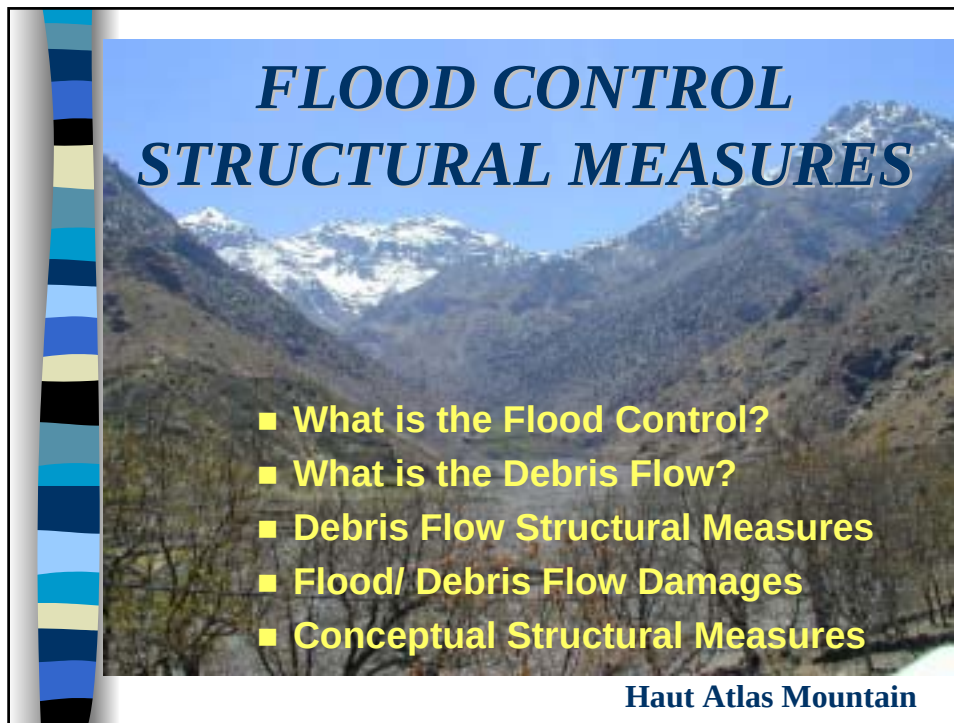




FLOOD CONTROL STRUCTURAL MEASURES

- What is the Flood Control?
- What is the Debris Flow?
- Debris Flow Structural Measures
- Flood/ Debris Flow Damages
- Conceptual Structural Measures

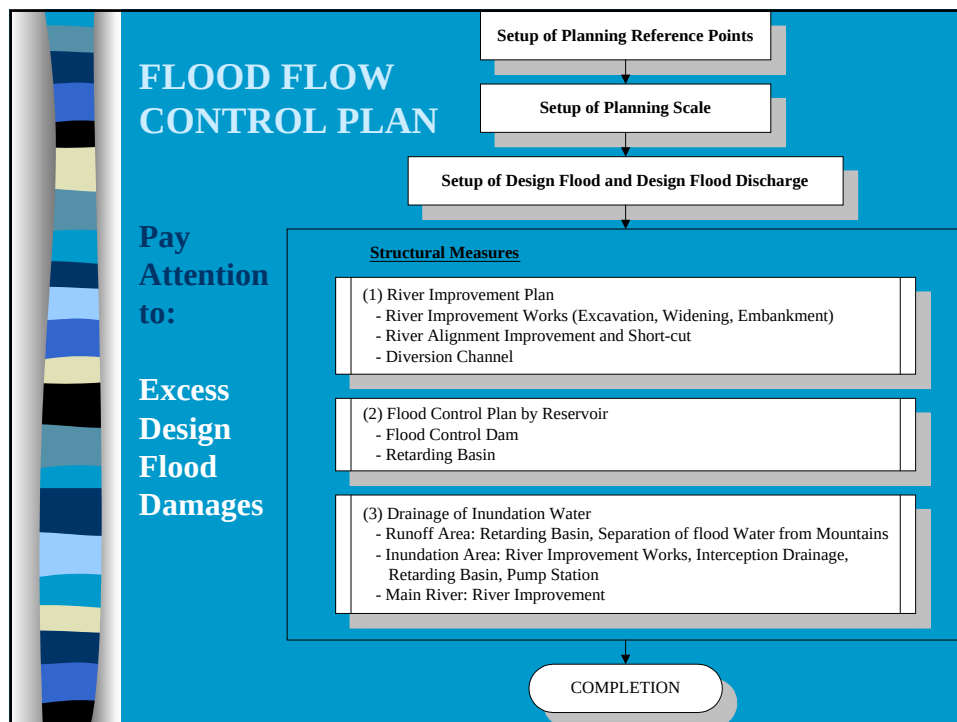
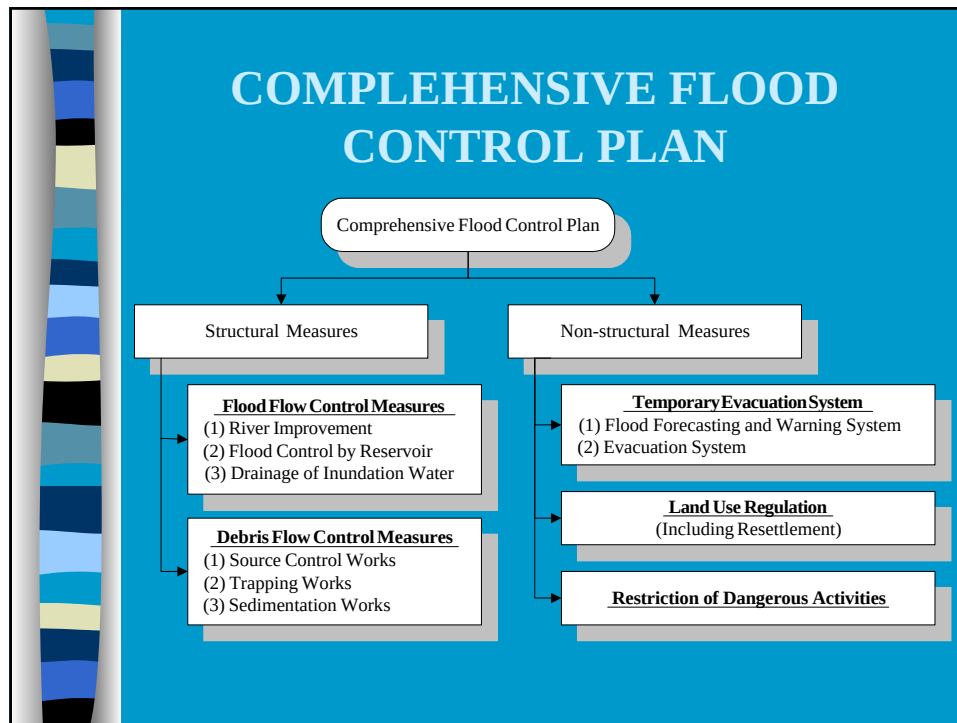
Haut Atlas Mountain



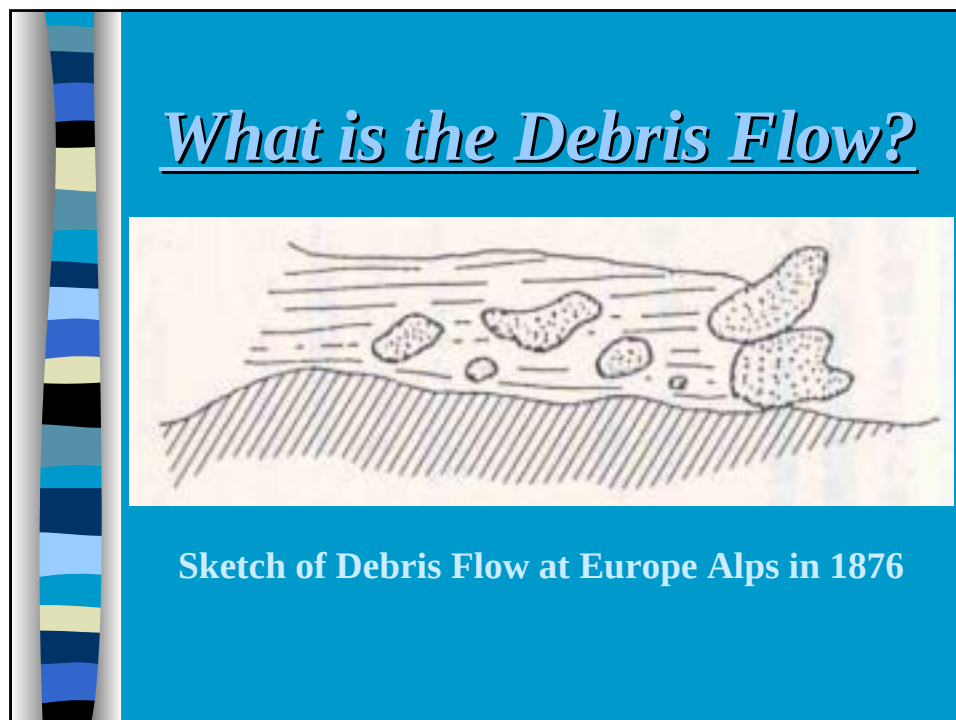
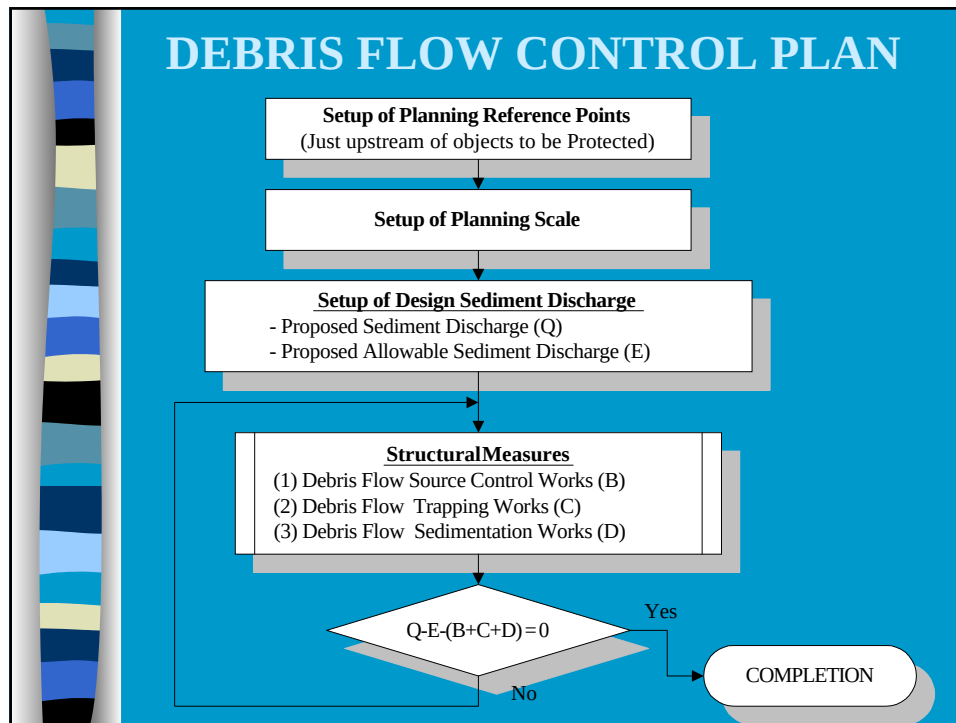
COMPREHENSIVE RIVER DEVELOPMENT PLAN

1. River Basin Utilization Plan in the Background of Social Economy
2. **Comprehensive Flood Control Plan**
3. Water Resources Development Plan
4. Sediment Management and Erosion Control Plan
5. River Environment Management Program

