



- Definition of land-use planning
- Different approaches to land-use planning processes
- Land-use planning in Switzerland
- Main points

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When dealing with mitigation of risk related to natural hazards, specialists have to face the reality of the land-use planners. Land-use planners are in charge of guiding the development of a territory; considering optimal solutions; stakeholder's interest; geographical, social, economic, and ecological constraints; and, of course, the legislative framework. Within this video, I would like to introduce you to the main definition of land-use planning and show you different approaches to land-use planning processes. Finally, I will explain to you the generic approach applied in Switzerland.

Notes

Summary



0m 04s



(1)

“The process undertaken by public authorities to identify, evaluate and decide on different options for the use of land, including consideration of long term economic, social and environmental objectives and the implications for different communities and interest groups, and the subsequent formulation and promulgation of plans that describe the permitted or acceptable uses.”

(UNISDR, 2009 and 2015)

Here is the definition of land-use planning according to UNISDR. What should be highlighted in this definition are the economic, social, and environmental aspects, as well as the involvement of different communities and interest groups in the process.

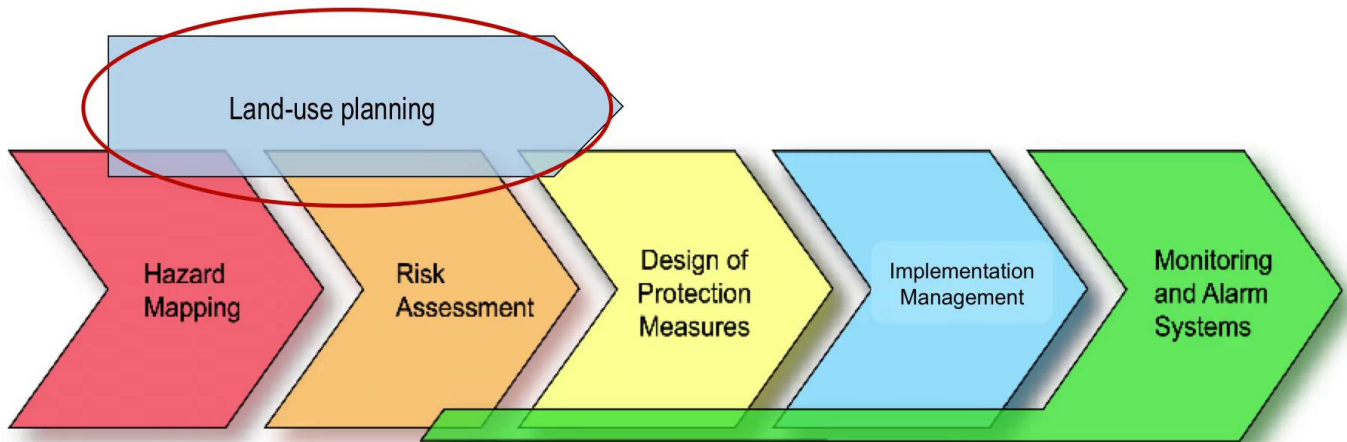
Notes

Summary



0m 48s

The Swiss approach to land-use planning



(2)

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The Swiss approach places land-use planning above a technical flow stream of hazard mitigation. What I mean by this is that specialists and engineers that deal with these technical aspects in the main flow stream-- as you can see here, where you find hazard mapping, risk assessment, structural measures, et cetera-- will have to discuss with different stakeholders at planning level. This is the level where balancing of interest between stakeholders will happen.

