

## Capabilities Tool<sup>1</sup>

Tools are devices needed to implement the approach such as adopting a zoning ordinance that requires new homes to be elevated above the level of flooding.

Approaches include methods that offer opportunities for:

1. Retreat
2. Accommodation
3. Protection through Artificial Buffers
4. Protection through Natural Buffers

Tools include:

1. Building Codes
2. Development and Land use
3. Planning
4. Hazard disclosure / Information dissemination
5. Revenue and Expenditures

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## Capabilities – Tools: Building Code Strategies

1. **Building Codes:** Since the early 1900s, the system of building regulations in the United States was based on model building codes developed by three *regional* model code groups.

The codes developed by the Building Officials Code Administrators International (BOCA) were used on the **East Coast** and throughout the **Midwest** of the United States, (SBCCI) were used in the **Southeast**.

Codes published by the International Conference of Building Officials (ICBO) covered the **West Coast** and across to most of the **Midwest**.

Although regional code development has been effective and responsive to the regulatory needs of the local jurisdictions, it became obvious by the early 1990s that the country needed a single, coordinated set of national model building codes. The nation's three model code groups decided to combine their efforts; in 1994 they formed the **International Code Council (ICC)** to develop codes that would have no regional limitations.

The first edition of the *International Building Code* was published in 2000. The code was patterned on three legacy codes previously developed by the organizations that constitute ICC.

Building codes are laws, ordinances, or governmental regulations setting forth standards and requirements for the construction, maintenance, operation, occupancy, use, or appearance of buildings, premises, and dwelling units. Building codes should be designed to ensure that development is built to withstand natural hazards.

2. **Cumulative Substantial Improvement:** For FEMA and the NFIP, any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either:
  - Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or
  - Any alterations of a "historic structure," provided that the alteration will not preclude the structure's continued designation as a "historic structure."
  - Cumulative substantial improvements would include all improvements undertaken over a given time period.
3. **Electrical and mechanical equipment:** Electrical and mechanical equipment can often be disaster-proofed, separate and apart from the building. It is often possible to elevate a building's interior components, such as the electrical and heating systems, at a fraction of the cost of elevating an entire structure. It may not be possible to effectively raise many facilities, but elevating electrical and mechanical equipment should enable the facility to be able to recover more quickly after a disaster.
4. **Floodproofing (Dry):** Dry floodproofing involves the sealing of a building against floodwaters by making all areas below the flood protection level watertight. This can be done

by coating walls with waterproofing compounds or plastic sheeting and protecting building openings with removable shields or sandbags. Dry floodproofing is limited to 2 or 3 feet above the foundation of the building due to the pressure exerted by deeper water on the walls and floors.

5. **Floodproofing (Wet):** Floodproofing allows water to enter a building to reduce the pressure exerted by deep water. Wet floodproofing at minimum involves the removal of some valuable items—to the rebuilding of floodable areas. Wet floodproofing can dramatically reduce damage costs with little cost to mitigate the disaster by simply removing furniture and electrical appliances out of the floodprone area
6. **Freeboard:** Structures are often designed to be built above the level of expected flooding. Estimates are based on best assumptions from best available science, known existing conditions, and so on. Providing an additional level of safety by increasing the height of expected damage can account for inaccuracies in these assumptions.
7. **Insurance:** The insurance industry plays an important part in the private sector guiding of development. The National Flood Insurance Program is a good example of how the insurance industry can also play a role in promoting development that reduces hazard risk. Insurers are taking steps to reduce their risks by limiting disaster coverage. Unfortunately, their current practices tend to leave all without disaster coverage rather than those in the most hazardous areas. Earthquake insurance in California is an example of this.
8. **Seismic Retrofitting and Design:** Many floodplains are located in active seismic areas and many floodplains are comprised of softer soils that can intensify ground shaking. In such cases seismic hazards considerations may have a great influence on design then that those needed to accommodate flooding. Seismic retrofitting means preparing existing and new buildings to withstand the shaking force of an earthquake and can also include non-structural improvements to reduce earthquake damage within a structure. Seismic retrofitting involves adding braces, removing overhangs, and providing flexible utility connections and tie downs to reduce damage to existing structures.
9. **Substantial improvement:** The National Flood Insurance Programs establishes 50 percent of market value as the substantial improvement threshold; damage above this threshold triggers other requirements, such as the requirement to elevate the first floor above the base flood elevation. The City of Snoqualmie Washington established a 15 percent threshold in the late 1980s and '90s. This, among other things, allowed the Small Business Administration to provide loans for elevating homes that were damaged less than 50 percent of their pre-event market value.
10. **Windproofing** focuses on design and construction of a building to withstand wind damage. This involves the aerodynamics of a structure, materials used, and addition of features such as storm shutters. Windproofing can also help protect a building's occupants and their possessions from broken glass and flying objects.

