely cultivated in Nigeria especially in Benue state. Although the area of land under production for the crop is increasing, it is quite low and at a slow pace because the farmers face number of constraints on use of resources and production pattern. Citrus contributes greatly to agricultural development in the country's economy and faces a lot of challenges in its development and maximization of potential by farmers and secondary school teachers who are expected to set the stage by teaching the potential farmer (students) on the new skills required in orange production. The researcher personal observation reveals that the area being challenge by farmers and secondary school teachers in Benue state are: pre-planting operation, planting operation, harvesting and marketing. It was also discovered that most of these teachers has no experimental farms in their schools which make the practice of orange production difficult. The researcher also observed that farmers and secondary school teachers' skills are inadequate which have affected orange production in the area. The researcher personal investigation reveals that the inadequate skills by farmer and secondary school teachers in orange production have led to hunger as a result of food scarcity. In addition, these farmers and secondary school teachers are not aware that the production of oranges in large quantity and quality will assist

in reducing the rate of food scarcity. Despite the huge potential of the orange fruit in terms of yield and value, farmers are unable to realise the expected income on their investment in orange production as a result of inadequate skills.

### **1.3 Objective of the study**

The following objective guided the study:

1. Identify skills required by farmers and secondary school teachers in pre-planting operation.
2. Planting and post-planting operation
3. Harvesting and Marketing of Orange

### **1.4 Research Questions**

The following research questions were raise

1. What are the skills required by farmers and secondary school teachers in pre-planting operations?
2. What are the skills required by farmers and secondary school teachers in planting and post plating operation?
3. What are the skills required by farmers and secondary school teachers in harvesting and marketing of orange?

### **1.5 Research of Hypotheses**

**H<sub>01</sub>:** There is no significant difference in the mean ratings of the responses of Secondary School Teachers and orange farmers on the skills required in pre- planting operation for orange production in Benue State.

**H<sub>02</sub>:** There are no significant differences in the mean ratings of the responses of Secondary School Teachers and orange farmers on the skills required in planting and post plating operation for orange production in Benue State.

**H<sub>03</sub>:** There are no significant differences in the mean ratings of the responses of Secondary School Teachers and orange farmers on the skills required in harvesting and marketing of orange planting in Benue State.

## **2.0 Method**

Survey research design was adopted for this study. The study was conducted in benue state. Three objectives, three research questions and two hypotheses were used to guide the study. The population of the study was 15,648 consist of 148 secondary school teachers and 15500 orange farmers who participated in the year 2022 crop yield/area survey (cyas). The sample size for this study was 236 registered orange farmers and 148 secondary school teachers. This was determined using taro yamen formula for sample size determination. Sampling for the study was done in multi-stages. The instrument for data collection was a structured questionnaire titled: "*required skills by agricultural science teachers in orange production questionnaire*" (*rsbastopq*) was structured to guide the study. The skill items had 5-point rating scale of required (hr), averagely required (ar), slightly required (sr) and not required (nr) with a score of 4,3,2, and 1. The instrument was validated by three experts, two from the department of agricultural education and one from measurement and evaluation joseph

sarwuan tarka university makurdi. The suggestion of the experts led to the final instruments used for the study. The reliability of the instruments was determined through a trial testing using (5) secondary school teachers and (15) farmers in nassarawa state. The data obtained from the trial testing were subjected to reliability analysis using cronbach alpha method which yielded a reliability coefficient of 0.89 indicating that the instrument is reliable for the study. The research instrument employed (4) research assistants in administering the questionnaires to the respondents. 384 questionnaires were administered to the respondents and were collected 100%. Data were analyzed using mean and standard deviation to answer research questions and t-test to test the null hypothesis at .05level of significant. This was done based on item by item analysis. An average mean of 2.50 was used for decision making. Item with a mean score of 2.50 to 3.50 and above was regarded as required, while any item with a mean score less than 2.50 were regarded as not required.

### 3.0 Results

The results are presented according to the research questions and hypothesis that guided the study.

**Research Question one:** What are the skills required by farmers and secondary school teachers in pre-planting operations?