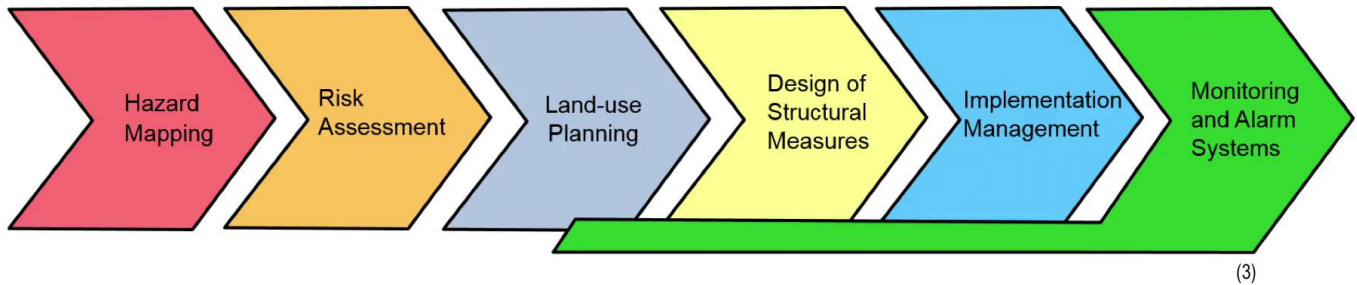
Notes

Summary



1m 06s

The French approach to land-use planning



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In comparison with the Swiss approach, the French approach considers land-use planning as an individual step. I will now present the Swiss approach.

Notes

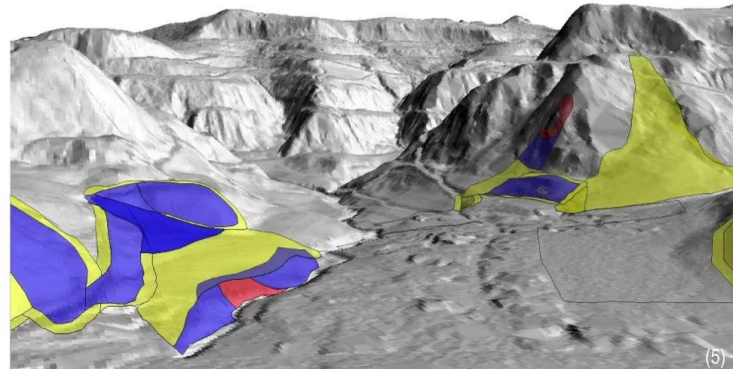
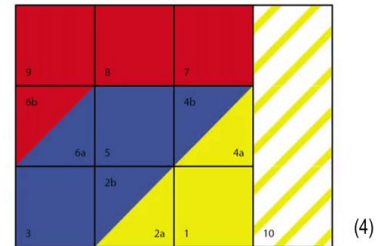
Summary



1m 38s

The Swiss approach: Hazard mapping

- Data collection
 - Record of event
 - List of existing structural measures
 - Field preparation and field work
 - Data transcription and analysis
 - Map of phenomena
 - Intensity map
- Hazard map



As showed in the previous flow streams, the first step is always hazard mapping. The necessary working steps to establish a hazard map are: data collection, field preparation and field work, and data transcription and analysis. A map of phenomena and an intensity map are needed to generate a hazard map.

Notes

Summary



1m 49s

Hazard mapping: Data collection



- Planning / Preparation
- Data collection
- Data treatment
- Decision & procedure

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The work starts in the office by collecting data and defining scientific and product management procedures to be used. According to my experience, the exchange with other colleagues is not to be underestimated. Their experience often brings a significant added value.

Notes

Summary



2m 12s

Hazard mapping: Data collection



- Need
- Quality
- Resolution
- Update frequency
-

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Before starting the data collection, you have to be clear about which data you specifically need. You should then ask yourself what quality, what resolution, and at what frequency the data should be updated. In most cases, you will have to use what is available, but be careful, not everything that is available is useful. By the way, do you all know what data on natural hazards are available in your country? Why don't you check and write it in our forum. It would help us understand your situation.

Notes

Summary



2m 31s

Hazard mapping: Field work



- Organization & logistics
- Site accessibility
- Environmental context and seasonal variations
- Weather conditions and vegetation cover

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Before going to the field and having in mind which data are needed, it is also important to establish procedures in order to be sure that the collected data can later be analyzed. Field work should be organized beforehand. What should be considered? The organization and logistics that it entails, the site accessibility, the environmental context and seasonal variations, as well as weather conditions and vegetation cover.

