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DEFINITION AND FORMATION OF A SET OF INDICATORS AND CRITERIA FOR ASSESSING THE EFFECTIVENESS OF THE USE OF BATTALION TASK FORCES OF THE NATIONAL GUARD OF UKRAINE FOR PARTICIPATION IN STABILIZATION ACTIONS

Proposed a set of indicators and criteria for assessing the effectiveness of the use of battalion task forces of the National Guard of Ukraine for participation in stabilization actions, which meets the goals and objectives of their implementation. A list of requirements has been determined that these elements of the system for assessing the use of the guard formations must meet. Was further developed the well-known approach to the formation of indicators and criteria for assessing the effectiveness of the use of troops (forces). The corresponding sequence of steps is provided in the form of a methodology for forming indicators and criteria for the effectiveness of the use of battalion task forces of the National Guard of Ukraine for participation in stabilization actions.

Keywords: *indicator, criterion, battalion task force of the National Guard of Ukraine, stabilization actions, effectiveness.*

Statement of the problem. Ensuring and maintaining stability and security in the post-war period is a priority task of the activities of the components of the security and defense sector of Ukraine in the field of national security in the territories liberated from russian occupation. It is implementation is currently carried out by execution a complex of measures of stabilization actions. At the same time to ensure the stabilization of the situation in the crisis area of the country an interdepartmental grouping of troops (forces) is usually created in the appropriate operational construction and systems, in the basis of which it is advisable to primarily have the formation of the National Guard of Ukraine (NGU).

In view of the multi-functionality of the tasks of stabilization actions, the purpose of the troops activity in the specified direction is achieved by the involvement of separate combat structural units of the battalion composition of the brigade (regiment), reinforced by attached (supporting) units. Erected in a single system, deployed in a certain way within a certain area (sector) of responsibility and united by a single management, the listed elements of the military structure an autonomous temporary military formation of variable composition – a battalion task force (BTF), which is able to perform a range of various events both of a military and law enforcement nature within the framework of stabilizing the situation in the territory liberated from the enemy.

At the same time, for an adequate assessment of the fulfilment of the assigned tasks of stabilization actions, it is important to have a specific set of tools, presented as a set of indicators and criteria for assessing the effectiveness (ICAE) of the use of BTFs of NGU for participation in stabilization actions. These indicators and criteria are a key means of management and control, which allows you to objectively assess how successful the actions of the troops were, helping to understand whether the defined goals have been achieved, and identifying weak points in the course of their application. The results of the analysis if necessary will ensure the adjustment of the adopted or the adoption of a new, more effective decision for future actions, which will enable commanders (chiefs) to bring the state of task performance in accordance with the planned (determined) goals of stabilizing the situation.

Analysis of recent research and publications. Separate issues of assessing the effectiveness of the use of organizational units of constituents of the security and defense sector of Ukraine for the

performance of assigned tasks are considered in a number of publications [1–7]. In particular, the authors of the article [1] proposed a system of indicators and criteria for assessing the effectiveness of the use of border units in the conditions of a special period during the participation in the operation of the United forces. However, the given indicators and criteria cover only some of the similar tasks in content to the NGU, and do not take into account the wide range of tasks performed by the BTF of the NGU during stabilization actions.

Indicators and criteria for assessing the effectiveness of the use of forces (troops) of the Naval Forces (Navy) during the performance of the tasks of protecting the economic activity of the state at sea are defined and substantiated in the article [2]. However, the developed ICAE do not cover the tasks that can be performed by the forces (troops) of the Navy in the interests of stabilizing the situation, and the indicators formed in the study are not suitable for the specific tasks of this activity.

In the scientific work [3], using a systematic approach and methods of operations research, a system of indicators and criteria for assessing the effectiveness of the use of NGU groups in peacetime and wartime is proposed. The outlined ICAE system makes it possible to formulate requirements for the created groups that will perform tasks during the provision of public safety in the district: a natural emergency situation; man-made emergency situation; social emergency situation. Common for these groups is that the activities aimed at ensuring (restoring) of public order in designated zones (districts) of different emergency situations, which is also carried out in the course of stabilization actions, is subject to evaluation. However, in order to analyze the results of ensuring and maintaining stability and security in the post-war period, it is necessary to identify and justify the totality of ICAE, which ones would cover other main tasks of stabilizing the situation and meet the functional and numerical parameters of the formed BTF of the NGU, as well as the conditions of the legal regime of a state of emergency or martial law (special period) in which the troops will operate.

The authors of the publication [4] considered issues, which are related to the formation of a system of indicators of the effectiveness of a group of troops, from the review the provisions of the basic law of armed struggle. The basis of the proposed indicators are tasks aimed at disabling the enemy's combat system and preserving the

functioning of one's combat system. With the help of these indicators, an opportunity is seen to partially assess the tasks of a military nature assigned to the BTF, but at the same time they cannot be accepted during analyzing of the execution results of the law enforcement component of NGU activities.

The study [5] developed indicators and criteria for evaluating the effectiveness of the use of the National Guard of Ukraine for the localization of an area of a non-international armed conflict (NIAC), which correspond to the nature and conditions of the tasks of localization of such a conflict and the levels of military management. However, the totality of the given ICAE is based on the results of tasks performed by NGU group under conditions of active armed confrontation between the parties to the conflict, while measures of stabilization actions are usually carried out in conditions where there are no armed clashes or the intensity of the armed struggle is reduced. For its part, the functional and numerical composition of the NGU temporary formation for the localization of the NIAC district is determined taking into account the conduct of active military operations by the troops against illegal armed formations. Instead, the implementation of tasks to stabilize the situation in the post-conflict period will require the minimal use of force and, accordingly, the involvement of a military unit of another combat composition. In view of the above, it is impossible to adequately assess the effectiveness of the use of NGU BTF for participation in stabilization actions, using the indicators and criteria substantiated by the author.

Order [6] defines the Procedure for assessing the performance of combat (service-combat) tasks by operational-territorial commands (OTCs), formations, military units and units of the National Guard of Ukraine outside their permanent deployment points. The document regulates issues regarding the assessment of the tasks of the guard post, the activities of units in the battalion defense area, the company (platoon) base point, and the activities of SCP (checkpoint) appointed from the regular formations of the NGU OTC. However, the Procedure does not regulate the issue of analyzing the results of tasks aimed at stabilizing the situation with the participation of temporary structural elements of the Guard.