## Capabilities – Tools: Development and Land use Strategies

**Overview:** Zoning can be divided into four general categories:

- **Euclidean Zoning:** Euclidean zoning *is* named after the town of Euclid, Ohio and the case influenced the content and design of zoning codes. Euclidean zoning regulates development through land use classifications and dimensional standards. Typical land use classifications are single-family residential, multi-family residential, commercial, institutional, industrial and recreational. Each land use must comply with dimensional standards that regulate the height, bulk and area of structures. These dimensional standards typically take the form of setbacks, sideyards, height limits, minimum lot sizes, and lot coverage limits.
- **Form based Zoning:** A form-based code places more emphasis on regulating the form and scale of buildings and their placement along and within public spaces (such as sidewalks, street trees, street furniture). Some of the urban planning goals of *form-based codes* include curbing urban sprawl, promoting pedestrian safety, and preserving the fabric of historic neighborhoods.
- **Incentive Zoning:** Zoning, as its name implies, offers a reward (usually in the form of increased density) to a developer who does something "extra" that is in the community's interest (such as more open space) or promotes a public goal (such as affordable housing).
- **Subdivision ordinances:** Subdivision ordinances regulate the act of dividing land into pieces, usually via a plat. The former single piece as a whole is then known in the United States as a subdivision and can be for the purpose of housing, commercial or industrial development.

While zoning is the most common form of land-use control available to local government, it has a number of weaknesses for mitigation purposes.

- First, zoning, like building codes, primarily affects new structures rather than existing buildings. As a result, it is a poor way to make present development more hazard-resilient.
- Zoning is a spatial control, and it is therefore best suited to hazards that are also spatially defined (such as flooding, but not tornadoes).
- Zoning regulations must preserve some economically viable use of the land for the landowner; otherwise, the regulations may qualify as an unconstitutional taking. This issue generally prevents any attempt at a blanket prohibition of development in hazardous areas.
- Zoning may be too flexible a tool to effectively restrict development in hazard-prone areas.
- Zoning is subject to changes in the courts' views and in the political climate. The courts and public opinion tend to sway between regarding property as an individual or community resource. Communities that issue variances, special use permits, or rezoning, or fail to enforce existing codes, seriously weaken the effectiveness of

those codes to prevent hazardous building practices.

- The zoning code may also be swayed by other community priorities. For example, zoning that lowers density may increase the cost of providing services for governments that are seeking the economic benefits of growth. On the other hand, zoning that raises densities may increase the number of people at risk in hazard areas. Down-zoning that appears to be primarily intended to exclude low-income residents rather to reduce hazard risk may be challenged in court.
1. **Agricultural Zones:** This zoning category sets a minimum lot acreage calibrated to the size necessary to maintain a commercial farm (which varies depending on the predominant crops grown in the region). Some ordinances contain a prohibition on nonfarm uses (exclusive use).
  2. **Bonus and Incentive Zoning:** In exchange for concessions from a developer, some governments allow developers to exceed limitations imposed by current regulations, such as building height or dwelling unit density.
  3. **Coastal Construction Control Line:** The CCCL defines an area seaward of which there are additional regulations. Kauai, Hawaii is considering a CCCL that will initially be the seaward edge of existing major structures for accreting beaches such as Kailua Beach. Florida established a Coastal Construction Control Line (CCCL) to protect beaches and dunes from improperly sited and designed developments. The CCCL represents the projected landward limit of significant damage to upland structures from water forces from a one-hundred year coastal storm. Structures located seaward of the CCCL are required to be designed and built to withstand the high winds and storm surges which accompany those events.
  4. **Contract or Conditional Zoning:** Under both approaches, the landowner agrees to previously unstated conditions (which can be in the form of deed restrictions) in exchange for some government action (such as a rezoning) or an exemption from other conditions. The difference between the two is that with contract zoning, the government is contractually obligated to allow the use.
  5. **Density Transfers/Average Density/Cluster:** This type of regulation allows flexible design of large- or small-scale developments that are constructed as a unit; the actual design is a matter of negotiation, but the basic premise is that some areas are developed more intensively than would normally be allowed, while others are used less than what the market would determine. The type of development usually has to conform to zoning, but there is a trend toward allowing mixed use.
  6. **Eminent Domain** is an action of the state to seize a citizen's private property, expropriate property, or seize a citizen's rights in property with due monetary compensation, but without the owner's consent. The property is taken either for government use or by delegation to third parties who will devote it to public or civic use.

or, in some cases, economic development. The most common uses of property taken by eminent domain are for public utilities, highways, and railroads; however, it may also be taken for reasons of public safety, such as in the case of Centralia, Pennsylvania. Some jurisdictions require that the government body offer to purchase the property before resorting to the use of eminent domain.