Table 1: Mean and Standard Deviation on the skills required by farmers and secondary school teachers in pre-planting operation.

| S/N | ITEM STATEMENT   | X <sub>1</sub> | S <sub>1</sub> | X <sub>2</sub> | S <sub>2</sub> | X <sub>g</sub> | S <sub>g</sub> | Sig | Rmk   |
|-----|--|----------------|----------------|----------------|----------------|----------------|----------------|-----|-------|
| 1   | Skills in pre- planting operation                          | 2.86           | .67            | 3.22           | .55            | 3.04           | .61            | .00 | R,S   |
| 2   | Ability to choose a site suitable for orange establishment | 3.18           | .59            | 3.09           | .64            | 3.13           | .61            | .16 | R, NS |
| 3   | Ability to considered the nature of the land (topography)  | 3.02           | .52            | 2.97           | .52            | 2.99           | .52            | .33 | R,NS  |
| 4   | Ability to identify the nature of soil                     | 2.77           | .67            | 2.83           | .67            | 2.80           | .67            | .38 | R,NS  |
| 5   | Ability to considered the availability of inputs           | 2.90           | .71            | 2.89           | .64            | 2.89           | .67            | .92 | R,NS  |
| 6   | Ability to identify the sources of labour                  | 2.95           | .57            | 2.80           | .66            | 2.87           | .61            | .02 | R,S   |
| 7   | Cleaning of site   | 2.37           | .67            | 2.64           | .79            | 2.50           | .73            | .01 | R,S   |
| 8   | Stumping   | 3.31           | .57            | 3.25           | .70            | 3.28           | .63            | .39 | R,NS  |

**Keys:** X<sub>1</sub>- mean of Sec Sch. Teachers, X<sub>2</sub>- mean of farmers, S<sub>1</sub>- standard deviation of teachers, S<sub>2</sub>-standard deviation of farmers X<sub>g</sub>-grand mean, S<sub>g</sub>- grand standard deviation, R- required, NS-not significant, S, significant

The above table show that all the skills are required by farmers and secondary school teachers with a mean ranging from 2.50 to 3.28 for required and a standard deviation of .73 to .63. It



also indicated that all the skills are necessary for successful production of orange in the area. Also, the t-test result shows that item 1, 6, 7 with a p-value (sig) of .00, .02 and .01 is less than the alpha value of .05 indicating that the test is statistically significant. The null hypothesis is therefore rejected. This means that there is significant difference in the mean ratings of the responses of Secondary School Teachers and orange farmers on the skills required in pre-planting operation for orange production in Benue State. But in the other hand item 2, 3,4,5 and 8 with a p-value (sig) of .16, .33, .38, .92 and .39 is greater than the alpha value of .05 indicating that the test is statistically non-significant. Therefore, the null hypothesis is retained. This shows that there is no significant difference in the mean ratings of the responses of Secondary School Teachers and orange farmers on the skills required in pre-planting operation for orange production in Benue State.

**Research Question two:** What are the skills required by farmers secondary school teachers in planting and post plating operation?

Table 2: Mean and Standard Deviation on the skills required by farmers and secondary school teachers in planting and post planting operation.

| S/N | ITEM STATEMENT                                      | X <sub>1</sub> | S <sub>1</sub> | X <sub>2</sub> | S <sub>2</sub> | X <sub>g</sub> | S <sub>g</sub> | Sig | Rmk   |
|-----|---|----------------|----------------|----------------|----------------|----------------|----------------|-----|-------|
| 1   | Skills in planting and post planting operation      | 2.9            | .64            | 3.21           | .56            | 3.05           | .06            | .00 | R,S   |
| 2   | Ability to understand the planting space/distance   | 3.18           | .59            | 3.09           | .63            | 3.13           | .61            | .14 | R, NS |
| 3   | Ability to understand the time of planting          | 3.04           | .53            | 2.97           | .52            | 3.00           | .52            | .19 | R,NS  |
| 4   | Ability to understand the planting depth            | 2.81           | .68            | 2.84           | .66            | 2.82           | .67            | .64 | R,NS  |
| 5   | Ability to understand how to prepare nursery        | 2.90           | .71            | 2.89           | .64            | 2.89           | .67            | .87 | R,NS  |
| 6   | Ability to identify the number of seed per hole     | 2.95           | .57            | 2.80           | .66            | 2.87           | .61            | .02 | R,S   |
| 7   | Ability to considered seed viability                | 2.39           | .67            | 2.64           | .79            | 2.51           | .73            | .01 | R,S   |
| 8   | Ability to understand water application time        | 3.31           | .56            | 3.25           | .70            | 3.29           | .64            | .42 | R,NS  |
| 9   | Ability to understand when to carry out thinning    | 3.03           | .52            | 2.98           | .53            | 3.00           | .52            | .36 | R,NS  |
| 10  | Ability to carry out transplanting                  | 2.78           | .67            | 2.83           | .66            | 2.80           | .66            | .47 | R,NS  |
| 11  | Ability to carry out manure/ fertilizer application | 2.91           | .71            | 2.89           | .64            | 2.90           | .67            | .76 | R,NS  |
| 12  | Ability to weed when the need arises                | 2.95           | .57            | 2.80           | .66            | 2.87           | .61            | .02 | R,S   |
| 13  | Ability to undertake pruning                        | 2.32           | .65            | 2.66           | .78            | 2.49           | .71            | .00 | NR,S  |

