Prevention and remediation activities at the solution of projects participating in environmental protection

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The article deals with the factors determining the causalities in a rise of floods and steams and it solves partially problems for prevention and remediation of unusual flood events. In this article there are the possibilities for an involvement of water flow owners, community land trusts and individual towns and municipalities in the sanitation process and prevention of unusual flood events. This pays main attention to the effective human resource management for organization of sanitation and working teams. It shows on a demand of process management introduction for complex realization procedure of sanitation and prevention activities.

Keywords: *prevention and remediation, flood, process approach*

Introduction

At the present time natural disasters as drought, landslide, flood, tornado, hurricane, volcanic eruption or earthquake come increasingly and extensively. In Slovakia, predominately in river Bodrog and Hornád basins there was the last year as a break year. During the history of measurement in more than 140 years there is the greatest precipitation amount. Also flood damages were the heaviest ones of the last 45 years.

This flood trend evocated various actions related with preventive and remedial measures. These measures include a flood protection and a solution of results for emergency situation.

There was not utilized the "free" manpower, i.e. the unemployed citizens in order to realize anti-flood prevention and remedial. This fact was supported legislatively by the Law of National Council of the Slovak Republic No.120/2011 Coll. which changes and adds the Law No.5/2004 Coll. about services for employment and about the changes and supplements of some laws according to the next regulations.

The labour market is also connected synergically with the national programmes of land revitalisation and integrated river basins. These programmes deal complexly with anti-flood prevention, land revitalisation as well as with increasing of land resistance to climate changes by means of its state, structure and management improvement, [1].

Causality factors for a rise of floods and streams in Slovakia

The term "flood" means a temporary uplift of water level in the water flow above the waterside, which is caused due to rapid accumulation of water overflow, e.g. as a consequence of rain, snow-melt or reduction of water-course flow capacity.

The term "stream" means a watery of an area during the flood because of high level of water. This situation is typical for storm rainfall or fast snow-melt, as well as in the case of dam breakage etc. A steam can also occur if underground water leaks out on the ground surface. The stream changes soil habitat because, from the biological point of view, it squeezes air from the soil and in this way it reduces amount of oxygen necessary for life of vegetal roots, [2].

The land management and its planning have to be adapted according to requirement of optimal saturation of land by rain water, as well as with regard to revitalization of swamps and stabilisation of water cycle. In this way ecological functions can be renewed, e.g. ability of land to restore water and to renew vegetation into the given landscape, [3].

There are various factors describing reasons of floods, taking into consideration their intensity and extend, Fig. 1.

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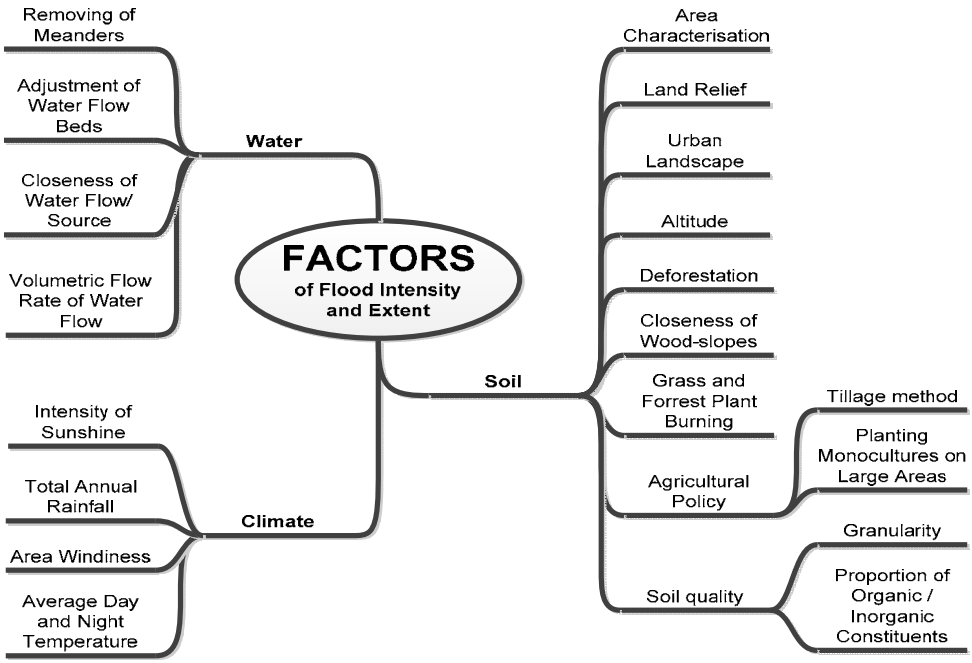

Fig. 1. Factors of flood occurrence causes.