7. **Floating Zones:** These zones appear in the text of the zoning ordinance, but not on the map, and they are typically used for shopping centers, industrial areas, mobile home parks, or multi-family housing. Unlike overlay zones, floating zones replace the existing code for the places in which they are implemented. Once certain conditions (usually development-related) are met, the ordinance becomes affixed to a particular site.”
8. **Impervious Overlay Zoning:** This specific type of overlay zoning limits future impervious area by estimating the environmental impacts of future impervious cover and setting a limit on the maximum imperviousness within a given planning area. Site development proposals are then reviewed in the context of an imperviousness cap. Subdivision layout options must then conform to the total impervious limit of the planning area.
9. **Large Lot Zoning: Large Lot Zoning:** This land use planning technique is perhaps most widely used to try to mitigate the impacts of development on water quality. The technique involves zoning development at very low densities to disperse impervious cover over very large areas. Densities of 1 lot per 2, 5, or even 10 acres are not uncommon. From the standpoint of watershed protection, large lot zoning is most effective when lots are extremely large (2 to 20 acre lots). While large lot zoning does tend to reduce the impervious cover and therefore the amount of stormwater runoff at a particular location, it also spreads development over vast areas. The road networks required to connect these large lots can actually increase the total amount of imperviousness created for each dwelling unit. In addition, large lot zoning contributes to regional sprawl. Sprawl-like development increases the expense of providing community services such a fire protection, water and sewer systems, and school transportation. Sprawl also increases the amount of land converted from forest or farmland to lawns.
10. **Mandatory Low-income Housing Construction Ordinance:** These ordinances require those developing large residential projects (often over 50 units, sale or rental) to include a certain percentage of subsidized or low-cost housing (typically 10 to 15 percent of the total number of dwelling units). This requirement can be made economically feasible by tying it to the availability of federal subsidies or tax credits, or by increasing allowable densities. Often those living in hazard areas are low income and often risk reduction efforts disproportionately harm economically vulnerable populations. Mandatory low-income ordinances may help reduce this impact.
11. **Moratoria:** A moratorium is a short-term suspension of right to develop, usually done by not issuing permits. Moratoria can play an important role following a disaster by giving time to set priorities for response and potential mitigation efforts.

12. **No Adverse Impact:** "No Adverse Impact" (NAI) floodplain management is a managing principle developed by the Association of State Floodplain Managers (ASFPM) to address the shortcomings of the typical local floodplain management program. Rather than depending on minimum requirements of federal or state programs, NAI provides tools for communities to provide a higher level of protection for their citizens and to prevent increased flooding now and in the future.
13. **Overlay Zones:** These zones coexist with other zones, operating like a transparency overlaying existing land use controls. Examples include floodplain and historic districts; within these areas development is regulated by the standard zoning ordinance and the unique requirements of the overlay zone.
14. **Performance Zoning:** This technique is designed to ensure an acceptable level of performance within a given zoning district such as providing a certain open space ratio, an impervious area target, or a desirable density. Performance zoning is a flexible approach that has been employed in a variety of fashions in several different communities across the country. Performance factors include traffic or noise generation limits, lighting requirements, stormwater runoff quality and quantity criteria, protection of wildlife and vegetation, and even architectural style criteria.
15. **Rate Allocation Systems:** Growth Phasing: Allocation systems and growth phases specify a rate of growth, which can be a percentage of total growth or a set number of units or square footage allowed per year.
16. **Rolling easement:** Texas offers an example of a rolling easement. For Texas, coastal construction controls are based primarily on two statutes: the Texas Open Beaches Act (TOBA) of 1959, which guarantees public access to the beach with an easement over the dry beach up to the vegetation line; and the Dune Protection Act (DPA) of 1973, which establishes state permitting authority up to these "dune protection lines." An amendment to the DPA in 1991 expanded regulatory authority up to the greater of 1,000 ft from the vegetation line or to the first public road running parallel to the beach for beach access purposes, and up to 1,000 ft from mean high tide to protect critical dune areas. Any structure, bulkhead, revetment, or excavation is effectively prohibited on the beach.

