Excessive and prolonged saturation of the soil decreases oxygen levels; this impedes respiration and ultimately roots suffocate and die. Further, plants inundated may have significant reduction in photosynthetic capacity outbreaks of pathogenic disease such as Fusarium, Sclerotinia white mold and Phytophthora capsica.

Adaptation in crop varieties: Introduce crop varieties that flood-resistant to achieve consistency in yields and better productivity. The introduction of such varieties should be selected in conjunction with the farming community at a local level depending on weather projections and planning.

Development of early warning systems: It is critical for farmers to have access and understand information in relation to weather forecasts, flooding risks, climate change impacts and adaptations, as well as climate models. Accessing information on risk and weather forecasting will allow farmers to determine the best planting schedules. Locally, such information can be accessed from the Hydromet Office, Ministry of Agriculture.

Governmental flood relief and assistance:
Often times farmers are faced with complete loss of crop after floods; which affects their livelihoods. With the absence of agricultural insurance farmers limited by the lack of finance to restart cultivation after flooding. Governmental assistance to recover after floods are ideal to assist farmers to return to the farm. Locally, the Government of Guyana through the Ministry of Agriculture rolled out a widespread flood relief campaign to assist farmers who suffered lost from flooding to return to the land.

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Soil Management and Farm Mechanization

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FARMING AFTER FLOODS

Farming After Floods

Flood is a global challenge in the light of the reality of climate change. **Climate-resilient agriculture** is an integrated approach to manage the components of agriculture and food security that are interlinked and directly impacted by climate change. Over the years floods have caused severe damage to property, infrastructure, and crops.

The severity of crop damage due to flooding depends on several factors, including:

Duration of the flooding:

Excessive and prolonged saturation of the soil decreases oxygen levels; this impedes respiration and ultimately roots suffocate and die. Further, plants inundated may have significant reduction in photosynthetic capacity outbreaks of pathogenic disease such as Fusarium, Sclerotinia white mold and **Phytophthora capsica.**

Effects on soil:

Flooding may result in the deposition of sand and debris on productive lands and erosion of agricultural soils. Excessive water can leach water soluble nutrients such as nitrate-nitrogen and potassium beyond the crop's rooting depth particularly in well-drained lighter textured soils. In heavier soils, nitrate nitrogen can be lost through denitrification. Available phosphorus can be reduced due to flooding decreasing the populations of arbuscular mycorrhizae fungi responsible for promoting phosphorus availability.


Root Rot


Biochar

Flood Recovery Plan

01 Repairing the physical damage to soil: Farmlands are exposed to erosion, sediment deposition, and crop residue accumulation as a result of flooding. In order to resolve the problem of debris and sedimentation in fields, it must be determined if the material and objects can be tilled into the soil, or if physical removal is required. To avoid compaction of soils that were inundated, it is crucial to allow soils drain and dry out sufficiently before working the soil.

02 Improve drainage: Management of the rise and drainage of floodwater within a farmlands is critical to prevent inundation. Low cost mechanisms that can be implemented includes the construction of soil bunds and drain ditches. Soil bunds help to protect farmlands from unexpected floods and they can also allow farmers to drain or retain water as needed; while drainage ditches can be used to channel away excess floodwaters.

03 Enhancing soil resilience: Improving soil health is a key component in building crop resilience under the impacts of climate change. In relation to flooding, soil testing for balanced nutrient application and improved application techniques are imperative for the synergy in crop requirements after water has receded . Building soil resilience also includes the enhancement of soil carbon (through the addition of soil amendments such as biochar), and reducing erosion.

04 Converting flat grow beds to raised beds: Raised beds can be achieved by digging deeper drains and mounding to elevate planting area. Wooden grow boxes raised 2ft above ground level can be used in kitchen garden growing systems.

05 Stimulating soil microbial and fungal activity: To compensate for the loss of beneficial soil microorganism it is advised to inoculate leguminous seeds with Rhizobium bacteria to ensure nodulation and nitrogen fixation. **Rhizombium inoculant** can be sourced locally at **NAREI– Soil Management and Farm Mechanization Department**.

During prolonged flood events, arbuscular mycorrhizae fungi (soil microorganisms responsible for increasing phosphorus availability) population decrease significantly. In order to re-establish the fungi population seedlings can be inoculated at transplant or a suitable potting mix inoculated arbuscular mycorrhizae fungi can be used to sow seeds. NAREI through the Soil Management and Farm Mechanization Department retails **S-SOWMix** which is a local potting mix capable of producing healthy inoculated seedlings.