# The potential of Planning Coordination to operationalize cross-border Ecosystem-based Adaptation (EbA). The case of the Western Scheldt

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#### Abstract

Sea-level rise, coastal erosion and destruction of natural habitats are some of the effects of climate change that are now affecting many parts of the world, particularly near coastal areas, where about 23% of the population is currently living. In the past, we have generally relied on hard engineered solutions to deal with the risks, but they have high costs and a limited adaptive capacity. Ecosystem-based adaptation (EbA) Is a concept that has recently been introduced in planning to respond to the effects of climate change. Wide range of studies show that EbA solutions are more sustainable, cost-effective and can provide many additional co-benefits. However, not much has been said about how to incorporate EbA in urban conditions where more land use conflicts are present. In most cases, EbA is presented as a goal, but frequently is not translated into practical actions.

This paper will first reexamine the roles of coordinated planning in relation to the concept of EbA to explain why this is a key factor to properly manage the territorial dimension of ecosystems and why planning structures need to adapt to site-specific conditions and normally cross their administrative borders. The discussion will then be developed in the case study of the Western Scheldt, which deals with the extreme of cross border planning coordination. The Western Scheldt is influenced by two different planning systems (Dutch and Belgian) and is an example of how planning coordination is used in the development of cross border EbA solutions.

Keywords: Ecosystem-based adaptation, adaptation strategies, planning coordination, cross border coordination,

#### **INTRODUCTION:**

Since the second half of the 20<sup>th</sup> century, we have been experiencing accelerated processes related to climate change. *"Climate change presents the single biggest threat to sustainable development everywhere"* (UNFCCC).

In coastal areas, some effects of climate change such as sea level rise and more extreme weather conditions make them particularly vulnerable. Dealing with this vulnerability requires special attention, considering that coastal areas are highly populated areas and about 23% of the total world's population lives within 100 km of the coast (Adger et al. 2005, p.1036). Establishing urban settlements in proximity to the coast has been driven by the diversity of resources and trading opportunities these areas provide (McGranahan et al. 2007, p.18). These areas concentrate diverse development opportunities including trade, food and mineral extraction, energy production, recreation, etc., creating high pressure to continue the urbanization processes. Therefore, *"increase coastal resilience to these threats is a priority for many countries and a global need"* (Barbier, 2014).

Even if actions are taken globally to mitigate the effects of climate change (Like reducing Co2 emissions and by that reducing temperature rise), cities still need to adapt to climate change. Most solutions that we have implemented until now will most likely not be effective in the future. For this reason, we have to aim for plans and implementations that can be more adaptable to the changing conditions. In the past, we have strongly relied on hard engineered solutions to deal with risks, which have a very limited adaptive capacity and result in high costs and constant interventions. Approaches like seawalls, building dams, levees and channels to control flooding and even relocating infrastructure and settlements may help to some extent, but do not address integrally the climate change impacts. Moreover, they can contribute to the destruction of fragile ecosystems and even reduce their adaptive capacity. (Hale et al., 2009, p.2). Hard structures can be used in more severe cases like highly urbanized areas, but should be in sync with natural dynamics. (Hale et al., 2009, p.4).

Both urban development and natural processes are operating in a context that is in need of constant adaptation to the uncertain context of climate change. In this process, each component reacts to the change, creates new interactions and modifies the overall system. Without an understanding of the system dynamics it is very difficult to predict these large-scale behaviours (Mitchell and Newman, 2001, p.1). In addition to that, both systems influence each other and understanding this interrelation between the human-induced urban development and natural processes is an issue of high complexity (Zagare, 2018, p.19,44). As cited by Zagare (2018), Richard Peet (1998, p.2) indicates that "the relation between society and nature is thus an entire system, a complex of interrelations", where each of these open systems affects the other and together shape the space where we live.

Recently we have rediscovered the potentialities that the natural systems offer in relation to risk reduction, with water retention, soil stabilization and Co2 absorption as some examples. There has been a shift of perspective related to adaptation to climate change from working against nature to work with nature and using it to increase the resiliency of the built environment. Ecosystem based adaptation has been introduced as an approach to build with nature and face climate change. However, the challenge is to take EbA from a goal to practice. In this paper, I will argue that this challenge is mainly caused by the limited capacities of

traditional planning systems to make decisions over territorial issues like ecosystem management. Ecosystems extend beyond administrative and political borders, which will require customized and comprehensive planning coordination. The relevant aspects that planning coordination should consider to implement EbA strategies will then be discussed on the case study of the Western Scheldt. This represents an extreme case where cross-border planning coordination is needed and used to develop the area, which needs to deal with increasing coast-related risks of climate change.