VI. STRUCTURAL MEASURES

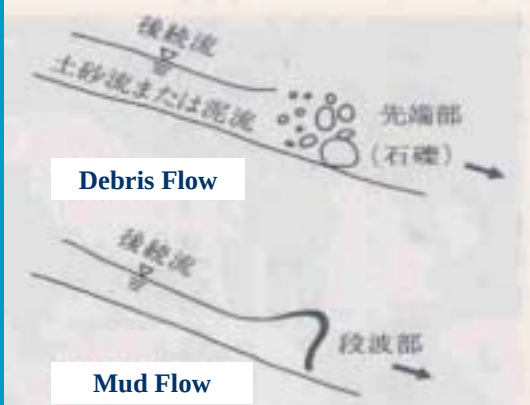


VI. STRUCTURAL MEASURES



Type of Debris Flow

- Debris Flow (sand and gravel type)
- Mud Flow (mud type)
- Earth Flow (the flow between debris flow and tractional flow)

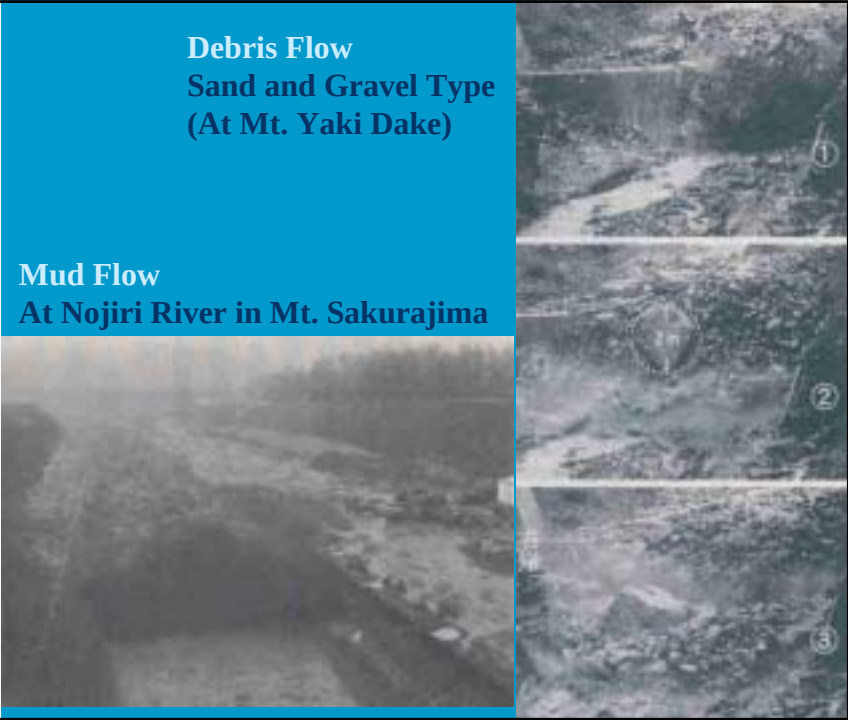


Debris Flow

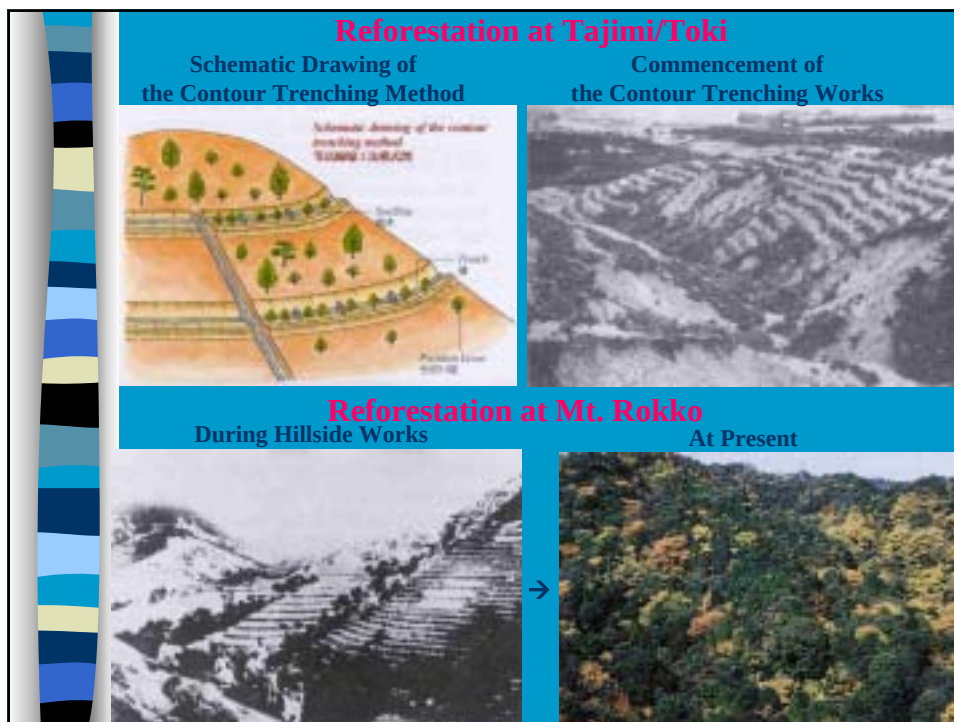
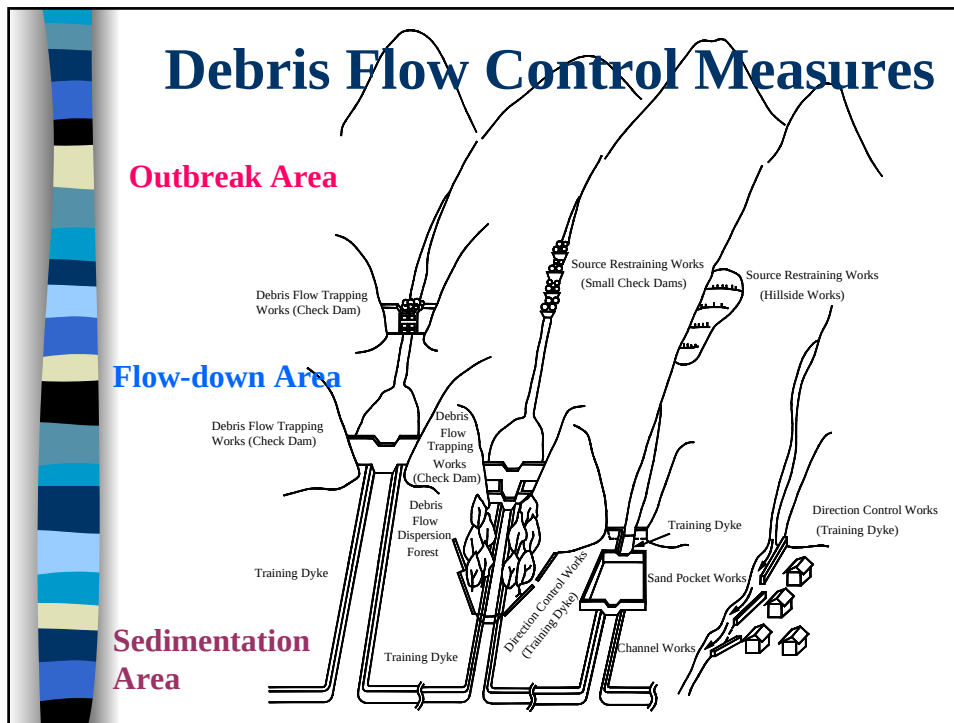
Mud Flow

Debris Flow Sand and Gravel Type (At Mt. Yaki Dake)

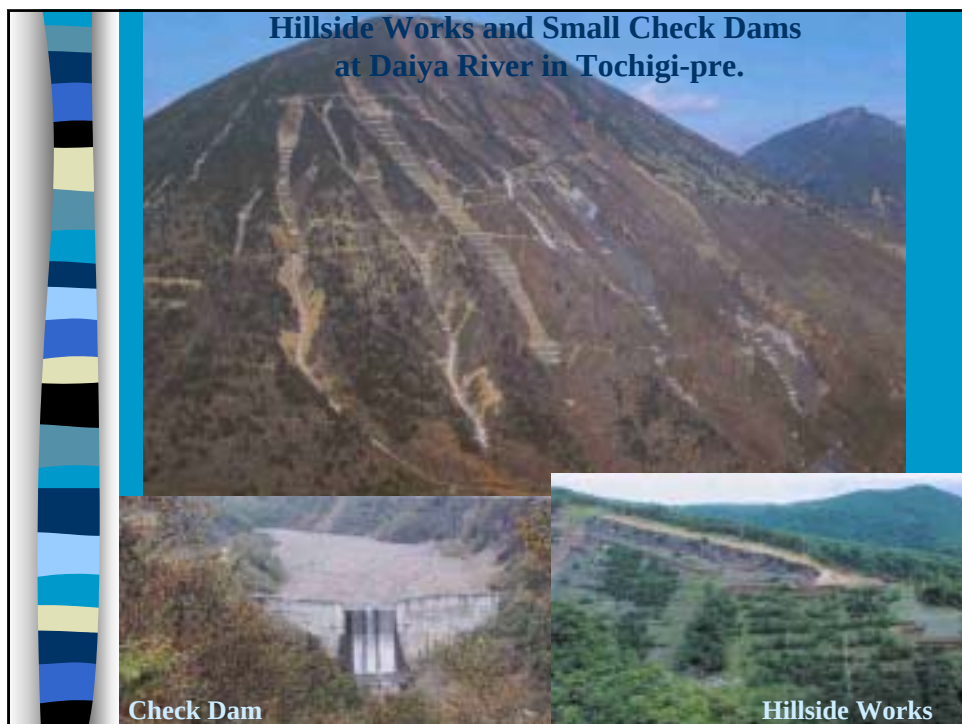
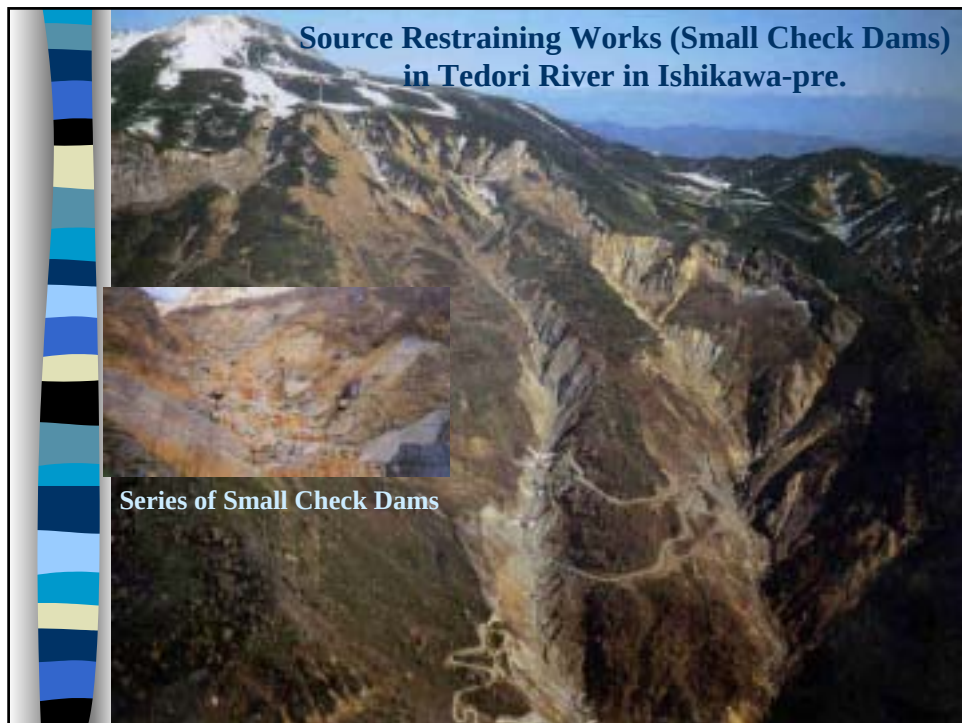
Mud Flow At Nojiri River in Mt. Sakurajima