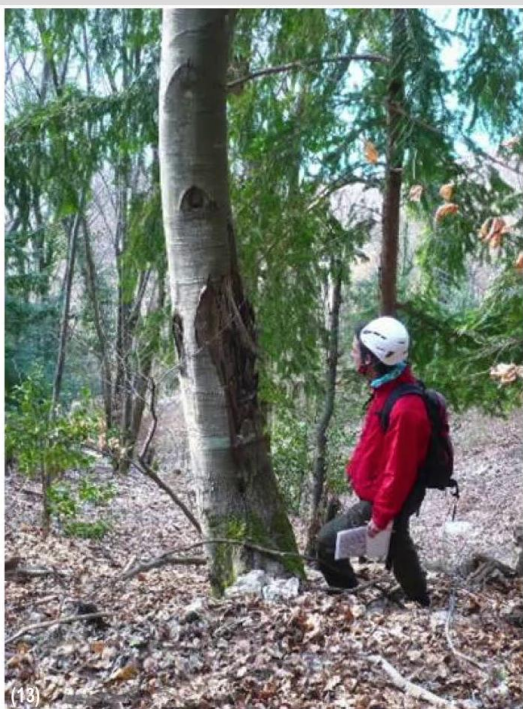
Notes

Summary



3m 03s

Hazard mapping: Field work



Do not underestimate the field conditions. These pictures show the conditions you could find: steep slopes, dangerous and challenging environment with unstable terrain, or strong water flows. Do not forget that hazard mapping can be a risk in itself. Think about the security procedures when going to the field.

Notes

Summary

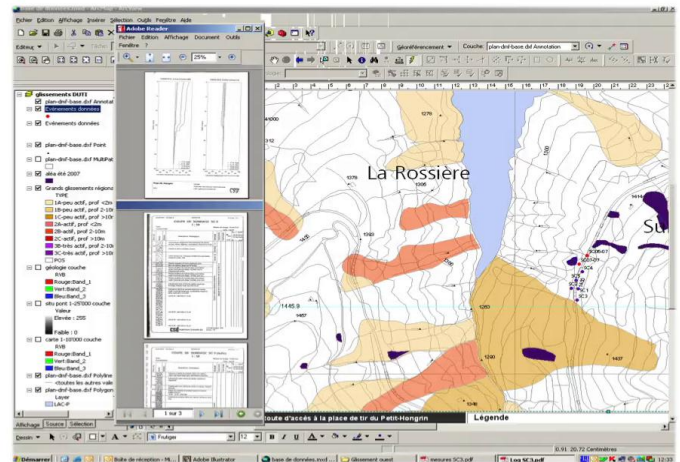


3m 33s

Hazard mapping: Data analysis

Data analysis and data transcription step → All data will be implemented in a GIS software

- Creation of phenomena & intensity maps
- Attribution of a layer per type of hazard



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Back to the office, the data treatment begins. Specific hazard maps are layered in a GIS program: one layer for landslide, one for floods, et cetera. The hazard mapping is now completed. We can now present the results and discuss land-use planning implementation with stakeholders and/or start assessing the risk.

Notes

Summary



3m 55s

Risk
[fatalities or CHF/yr]

=

Event's potential
[Event intensity and probability]

x

Damage potential
[Elements at stake and vulnerability]

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You have here, the Swiss definition of risk. Based on hazard mapping, the risk can be calculated as the monetary value of the damage, or the number of fatalities. This is a function of the event's potential times the damage's potential. This value can come from insurance policies, for example.