The scientific article [7] considers an approach to assessing the effectiveness of combat operations of a group of anti-aircraft missile forces (AAMFs) using a generalized indicator that characterizes the achievement of the combat objective: the effectiveness of combat operations of the AAMFs group and the

required effectiveness; mathematical expectation of the number of destroyed means of air attack; mathematical expectation of the number of directions in which the number of firings (fire density) is not less than the specified one; mathematical expectation of the number of military objects which have survived with a probability not less than a given one; mathematical expectation of casualties of AAMFs; integral indicator. However, the indicators have been formed provide an assessment of the performance of combat missions by anti-aircraft units and subunits during hostilities in the conditions of widespread use of various types of air attack by the enemy and cannot be adapted to the specifics of tasks of stabilization actions.

Conducted analysis of these sources has shown that the developed indicators and criteria correspond to the goals and objectives of the activities of the structural units of the security and defense forces of Ukraine in the current situation, in particular during the introduction of special legal regimes. At the same time, the issue of defining, structuring and systematization indicators and criteria for assessing the effectiveness of the NGU BTFs in stabilization actions has not been insufficiently researched by scientists and requires a detailed and comprehensive study.

The purpose of the article is to define and form a set of indicators and criteria for assessing the effectiveness of the use of battalion task forces of the National Guard of Ukraine for participation in stabilization actions.

Summary of the main material. A comprehensive, complete and objective assessment of the effectiveness of the use of the NGU BTFs in the course of conducting stabilization actions is possible only if an appropriate set of indicators and criteria is used. Determining the right performance criterion is a key and most important stage in the study the systems of any type. It is accepted to consider that even a non-optimal decision, if based on a correctly selected criterion, contains lower risks to achieve the purpose of using a military organizational unit and successfully performing its tasks compared to an optimal decision which is based on incorrectly selected criterion.

The term "efficiency criterion" is considered by the authors of this article as a basic condition (requirement) on the basis of which the efficiency indicator is determined. The criterion is expressed in the form of a statement about the qualitative or quantitative value of the indicator, which determines the desired properties or the degree of achievement of the planned (defined) goals of the

system functioning. The "performance indicator" means a quantitative or qualitative characteristic which reflects the degree of compliance of actual results with the required values according to the selected criterion.

Efficiency can reflect not only the desired (planned) end result or one of the tasks of using the NGU BTFs during participation in stabilization actions, but also a negative side effect, including the loss of personnel, population and material resources, as well as the destruction of important infrastructure. Therefore, it is worth trying not only to achieve maximum results, but also strive to minimize losses.

Continuing the research of the chosen direction, first of all, it is necessary to outline the requirements for the ICAE, which will consist of the following: the elements of the system for assessing the performance of tasks of the NGU BTFs should be closely related to the content and nature of these tasks, clear and understandable, balanced, easy in calculation and convenient for use, take into account current conditions and be able to adapt to changes in the factors that affect the outcome and effectiveness of the use of temporary military formations.

Considering that the effectiveness indicator is directly determined by the purpose of the use of troops, we will list the main tasks the implementation of which stabilizes the situation.

1. Isolation of the crisis area, that is carried out by security, isolation and restrictive actions for the formation of NGU in cooperation with the bodies of the National Police, the State Border Guard Service of Ukraine (SBGSU), the Security Service of Ukraine and the Armed Forces of Ukraine (AFU) regarding: implementation of the entry and exit procedures established in the area of stabilization actions; restrictions on the freedom of movement of citizens and traffic; prevention of penetration of enemy sabotage and reconnaissance forces (SRF) and illegal armed formations (IAFs) into the crisis area and limitation of their maneuver; prevention of supply of weapons, ammunition and other military equipment to the area of tasks.

2. Ensuring conditions for the reliable functioning of state executive authorities and local self-government bodies, which provides their physical security, engineering and technical equipment of their locations and life support facilities; countering sabotage; preventing threats to the personal safety of their representatives regardless of their location; escort and protection during movement, including the provision of vehicles.

3. Combating the enemy SRF and IAFs, that is carried out by conducting reconnaissance and search, search and strike, ambush, special actions, battles and strikes, blocking (encircling) detachments (groups), IAFs base camps and their destruction (defeat) by firepower of the NGU BTF in cooperation with the bodies and units of other military formations and law enforcement agencies.

4. Strengthening the protection (cover) of the state border (SB), organized and carried out by the NGU BTFs in cooperation with the SBGSU (AFU): preventing mass crossing of the SB from the territory of neighboring states, illegal transportation of weapons, explosives, other military equipment, narcotic substances, illegal migration of people through the SB; maintaining a special legal regime in the controlled border areas in case of it is introduction; repelling armed attacks and invasion of the country by armed military groups and criminal groups, stopping armed provocations, as well as repelling an attack or stopping armed resistance of persons illegally crossing or trying to cross the SB; repulsing or weakening enemy attacks from land, sea and air, ensuring favorable conditions for the deployment of the AFU and their respective actions, as well as preventing the penetration and breakthrough of enemy SRF, IAFs and terrorist groups across the state border.

5. Protection and defense of critical objects and communications, carried out through protective (defensive) actions by formations of the NGU in cooperation with other components of the security and defense forces.

6. Protection of public safety and order, which includes preventive, regime, operational and other measures aimed at ensuring personal safety of citizens, preventing and suppressing criminal and administrative offences, and maintaining law and order in public places.

7. Maintaining the legal regime of martial law or a state of emergency, that is carried out by carrying out regime-restrictive actions aimed at comprehensive protection and preservation of the foundations of the constitutional order, territorial integrity and sovereignty of the state, as well as ensuring the protection of life, health, rights and freedoms of citizens under special legal modes.

The final result of stabilization actions with the participation of the NGU BTFs will be characterized by:

– the reliability of the isolation of the crisis area;
– creating safe conditions for the exercise of powers by state and local authorities;
– the promptness of liquidation (disarmament) of the enemy SRF and IAFs;
– completeness and continuity of control over the state border;
– reliability of protection of objects and communications;
– stability of covering the section of the state border;
– safety of citizens and stability of public order in the defined area of responsibility;
– stability of the defense of objects and communications;
– combat capability of BTF elements during combat;
– establishment of control over the territory and population in the defined area of responsibility.