**Keys:** X<sub>1</sub>- mean of Sec Sch. Teachers, X<sub>2</sub>- mean of farmers, S<sub>1</sub>- standard deviation of teachers, S<sub>2</sub>-standard deviation of farmers X<sub>g</sub>-grand mean, S<sub>g</sub>- grand standard deviation, R- required, NS-not significant, S, significant

Table 2 shows that skills required by farmers and secondary school teachers are 12 with a cut off mark of 2.51 to 3.29 for required with a standard deviation of .73 to .64 except for item 13 which have a mean score of 2.49 less than the cup off point for required and a standard deviation of .71. This shows that majority of the skills are required in orange production in Benue State. The t-test analysis indicated that item 1, 6, 7, 12 and 13 with a p-value (sig) of .00, .02, .01, .02 and .00 is less than the alpha value of .05 indicating that the test is statistically significant. The null hypothesis is therefore rejected. This means that there is significant difference in the mean ratings of the responses of Secondary School Teachers and orange farmers on the skills required in planting and post planting operation for orange production in Benue State.

Secondly item 2, 3,4,5, 8, 9, 10 and 11 with a p-value (sig) of .14, .19, .64, .87, .42, .36, .47 and .76 is greater than the alpha value of .05 indicating that the test is statistically non-significant. Therefore, the null hypothesis is retained. This reveal that there is no significant difference on in the mean ratings of the responses of Secondary School Teachers and orange farmers on the skills required in post planting operation for orange production in Benue State.

**Research Question three:** What are the required skills by farmers and secondary school teachers in harvesting and marketing of orange?

Table 3: Mean and Standard Deviation on the skills required by farmers and secondary school teachers in harvesting and marketing of orange.

| S/N | ITEM STATEMENT                                     | X <sub>1</sub> | S <sub>1</sub> | X <sub>2</sub> | S <sub>2</sub> | X <sub>g</sub> | S <sub>g</sub> | Sig | Rmk  |
|-----|--|----------------|----------------|----------------|----------------|----------------|----------------|-----|------|
| 1   | Skills in harvesting and marketing                 | 3.40           | .49            | 3.25           | .54            | 3.32           | .51            | .00 | R,S  |
| 2   | The use of hand picking                            | 3.50           | .50            | 3.22           | .62            | 3.36           | .56            | .00 | R,S  |
| 3   | The use of pull-twist-snap method                  | 3.43           | .49            | 3.12           | .52            | 3.27           | .50            | .00 | R,S  |
| 4   | The use of ladders to reach the highest oranges    | 3.41           | .58            | 3.01           | .73            | 3.21           | .65            | .00 | R,S  |
| 5   | Avoid harvesting when the fruit is wet             | 3.35           | .48            | 3.03           | .65            | 3.19           | .56            | .00 | R,S  |
| 6   | The use of machine to shake the trunk              | 3.01           | .71            | 2.95           | .71            | 2.98           | .71            | .45 | R,S  |
| 7   | Marketing skills                                   | 3.29           | .48            | 2.77           | .75            | 3.03           | .61            | .00 | R,S  |
| 8   | Know your competitors                              | 3.45           | .58            | 3.31           | .68            | 3.38           | .63            | .40 | R,NS |
| 9   | Street vendor marketing strategy                   | 3.50           | .54            | 3.12           | .57            | 3.31           | .55            | .00 | R,S  |
| 10  | Marketing in whole sale                            | 3.41           | .49            | 3.06           | .70            | 3.23           | .59            | .00 | R,S  |
| 11  | Reduction of cost to allow for more patronage      | 3.20           | .81            | 3.00           | .67            | 3.10           | .74            | .00 | R,S  |
| 12  | Selling in small quantity to encourage more buyers | 3.20           | .60            | 2.88           | .69            | 3.04           | .64            | .00 | R,S  |
| 13  | Keeping of sale record                             | 3.58           | .60            | 2.94           | .86            | 3.26           | .73            | .00 | R,S  |

**Keys: X<sub>1</sub>- mean of Sc sch. Teachers, X<sub>2</sub>- mean of farmers, S<sub>1</sub>- standard deviation of teachers, S<sub>2</sub>-standard deviation of farmers X<sub>g</sub>-grand mean, S<sub>g</sub>- grand standard deviation, R- required, NS-not significant, S, significant**

Table 3 indicated that skills required by farmers and secondary school teachers include all the items ranging from 2.98 to 3.38 for required with a standard deviation of .71 to .40 respectively. This shows that all the skills in harvesting and marketing of orange are required. The t-test also indicated that item 1, 2, 3, 4, 5, 7, 9, 10, 11, 12 and 13 with a p-value (sig) of .00, respectively is less than the alpha value of .05 indicating that the test is statistically significant. The null hypothesis is therefore rejected. This means that there is significant difference in the mean ratings of the responses of Secondary School Teachers and orange farmers on the skills required in harvesting and marketing for orange production in Benue State.