Sources for prevention and sanitation of extraordinary flood occasions

It is possible to divide individual sources or components participating on flood prevention and flood remedy into the next groups: personal, financial, material and technical sources, Tab.1.

Tab. 1. Groups of individual sources/components for flood prevention and remedy.

<table>
<tr><th colspan="2">Sources or components for flood prevention and remedy</th></tr>
<tr><th>Personal (i.e. human)</th><th>Financial</th></tr>
<tr><td>• Owners or administrators of objects (administrators of river basins, suburban areas, municipalities, physical or legal entity)</td><td rowspan="3">• Sanitary:
○ long-time utilizing sources – if the process of sanitation is more time demanding,
○ long-time utilizing sources – they are used for reduction of damages and for prompt removing of damaging consequences (water outflow from cellars, cleaning and disinfection of water wells and sources of drinking water, spraying, removing of sludge, etc.)</td></tr>
<tr><td>• Organizers (for organization of prevention and sanitations, for control of emergency situation – emergency management)</td></tr>
<tr><td>• Liquidators of damages (insurance companies, physical or legal entity, municipalities, community service workers, volunteers)</td></tr>
<tr><td>• Rescue organisations (Fire-fighting brigade, Medical rescue service, Civil defence, Police, Army)</td><td rowspan="2">• Preventive:
○ long-time utilizing sources (creation of working positions in the area of anti-flood protection remedies and solution of consequences of extraordinary situations), [4]</td></tr>
<tr><td>• Employees of post-flood consulting centres (psychologists, insurance company agents, builders, hygienists)</td></tr>
<tr><th>Material</th><th>Technical</th></tr>
<tr><td>• liquid state sources (drinking water, detergents, other chemicals)
• solid state sources (wood, textiles)
• bulk materials (sand, gravel, lime)
• other consumable material</td><td>• means of mechanisation (machines and heavy mechanization, e.g. lorries, excavators, cranes, heavy machinery and others)
• technical equipment (storages, removable containers, pumps, shovels, saws, etc.)
• technical areas (centres for landscape revitalisation, main and removable storage areas)</td></tr>
</table>

Revitalisation of landscape and its durable renovation

In order to provide a durable development of landscape revitalisation and renovation it is necessary to create suitable conditions for mutual cooperation among the Government (represented by the Ministry of Environment), Administrator of Water Flows, Self-Governing Region and individual municipalities situated along the given water flows in order to enable durable renovation and revitalisation of the landscape. The above-mentioned relations are illustrated in the Fig. 2.