We will form a set of ICAE of the use of the NGU BTFs during stabilization actions taking into account the previously listed requirements and submit it in the form of ICAE:

– performing tasks to isolation the crisis area;
– performing tasks to combat SRF of the enemy and IAFs;
– performing tasks to strengthen the protection (cover) of a section of the state border;
– ensuring the protection (defense) of important objects and communications;
– performing service and combat tasks to protect public safety and order in the defined area of responsibility;
– implementation of regime-restrictive actions.

The corresponding algorithm for the formation of indicators and criteria is given in study [3] and is presented as a methodology for the formation of indicators and criteria for the effectiveness of the use of a group of troops (forces) of the NGU. By analogy with the publication [3] a methodology for the formation of indicators and criteria for the effectiveness of the use of the NGU BTFs to participate in stabilization actions is proposed (Figure 1).

The result of applying the methodology shown in Figure 1 is the identification and formation of a set of indicators and criteria for assessing the effectiveness of the use of BTFs of the NGU for participation in stabilization actions (Table 1).

1 Beginning

2 Input data — Define the goal of stabilization actions and the partial tasks to achieve it.

3 Determination of all controllable and uncontrollable characteristics that affect the composition and size of the battalion task force — The main factors that should be taken into account when creating temporary organizational units and additional that will increase the validity of the decision are determined.

4 Determination of the indicator of the final result of the use of the NGU battalion task force (IFRU) — Determined taking into account the qualitative indicators of the performance of tasks, which most often include: effectiveness, resource intensity and promptness.

5 Clarity of physical content, relevance to the tasks of the troops, balance, adaptability, ease of calculation — The proposed set of indicators of the final result of the tasks is checked for compliance with the general requirements for indicators of the final result of the use of a temporary military formation. In case of their inconsistency, points (stages) 2–4 are

No / Yes

6 Determination and formation of criteria for assessing the effectiveness of the use of the NGU battalion task force — The effectiveness criterion consists of the suitability (sufficiency) criterion:
$$W_{\text{ifru } i} \geq W_{\text{ifru } i \text{ limit } i,}$$
where $W_{\text{ifru } i}$ − i^{th} element of the IFRU vector;
$W_{\text{ifru } i \text{ limit } i}$ − i^{th} element of the vector limits for the IFRU;
$i \in [1, nl]$ nl − the length of the IFRU vector and the criterion (optimality):
$$W_{\text{ifru } i} = W_{\text{ifru } i \text{ optimal } i,}$$
where $W_{\text{ifru } i \text{ optimal } i}$ − the optimal value of the ith element of the PCRF vector.

7 The created battalion task force of the NGU meets the requirements — The requirements for the created battalion task force of the NGU are formed. If the military unit does not meet the requirements, points (stages) 2–6 are specified.
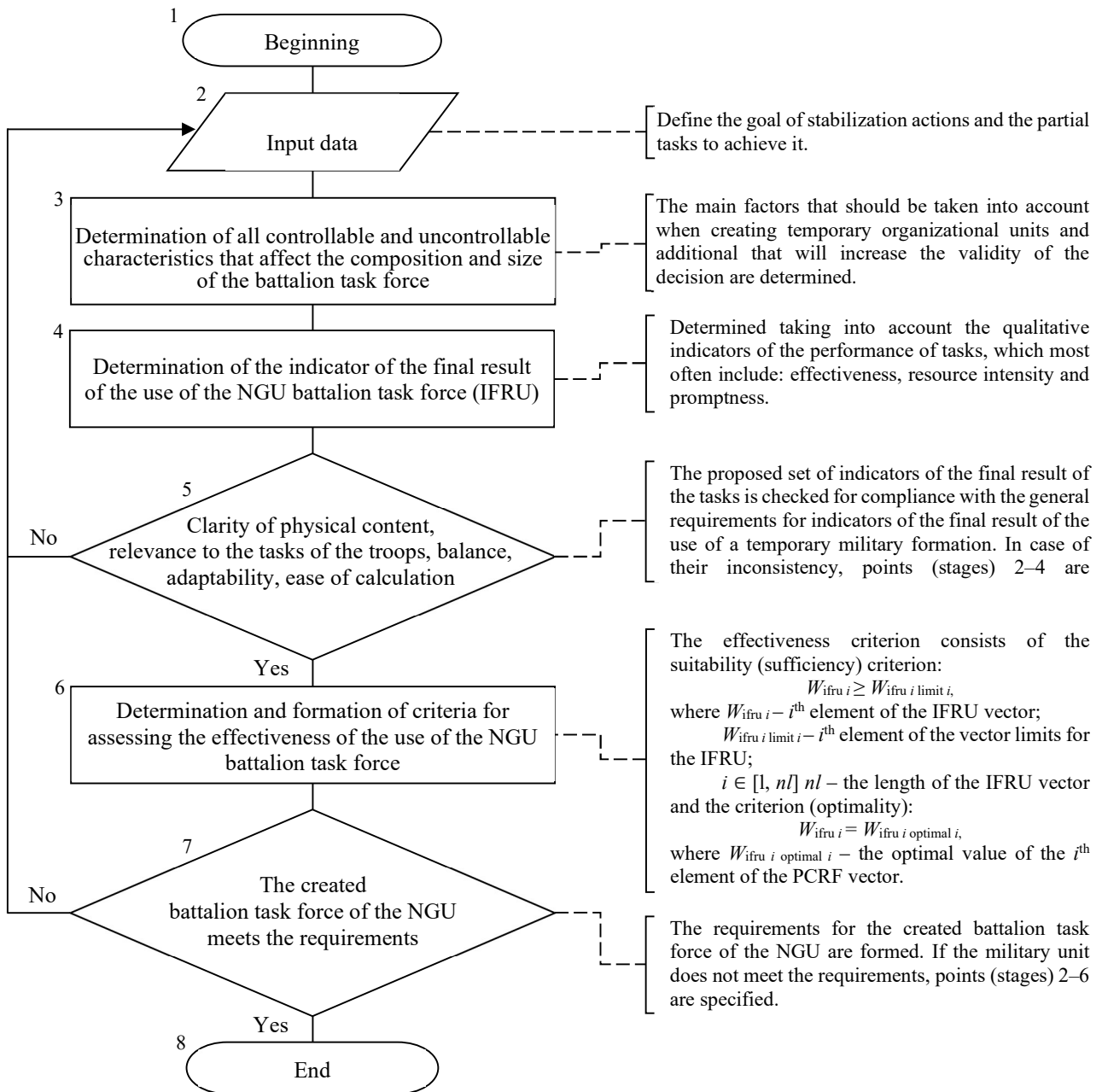
No / Yes