#### EBA AS A RESPONSE TO CLIMATE CHANGE AND SUSTAINEBLE DEVELOPMENT

For the purpose of this paper, the definition given by the Convention of Biological Diversity (CBD) will be used: *"The use of biodiversity and ecosystem services (BES) as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change* (CBD, 2009).

EbA is an anthropocentric concept, it is centred on meeting people's needs (WWF,2011). The concept also implies that by "using" the ecosystem services, humans are capable to alter to some extent their performative capacities. EbA is considered a multiscale and multisectorial approach to manage ecosystems so they can help reduce the vulnerability that people is facing with climate change (Sierra-Correa and Cantera, 2014). This means that we are responsible to take good care of the ecosystems we rely on if we want them to be more productive.

But in the context of climate change, not only human action has an impact on the environment. Natural cycles on the planet create temperature variations over time and have effects on the habitat of species, the melting of ice and weather conditions. Society also needs to find ways to make their built environment more resilient to these changes and working with nature can be provide many opportunities. The extent to which ecosystems, food supplies and sustainable development are in danger is related to their exposure to climate change and the ability of these systems to adapt. (Smit et al., 2001, p.879)

EbA can be a key instrument to drive the transition towards a sustainable development (Scarano, 2017, p.66) because it can adapt to this evolving target as we learn and understand better our socio-environmental system (Bagheri et al., 2007, p.84). As Holling (2004) describes, "sustainable" aims to create, test and maintain adaptive capacities and "development" simultaneously aims to create opportunities. EbA can be a link between the socio-economic and environmental issues that sustainable development attempts to combine (Hopwood et al. 2005, p.39). If ecosystems are preserved and properly managed, they can contribute to a sustainable development by the provision of food, risk reduction, water management and livelihood diversification (Munang et al. 2013). EbA can offer a policy mix to guide this sustainability transition by preserving biodiversity, but also reducing social vulnerability and shaping economic and infrastructural development. (Scarano, 2017, p.67). It can work as a long-term investment to ensure future environmental, social and financial benefits (Munang et al. 2013). This means that long term vision and planning is required, especially considering the speed of change of natural processes.

#### PLANNING COORDRINATION FOR EBA – A CROSS-BRODER ISSUE

Most of the definitions for EbA describe diverse potential benefits that these solutions may provide, how they can be more cost-effective, provide many other co-benefits and even be integrated with other functions (Munang et al. 2013). For all the reasons mentioned above, EbA is currently being mainstreamed into planning systems (Wamsler, 2014). The EbA concept is relatively new in planning (Wamsler, 2014) and still needs to be further developed in the field, particularly for urban contexts. Where in Geneletti and Zardo's (2015) review on European climate adaptation plans shows that EbA appears more frequently as a goal to achieve, but more limited presence of measurements to achieve such adaptation. In fact, their study resulted in 52% of the cases introducing measures to implement EbA.

Some authors acknowledge the concepts of multi-sectoral, multi-scale among the guiding principles for EbA (Fedele et al., 2015) (Sierra-Correa and Cantera, 2014), but state that the challenge in planning is to operationalize EbA. For example, the *Assessment of the potential of ecosystem-based approaches to climate change adaptation and mitigation in Europe* by Naumann et al. (2011) indicates that despite the concept being more recognized in policy and research, there is still insufficient practical implementation. Munang et al. (2013) support the idea that governments have not yet exploited the potential of EbA, despite the increasing evidence of its benefits.