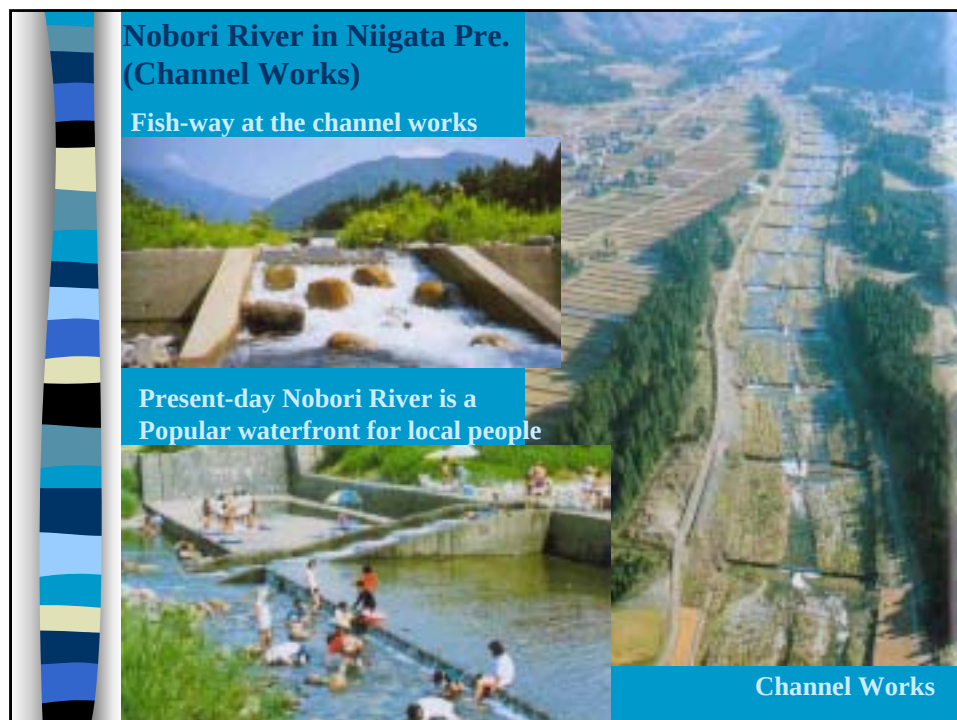
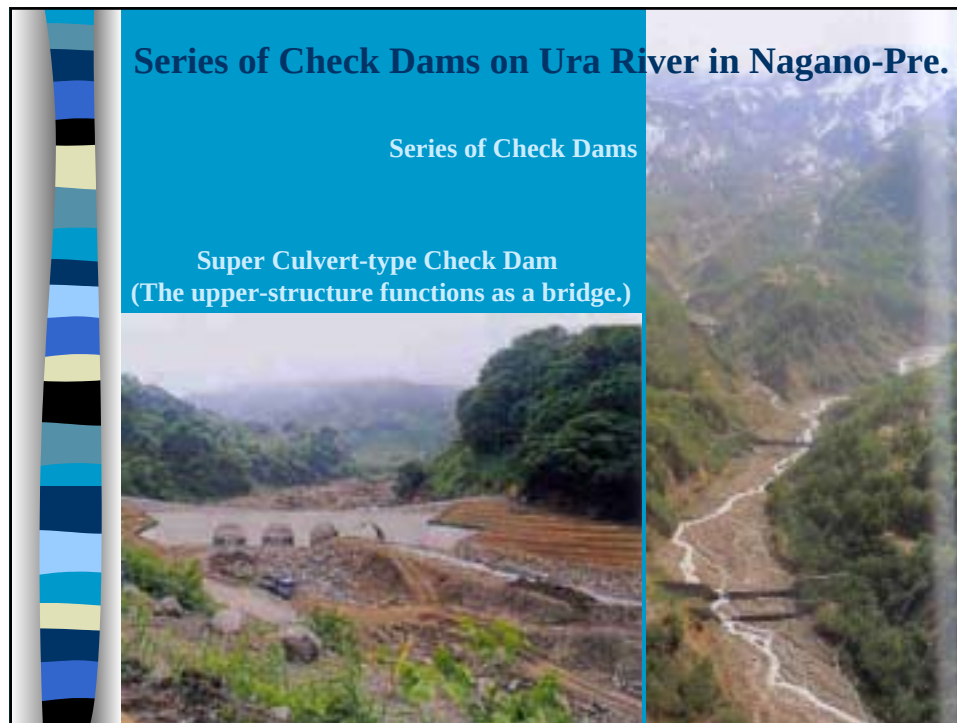
VI. STRUCTURAL MEASURES



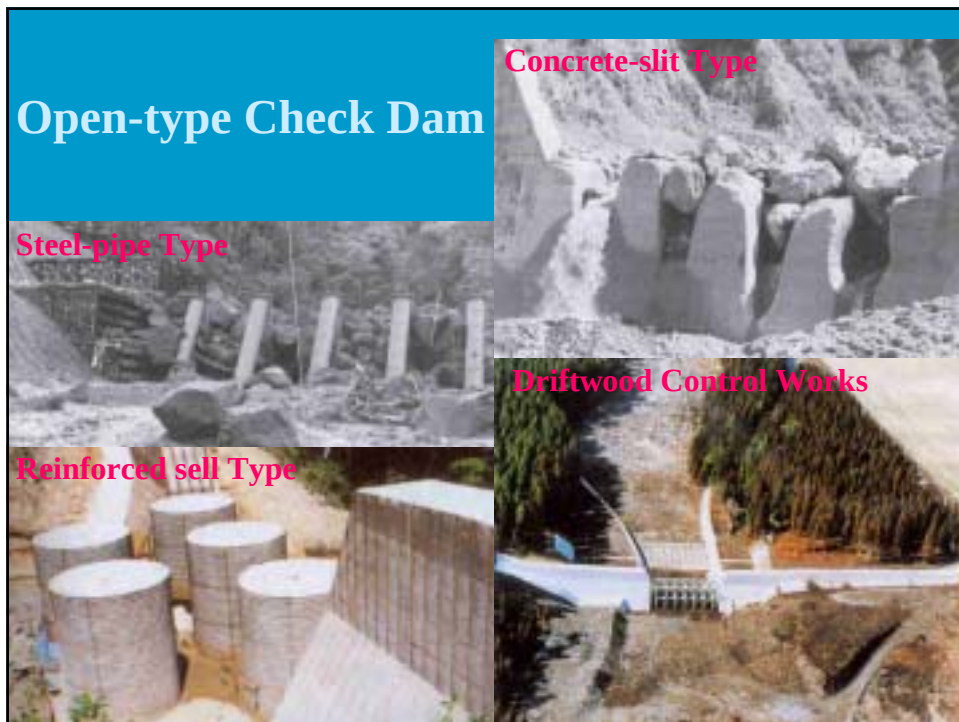
VI. STRUCTURAL MEASURES



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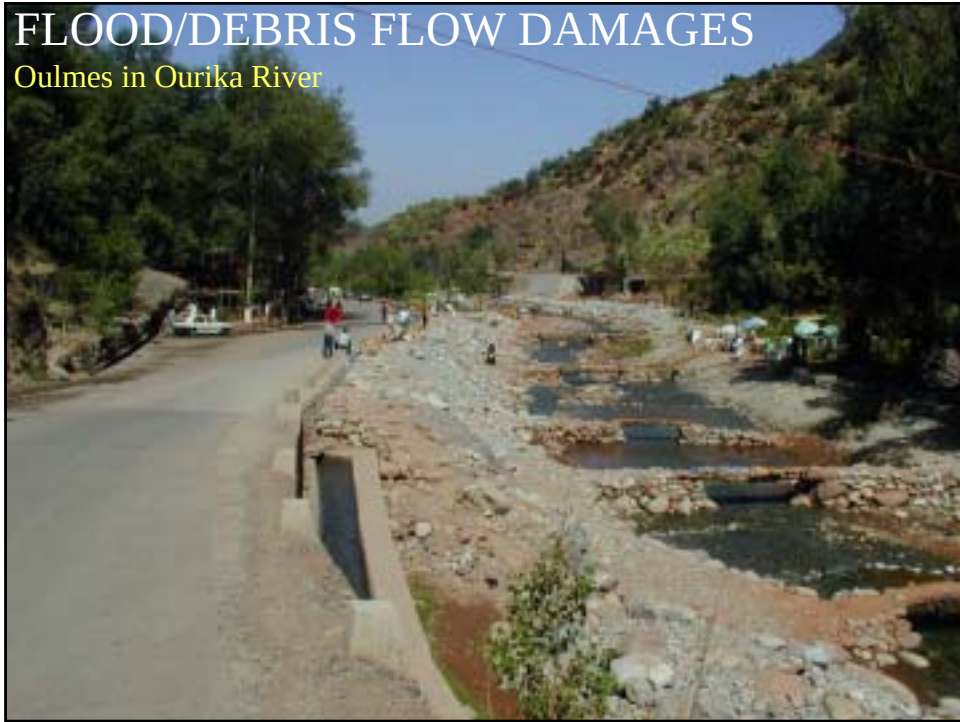
VI. STRUCTURAL MEASURES



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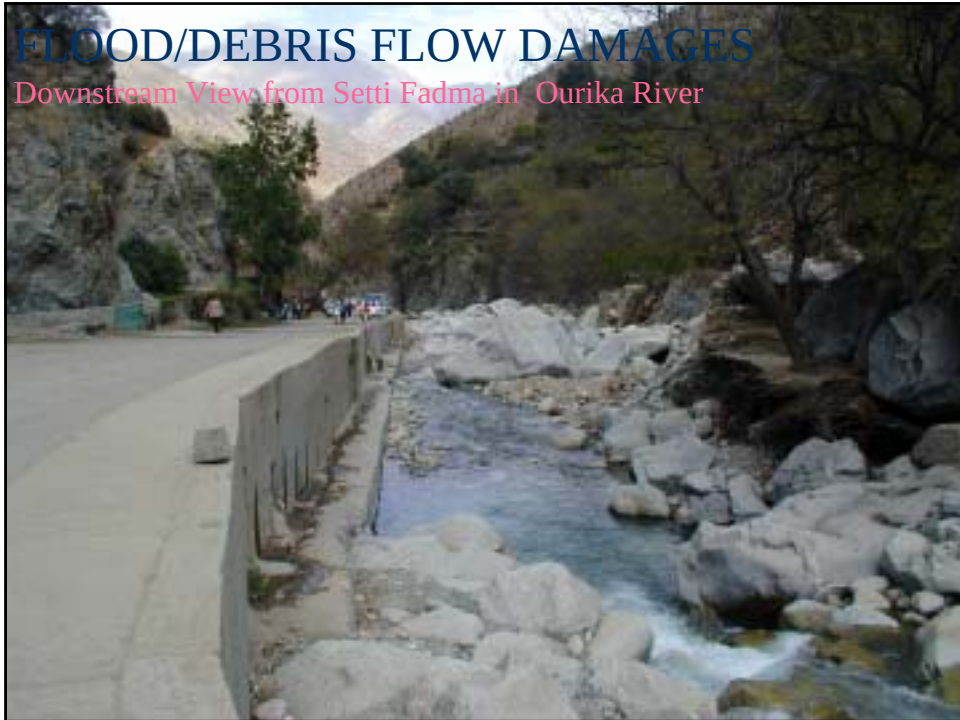
FLOOD/DEBRIS FLOW DAMAGES