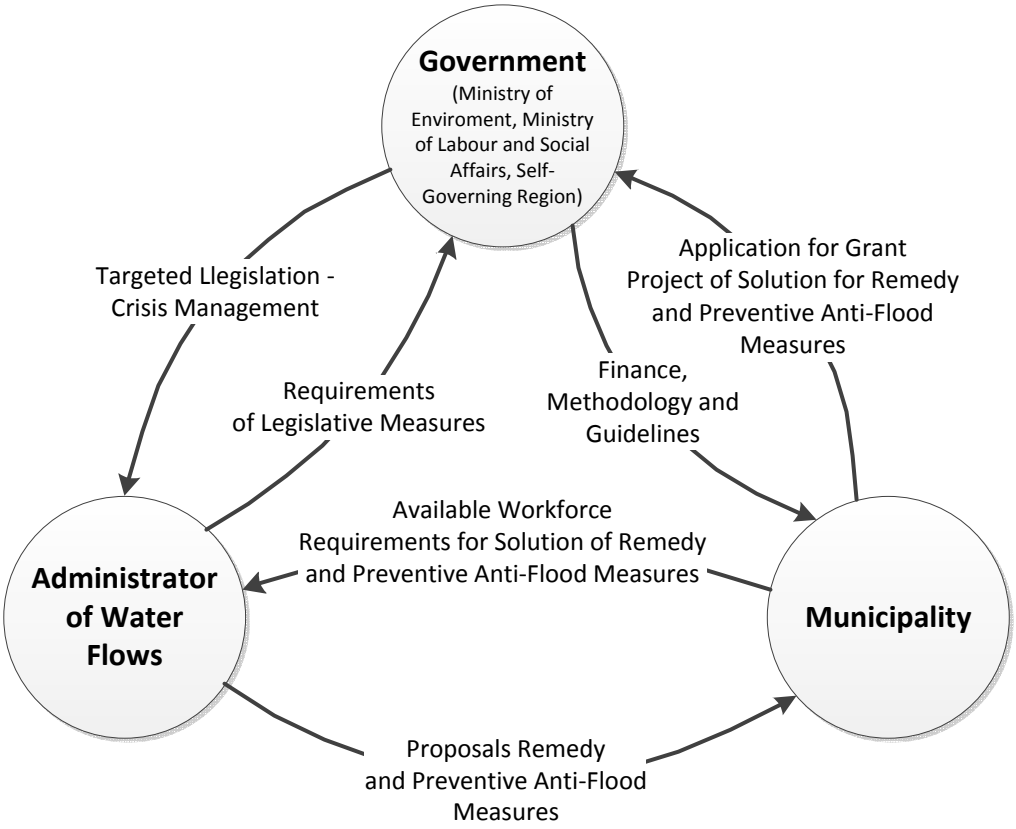

Fig. 2. Relations among involved parts during solution of remedy and preventive anti-flood measures, [5].

Orientation of preventive and remedy activities and character of new employment

Individual municipalities, administrators of water flows and catch-water drains, administrators or users of corresponding part of infrastructure or territory can submit order for realization of works. These works can be performed on the own lands and estates of employer and/or according to contracting partnership of main involved parts in the land registers of municipalities situated along individual river-basins.

The main purpose of creation of new working positions is return of landscape into original state, renewing of basic services for inhabitants, reduction of future flood risks, creation of new employment and more efficient exploitation of disposable labour in regions. New employment has to ensure the targeted measures in regions, for example:

1. Performing of maintenance of water flow network and catch-water drain network: for example skiving, felling, cleaning of stream channel, as well as cleaning of water flow surroundings from freely laying matters, modification of critical points along the water flow (unsuitable water-gates, bridges, etc.).
2. Areal anti-flood measures, together with revitalisation steps for better water bearing capacity are able to reduce water erosion of soil and to increase vegetation covering, [6, 7].
3. Other preventive measures, including organisational steps, [8].
4. Renewal of damaged area, infrastructure and buildings after the flood or extraordinary situation, [1].