8 End

Figure 1 – Methodology for the formation of indicators and criteria for the effectiveness of the use of battalion task forces of the National Guard of Ukraine for participate in stabilization actions

Table 1 – A set of indicators and criteria for assessing the effectiveness of the use of battalion task forces of the National Guard of Ukraine for participate in stabilization actions

The tasks performed by the battalion task force of the NGU	Performance (quality) indicator	Performance evaluation criteria	Formula for calculating the criteria
1	2	3	4
		The main task	
1. Ensuring and maintaining stability and security in the crisis area	Population safety coefficient K_{ps}	1. $K_{ps} \geq 0{,}95$ – high level of population safety. 2. $0{,}75 \leq K_{ps} < 0{,}95$ – medium level of population safety. 3. $K_{ps} < 0{,}75$ – low level of population safety, additional measures are required	$$K_{ps} = 1 - \frac{\sum_{i=1}^{n} N_{c_i}}{N_{op}},\ K_{ps} \to \max,$$ where N_{c_i} – the number of crimes of the ith type; N_{op} – overall population in the area of responsibility of the troops; n – number of types of crimes to be taken into account; $K_{ps} \to \max$ – the maximum value of the population safety coefficient which is set as a goal
	The daily maximum volume of tasks (service) $V_{t(s)}$ in the course of the use of troops	The daily volume of tasks (service) $V_{t(s)}$ exceeds or reaches the required scope of tasks (service) and acquires the maximum possible value	$$V_{t(s)} \geq V_{t(s).rq},\ V_{t(s)} \to \max,$$ here $V_{t(s).rq}$ – the required daily volume of tasks (service) to ensure and maintain stability and security in the designated area; $V_{t(s)} \to \max$ – the maximum volume of tasks (service) that can be performed during a day and to which the troops aspire
	The daily average expenditure of resources S_r to support the activities of one serviceman in the area of tasks	Resource expenditures S_r are less than or reach the standard daily resource consumption expenditures for the support of one serviceman and are reduced to a minimum	$$S_r \leq S_{r.n},\ S_r \to \min,$$ where $S_{r.n}$ – the normative daily expenditure of resources to support the activities of one serviceman in the area of tasks; $S_r \to \min$ – minimum average daily resource expenditure, which is the desired result
	Casualties of own forces L_{of} per day of task performance	Casualties of own forces L_{of} constitute a share of the overall number of personnel, less than or such that it reaches the ratio of permissible casualties of personnel to its overall number, and are reduced to a minimum	$$\frac{L_{of}}{L_o} \leq \frac{L_{pc}}{L_o},\ L_{of} \to \min,$$ where L_{of} – number of personnel casualties; L_o – the overall number of the troops; L_{pc} – the number of permissible casualties of personnel; $L_{of} \to \min$ – the minimum level of troop casualties which is set as a goal
	The duration of actions during which troops are able to perform tasks and achieve their goal T_a	The duration of the troops actions T_a exceeds or reaches directive-defined and acquires the maximum possible value	$$T_a \geq T_{a.dd},\ T_a \to \max,$$ where $T_{a.dd}$ – directive-defined duration of actions; $T_a \to \max$ – the maximum value of the duration of actions, during which the troops should be able to perform tasks and achieve the set goal

Continuation of Table 1

1	2	3	4
	The coefficient of troops combat capability preserving K_{cp}	The coefficient of troops combat capability preserving K_{cp}, defined as the ratio of the number (level) of opportunities at the end of the task to the opportunities of troops at the beginning of their actions, exceeds or reaches the required value (0.7…0.9)	$K_{cp} \geq K_{cp.rq}$, $K_{cp} = \dfrac{F_{et}}{F_{bt}}$, where F_{et} – number (level) of opportunities at the end of the task; F_{bt} – number (level) of troop opportunities at the beginning of the task; $K_{cp.rq}$ – the required coefficient of preserving the combat capability of troops
Partial tasks			
1.1. Isolation of the area of conducting stabilization actions	The density of the action area isolation ρ_i	The degree of density of the action area isolation ρ_i, defined as the ratio of the number of personnel performing tasks at the isolation boundary to its length, exceeds or reaches the normative established	$\rho_i \geq \rho_{i.n}$, $\rho_i = \dfrac{N_i}{L_i}$, where N_i – the number of personnel involved in the isolation of the crisis area; L_i – the length of the isolation boundary; $\rho_{i.n}$ – the normatively established (minimum required to ensure an adequate level of isolation) degree of density of the crisis area isolation
	Size of the occupied territory of the isolation area S_{oti}	The territory of the isolation area S_{oti} under the control of the troops exceeds or reaches the normatively established area	$S_{oti} \geq S_{oti.n}$, where $S_{oti.n}$ – the normative value of the territory of the isolation area occupied by the troops
	The probability of detecting and detaining violators of the pass mode (border of isolation) P_{ddv} for a determined time t	The probability of detecting and detaining violators of the pass mode (border of isolation) P_{ddv}, defined as the ratio of the number of detained violators to the overall number of attempts to violate the access control regime, exceeds or reaches a given level (0.7…0.9)	$P_{ddv}(t) \geq P_{ddv.g}(t)$, $P_{ddv}(t) = \dfrac{N_{dv}}{N_{avpm}}$, where N_{dv} – number of detained violators of the pass mode; N_{avpm} – overall number of attempts to violate the pass mode; $P_{ddv.g}(t)$ – a given probability of detecting and detaining violators of the pass mode (border of isolation)
	Productivity of filtration measures Q_{fm} during time t	The productivity of filtration measures Q_{fm}, defined as the ratio of the difference between the overall number of persons subject to inspection and the number of persons detained during such measures to their overall number, exceeds or reaches a sufficient level (0.7…0.9)	$Q_{fm}(t) \geq Q_{fm.s}(t)$, $Q_{fm}(t) = \dfrac{N_{ofm} - N_{d.fm}}{N_{ofm}}$, where N_{ofm} – the overall number of persons subjected to inspection in the course of filtration measures; $N_{d.fm}$ – the number of persons detained during filtration measures; $Q_{fm.s}(t)$ – sufficient (desired) productivity of filtration measures, that determines the proportion of persons who have successfully passed the screening