Oulmes in Ourika River



FLOOD/DEBRIS FLOW DAMAGES

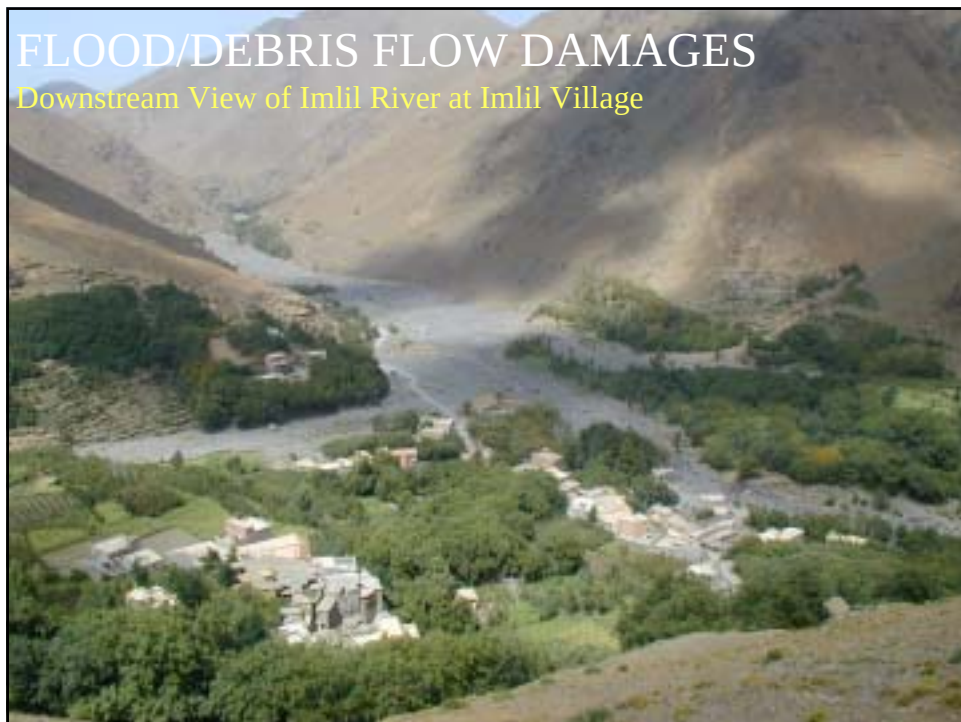
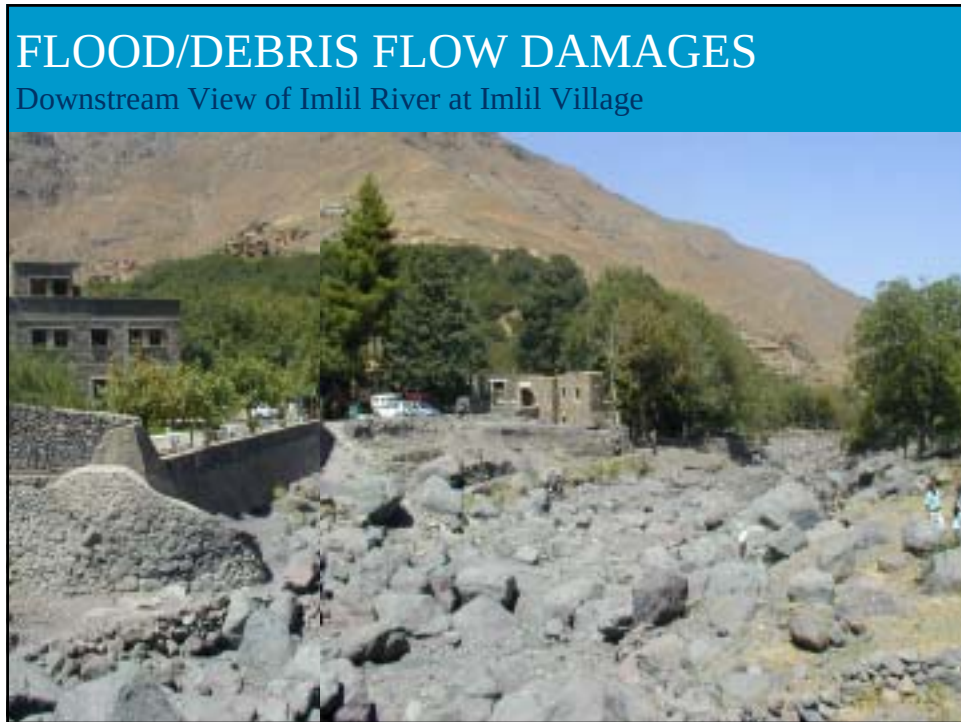
Downstream View from Setti Fadma in Ourika River



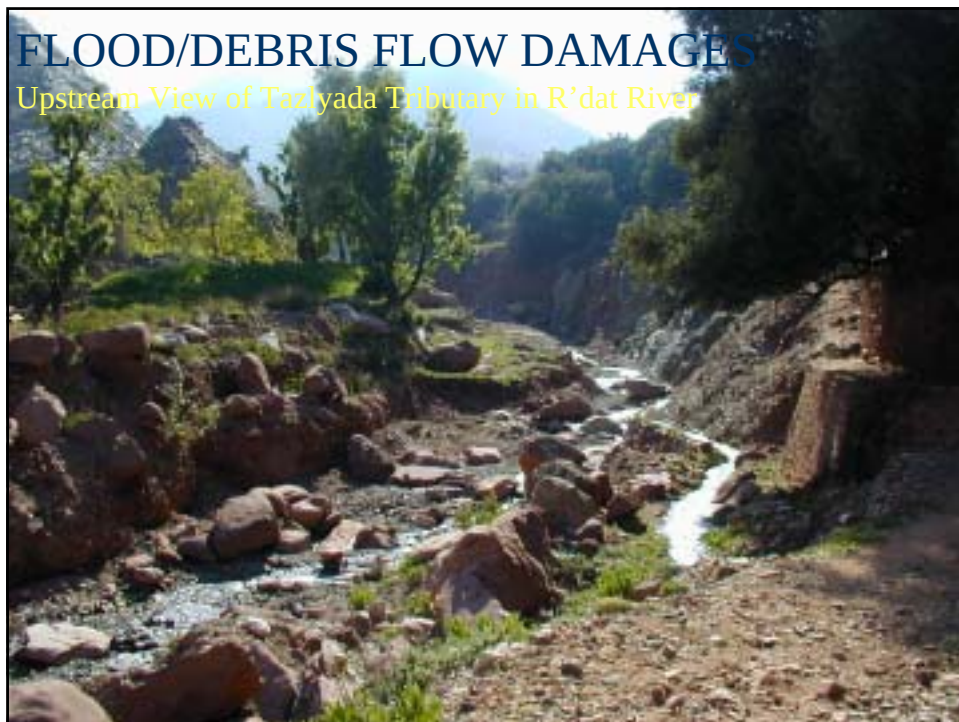
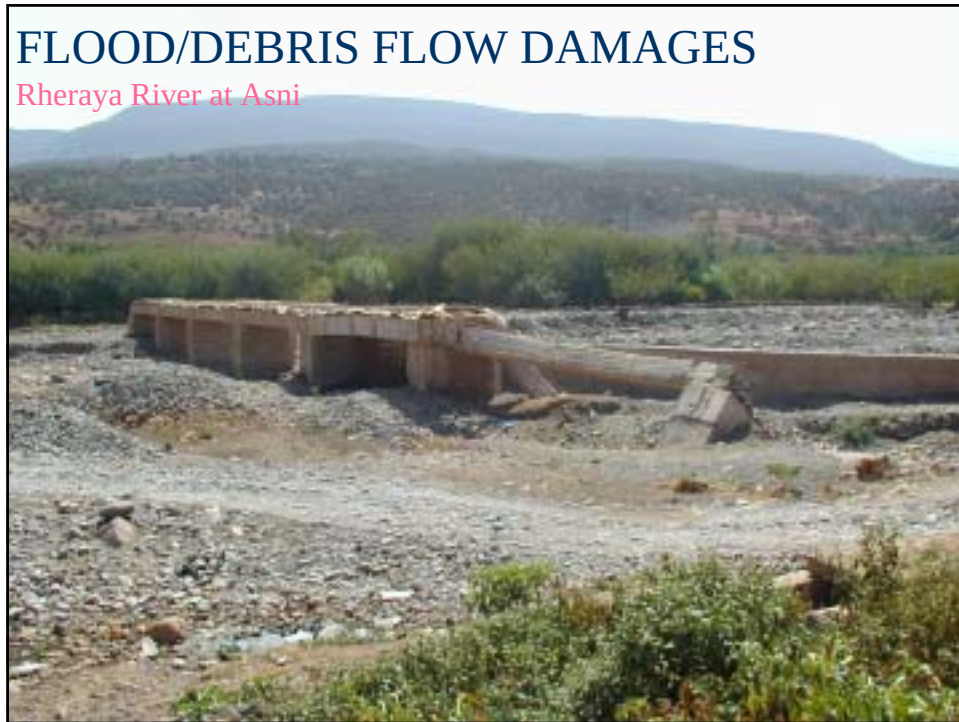
VI. STRUCTURAL MEASURES



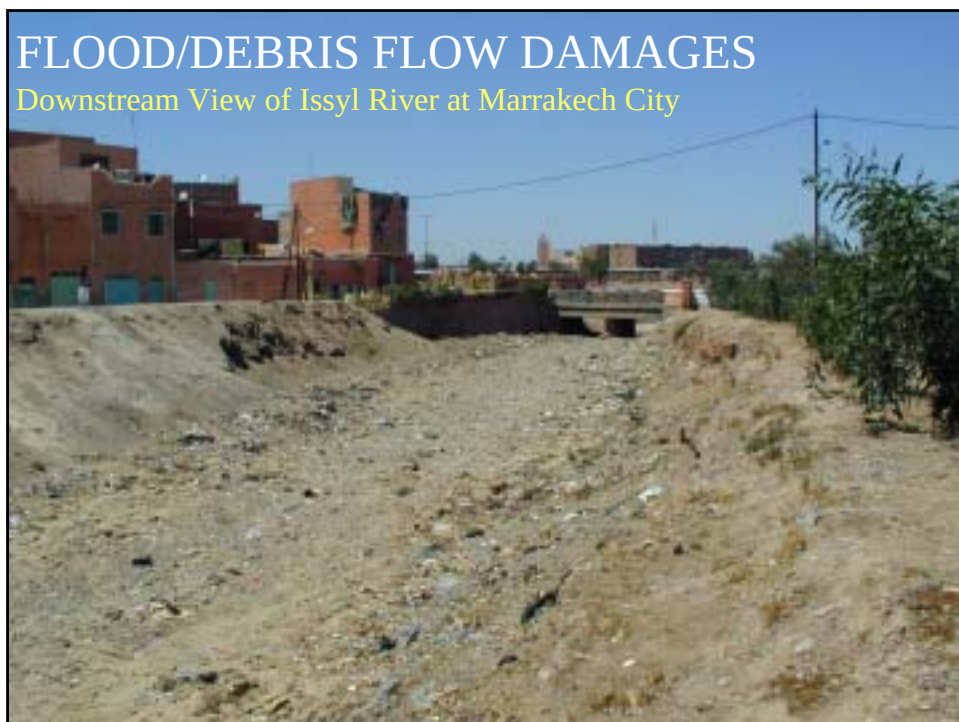
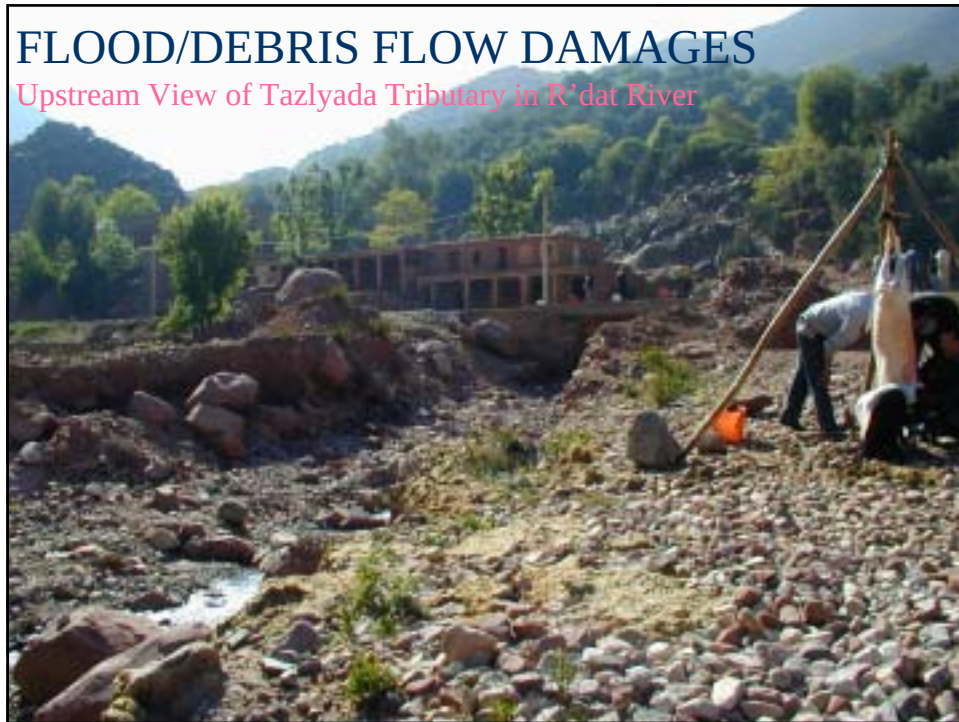
VI. STRUCTURAL MEASURES