Since the boundary is the line of vegetation, the result is a "rolling easement" that follows an eroding or accreting shoreline. Fixed structures can be built prescribed distances landward of the easement (typically 200 ft, but this can vary by locality), but they are subject to forced removal if the vegetation line moves landward of the structure. The developer and property owner assume the risk. If the shoreline is stable or accreting, the structure is physically and legally "safe." If the shoreline erodes, it is difficult for the owner to avoid the impacts of what amounts to trespassing on the public easement.

17. **Setback, Buffers...:** Set back regulations are tools in land use regulation. They refer to the distance which a building or other structure is set back from a street or road, a river or other stream, a shore or flood plain, or any other place which needs protection.
18. **Setting Population Limits, Development Caps:** As the name implies, these are absolute limits on housing units or population itself. If a limit succeeds in limiting growth but demand for housing is high, property values will necessarily increase, which can affect the character of the community. The limits themselves do not address quality, type, and location of growth, and restricting only one development sector can lead to an imbalance of growth. Not surprisingly, a restriction on growth can cause development to leapfrog out to neighboring jurisdictions.
19. **Special Exception:** This term, which is often used interchangeably with "conditional use," is used for activities that are permissible but require an additional layer of approval because they need additional attention or cannot be reasonably accommodated in a traditional zoning ordinance. In some cases, the use can be by right if the developer meets certain conditions.
20. **Subdivision Regulations:** Subdivision regulations govern the division of a lot, tract, or parcel into two or more lots, tracts, parcels, or other divisions of land for sale or development. In addition to controlling the configuration of parcels, subdivision regulations set standards for developer-built infrastructure. Many communities include utilities and impact fees/system development charges in their subdivision regulations.
21. **Sword of Damocles Provision:** A government agency with the power of eminent domain suspends condemnation of land covered by a comprehensive plan as long as the land use remains compatible with the plan. If the landowner proposes or commences a use in contravention of the plan, the land is taken into public ownership.
22. **Transfer of Development Rights (TDR):** These programs treat development as commodity separate from land itself. The government awards development rights based on value or acreage of land, and establishes sending and receiving areas for these rights. The sending areas contain land the government, for various reasons, seeks to protect. In these zones, landowners do not have enough rights to develop their land, but they can sell rights to developers in receiving areas. With these rights, projects can take on higher densities than would otherwise be permissible. In addition to density, TDR programs can be used to affect the type of uses if the rights are for specific kinds of development, as opposed to one general purpose right.
23. **Urban Growth Boundary:** This planning technique establishes a dividing line between areas appropriate for urban and suburban development, and areas appropriate for agriculture, rural, and resource protection. Boundaries are typically set up for a 10- or 20-year period and should be maintained for the duration of the life of the planning period. Boundaries may be examined at planning period renewal intervals to assess

whether conditions have changed between planning cycles, to ensure a consistent playing field for both the marketplace and citizens.

24. **Variance:** A variance is an administrative exception to land use regulations. The use and application of variances can differ considerably throughout the great number of municipalities worldwide that regulate land use on this model. The issuance of variances may be very common, or nearly unheard-of in a given municipality. This can depend on a municipality's regulations, built environment and development pattern, and even political climate. One city may view variances as a routine matter, while another city may see variances as highly unusual exceptions to the norm. Community attitudes and political climates can change within a city as well, affecting the manner in which variances are granted even when no changes are made to the regulations governing variances. Typically, in the United States, the process for a variance must be made available to a landowner upon request, or the municipality may be in danger of committing a regulatory taking. The variance process has been described as "'a constitutional safety valve'" to protect the rights of landowners."

## Capabilities – Tools: Planning Strategies

Daniel H Burnham: Make no little plans; they have no magic to stir men's blood and probably will themselves not be realized. Make big plans; aim high in hope and work, remembering that a noble, logical diagram once recorded will not die

Planning can be divided into three broad categories:

- **General Community Plans:** These are usually multi functional community wide plans and include Master Plans, County Development Plans, Comprehensive Plans, Regional Master Plan and Hazard Mitigation Plans
  - **Functional Plans:** Function plans refer to those that address specific functions such as transportation, contingency planning, and emergency management.
  - **Special Purpose Plans:** These plans could include those that address the transfer of development rights or Tax increment financing.
1. **Basin Wide Organizations:** According to research by Professor Warren Campbell, there are more than 35,000 special flood- and water-related districts in the United States. They generally focus on a single task, such as providing a utility or fire prevention. Some specifically address dikes. Many are water-delivery or wastewater-treatment districts, which give them a special interest in river management. They often cross city or county borders... Many have taxing authority and the majority of these base their assessment on the average number of square feet of impervious surface within the parcels in question. (Professor Warren Campbell, "Western Kentucky University Stormwater Utility Survey 2008." May 2008)
  2. **Biological Opinion-Puget Sound:** In 2008, the National Marine Fisheries Service (NWFS) issued a Biological Opinion challenging NFIP program requirements. The opinion noted that continued implementation of the NFIP in the Puget Sound adversely affects the habitat of certain threatened and endangered species. As a result of the Opinion, FEMA was instructed to modify implementation of the NFIP minimum criteria required of communities participating in the NFIP within the Puget Sound Region. FEMA was instructed to place additional restrictions on development in the floodway, the channel migration zone plus 50 feet, and the riparian buffer zone (RBZ).
  3. **Community Rating System:** The CRS is a program that provides a flood insurance premium rate reduction from five to 45 percent based on a community's floodplain management activities.
  4. **Comprehensive Planning:** Comprehensive plans and land use plans identify how a community should be developed and where development should not occur. They govern the rate, intensity, form, and quality of physical development. A thorough comprehensive plan will also address economic development, and environmental, social, and hazard mitigation concerns. Uses of the land can be tailored to match the land's hazards,

typically by reserving hazard areas for parks, golf courses, backyards, wildlife refuges, natural areas, or similar compatible uses.

5. **Contingency of Operations Plans and Continuity of Operations Plans (COOP):** Contingency plans are prepared by businesses for specific situations when things could go wrong. COOP plans are similar to Continuity of Operation plans devised by governments.
6. **Focused Public Investment Plan (FPIP):** This is basically a Capital Improvements Plan for a specific area, known as a Public Investment Area (PIA). A Focused Public Investment Plan (FPIP) coordinates and concentrates investments such as water, sewer, streets, schools, and parks. While funding mechanisms and expected contributions from developers may vary, the objective is to supply fully served land for development. FPIPs limit growth is dispersed and has inadequate public services.
7. **Forest Harvesting and Management Plans (FPIP):** Harvesting plans to assure not only profitable economic return, but also environmental benefits such as reduced discharge and sediment mobilization.
8. **Hazard Mitigation Plans:** A hazard mitigation plan specifies actions a community will take to reduce its vulnerability to natural hazards or to minimize the impact of a hazard event. Post-disaster reconstruction plans outline the policies or planning instruments that community officials will rely on for post-disaster decision-making. The two are often linked because the post-disaster window is considered an opportune time to make a community more disaster resilient. Disaster Mitigation Act of 2000 amended provisions of the United States Code related to disaster relief and provided the legal basis for FEMA mitigation planning requirements for state, local and Indian Tribal governments as a condition of mitigation grant assistance. The Plan and the process undertaken supports long-term risk reduction strategies and breaking the cycle of disaster damage, reconstruction, and repeated damage. The Plan creates a framework for risk-based decision making to reduce damages to lives, property, and the economy from future disasters. Larger communities have prepared Hazards Mitigation Plans.
9. **Levee and dike breaching:** In 2011, the dikes below Cairo, Illinois were blown to prevent flooding within the town. Farmland in Missouri was flooded, and farmers took legal action despite an agreement acknowledging this possibility. Cairo was not flooded. In 1990, Mt. Vernon, Washington was saved from flooding because a downriver levee was destroyed and Fir Island farmland was flooding. Mt Vernon was saved. Such actions can be designed into levee systems, and agreements can be written reducing losses associated with levee breaching.
10. **National Flood Insurance Program (NFIP):** The NFIP was created in 1968 as a way to offer an alternative to disaster assistance for properties subject to flood damage. In return for federally supported flood insurance, local governments had to agree to regulate development in their floodplains in accordance with the Program's criteria. Since 1979, the program has been administered by the Federal Emergency Management Agency (FEMA).