Continuation of Table 1

1	2	3	4
	The mathematical expectation of the number (average number) of citizens (vehicles) that are checked at the checkpoint (SCP) within a day $E_{c(v)}$	The mathematical expectation of the number (average number) of citizens (vehicles) checked per day of service at the checkpoint (SCP) $E_{c(v)}$ exceeds or reaches the normative value and acquires the maximum possible value	$E_{c(v)} \geq E_{c(v).n}$, $E_{c(v)} \to \max$, where $E_{c(v).n}$ – the normative value of the number of citizens (vehicles) checked per day; $E_{c(v)} \to \max$ – the maximum value of the average number of citizens (vehicles) checked, which is set as a goal
	Throughput capacity (productivity) C_{tb} of the objects crossing points through the boundary of isolation per unit of time t	The throughput capacity (productivity) C_{tb} of the objects crossing points through the boundary of isolation, defined as the ratio of the number of citizens (vehicles) that passed (crossed) the boundary of isolation during a certain period to the duration of such period, exceeds or reaches the normative established	$C_{tb}(t) \geq C_{tb.n}(t)$, $C_{tb}(t) = \dfrac{N_{c(v)}}{t_p}$, where $N_{c(v)}$ – the number of citizens (vehicles) that have passed through (crossed) the isolation boundary during a certain period; t_p – duration of the period; $C_{tb.n}(t)$ – throughput capacity (productivity) of the objects crossing points through the boundary of isolation is established by normatively
	Promptness of response T_r of military units for violation of the isolation boundary	The promptness of response T_r of military units to violations of the isolation boundary is less than or reaches the normatively established time	$T_r \leq T_{r.n}$, where $T_{r.n}$ – normative time of response of military units to violations of the isolation boundary
1.2. Combating SRF of the enemy and IAFs	Coefficient of reduction of the enemy activity in the area of operations of troops K_{rea} for time t	1. $K_{rea} \geq 0{,}95$ – high level of reduction of enemy activity. 2. $0{,}75 \leq K_{rea} < 0{,}95$ – medium level of reduction of enemy activity. 3. $K_{rea} < 0{,}75$ – low level of reduction of enemy activity, additional measures are required	$K_{rea}(t) = \dfrac{\sum\limits_{i=1}^{m}(\alpha_{b.i} - \alpha_{e.i})}{\sum\limits_{i=1}^{m}\alpha_{b.i}}$, $K_{rea}(t) \to \max$, where $\alpha_{b.i}$ – enemy activity by the ith type of activity at the beginning of the term; $\alpha_{e.i}$ – enemy activity by the ith type of activity at the end of the term; m – number of types of enemy activity; $K_{rea}(t) \to \max$ – the maximum value of the coefficient of reduction of the enemy activity, which is set as a goal
	Probability of detection SRF of the enemy or IAFs P_{de} during time t	The probability of detecting SRF of the enemy or IAFs P_{de}, defined as the ratio of the number of detected SRF of the enemy or IAFs to the overall number of groups of enemy forces which operated in the area of responsibility of the troops, exceeds or reaches the required level (0.7…0.9)	$P_{de}(t) \geq P_{de.rq}(t)$, $P_{de}(t) = \dfrac{N_{dge}}{N_{ge}}$, where N_{dge} – the number of detected groups SRF of the enemy or IAFs; N_{ge} – the overall number of enemy groups operated in the area of responsibility of the troops (or known from intelligence); $P_{de.rq}(t)$ – the required level of probability of detecting SRF of the enemy or IAFs, which is considered to be the minimum acceptable for making (adjusting) decisions on future actions

Continuation of Table 1

1	2	3	4
	Productivity of search activities Q_{sa} per unit of time t	The productivity of search activities Q_{sa}, defined as the ratio of the number of detected personnel of enemy forces in the search area during a specified period to the duration of such a period, exceeds or reaches the required level (0.7…0.9)	$Q_{sa}(t) \geq Q_{sa.rq}(t)$, $Q_{sa}(t) = \dfrac{N_e}{t_p}$, where N_e – the number of detected members of the enemy SRF or participants of the IAFs in the search area during a certain period; t_p – the duration of the period; $Q_{sa.rq}(t)$ – the productivity of search activities required to achieve the desired results
	Coefficient of killed (detained) members SRF of the enemy or participants of IAFs $K_{k(d)e}$ in time t	The coefficient of killed (detained) members of the enemy SRF or participants of the IAFs $K_{k(d)e}$, defined as the ratio of the number of killed (detained) personnel of the enemy forces in the area of operations of the troops to the overall number of members of the enemy SRF or participants of the IAFs in the crisis area, exceeds or reaches the required value (0.75…0.95)	$K_{k(d)e}(t) \geq K_{k(d)e.rq}(t)$, $K_{k(d)e}(t) = \dfrac{N_{k(d)e}}{N_{eo}}$, where $N_{k(d)e}$ – the number of killed (detained) members of the enemy SRF or participants of the IAFs in the area of operations of troops; N_{eo} – the overall number of the enemy who was in the crisis area; $K_{k(d)e.rq}(t)$ – the required coefficient of destruction or detention of the enemy, which determines the result of the task
	The level of personnel casualties due to the influence of the countering force N_c within a specified time t	The level of personnel casualties due to the influence of the countering force N_c is a fraction of the overall number of personnel, which is smaller or such, that it reaches the ratio of permissible casualties of personnel to its overall number, and is reduce to a minimum	$\dfrac{N_c}{N_o}(t) \leq \dfrac{N_{pc}}{N_o}(t)$, $N_c(t) \to \min$, where N_c – number of personnel casualties; N_o – the overall number of personnel of the troops; N_{pc} – the number of permissible casualties of personnel; $N_c(t) \to \min$ – the minimum level of casualties of troops due to the influence of the countering force, which is set as a goal
	The ratio of combat capabilities of the parties λ	The combat capability λ of the Guard unit exceeds or reaches the combat capability of the enemy forces	$\lambda_{uNGU} \geq \lambda_e$, where λ_{uNGU} – combat capability of the unit of the National Guard of Ukraine; λ_e – combat capability of the enemy