The United Nations Environment Programme (UNEP) offers a programme to help mainstreaming EbA strategies in countries. This includes: Knowledge support, capacity building and help to integrate them in national plans. (Munang et al. 2013)

The main limitation in operationalizing EbA is related with the differences between the scale at which ecological dynamics occur and the scales of governance that can potentially manage these ecosystems. Traditional planning structures do not align with the territorial dimensions of ecosystems and cannot manage them properly. (Andrade et al. 2011, p.8). Ecosystems can cross cities, regions and even countries and therefore be subject to many different and conflictive planning structures. For example, highly urbanized areas have limited available land and high pressure to be developed in comparison to rural areas. One ecological body can extend though 2 or more countries, which may have drastically different governance structures. From the beginning of the 21<sup>st</sup> century, this discussion even involves the differences between land and sea with the introduction of marine spatial planning.

As it was mentioned before, the complexity of the natural systems is high and needs to be understood on a territorial scale. However, in most cases, this scale will not be confined in the traditional administrative boundaries and one isolated planning system will not have sufficient knowledge or power to manage these ecosystems. Any intervention in one place could potentially have effects in other.

Planning coordination is then necessary to deal with these cross-border issues. Territorial transformations, including EbA strategies, can then be realized faster, the use of resources can be optimized and all the stakeholders have a better understanding about what will be their loss and gains.

#### PLANNING COORDRINATION FOR EBA - CONTEXT-SPECIFIC

According to Douvere (2008, p.764-765), the concept of ecosystem-based management departs from traditional management approaches by focusing on a specific ecosystem and its related activities instead of a single species, sector activity or concern. It aims to look at the system from a spatial and temporal perspective and direct policies and strategies to influence how human use ecosystems and its resources.

Similar recognition of this biophysical context appears in the cohesion policy under the name of place-based. The place-based definition aims to reduce the inefficiency of resources and the increase of social inclusion by defining and producing tailored public goods and services according to the area (Barca, 2009).

By recognizing the geographical dimension of ecosystems, we should define then governance structures that respond accordingly. As one of the dimensions of territorial governance indicated in the European cohesion policy document (2015), policy making has to be place-based, consider the territorial specificities and adapt to the changing context (Böhme et al.2015, p.18).

Allmendinger and Haughton's (2009) concept of "fuzzy boundaries" is based on the idea that planning systems need to be more fluid and not be completely restricted by the statutory scale of governance. "Fuzzy boundaries" allows for more tactical associations that can respond to the real geographies and better explore the potential problems and opportunities. That way, governance structures may extend their involvement beyond their administrative boundaries and establish some level of participation when they may be affected by decision making in that territory. Such dynamics would blur the preexisting administrative boundaries of planning to respond to "spatial" planning.

#### PLANNING COORDRINATION FOR EBA – MULTIPLE SCALES OF PLANNING

Consideration of multiple geographical scales and linkages between them is frequently mentioned as one of the principles for EbA. As it was stated before, functional scales of ecosystems are generally broad and not necessarily match the administrative structures or the scales at which project developers operate. (Andrade et al. 2011, p.8).

"With the existence of multiple scales of governance that consider the global change problems, gaps and mismatches can occur in these regulatory frameworks, affecting the overall coherence". (McDaniels et al., 2005)

Planning scales have different roles, and these roles vary according to the context of each country. Taking into consideration that the case study area focuses on the Dutch and Belgian territories, we can indicate that both planning systems share some of these scale-related trades. National plans of both are currently aiming towards decentralizing power and ensure that local scales of governance can develop and implement their own plans (Alpkokin, 2012). According to Adger (2005), there are two main categories for taking action in order to adapt to change, one involves making policies or regulations and the other involves operational actions. While larger scales (national, regional) focus on creating a framework to regulate the interventions (including policies), local scales have a bigger responsibility in developing strategies to implement and manage projects.

But there is still a need to ensure that local projects work in an associative way and not a solution creating problems somewhere else. A high scale plan cannot be just based on the of

combination many low-scale plans when frequently these local plans and projects are conflictive with each other (Rivolin, 2005, p.101)

Adger (2005) elaborates on this idea of achieving successful adaptation. For adaptation to be successful it needs to be evaluated in terms of meeting its own goals, but also if it affects the ability of other strategies to reach their goals. In other words, an isolated project may increase the local adaptive capacity, yet reduce the large-scale adaptive capacity.

Policies are also present in this multiplicity of scales, ranging from global to a local. As the areas regulated by these scales of policies overlap, there is a challenge in meeting the multiple criteria for a successful adaptation as defined by each scale. There are limitations regarding to translating global-scale agreements to small scale policies and also small scale EbA solutions cannot always scale up to influence large scale goals (Scarano, 2017, p.68).