11. **Post-storm Reconstruction Plans:** Post-disaster reconstruction plans outline the policies or planning instruments that community officials will rely on for post-disaster decision-making. The two are often linked because the post-disaster window is considered an opportune time to make a community more disaster resilient.
12. **Reconstruction Triage: Reconstruction Triage:** Reconstruction triage means sorting priorities for reconstruction. The use of a triage for decisions on reconstruction should be outlined in a post-disaster reconstruction plan, created prior to the disaster
13. **Special Area Management Plans and the Coastal Zone Management Program (CZM):** The CZM program is a voluntary state-federal partnership that encourages states to adopt their own management programs in order to meet the federal goals of protection, restoration, and appropriate development of coastal zone resources. The states have broad latitude to adapt federal goals to state and local circumstances, needs, and legal traditions.
14. **Specific Development Plans; Shadow Platting:** This technique creates a plan that describes land uses and subdivisions in greater detail and covers a smaller area than a comprehensive plan, zoning map, or public facilities plan. The plan may include designation of specific uses and/or design standards that vary from the zoning ordinance, and may even contain enough detail to allow approval of developments that comply without public hearing
15. **Stormwater Management Plan:** Stormwater Management: Beyond maintenance and improvement of urban storm water systems, land treatment measures are effective means of counteracting the effects of urbanization (particularly the increase in impervious surfaces) on runoff. Land treatment measures include maintenance of trees, shrubbery, and vegetative cover; terracing; slope stabilization; grass waterways; contour plowing; and strip fanning. The use of perennial vegetation, such as grasses, shrubs, and trees provides cover for the soil; prevents erosion; slows the rate of runoff; increases infiltration; and reduces water pollution. Terracing involves a raised bank of earth having vertical or sloping sides and a flat top for controlling surface runoff. Strip cropping is growing crops in a systematic arrangement of strips or bands along a contour.
16. **Capital Improvement Plan (Program), or CIP:** A Capital Improvement Plan (Program), or CIP, is a short-range plan, usually four to ten years, which identifies capital projects and equipment purchases, provides a planning schedule, and identifies options for financing the plan. Essentially, the plan provides a link between a municipality, school district, parks and recreation department and/or other local government entity, and a comprehensive and strategic plan and the entity's annual budget.
17. **Focused Public Investment Plan (FPIP):** This is basically a Capital Improvements Plan for a specific area, known as a Public Investment Area (PIA). A Focused Public Investment Plan (FPIP) coordinates and concentrates investments such as water, sewer, streets, schools, and parks. While funding mechanisms and expected

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contributions from developers may vary, the objective is to supply fully served land for development. FIPs limit growth is dispersed and has inadequate public services.

## Capabilities – Tools: Awareness Strategies

1. **Community Awareness Programs:** Community awareness programs may be used in conjunction with and/or in place of real estate disclosure requirements to directly educate the potential homebuyer and the community of hazard risks. Information can be presented in a number of ways, including information pamphlets, brochures, literature, and workshops. Topics may include identification of hazards, things to consider in purchasing a home or business, and ways to limit exposure and reduce future property damages.
2. **Disaster Warning:** Warning systems that include a method of activation, maintenance, and response training can save lives. The “All Hazard Alert Broadcast” (AHAB) system is an example of such a system. AHAB is a single unit or network of warning sirens strategically placed to warn those who are outside or who are in close proximity to a siren. The sirens are placed on the top of a pole that looks much like any other utility pole. AHAB is a supplemental warning system. It may not always be heard inside homes or businesses or when people are sleeping. It has a range anywhere from a mile to a mile and a half, depending on many different conditions. AHAB is only one component in a comprehensive warning system. Other warning elements include NOAA Weather, radios, the Emergency Alert System on radio and TV, the Telephonic Warning System, loudspeakers, and sirens.
3. **Disclosure Requirements:** Real estate disclosure requirements require notification that the property to be purchased is located in a hazard-prone area. Currently, federally regulated lending institutions must advise applicants for a mortgage or other loan that it is to be secured on a building which is in a floodplain as shown on the Flood Insurance Rate Map (FIRM). California law requires explicit disclosure of six hazard zone maps (including FIRM) and any other information that is pertinent to the sale. Since the buyer can back out of the purchase without penalty, the disclosures are usually comprehensive and made shortly after the offer is accepted, if not before.
4. **Mapping Hazards:** The application of vulnerability and/or risk analysis, inventories, and other studies to maps is an important step in reducing disaster potential. Hazards can be located through cooperation with a number of federal and state agencies. Use of a geographic information system (GIS) to overlay high risk areas over property maps can serve as indicators of sites for mitigation.
5. **Monitoring Hazard Areas:** Hazards, by definition, represent likely changes in condition; no matter whether the change is caused by climate, flooding, earthquake, or winter storms, risks can be reduced through monitoring. Seismic monitors in Japan provided vital minutes of response time that saved lives during the March 2011 earthquake and tsunami.