Continuation of Table 1

1	2	3	4
1.3. Strengthening the protection (cover) of a section of the state border within the designated area of responsibility	The density of the state border protection ρ_p	The density of the state border protection ρ_p, defined as the ratio of the number of personnel performing tasks on the state border section to its length, exceeds or reaches the normatively established level	$\rho_p \geq \rho_{p.n}$, $\rho_p = \dfrac{N_p}{L_p}$, where N_p – the number of personnel involved in border protection; L_p – length of the protected border section; $\rho_{p.n}$ – the normatively established degree of density of state border protection
	Probability of detection and detention of state border violators P_{ddbv} per unit of time t	The probability of detection and detention of state border violators P_{ddbv}, defined as the ratio of the number of apprehended violators to the overall number of attempts to violate the state border, exceeds or reaches a given level (0.7…0.9)	$P_{ddbv}(t) \geq P_{ddbv.g}(t)$, $P_{ddbv}(t) = \dfrac{N_{dbv}}{N_{avb}}$, where N_{dbv} – number of detained state border violators; N_{avb} – the overall number of attempts to violate the border; $P_{ddbv.g}(t)$ – a given probability of detection and detention of state border violators
	Effectiveness of repelling attacks and stopping armed provocations on the state border R_{ta} during time t	The effectiveness of repelling attacks and stopping armed provocations at the state border R_{ta}, defined as the ratio of the number of successful actions of troops to repel and stop attacks and armed provocations to the overall number of such threats, exceeds or reaches the required level of counteraction (0.75…0.95)	$R_{ta}(t) \geq R_{ta.rq}(t)$, $R_{ta}(t) = \dfrac{N_{sta}}{N_a}$, where N_{sta} – the number of successful actions by troops to repel and stop attacks and armed provocations at the border; N_a – the overall number of attempted attacks or armed provocations; $R_{ta.rq}(t)$ – the required level of countering threats that will ensure the successful completion of the assigned task and the achievement of the set objectives of the use of troops
	Promptness of response to threats T_{rt} related to the protection (cover) of the state border	The promptness of response to threats T_{rt} related to the protection (cover) of the state border is less than or reaches the normatively established time	$T_{rt} \leq T_{rt.n}$, where $T_{rt.n}$ – normative time of response to threats related to the protection (cover) of the state border
	The ratio of casualties of own forces towards the enemy L_{of}	The Guard unit casualties L_{of} are less than or equal to the number of enemy casualties	$L_{ofuNGU} \leq L_{ce}$, where L_{ofuNGU} – number of casualties of the unit of the National Guard of Ukraine; L_{ce} – number of enemy casualties
	The coefficient of combat stability reserve K_{csr}	The coefficient of combat stability K_{csr} reserve exceeds or reaches the given value (0.6…0.7)	$K_{csr} \geq K_{csr.g}$, where $K_{csr.g}$ – a given coefficient of combat stability reserve, which will allow to maintain the combat capability of troops and continue performing the task in case of loss of resources

Continuation of Table 1

1	2	3	4
1.4. Protection (defense) of important objects and communications	Coefficient of security (defense) reliability $K_{s(d)r}$ for time t	The coefficient of security (defense) reliability $K_{s(d)r}$, which is defined as the ratio of the number of successful actions of troops to prevent intruders from entering the object (from the object) or to stop (repel) an attack on the object to the overall number of such threats, exceeds or reaches the required value (0.75…0.95)	$$K_{s(d)r}(t) \geq K_{s(d)r.rq}(t),$$ $$K_{s(d)r}(t) = \frac{N_{sauNGU}}{N_{ao}},$$ where N_{sauNGU} – the number of successful actions of the unit of the National Guard of Ukraine to prevent trespassers from entering the object (from the object) or to stop (repel) an attack on the object; N_{ao} – the overall number of attempts by violators to penetrate the object (from the object) or attack the object; $K_{s(d)r.rq}(t)$ – the required coefficient of security (defense) reliability, which will ensure the successful completion of the task
	The daily average number of objects that were under protection (defense) $N_{p(d)}$	The number of objects that were under protection (defense) $N_{p(d)}$ during the day exceeds or reaches the number of objects that required protection (defense)	$$N_{p(d)} \geq N_{p(d).rq},$$ where $N_{p(d).rq}$ – number of objects that required protection (defense) during the day
	The coefficient of combat stability reserve K_{csr}	The coefficient of combat stability K_{csr} reserve exceeds or reaches the given value (0.6…0.7)	$$K_{csr} \geq K_{csr.g},$$ where $K_{csr.g}$ – a given coefficient of combat stability reserve, which will allow to maintain the combat capability of troops and continue performing the task in case of loss of resources
	The coefficient of prevention of damage to important objects and communications K_{pd} within a certain time t	The coefficient of prevention of damage to important objects and communications K_{pd}, defined as the ratio of the difference between the overall number of objects under protection (defense) and the number of those that suffered damage to their overall number, exceeds or reaches the given value (0.7…0.9)	$$K_{pd}(t) \geq K_{pd.g}(t), \quad K_{pd}(t) = \frac{N_{p(d)o} - N_{od}}{N_{p(d)o}},$$ where $N_{p(d)o}$ – the overall number of objects that were under protection (defense); N_{od} – the number of objects that suffered damage; $K_{pd.g}(t)$ – a given coefficient of prevention of damage to important objects and communications, which determines the success of protection measures
	Casualties of own forces L_{of} per unit of time t	Casualties of own forces L_{of} constitute a share of the overall number of personnel, less than or such that it reaches the ratio of permissible casualties of personnel [set by the commander (chief)] to its overall number, and are reduced to a minimum	$$\frac{L_{of}}{L_o}(t) \leq \frac{L_{pc}}{L_o}(t), \quad L_{of}(t) \to \min,$$ where L_{of} – number of personnel casualties; L_o – the overall number of personnel of the troops; L_{pc} – the number of permissible casualties of personnel; $L_{of}(t) \to \min$ – the minimum level of troop casualties which is set as a goal

