

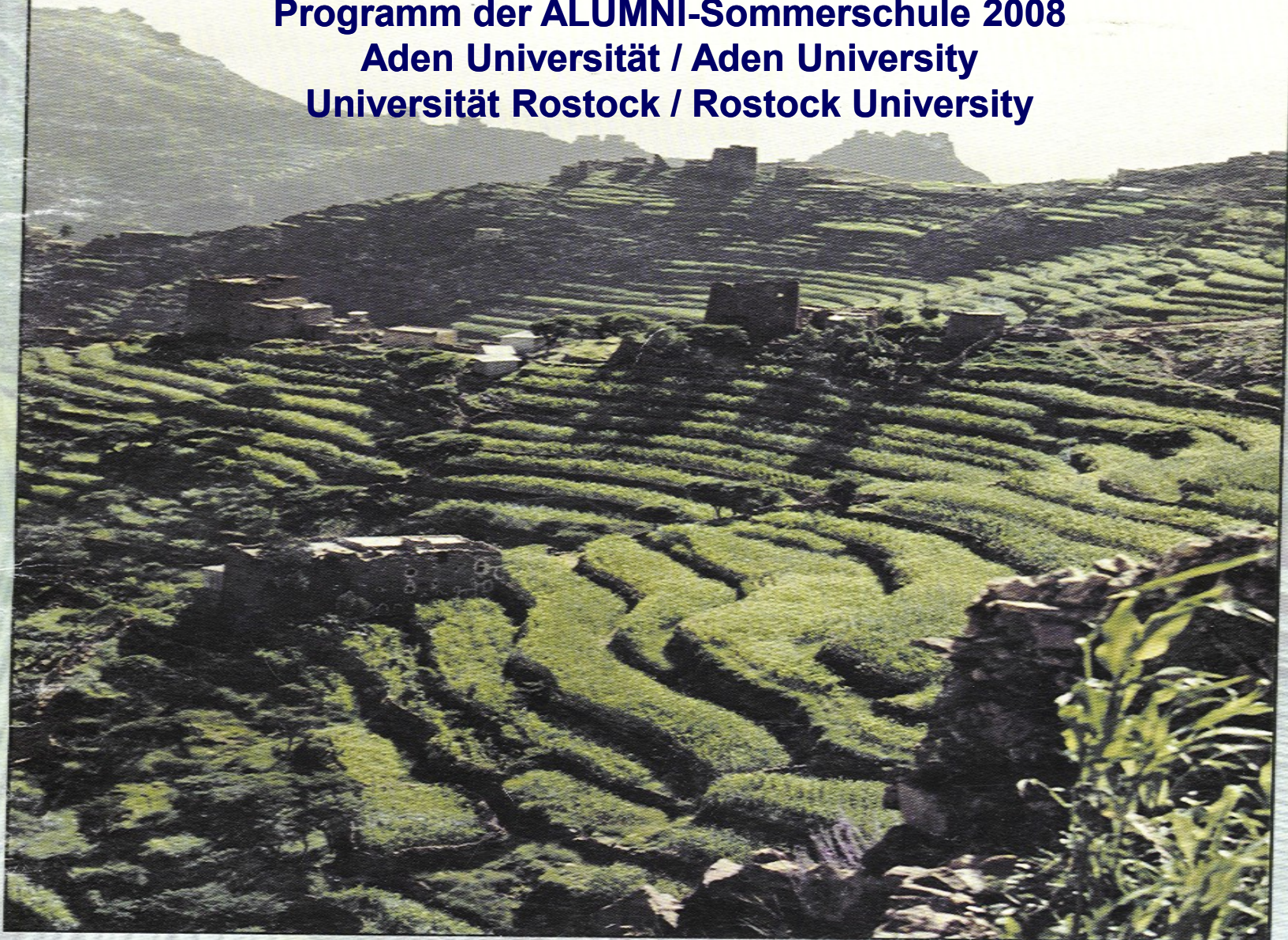
# **The Role of Terraces on Land and Water Conservation in Kuhlan-Affar / Wide Sharis Districts Hajja - YAR**