As an example, an urban project that deals with river renaturalization can't be managed by a city alone. However, these strategies can well be coordinated with other planning scales (Geneletti and Zardo, 2015).

In a cross-border context, the complexity increases. Different countries have different planning systems, but they will need to find common ground to define policies, strategies and projects that involve shared ecosystems. The concept of vertical subsidiarity as explained by Rivolin (2005) is related to the relations between the scales involved in territorial governance. Under this vertical governance, the addition of an EU scale and the territorial cohesion policy in 2005 as an overall framework can help with development of spatial plans that include cross-border, transnational and supra-national dynamics. But the cross-border cooperation of this policy prioritizes economic growth and creation of jobs to increase competitively of border regions (Miosga, 2008, p.27) over ecological issues.

#### PLANNING COORDRINATION FOR EBA – MULTIPLE SECTORS AND ACTORS

Implementing EbA strategies has spatial implications by preserving areas for ecological processes. It requires to be coordinated with the needs of other sectors to resolve potential land use conflicts. In urban areas, where land is scarce, competing against economic drivers is one of the main limitations for EbA. In order to gain relevance, EbA research takes a problem-focus approach and relates multiple academic fields such as ecology, nature conservation, risk management and development (Brink, 2016 p.112)

This requires a better coordination between plans of different sectors to make EbA feasible and desirable (Geneletti and Zardo, 2015).

In Rivolin's (2005) horizontal dimensions of subsidiarity promotes sharing of governance perspectives among the different actors (private and public) as a way to contribute to overall cohesion of plans and strategies.

Adger (2005) state that the value of equity is relevant in this discussion, because of the duality between the groups that are responsible in the decision-making and the groups that benefit or suffer from these decisions. For example, using land for natural conservation may reduce the land available for agriculture and therefore affect the farmers source of income. Based on the cascade model of EbA elaborated by Brinks et al. (2009), the consideration of equity is particularly relevant in three aspects: (i) Equal distribution of the adaptation benefits as well as other co-benefits like recreation and beautification, (ii) equal consideration in the valuation of things by understanding what is a desirable state for the different groups, and (iii) equal consideration in the managing processes, where different stakeholders can be involved in the

decisions that will affect them. Not only multi-disciplinarity is necessary for an equal participation, but also including social participation is necessary to integrate social, economic and environmental demands into policy-making (Scarano 2017). Societal participation is relevant for their engagement with ecosystem conservation and being informed about the relevance of being more adaptable to change and be more resilient.

This involvement however, is not only limited to groups physically present on the areas of discussion. For an effective and successful EbA strategy, the knowledge coming from the researchers is fundamental. Disciplines such as biology, geology, chemistry, sociology, economy, etc. may provide very useful information to make proper decisions. Bridging this knowledge from other disciplines constitutes frequently a challenge, where there are spatial and administrative separations between the groups that demand the ecosystem services, the groups that can influence the ecosystem service provision and the groups that generate and analyse the information for a proper management of these ecosystems (Vignola et al. 2013). To illustrate an example, there could be accelerated erosion on the lower part of a river, but the problem needs to be managed on the high part on a different administrative unit. The effective integration of scientific knowledge can inform for a proper definition of scales of governance that can deal with ecological problems (Boesch, 2006, p.9)

There is a role for planning not only at the phase of management of ecosystems as stated in Brink's cascade model for EbA. In addition to these formal roles of defining laws and policies to manage the problem of environmental degradation, there are informal roles in facilitating interactions between groups that are part of this complex network related to ecosystems and the planning of adaptive responses. (Vignola 2013)

To deal with the differences that planning systems may pose and find common ground to define EbA strategies, the following aspects need to be considered for an effective planning coordination:

-Flexible governance structures, where existing structures don't limit their area of concern exclusively to the administrative boundaries and new forms of governance that are context-specific can emerge.

-Vertical coordination among scales, where common goals are defined and higher levels of administration not only supervise but ensure that local level projects also contribute to the overall improvement of the ecological systems.

-Horizontal inclusion of stakeholders, to facilitate the flow of knowledge and perspectives even if they are spatially separated.