Continuation of Table 1

1	2	3	4
1.5. Protection of public safety and order in a crisis area	The coefficient of reduction the level of crime in the area of responsibility of the troops K_{rlc} during time t	The coefficient of reduction the level of crime in the area of responsibility of the troops K_{rlc}, defined as the ratio of the difference between the number of crimes in the previous period and the number of crimes in the current period to the number of crimes in the previous period, exceeds or reaches the required value (0.7…0.9)	$K_{rlc}(t) \geq K_{rlc.rq}(t),$ $K_{rlc}(t) = \dfrac{N_{pp} - N_{cp}}{N_{pp}},$ where N_{pp} – the number of crimes in the previous period; N_{cp} – the number of crimes in the current period; $K_{rlc.rq}(t)$ – the required coefficient of reduction the level of crime in the area of responsibility of the troops, which determines the result of the task
	Probability of preventing (stopping) crimes P_{pc} for time t	The probability of preventing (stopping) crimes P_{pc}, defined as the ratio of the number of prevented and stopped crimes within a certain period of time to their overall number, exceeds or reaches the average level for the similar period	$P_{pc}(t) \geq P_{pc.a}(t),$ $P_{pc}(t) = \dfrac{N_{psc}}{N_{c.o}},$ where N_{psc} – the number of prevented and stopped crimes during the period of tasks completion; $N_{c.o}$ – the overall number of crimes within a certain time; $P_{pc.a}(t)$ – the average probability of preventing (stopping) crimes for the similar period
	The daily average number of cases of preventing (stopping) of crimes $N_{p(s)c}$ during the completion service and combat tasks	The number of cases of preventing (stopping) of crimes $N_{p(s)c}$ during the completion service and combat tasks, defined as the ratio of the overall number of prevented crimes to the number of days of service, is less than or reaches the average number per day of the similar period	$N_{p(s)c} \leq N_{p(s)c.a}$, $N_{p(s)c} = \dfrac{N_{pc.o}}{t_d}$, where $N_{pc.o}$ – the overall number of crimes prevented during the period of service; t_d – the number of days during which the tasks were performed; $N_{p(s)c.a}$ – the average number of cases of preventing (stopping) of crimes per day of completion service and combat tasks during the similar period
	The mathematical expectation of the number of recorded (registered) facts of crimes in the field of protection of public safety and order per day E_{rc}	The mathematical expectation of the number of recorded (registered) facts of crimes in the field of protection of public safety and order during the day E_{rc} is less than or reaches the average value for the reporting days of the similar period and acquires a minimum value	$E_{rc} \leq E_{rc.a}$, $E_{rc} \to \min,$ where $E_{rc.a}$ – average mathematical expectation of the number of recorded (registered) facts of crimes for the previous days of the similar period; $E_{rc} \to \min$ – the desired result of the mathematical expectation is to reduce the number of crimes in the field of protection of public safety and order to a minimum
	Promptness of response T_{rc} to calls and reports of crimes by citizens	Promptness of response T_{rc} to calls and reports of crimes by citizens is less than or reaches the normatively established time	$T_{rc} \leq T_{rc.n},$ where $T_{rc.n}$ – normative time of response to calls and reports of crimes by citizens

End of Table 1

1	2	3	4
1.6. Implementation of regime-restrictive actions in the area of stabilization of the situation	Territory control coefficient K_{tc}	Territory control coefficient K_{tc}, defined as the ratio of the area of the territory which is under the control of the troops to the total area of the district of responsibility, exceeds or reaches the required value (0.7…0.9)	$K_{tc} \geq K_{tc.rq}$, $K_{tc} = \dfrac{S_c}{S_t}$, where S_c – the area of the territory of the district of responsibility, which is under the control of the troops; S_t – the total area of the district of responsibility, which is subject to control; $K_{tc.rq}$ – the required coefficient of territory control, which affects the implementation of measures to stabilize the situation and ensure security in the crisis area
	Probability of detection violations of the special legal regime P_{dvlr} within a certain time t	The probability of detection violations of the special legal regime P_{dvlr}, defined as the ratio of the number of detected violations of all types to the overall number of persons subject to verification, exceeds or reaches the required level (0.7…0.9)	$P_{dvlr}(t) \geq P_{dvlr.rq}(t)$, $P_{dvlr}(t) = \dfrac{\sum\limits_{i=1}^{k} N_{dv_i}}{N_{ocp}}$, where N_{dv_i} – number of detected violations of the ith type; N_{ocp} – the overall number of persons checked; k – number of types of violations taken into account; $P_{dvlr.rq}(t)$ – the required level of probability of detecting violations of the special legal regime, which directly affects the provision and maintenance of stability and law and order in the area of operations of troops
	The daily average number of violations of requirements or cases of failure to comply with measures of special legal regime N_{dvlr} detected during service	The number of violations of requirements or cases of failure to comply with measures of special legal regime N_{dvlr}, defined as the ratio of the overall number of violations detected during the service to the number of days of the assignment, is less than or reaches the average number per day of the similar period	$N_{dvlr} \leq N_{dvlr.a}$, $N_{dvlr} = \dfrac{N_{dv.o}}{t_d}$, where $N_{dv.o}$ – the overall number of violations detected during the service; t_d – the number of days during which the tasks were performed; $N_{dvlr.a}$ – the average number of violations of requirements or cases of non-fulfillment with measures of special legal regime detected per day of performing tasks during the similar period
	Mathematical expectation of the number of detected violations of the special legal regime in the area of responsibility of the troops E_{dv} per day	The mathematical expectation of the number of detected violations of the special legal regime E_{dv} is less than or reaches the average value for the reporting days of the similar period and acquires the minimum value	$E_{dv} \leq E_{dv.a}$, $E_{dv} \to \min$, where $E_{dv.a}$ – the average mathematical expectation of the number of detected violations of the special legal regime during the previous days of the similar period; $E_{dv} \to \min$ – the desired result of the mathematical expectation is to reduce the number of detected violations of the special legal regime in the area of the tasks to a minimum

Notes (Table 1)

1. The number of permissible casualties of personnel of own forces is established by the relevant commander (chief).

2. The time of the beginning and completion of the execution of tasks is determined in the directive documents of the military-political leadership.