Notwithstanding item 6 and 8 has a different view as the p-value (sig) of .40 and .45 is greater than the alpha value of .05 showing that the test is statistically non-significant. Therefore, the null hypothesis is retained. This also indicate that there is no significant difference on in the mean ratings of the responses of Secondary School Teachers and orange farmers on the skills required in harvesting and marketing of orange production in Benue State.

#### **4.0 Discussion of Findings**

Table 1 show that all the skills required by farmers and secondary school teachers in pre-planting operation include: Ability to choose a site suitable for orange establishment, ability to considered the nature of the land (topography), ability to identify the nature of soil, ability to considered the availability of inputs among others. This is in agreement with Julie et al, (2017) who said that in establishment of orange production there are basic things that must be considered which topography and nature of soil is one of them. The author added that the basic skills are necessary for every farmer to ensure success because they served as the foundation which when not properly laid the production will fail.

These findings align with the view of Olaitan and Mama (2014) that pre-planning activities for any project include identify the sources of labour, cleaning of site, plotting or farm layout, stumping, planning for procurement of farm inputs among others. These activities are always the first to be considered in production but some farmers often ignored it may be due to lack of knowledge (Ekele, Doom and Ngbongha, 2020). In addition, Udie and Ejie, (2020) opine that orange production ought to be for those trained with the knowledge and skills of production to obtained success and until this is done food scarcity will continue in the land.

The findings of table 2 indicate that the following skills are required by farmers and secondary school teachers in planting and post planting operation such as ability to understand the planting space/distance, ability to understand the time of planting, ability to understand the planting depth, ability to identify the number of seed per hole and so on. To support the assertion therefore Ibeawuchi, (2017) explain that increasing farmers' productivity and income will require the development of appropriate technology through the transfer of skills as a means of Promoting productivity among small-scale farmers for better growth and development of orange thereby reducing food security.



Also, peasant farmers should be encouraged to engage in Integrated Farming Systems as this will assist in increasing soil fertility; minimizes insect and disease problems and protects the environment through erosion (Tirado, 2019). Hashmi, (2012) further observed that farmers need skills in the following areas; ability to identify seed viability, manure/ fertilizer application, weeding, pest and disease control which is one of the most essential skills to avoid damage or loses of the plant. Farmers must not relent in their efforts to proffer solutions to the challenge of food security in Benue as such need to understanding the significance of increased food production to food security and this can only made possible through skill acquisition (Ngbongha and Akaa, 2020).

Finally, table 3 reveal that the skill required in harvesting and marketing of oranges are: The use of hand picking, the use of pull-twist-snap method, use of ladders to reach the highest oranges, avoid harvesting when the fruit is wet, use of machine to shake the trunk and many more. Garcia-Amezquita, (2018) augured that though most of the above are the instruments used for harvesting but such also required skills. The author added that the month of harvest depend on the variety of the fruit. Therefore, harvesting at the wrong time will lead to undesirable consequence such as fruit rot and post-harvest losses.

Also, skills required by farmers and secondary teachers in marketing of orange include; Knowing your competitors, street vendor marketing strategy, marketing in whole sale, reduction of cost to allow for more patronage, and selling in small quantity to encourage more buyers. Unfortunately, according to Ojo, (2019) augured that although it is essential for farmer to understand these skills but the revise is the case as most farmers in the study area have found themselves not to adhered to the laydown principle due to unavailability of buyers when it is the right time to harvest the fruit. While Wever & Obiyai,(2019) opine that for farmers to achieved success in this area they should first carry out market survey in order to understand the right time of sale and these can be achieved through constant training and information sharing.

## **5.0 Conclusion**

From the above result and discussion, the researcher concluded that farmers and secondary school teachers required skills in pre- planting operation, planting and post- planting operation as well as harvesting and marketing of oranges in Benue State. The study also concludes that pruning of the orange is not required. To prevent food security therefore, farmers most ensured they carried out routine check on their activities with regard to orange for better productivity.

## **6.0 Recommendations**

Based on the findings of the study, the following recommendations were made:

1. Farmers and secondary teachers should undergo training and re-training in pre-planting, planting and post planting, harvesting and marketing to enhance quality and increase production of orange as a means of preventing food scarcity in the area.
2. The skills in planting and post planting should be improve upon for better increase and yield.
3. Farmers should endeavour to carry out market survey before harvesting to prevent post-harvest losses.

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