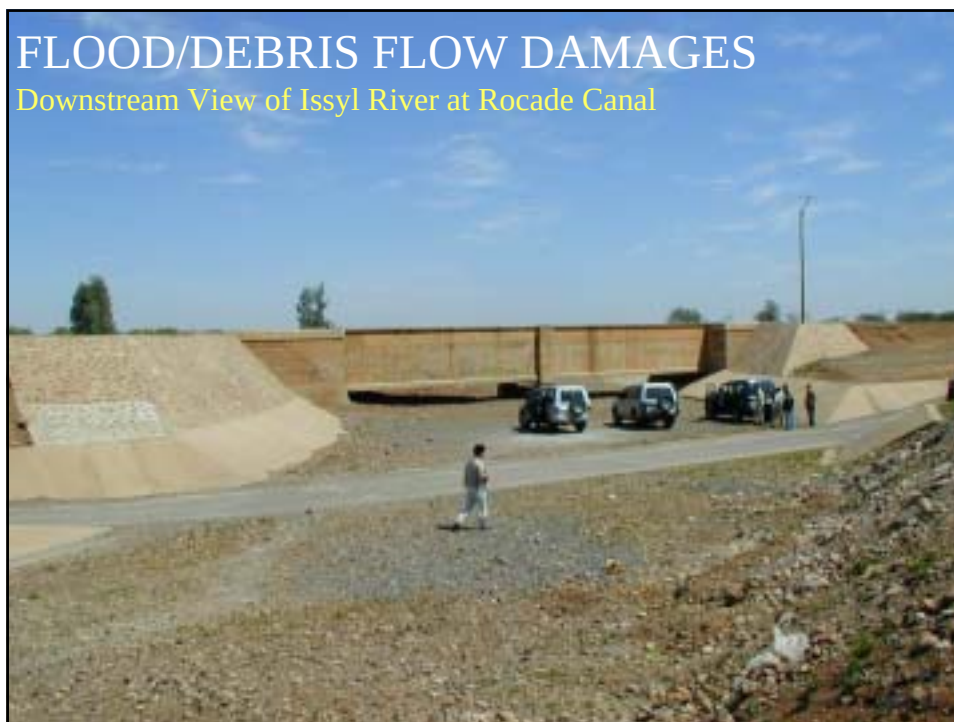
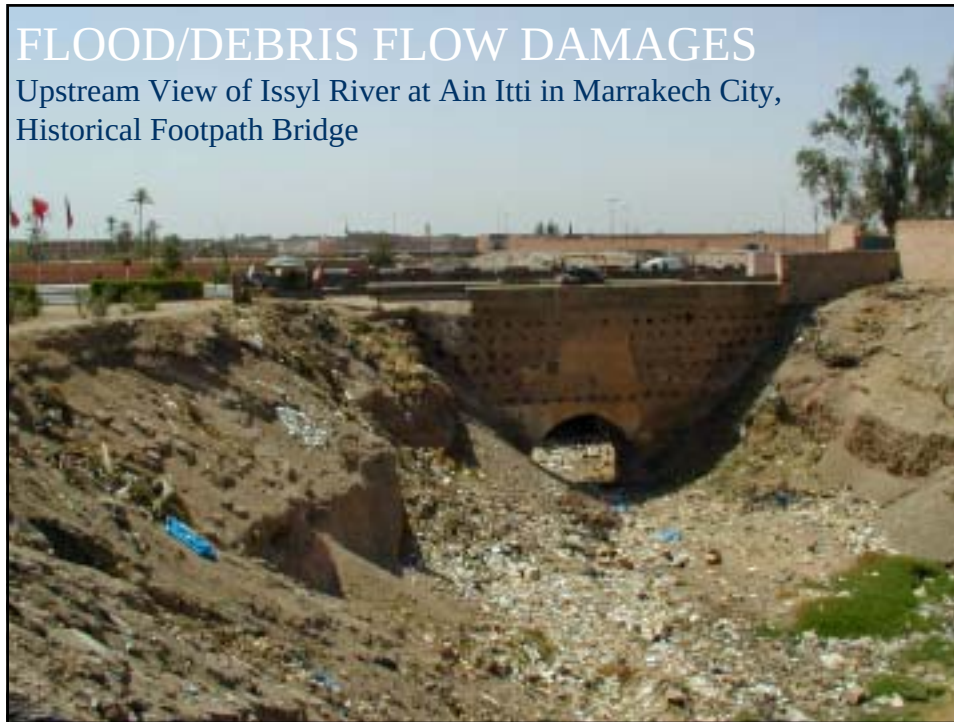
VI. STRUCTURAL MEASURES



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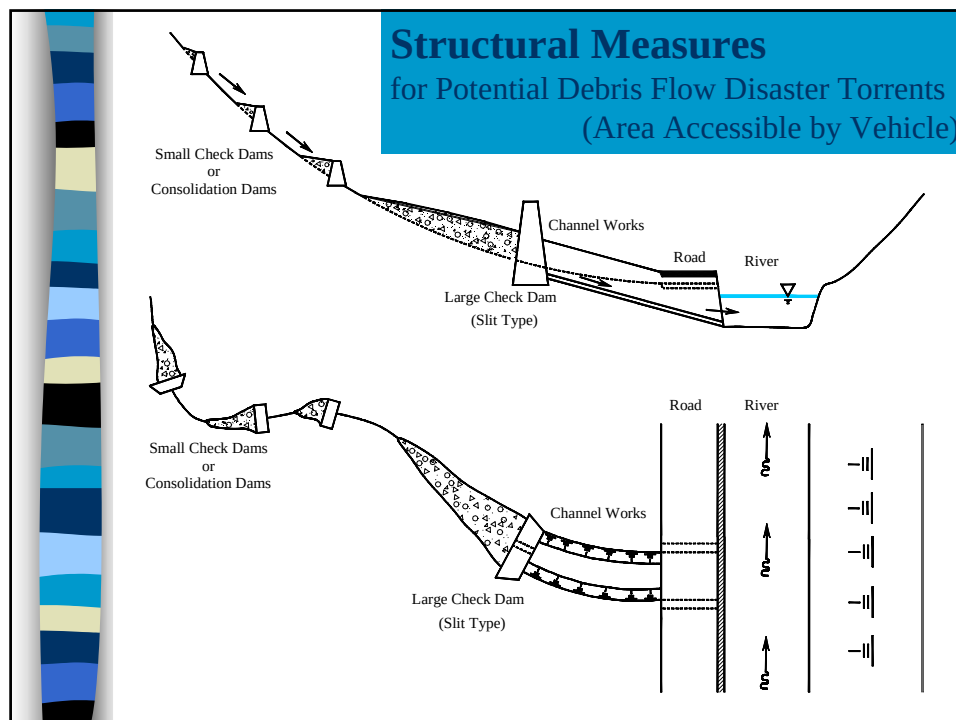


VI. STRUCTURAL MEASURES

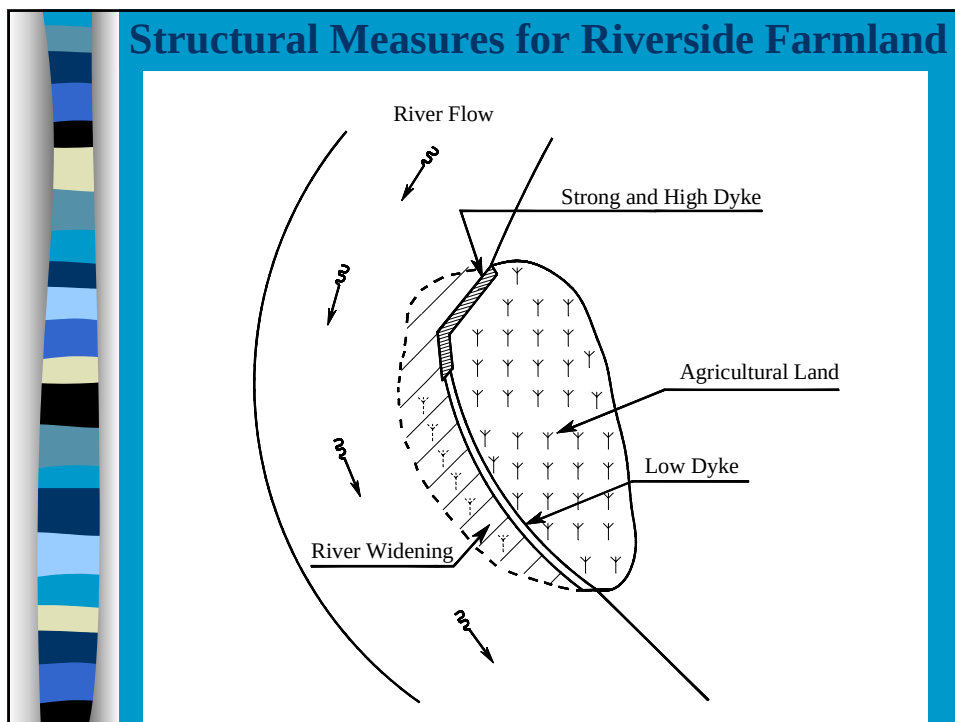
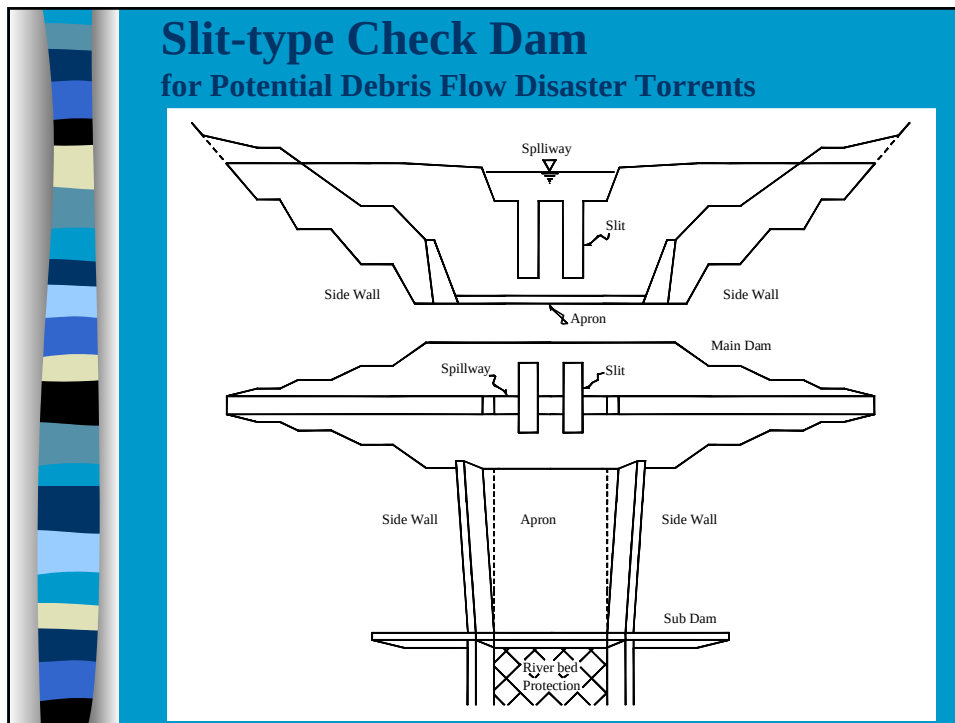