3. Normatively established (minimum required to ensure an adequate level of isolation) isolation density of the crisis area:

– for a department:

in closed areas – up to 250 m;

in open areas – up to 500 m;

– for a platoon:

in closed terrain – up to 750 m;

in open terrain – up to 1500 m;

– for a company:

in closed terrain – up to 2500 m;

in open terrain – up to 5000 m.

4. The normative value of the area of the isolation area occupied by troops is determined taking into account the degree of isolation of the area of responsibility.

5. Throughput (productivity) of the objects crossing points [checkpoints (SCP)] through the boundary of isolation is normatively 20–24 people (10–12 vehicles).

6. The standard response time of military units to a violation of the isolation boundary is no more than 15 minutes.

7. The number of forces and means involved in the performance of tasks on ensuring the protection of the state border and determining the normative density of protection is established by the Plan of interaction between the formations of the National Guard of Ukraine and the bodies of the State Border Guard Service of Ukraine.

8. The standard response time to threats related to the protection (cover) of the state border is no more than 15 minutes.

9. The standard time for responding to calls and reports of crimes by citizens is:

– within the city limits:

up to 7 minutes – if the military unit is in the operational response area;

up to 10 minutes – if a military unit from another (neighboring) service area is involved;

– in rural areas:

up to 20 minutes – if the unit is in the operational response area;

up to 40 minutes – if a unit from another district is involved.

By its essence and content, stabilization of the situation is a complex and multifaceted task and combines simultaneous or sequential execution of stabilization measures of various orientations. Therefore, it is considered necessary to evaluate the effectiveness of the NGU BTFs for participation in stabilization actions, taking into account the main task which consists in ensuring and maintaining stability and security in the crisis area, as well as partial tasks in the areas of service and combat activities of troops in the interests of achieving the goal of stabilization actions as shown in Table 1.

Six efficiency indicators have been selected to assess the fulfilment of the main task of stabilization actions by the NGU formations. The group of partial tasks 1.1–1.6, in accordance with their specificity, is proposed to be assessed using thirty-two performance indicators distributed among them as follows: for task 1.1 – seven indicators, for tasks 1.2, 1.3 – six indicators, for tasks 1.4, 1.5 – five indicators each, and for task 1.6 – four indicators.

In total, thirty-nine performance indicators and performance criteria for each of them have been identified and formed to assess the effectiveness of the NGU BTFs for participation in stabilization actions.

This set of indicators and criteria will enable for a comprehensive assessment of the state of fulfilment of the main tasks of stabilization actions assigned to the formations of the National Guard of Ukraine and, if necessary, take appropriate measures to improve their effectiveness. This will contribute the timely identification of risk factors (certain events that may adversely affect the situation and the final outcome of the troops actions) in the course of stabilizing the situation, optimizing resources, and ensuring that informed management decisions are made to respond quickly to changes in the situation.

Conclusions

So, the article identifies and forms a set of indicators and criteria for assessing the effectiveness of the use of battalion task forces of the National Guard of Ukraine for participation in stabilization activities, and also further develops

the well-known approach to forming indicators and criteria for assessing the effectiveness of the use of troops (forces). Given that the goal of stabilization actions is achieved by performing a number of tasks, the article decomposes them and develops elements of the efficiency assessment system for each individual task.

The presented set of indicators and criteria makes it possible to formulate requirements for the established battalion task forces of the National Guard of Ukraine for participate in stabilization actions and to adequately assess the results of the tasks. The proposed set of tools for assessing the effectiveness of the use of troops is not permanent and may change depending on the nature, content and scope of the tasks, as well as the conditions of the situation in which the Guard formations operated.

The use of above indicators and criteria will help commanders (chiefs) and their subordinate staffs to make informed decisions, carry out effective planning of the use and control of troops in the interests of successful execution of tasks and achievement of the goal of stabilizing the situation.

Further scientific research will be aimed at developing a method for determining the rational composition of a battalion task force of the National Guard of Ukraine for participation in stabilization actions.

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ВИЗНАЧЕННЯ ТА ФОРМУВАННЯ СУКУПНОСТІ ПОКАЗНИКІВ І КРИТЕРІЇВ ОЦІНЮВАННЯ ЕФЕКТИВНОСТІ ЗАСТОСУВАННЯ БАТАЛЬЙОННИХ ТАКТИЧНИХ ГРУП НАЦІОНАЛЬНОЇ ГВАРДІЇ УКРАЇНИ ДЛЯ УЧАСТІ У СТАБІЛІЗАЦІЙНИХ ДІЯХ

Запропоновано сукупність показників і критеріїв оцінювання ефективності застосування батальйонних тактичних груп Національної гвардії України для участі у стабілізаційних діях, яка відповідає цілям і завданням їх проведення.

Термін «критерій ефективності» розглянуто авторами статті як базова умова (вимога), на підставі якої визначається показник ефективності. Критерій виражається у формі твердження щодо якісної чи кількісної величини показника, яке визначає бажані властивості або ступінь досягнення запланованих (визначених) цілей функціонування системи. Під «показником ефективності» розуміється кількісна або якісна характеристика, яка відображає ступінь відповідності фактичних результатів необхідним значенням за вибраним критерієм.

Ефективність може відображувати не лише бажаний (запланований) кінцевий результат або одне із завдань застосування батальйонних тактичних груп Національної гвардії України під час участі у стабілізаційних діях, але й негативний побічний ефект, зокрема втрати особового складу, населення та матеріальних ресурсів, а також руйнування важливих об'єктів інфраструктури. Тому варто намагатися не тільки досягти максимального результату, а й прагнути звести втрати до мінімуму.

Окреслено вимоги до показників і критеріїв оцінювання ефективності, які полягатимуть у такому: елементи системи оцінювання виконання завдань батальйонними тактичними групами Національної гвардії України повинні бути тісно пов'язаними з їх змістом і характером, чіткими і зрозумілими, збалансованими, простими у розрахунку та зручними для використання, враховувати поточні умови і бути здатними адаптуватися до зміни факторів, які впливають на результат та ефективність застосування тимчасових військових формувань.

Послідовність кроків формування показників і критеріїв ефективності застосування батальйонних тактичних груп Національної гвардії України для участі у стабілізаційних діях подано у вигляді відповідної методики.

Ключові слова: *показник, критерій, батальйонна тактична група Національної гвардії України, стабілізаційні дії, ефективність.*

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