As a way to contribute to the challenge of taking EbA from a goal to operationalization, these aspects will be discussed from a practical perspective. The case of the Western Scheldt will be used as an example of working with coordination in planning to address EbA strategies.

#### CASE STUDY DISCUSSION: THE WESTERN SCHELDT

The case study of the Western Scheldt deals with the challenge of implementing Ecosystembased Adaptation (EbA) by reinforcing planning coordination of the involved governance structures. It represents an extreme case where the territorial dimension of the ecosystem is not confined by the administrative boundaries and the traditional planning scales. We are talking about a river delta that is present in 2 countries, Belgium and the Netherlands. The cross-border delta also plays a significant role for both countries, but driven by different dynamics.

From the Belgium side, the presence of the ports of Antwerp and Ghent influence significantly the management of the Western Scheldt. Belgium and the Netherlands signed in 1863 an agreement that allows unconditional freedom of navigation to the port of Antwerp. This economic activity is the main catalyst for altering the river and facilitate ship accessibility from the North Sea to the ports. As a result, pollution, water diversion to new canals, edge straightening and increasing dredging have changed significantly the natural dynamics of the river. (EEA, 2016, p.3). On the other hand, the Dutch government is responsible of the last portion of the river including the river mouth. For the Netherlands, it is important to maintain the natural dynamics of the estuary. This includes conservation of bird-breeding sites, allowing the transition from salt to fresh water, preserving the intertidal marshes and the sediment quality (Maillefert, 2013, p.1).

Maintaining a good connectivity between the sea and the ports required the delta arm to remain open. Unlike the Western Scheldt, other arms of this delta were closed by dams as part of the Delta Plan. This decision was taken after the disaster of 1953, where flood defenses could not withstand the storm and significant damage was caused inland (de Vlieger, 2017, p.25-26). The closed deltas have had an impact on the ecological systems of the area and deteriorated their conditions, which adds extra pressure on the Western Scheldt to maintain ecological values.

The cross-border condition of the Western Scheldt requires coordination between the two countries to fulfill the different goals in an optimal way. However, both countries have different planning cultures, which may pose an obstacle to reach coordination.

The Dutch planning culture has a long history which dates back even to the creation of polders and is well embedded in the development of the country. In Belgium, spatial planning has become more important for the development of the country since the decree of 1997. As another example, the Dutch society has high expectations the government capacities to solve problems, while the Belgians emphasize the stakeholder agreement in their decision-making (Eker, 2013). There is even a difference in the position that planners take when they propose strategies. Flemish planners tend to have a recognizable political inclination while the Dutch planners tend to stay neutral (Eker 2013). It is also important to mention some similarities between the countries' planning systems, including the language (to some extent), the transition of the Flemish planning system from regulative to development oriented (similar to the Dutch) and the increasing decentralization of responsibilities in the development of plans and strategies (Eker 2013) In the specific context of this cross-border delta area, several governance structures have emerged trying to develop a coordinated plan. Some examples are the Border Commission (VlaNed), the Euroregions, the Rhine-Scheldt Delta cooperation and Project Team Development Perspective Scheldt Estuary (PROSES). Most of these governance structures have had limited influence of the development of the delta. Their broad scope of initiatives and the bottom-up approach has led *"to a fragmented use of already limited resources"* (Vries, 2008).

The most successful cross-border structure in this area has been PROSES. Both countries signed to this project in 2005 and worked on an outline for the future of the estuary by 2030. They established 3 main objectives that need to be simultaneously developed: Maintain good accessibility to the ports, increase safety by reducing flood risks and increasing the ecological quality of the delta. This outline has created a framework to guide the development of an updated "Deltaplan" for the Netherlands and the "Sigmaplan" for Belgium. Both plans work by coordinating several local-scale projects along the Western Scheldt.