STRUCTURAL MEASURES Common to the Target Rivers

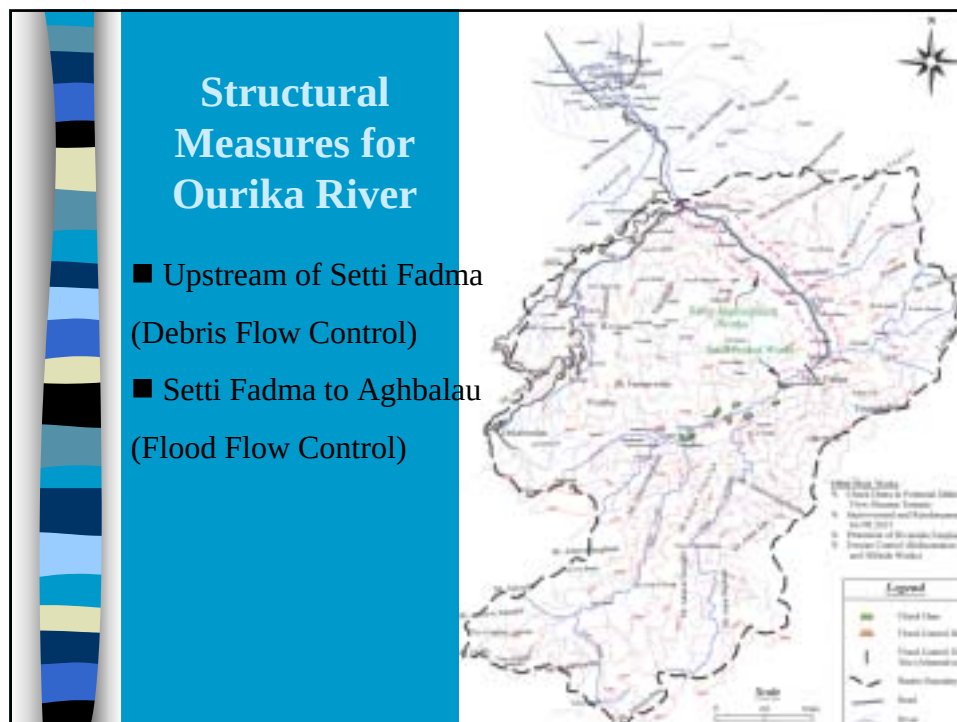
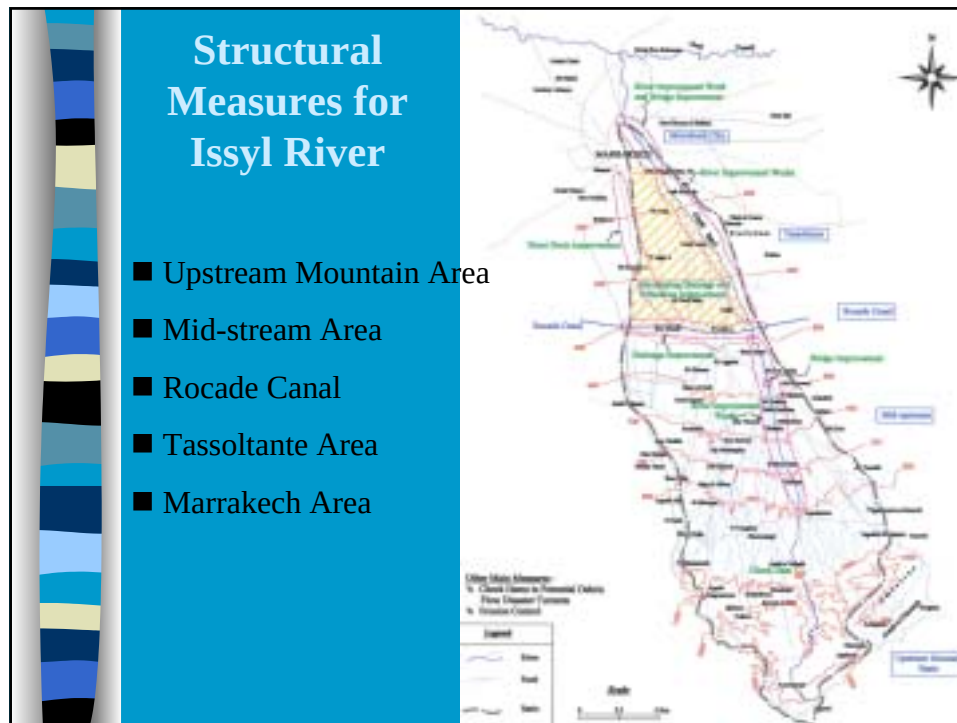
- For Potential Debris Flow Disaster Torrents
 - 1) Area Accessible by Vehicle
 - 2) Area Hardly Accessible by Vehicle
- For Riverside Road
- For Riverside Farmland
- Erosion Control Works for Hillside



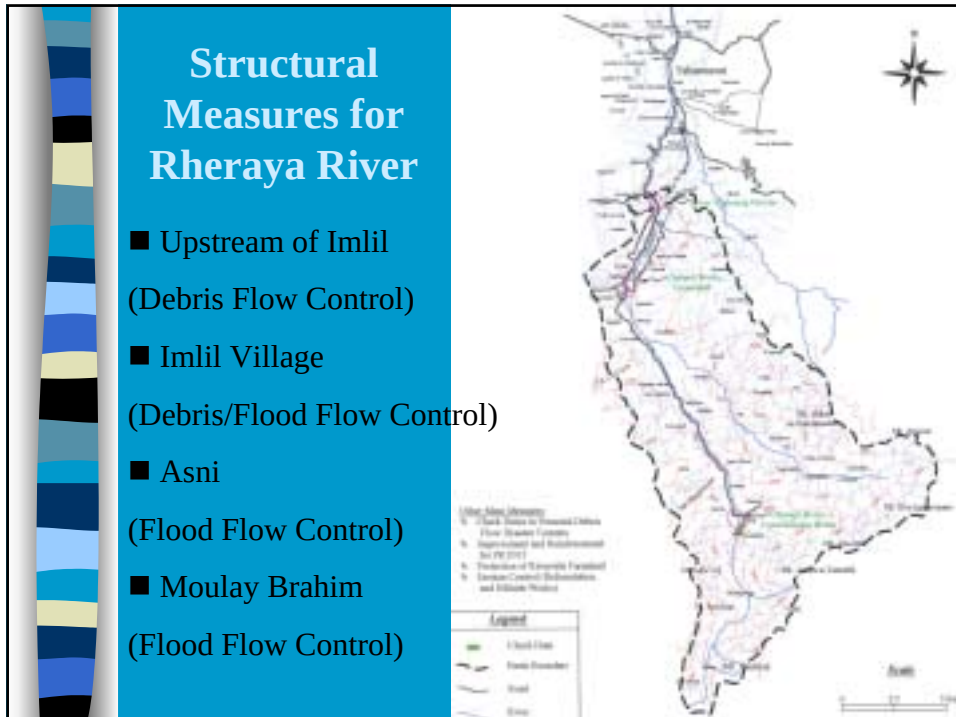
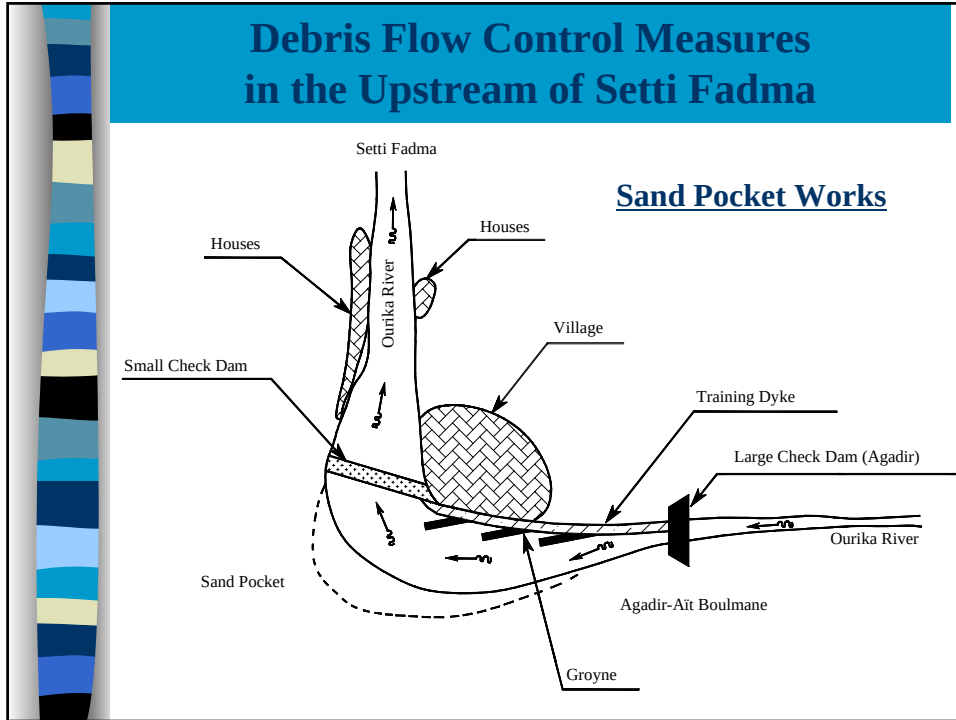
VI. STRUCTURAL MEASURES