Notes

Summary

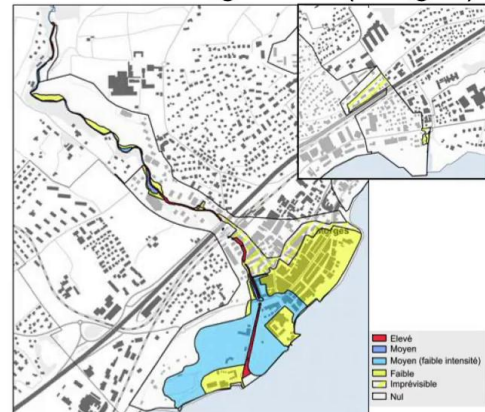


4m 20s

“To maintain an equivalent security level for all natural hazards throughout Switzerland through sustainable means that are environmentally friendly, economically viable and socially responsible.”

(PLANAT, 2005)

Hazard zoning – INO (Morges)



(15)

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Once the risk is known, you have to decide how to manage the risk. The Swiss strategy entails that risks are part of the land-use management through the maintenance of the recommended level of security for all natural hazards.

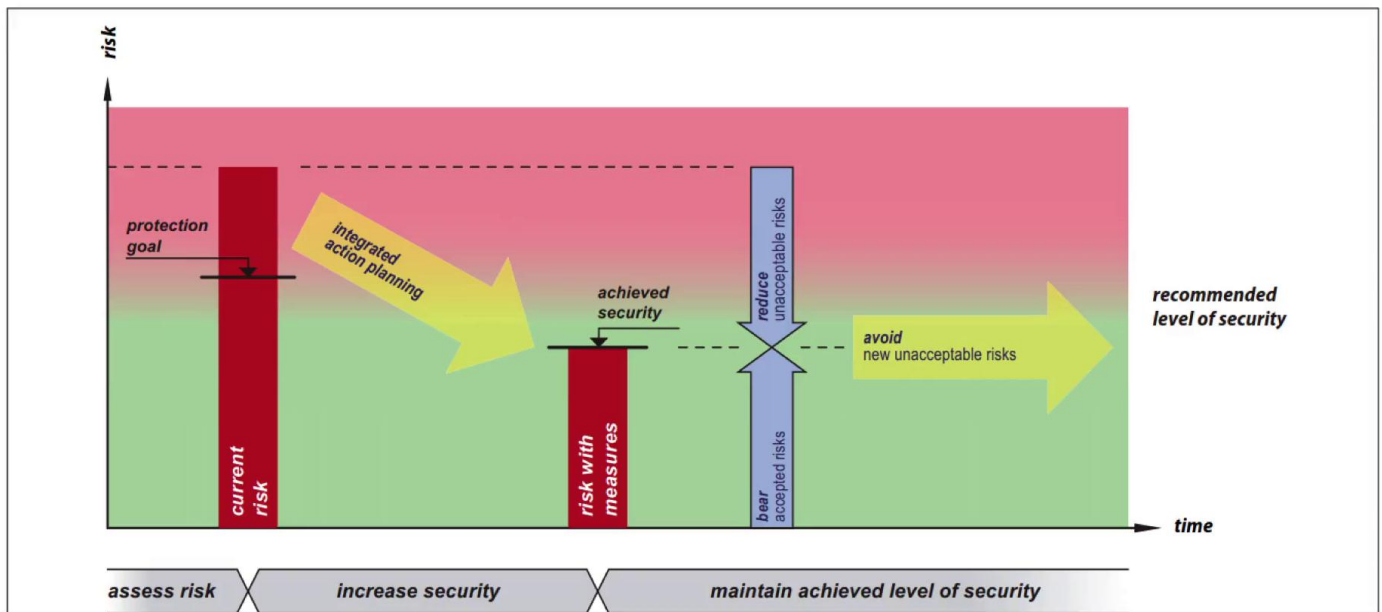
Notes

Summary



4m 41s

The Swiss approach: Land-use planning



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Here is a sketch that illustrates this strategy. Protection goals need to be defined. This is where the interests of stakeholders will be weighted against each other to define the protection goal level. I will talk more about this further. If the risk is higher than the protection goals, as shown in the picture, actions are taken to lower the risk. The achieved security level is now the one you want to maintain and guarantee over the long term. Note that after the integrated action planning, the achieved security level is always the same or below protection goals.