## Capabilities – Tools: Revenue and Expenditures

Government financing includes revenues and expenditure.

Revenues are typically secured through direct and indirect taxation but can also include user fees, grants and investment.

- **Direct:** The term direct tax generally means a tax paid directly to the government by the persons on whom it is imposed.
  - **Indirect:** An indirect tax is generally referred to a tax where the tax is not made by the person for whom it is imposed. Property tax is a direct tax while sales tax or impact fees may be considered indirect
1. **Acquisition (fee simple, and so on):** Fee-simple Acquisition of Undeveloped Land: Fee-simple acquisition of undeveloped land includes the purchase of the full “bundle of rights” contained in real property. Fee-simple acquisition of undeveloped land is important for two reasons. First, it can involve removal of hazardous sites from the private market, thereby reducing potential threat to the public. Second, fee-simple acquisition can act as a development management tool for guiding the location of development.
  2. **Acquisition (life estate, for example):** A life estate is a concept used in common law and statutory law to designate the ownership of land for the duration of a person's life. In legal terms it is an estate in real property that ends at death when there is a "reversion" to the original owner. The owner of a life estate is called a "life tenant"
  3. **Capital Improvement Plan (CIP Developer Extractions):** Fees to offset the burdens of new development on the community. Exactions contribute to regional equity by ensuring that a new development pays a fair share of the public costs that they generate. Exactions consist of a developer's payment of "impact fees." These fees are used to fund new schools and parks; construction or maintenance of public infrastructure directly connected to the new development; and off-site improvements and services. Exactions are levied on developers in exchange for the approvals to proceed with a project.
  4. **Development Impact Tax/Improvement Tax:** These are taxes on new construction, including alterations to existing structures, usually paid while applying for building permit.

Unlike a fee, this charge does not need to be based on the cost of improvements needed to serve the new development, and there are no restrictions on how the revenues can be spent.

5. **Differential Assessment/Taxation:** This technique can take on several different forms: reducing the tax rate applied to the assessed value of resource production land such that payments only cover essential services; reducing the assessed value of resource production land such that payments only cover essential services; reducing the assessed value of land to a percentage of urban land; assessing the value based on current income-producing capacity, as opposed to the market value (most states allow land in several specified uses, such as forests and open space, but some limit to farmland).

The differential assessment reduces the tax burden on land facing development pressure and recognizes that some tracts put less demand on services funded by property taxes. The flip side of this recognition is that the loss of tax revenue can be substantial. An unintended consequence of having preferential status is that it can be a haven for speculation as property value rises, and it can force development further out as close-in property owners hold out and sustain tax benefits.

This effect can be reduced with either a use change/conveyance penalty or a deferred taxation system, where the difference between market and preferential taxes are paid when the property is converted to a higher use (laws vary, but the range is five to ten years of tax deferred taxes due). However, the amount of accumulated taxes may not be enough to offset profits, and there may be a leapfrog effect because land farther out will have lower market value and thus lower accumulated taxes. In addition, basing the tax rate on income production for a specific property will encourage development of best farmland because it will have the lowest accumulation of deferred taxes (which can be avoided by having a uniform rate). The few legal challenges have been based on uniform taxation provisions in state constitutions.

6. **FEMA Grant Programs:** See references on the following:

- Hazard Mitigation Grant Program
- Flood Mitigation Assistance
- Pre-Disaster Mitigation Grant,
- Repetitive Flood Claims,
- Severe Repetitive Loss,

7. **Internalizing externalities:** Externalities are impacts generated by one economic actor, which are felt by others, but the market doesn't bring these impacts back to affect the actor that originated them. Impacts can be positive or negative.

Internalizing externalities would require those benefiting from an action to pay the external actors for the benefit, or in case of a negative impact, reimburse external actors for the loss. For instance, those that benefit from a levee should pay for the protection. Those downstream of the levee receiving flood damage because of the

levee restricting storage should be reimbursed by those upstream protected beneficiaries.

8. **Land Gains Taxation, Transfer or Development Taxes:** Vermont is the only state to employ a tax on the profits gained from the sale of land. The amount is inversely proportional to the length of time land is held, and it can apply only to value of land, not improvements. There is an exception for the principal residence of seller. Transfer taxes are simply assessed against the seller of land devoted to certain designated uses. Development taxes are charged against developers obtaining permits to convert land in certain categories to more intense uses.