Image 1: Diagram of plans area of application on the Western Scheldt (Elaborated by author)

The international EU scale also influences the decision-making process in relation to these 3 goals. For example, under the EU nature legislation, port expansions require to compensate for the loss of natural areas with new flooding areas and by 2030 is expected around 2458 ha of these areas to be created. (EEA, 2016, P.4)

From the Belgian side, the Sigma plan considered collaboration between the Flemish and the Dutch government to tackle this compensation for the expansion of the port of Antwerp. This consisted in "depoldering" two adjacent zones of the Scheldt riverbank in order to make room for the river in case of increase of the water level and providing protection. At the same time, such areas will be exposed to the natural tidal processes of the Scheldt, which would help restore some of the intertidal marshes of the river. In this case, the Sigma plan studied and evaluated optimal spaces to intervene with a cost-benefit analysis and several discussions between environmental conservation groups and port authorities. These studies were elaborated with a larger perspective that was not limited to the countries limits, but to the tidal processes along the river. As their results proved that depoldering some areas in both Belgium and the Netherlands would contribute to the optimal solutions, coordination



between the 2 countries became necessary. The Belgian government would be responsible for part of the costs related to this project.

Image 2: Diagram of cross-border depoldering project on the Western Scheldt (Elaborated by author)

Even though both countries initially agreed to this plan, the Dutch government and the citizens presented opposition. Depoldering those areas would result in the loss of agricultural land and the Dutch parliament was not willing to affect the farmers of Zeeland to benefit the development of Flemish ports (Warner and van Buuren, 2009)

The project was supposed to start no later than by 2007, but these reevaluations of the solutions delayed the project, which started in 2017 on the Dutch side. This collaborative process was successful to some extent, but not including the group that was going to be mostly affected by the deal resulted in a major setback to the implementation of the plan (Warner and van Buuren, 2009)

Planning coordination in this case will result in an extensive area of ecological value, which if it was managed separately would have had an inferior spatial structure. Both depoldered area will now be connected to the adjacent natural estuary. Coordination could have been optimal if both timelines were integrated. It would have resulted in efficient use of resources to transform the areas, a more concentrated impact related to noise and pollution. From an economic perspective, this EbA strategy based on the restauration of marsh areas will have recovered the investments in a period of 20 years (Broekx et al, 2011, .57)

The discussion about planning coordination still has a lot of potential to improve the conditions in the Western Scheldt. Until recently, the development of the ports along this river have followed autonomous development patterns. This means that there is high competition between all the ports in the area and results in misuse of resources, unnecessary environmental impacts and even wasted economic opportunities. Recent models, including the Ghent-Terneuzen port association and the branding of the combined Flemish ports as "Flemish port area" are changing this pattern and will require further development of these context-specific governance structures, the coordination between scales (including cross-border regions) and the involvement of all the relevant stakeholders to implement future infrastructure that can reduce the pressure over the local ecosystems.

#### CONCLUSION:

Planning coordination may contribute to any large-scale strategy, but it is fundamental for the development of plans involving ecosystem management, including ecosystem-based adaptation (EbA). The scale and time frames of EbA are large and complex to incorporate in planning, but in a long-term perspective can offer a very positive cost-benefit balance.

Governance requires to understand the territorial dimension of ecosystems and elaborate custom planning systems that respond to them. This may demand for flexibility in the areas of concern of traditional planning scales and have "fuzzy boundaries" between different local, regional and even national divisions to define possible EbA strategies. Coordination between the multiple scales involved in these ecological dynamics will facilitate recognizing the value of local adaptation strategies and how they can contribute towards the overall systems' adaptive capacity and mitigation of impacts. The involvement of the multiple sectors and stakeholders will facilitate the flow of knowledge and perspectives, increase the benefits and distribute them more equally.

As it can be seen on the case study, the Netherlands and Belgium cannot be restricting their concerns to the borders when natural dynamics take place in both countries. Trying to balance economic development of the ports, safety in relation to flood risk and environmental concerns became the pillars to align the different priorities of both countries. This reduces the potential of one country's solution to become and incremental issue for the other. The plan considered international, national, regional and local scales and developed strategic plans associated with the river ecosystems. This allows to implement local measures that can adapt according to long-term objectives and benefit the whole system' equilibrium. The omission of the most affected group (Zeeland farmers) in the decision-making process proved to affect the level of efficiency to implement the project by delaying part of it for 10 years. Luckily the plans remained as they were planned in the beginning and can still result in a highly successful adaptation strategy.

This example of cross-border coordination can provide lessons for future collaboration between Belgium and the Netherlands. There are multiple opportunities to operationalize EbA strategies and contribute to the outline's 2030 goal of an accessible, safe and natural Wester Scheldt if the regional port infrastructures develop as a network instead of as autonomous entities. SOURCES:

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