Notes

Summary



4m 56s

Balancing of interests

- Stakeholders should be involved in order to define the **best adapted land-use planning solution**
- Public authorities are a **key** contributor to risk avoidance and risk mitigation

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Stakeholders, that is to say, authorities, owners, site managers, site operators, urban planners, natural hazard specialists should be involved to define the best adapted land-use planning solution. To what extent should decision makers engage in the avoidance and reduction of risk? Which risks are risk carriers willing to accept? Which risks does the community expect the risk carriers to accept? How can illegitimate risk transfers be avoided? Public authorities are a key contributor to risk avoidance and risk mitigation. They should make use of land-use planning as an instrument to avoid newer risks. The final decision often lays with authorities. While asked to be the referee in balancing interests, one has to be aware that decisions will be partially subjective.

Notes

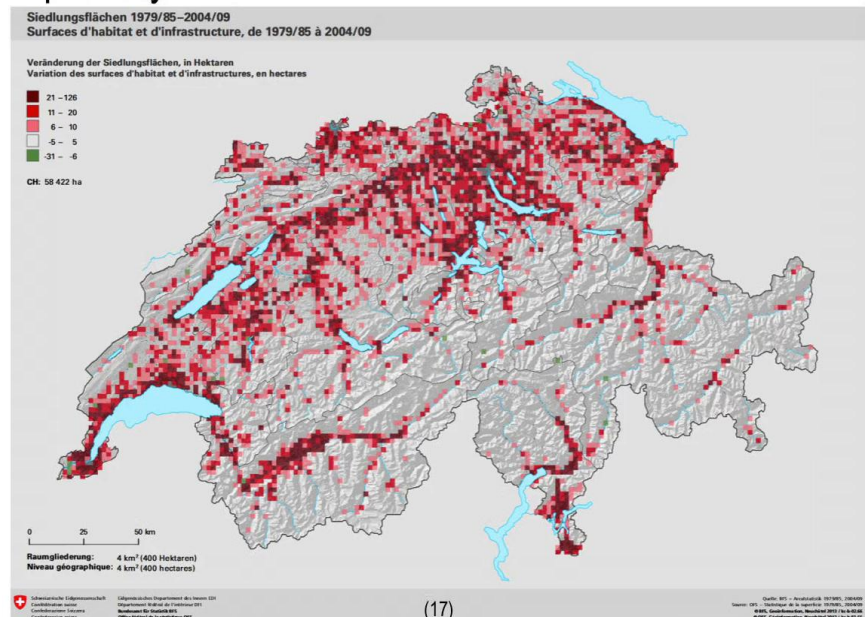
Summary



5m 35s

Parameters influencing hazard acceptability:

- Demography
- Economy & Finance
- Socio-cultural perception
- Types of hazards and risks
- Insurances



It is impossible to set a hazard level that will be universally applied to define if buildings are safe or not. A country has to take into account all these aspects: demography, economy and finance, socio-cultural perception, types of hazards and risks, and insurances. For example, Japan will have a completely different challenge with the higher risks of earthquakes, than Bangladesh with flooding, or Nepal with landslides. Demographical development is a key aspect. With increasing urbanization, risk exposures can evolve quickly.

Notes

Summary



6m 31s

The Swiss approach: Land-use planning

“The main reason for the shift from centralized to decentralized organization is that local scales are more efficient in dealing with tasks related to risk and emergency management.”

(Sven Fuchs et al , 2016)

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The main reason for the shift from centralized to decentralized organization is that local scales are more efficient in dealing with tasks related to risk and emergency management. The Swiss approach is based on local context, regional or national, and on the identified risks. Decisions are taken at decentralized level.

Notes

Summary



7m 08s

The Swiss approach: Land-use planning



The urban planner should be able to take natural hazards into account as a land-use constraint among others (such as environmental constraints, etc.)