These taxes discourage conversion to higher density, slow the growth rate, and discourage speculation, but they also are not effective for long term protection and may limit needed economic development while owners hold out on selling their property. The land gains tax may be vulnerable to legal challenge under the uniformity clause in state constitutions or based on discrimination against non-residents because of the principal residence exception. On the other hand, the Vermont law sustained a Fourteenth Amendment challenge of arbitrary discrimination against land owners of less than six years.

9. **Increased Cost of Compliance (ICC):** Homes or businesses damaged by a flood may be required to meet certain building requirements. To help cover the costs of meeting these requirements, the National Flood Insurance Program (NFIP) includes Increased Cost of Compliance (ICC) coverage as an option for all new and renewed Standard Flood Insurance Policies.

Flood insurance policyholders in high-risk areas can get up to \$30,000 to help pay the costs to bring insured homes or businesses into compliance with their community's floodplain ordinance.

There are four options available:

- a. Elevation
- b. Relocation
- c. Demolition
- d. Floodproofing (for non-residential buildings only)

10. **Property Tax:** Property tax is imposed at regular intervals on land and improvements to the land. Property tax can also be imposed on the net wealth of individuals or corporations. Many jurisdictions impose estate tax, gift tax or other inheritance taxes on real property at death or gift transfer. Some jurisdictions impose taxes on financial or capital transactions. A property tax (or millage tax) is an ad valorem tax levy on the value of property that the owner of the property is required to pay to a government in which the property is situated. Multiple jurisdictions may tax the same property

11. **Purchase of Development Rights/Easements:** The owner of an easement has one or more of the several rights in land, leaving the rest in the hands of the land owner. Easements either grant an affirmative right to use property, such as a right of access, or restrict the landowner's right to use the property in a particular way. Local governments can purchase an easement in development rights and thus preclude building on the property
12. **Purchase Options (Right of First Refusal):** A right of first refusal guarantees the government the first opportunity to purchase the property, while an option prevents the sale of the property to another party for specified period.
13. **Purchase Sellback/leaseback:** The government can control the use of its land by selling or leasing it to the private sector with restrictions, covenants, and/or negative easements. In so doing, the government maintains control without having to actually manage the property. Where the government sells the property, the restrictions lower the tax burden on the owner.
14. **Sales Tax:** Sales tax is an indirect tax collected by an intermediary (retail store) from the person who bears the ultimate economic burden of the tax (consumer). The intermediary later files a tax return and forwards the tax proceeds to government
15. **Service Areas:** The taxing authority of a government can designate areas which will receive services and those that will not, and it can tax the former at a higher rate. This technique will be more effective if used in conjunction with a regulatory program, which limits development in areas with lower, more attractive tax rates, and a capital program will make the designation more equitable and less open to legal challenge.

The uniformity of taxation provision in most state constitutions can be the basis for legal challenge. Ironically, under-served areas may be more attractive to residents because of their lower tax rate. This would run counter to the intent of a program that limits services in hazard-prone areas.

16. **Special Assessments Districts:** Special assessment districts include property owners who benefit from a specific public improvement. These owners are charged a fee, which can be based on an attribute(s) of the property that is proportional to the benefits received from the improvement, and which is charged to both new and existing development.

There are numerous possibilities, from temporary creations designed simply to raise revenue for a specific improvement to independent, special purpose governmental entities. A commonly used example is the transportation utility fee. While exactions, bonds, impact fees, and other methods are used to pay for transportation improvements, the utility fee covers the maintenance/operation cost of the system(s).

Since this is not a tax, special assessment districts are free from constitutional requirements of uniformity, equality, and double taxation. This technique shifts the financial burden from the general public to those directly benefiting. The revenues are more predictable than sources which depend on development cycles, which makes issuing bonds easier.

17. **State and local income taxes:** Local taxes are imposed in addition to Federal income tax. State income tax is allowed as a deduction in computing Federal income tax, subject to limitations for individuals. Some localities impose an income tax, often based on state income tax calculations. Forty-three states and many localities in the United States impose an income tax on individuals. Forty-seven states and many localities impose a tax on the income of corporations.
18. **Tax Increment Financing:** TIF is a public financing method, which has been used as a subsidy for redevelopment and community improvement projects in many countries including the United States for more than 50 years. It is a method that exploits future gains in taxes to finance current improvements (which theoretically will create the conditions for those future gains). When a development or public project is carried out, there is often an increase in the value of surrounding real estate, and perhaps new investment that will generate additional tax revenue to pay for the initial improvements.