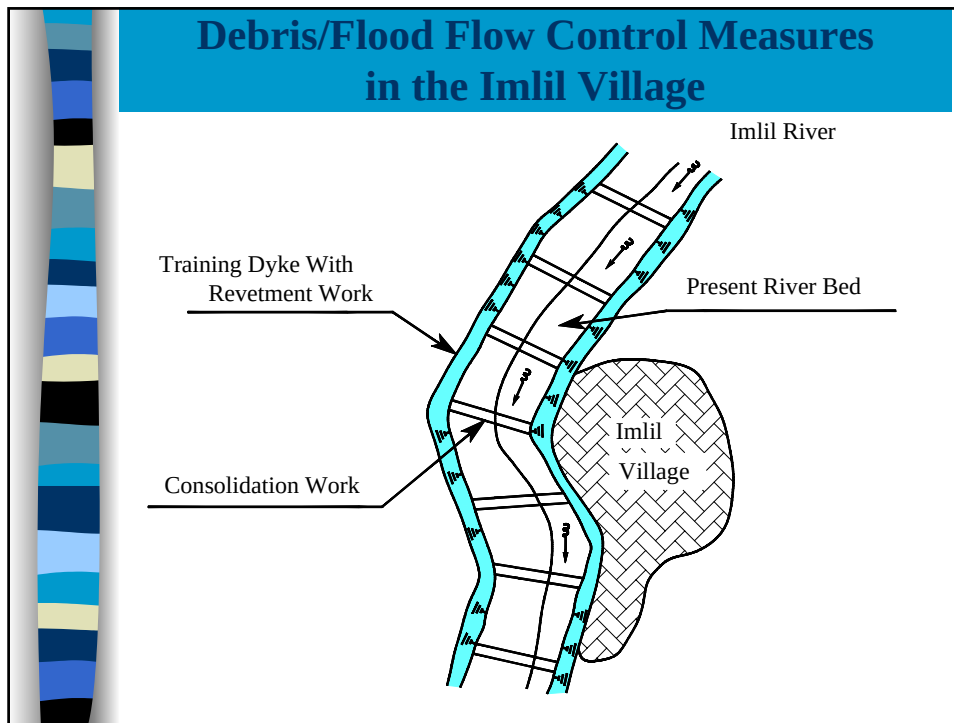
VI. STRUCTURAL MEASURES

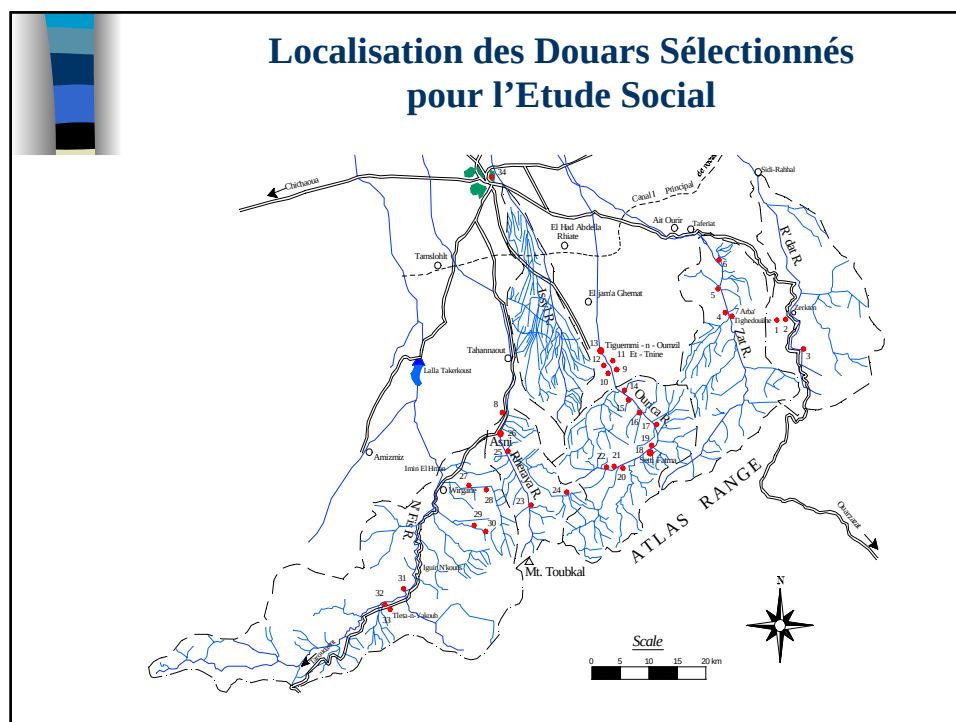


VI. STRUCTURAL MEASURES



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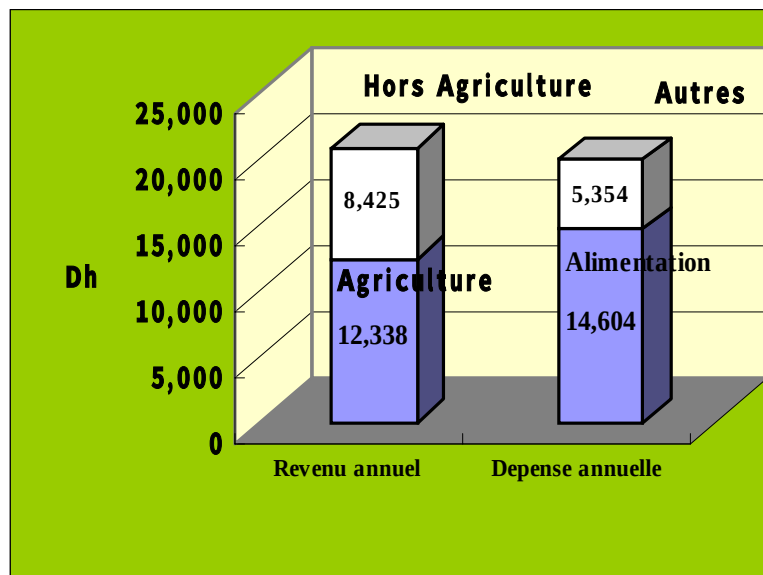




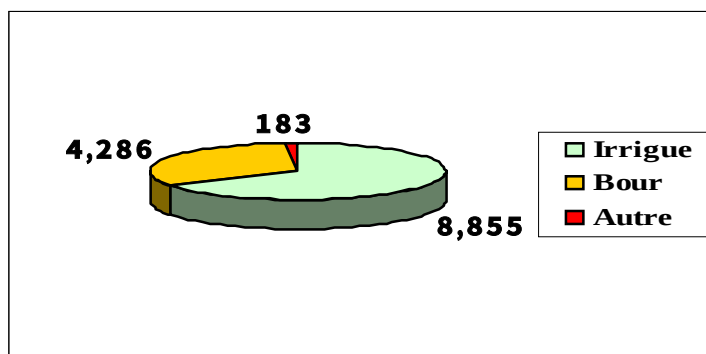
Population de la Zone de l'Etude

Bassin Versant	Nbre de C.R.	Population (1994)	Population (2000)
R'dat	3	30,845	31,520
Zat	3	34,554	35,310
Ourika	2	24,343	24,870
Rheraya	1	16,235	16,590
N'fis	6	35,182	35,950
Issyl	5	190,711	226,400
Total	20	331,870	370,640

Bilan Economique Annuel d'une Famille Moyenne

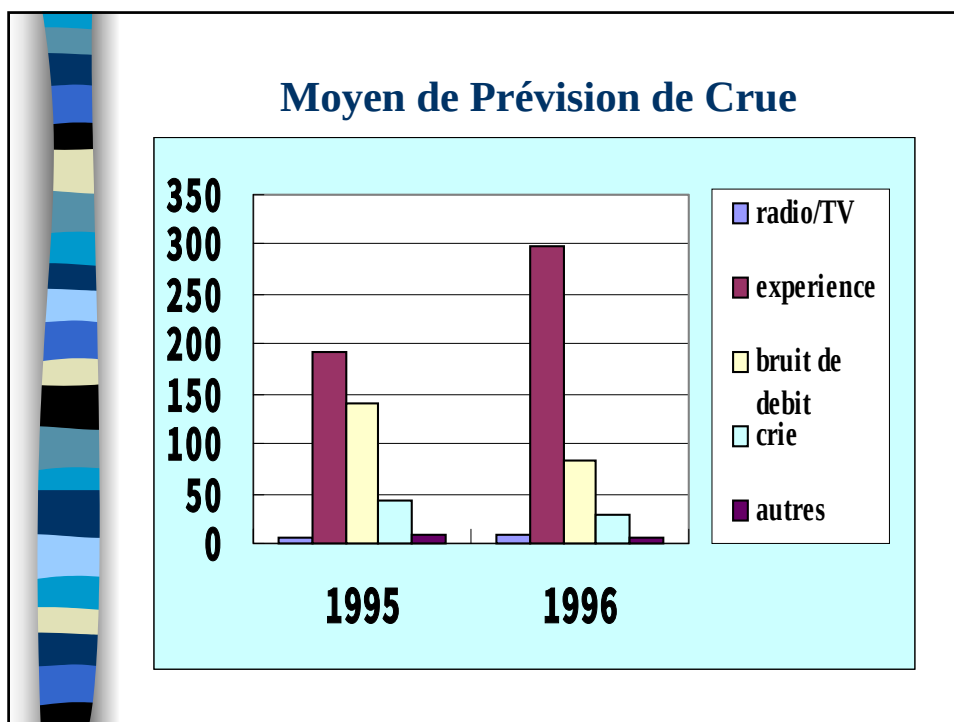
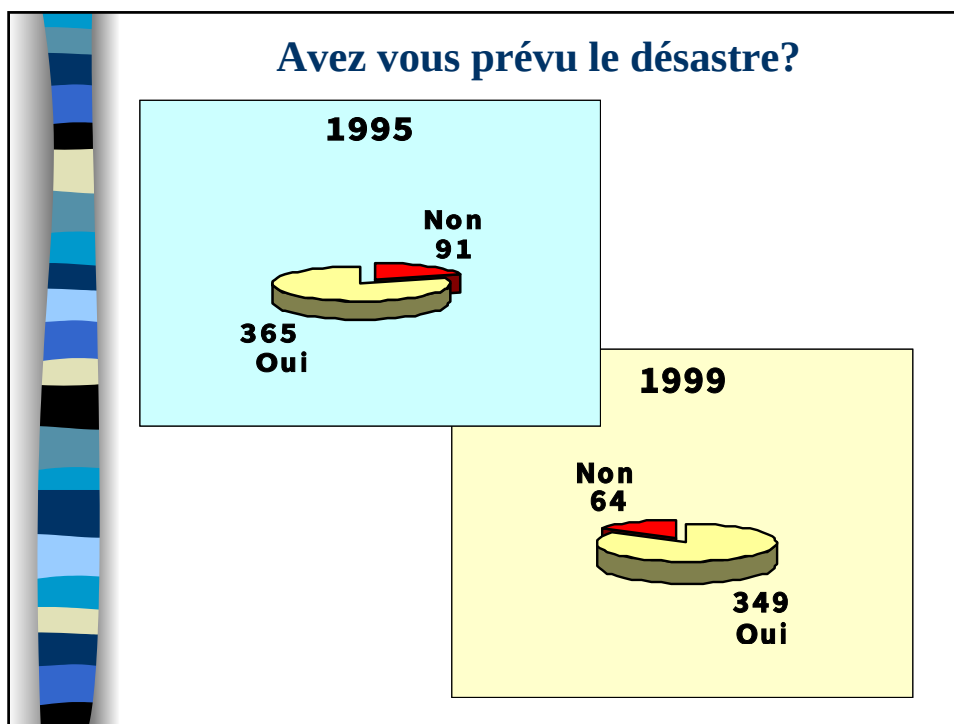


Utilisation de Terre d'une Famille Moyenne (m2)

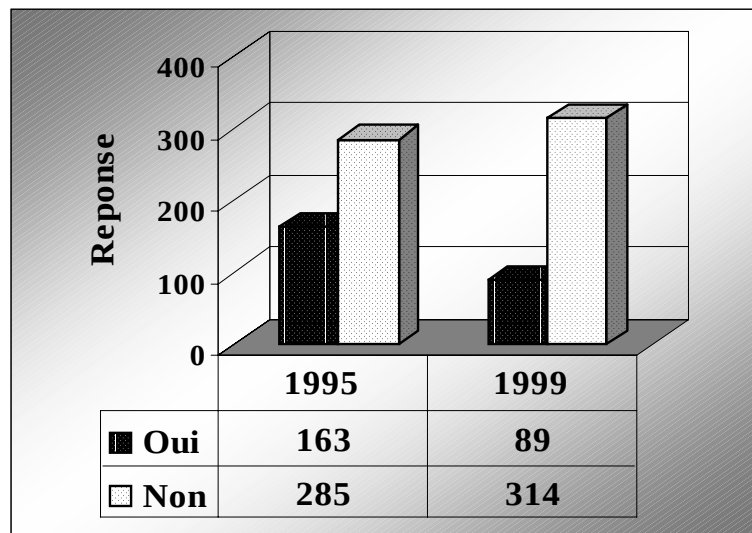


Nombre Moyen de Cheptel par Famille

Ovin	3 - 4
Caprin	6 - 7
Bovin	1 - 2
Equide	1



Avez vous évacué?



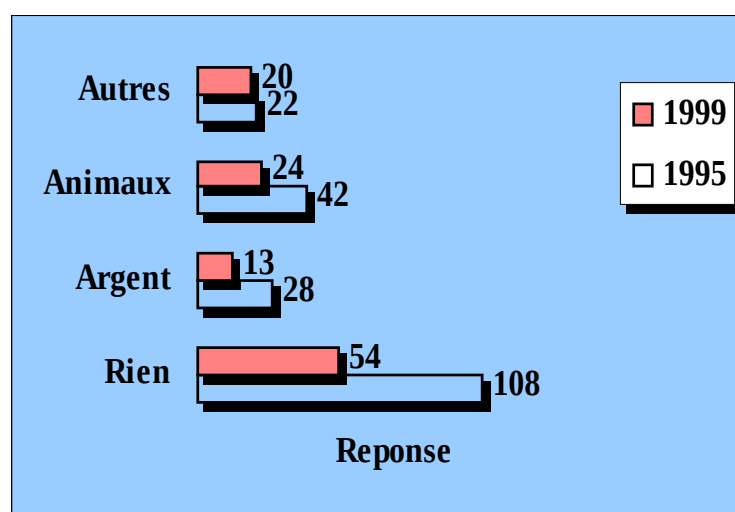
Quand avez vous évacué?