Information on natural hazards should therefore be available to and understandable by urban planning specialists

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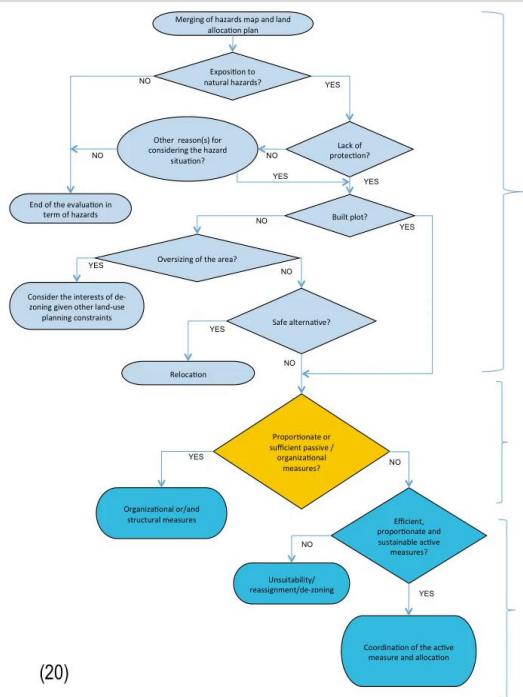
We want natural hazard mitigation to be integrated in the routine approach to land-use planning. Land-use planning is a complex procedure encompassing many steps in which, one of them, is natural hazards. Part of the work of natural hazard specialists is therefore to make the data available and explain the context to land-use planning specialists in an understandable way.

Notes

Summary



The Swiss approach: Land-use planning



(20)

Land use planning

Organizational and passive measures

Active measures

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This procedure chart has been established to accompany the hazard mitigation procedure in the Swiss state where EPFL lays. You will find the official version in the reference documents of this training. What I would like you to note is that the land-use planning actions are taken at the beginning of the process. If land-use planning is not sufficient to mitigate risks, then organizational passive and active measures will be taken.

Notes

Summary



Main points



- Land-use planning is a key non-structural measure for the mitigation of risks related to natural hazards
- There is no universal approach to land-use planning

The key messages that I would like you to remember about land-use planning is that it is the first action for the mitigation of risks related to natural hazards. However, the approach has to be based on local conditions. This is why the priority should be given to decentralized analyses of the situation. Therefore, there is no universal approach to land-use planning.

Notes

Summary



8m 28s

Main points

- Golden rules:
 - Data analysis and hazard mapping come first
 - Non-structural measures should be implemented before structural measures



Technology for Disaster Risk Reduction

This presentation can be summarized in these two golden rules: What is important to remember is that data analysis and hazard mapping come first. And that non-structural measures should be implemented before structural measures.

Notes

Summary



8m 53s

References

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Thank you for watching.

Notes

Summary



9m 10s

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(1) – (3) CSD Engineers

(4) Unité des dangers naturels, Direction générale de l’environnement, Canton de Vaud (2014) Cartographie des dangers naturels, Vade-mecum.

(5) – (15) CSD Engineers

(16) Gosteli, H.; D. Aller; A. Leutwiler; F. von Fischer, and M. Stump (2016) Risk Governance and Policies (objectives, strategies, communication). Congress Interpraevent 2016.

(17) “Surfaces d’habitat et d’infrastructure, de 1979/85 à 2004/09” Federal Statistical Office (FSO), Switzerland

(18) – (19) CSD Engineers

(20) Fig. 3 on page 23. Chantry, R. et R. Yersin (2016) Prise en compte des dangers naturels dans le canton de Vaud : vers des solutions durables et cohérentes en matière d’aménagement du territoire et de construction. Association Romande pour la Protection des Eaux et de l’Air. Bulletin de l’ARPEA. Journal Romand de l’Environnement. No 269. Été 2016.

Notes

Summary



9m 14s