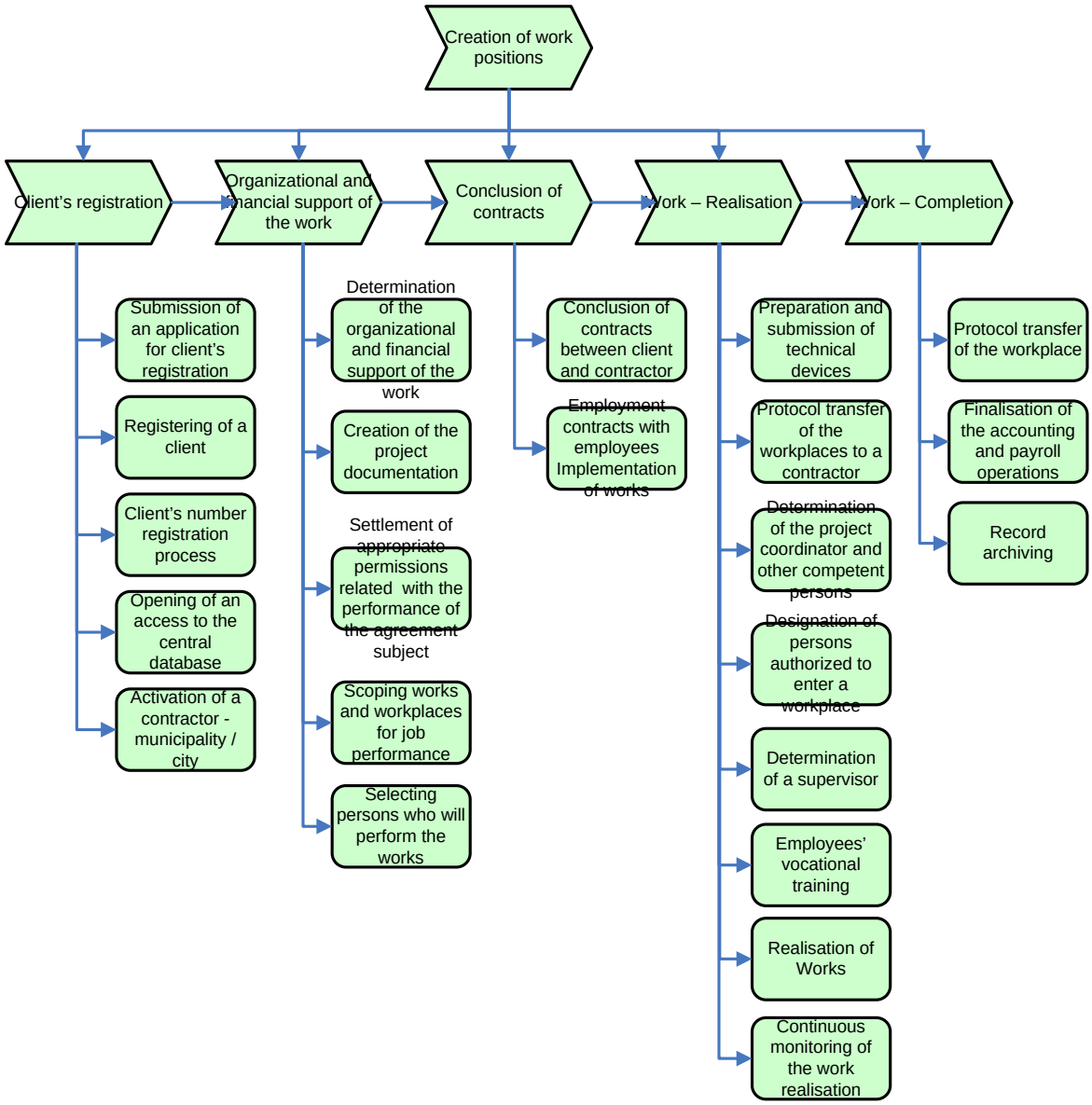

Fig. 3. Process model of work position creation for solution supporting of remedy and preventive anti-flood measures.

Process approach in application of preventive-remedial anti-flood measures

It is necessary to elaborate the methodological guidelines and techniques for a solution of remedy and preventive anti-flood measures and more effectively source application. These techniques should be designed like processes which we can monitor and control actually, [9].

The process of source application for solution of remedy and preventive anti-flood measures is illustrated in Fig. 3.

The creation of suitable working environment can also make allowance for various subsidies. These contributions are determined for employment supporting in the field of a realisation of remedy and preventive anti-flood measures as well as a solution of results for emergency situation.

The process consists of the following sub-processes itself:

1. Definition of employer, contractor and client (e.g. individual municipalities, administrators of river basins and forests, hydro-amelioration enterprises) potential localities and workplaces for job performance.
2. Contract for locality of job performance, organisational and financial supporting, [10].
3. Agreement of work realisation and relating contract relations.
4. Work realisation together with consecutive evaluation and regular controls.
5. Finishing of work realisation, its evaluation and accounting, [11].

Provision and support of sustainable new employment

Works in the field of land revitalisation and anti-flood protection should have been complexly step-by-step supported as well as in the framework of legislation processes which is a part of land revitalisation and integrated river basins management. In this manner the long-term sustainable development will be ensured and the main partner of process will be more qualitatively motivated to support and realise given revitalisation measures and prevention techniques in their areas. There will be more effective support and application of local capacities for realisation of various measures in the areas and there is an assumption of reinforcement of initial, municipal coordination and control role for the realisation of these measures in registers of their municipalities, [12, 13].

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