Réponse	1995	1999
1. Juste après l'avoir su	60	34
2. Dans 10 min. après l'avoir su	24	11
3. Dans 30 min. après l'avoir su	17	8
4. Dans 1 heure après l'avoir su	8	9
5. Après le désastre	54	27
Total	163	89

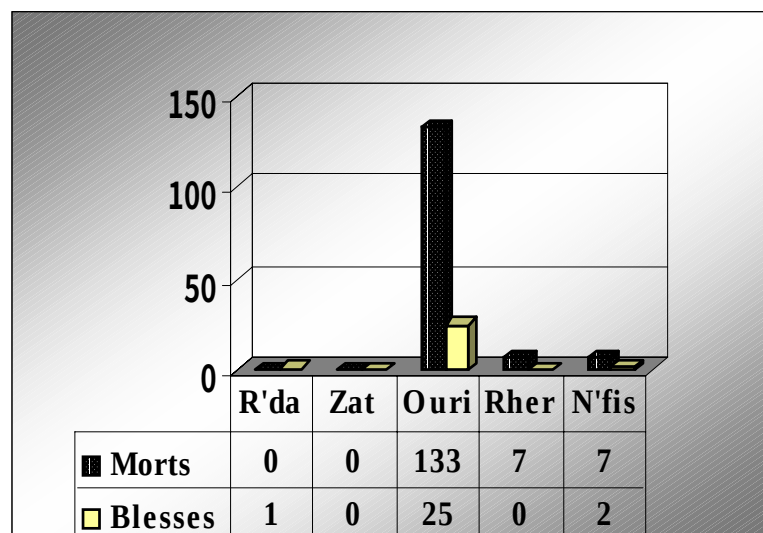
Où avez vous évacué?

Réponse	1995	1999
1. Zone d'évacuation	2	1
2. Sur le toit	12	6
3. Place élevée à côté	63	43
4. Sur une colline	29	17
5. Autre village, mosquée, etc.	75	37
Total	181	104

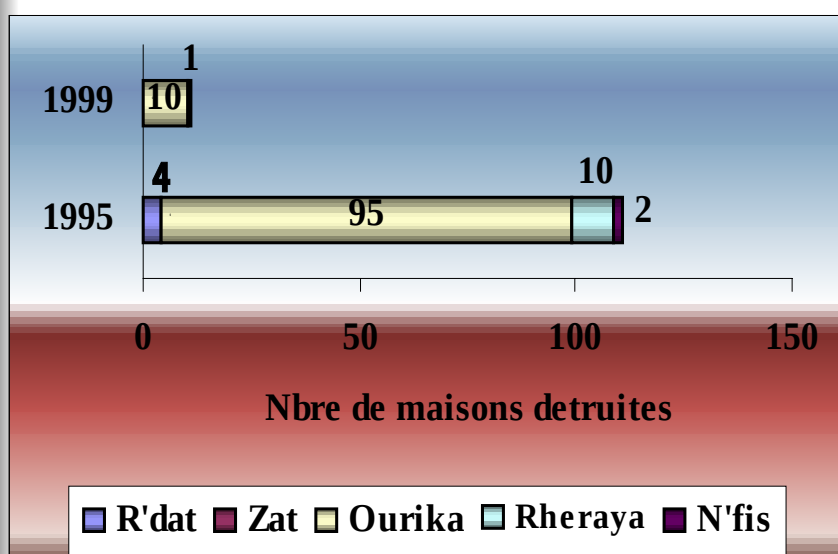
Qu'est-ce que vous avez apporté lors d'évacuation?

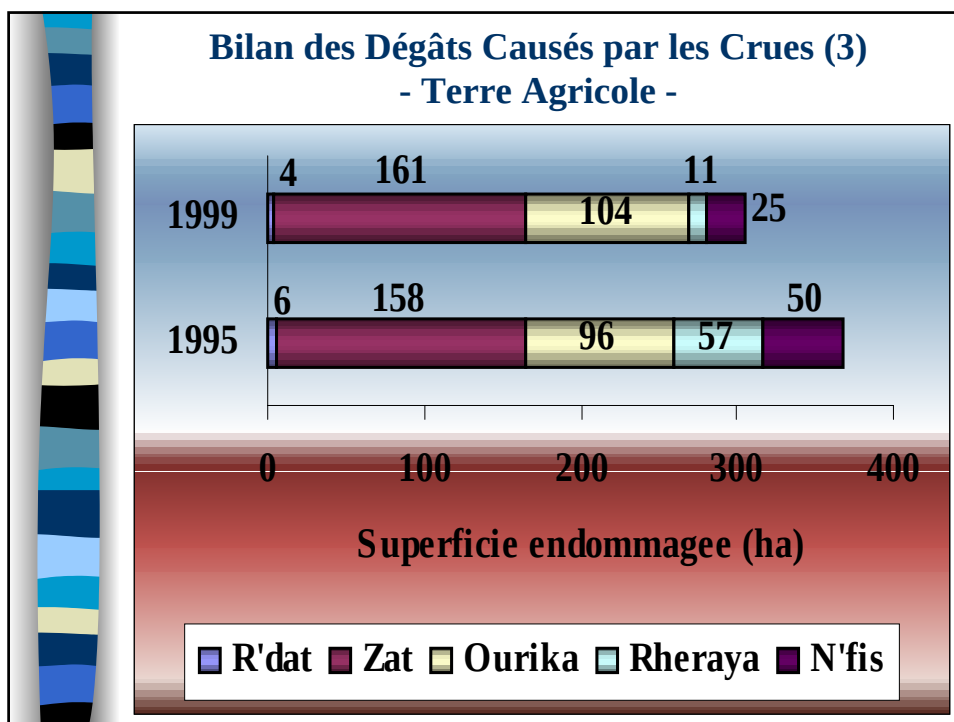
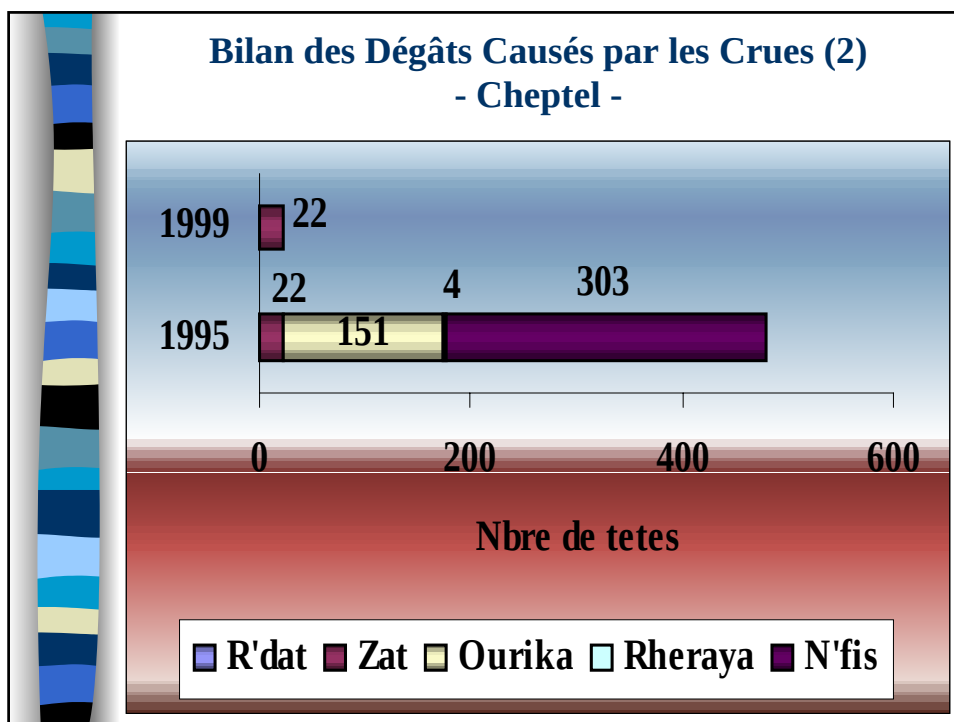


Bilan des Dégâts Causés par la Crue de 1995

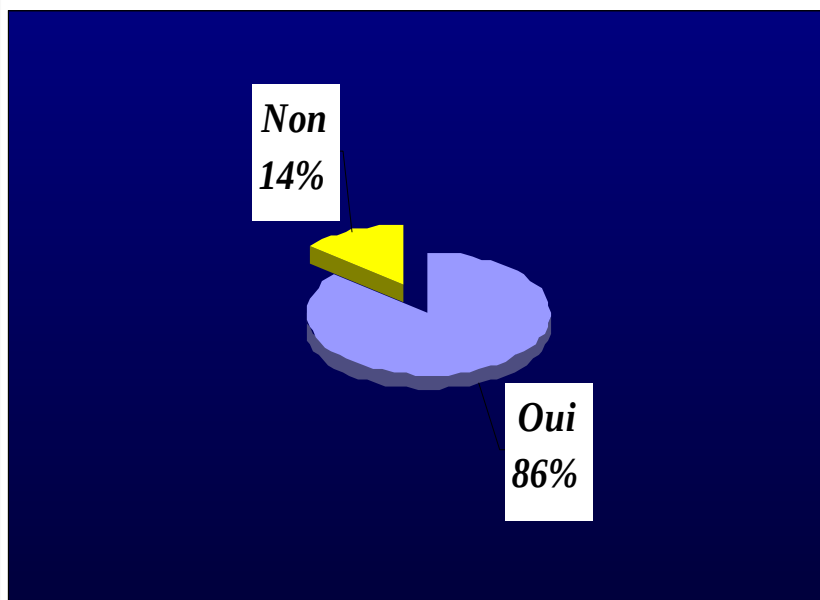


Bilan des Dégâts Causés par les Crues (1) - Maisons Détruites -





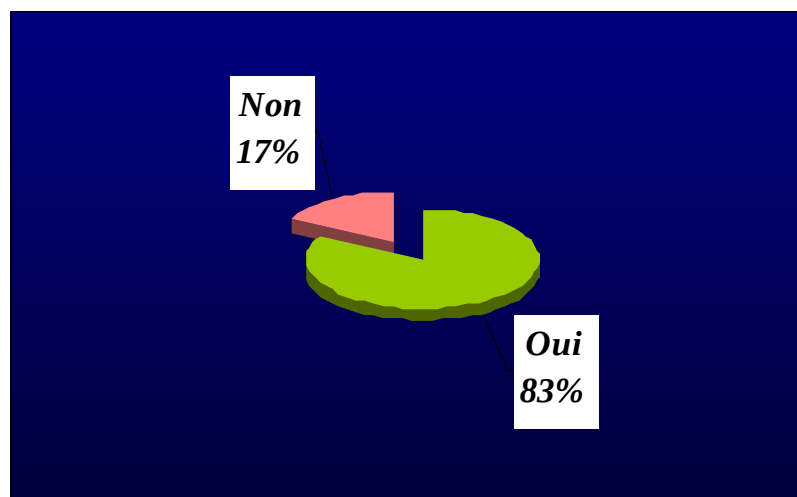
Avez vous participé aux activités de restauration?



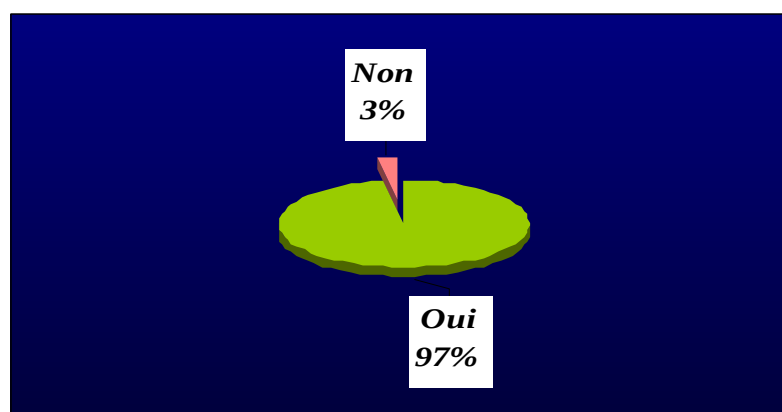
A quelle sortes d'activités de restauration?

Activité	Réponse
Ma maison	65
Maison de voisin	101
Route d'accès	314
École, hôpital, etc.	25
Terre agricole, seguia, prise d'eau, etc	179

**S'il avait action d'évacuation,
voulez vous y participer**



**Est ce que le système de prévision et
d'alerte de crue est nécessaire?**



**Quel genre de contribution
vous pouvez apporter?**

Genre	Réponse
Garder l'appareil de communication	244
S'occuper de la radio de communication volontairement dans la période de crue	278
N'importe quel service si nécessaire	45