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**Programm der ALUMNI-Sommerschule 2008**

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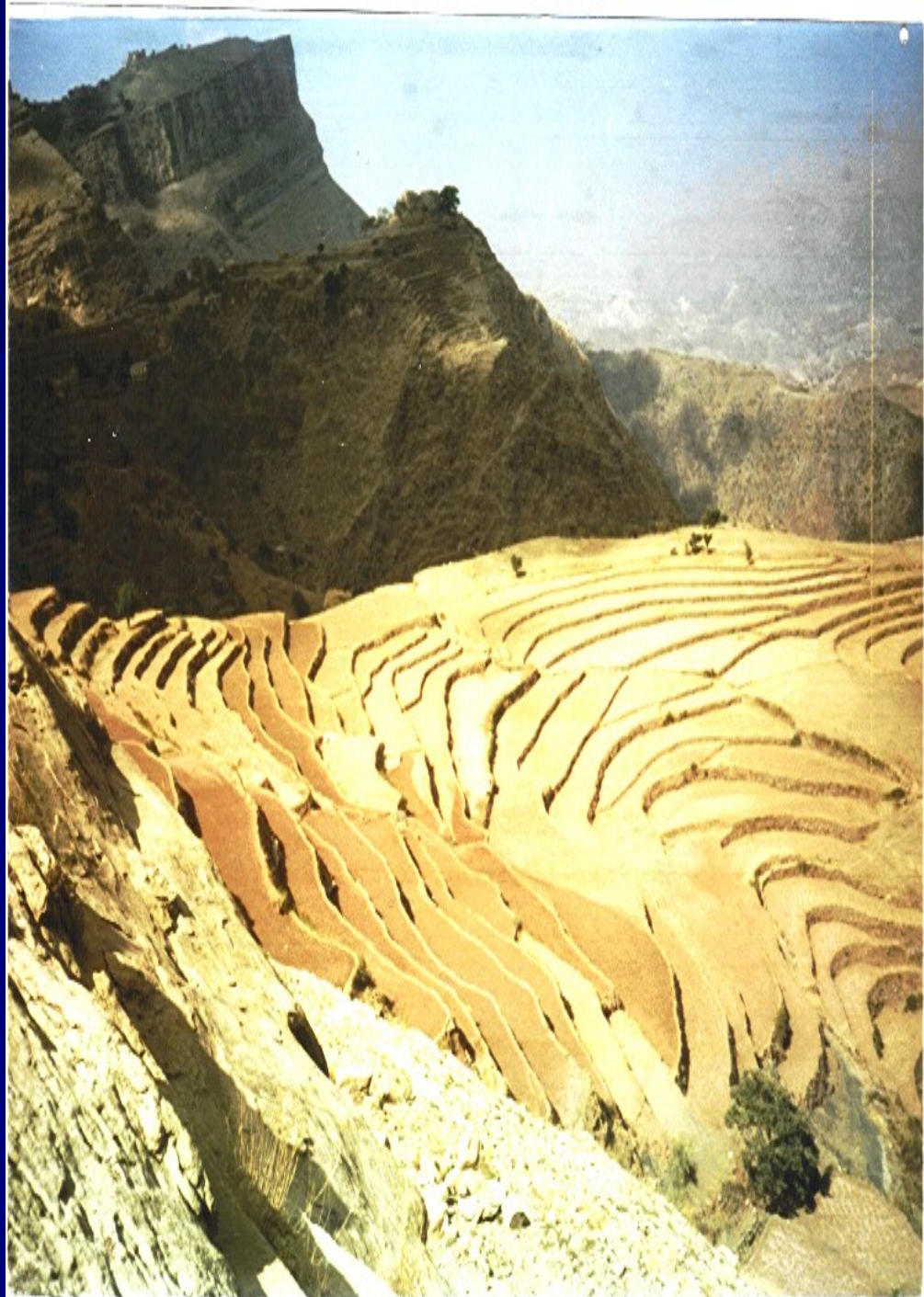








**From a technical point of view terrace cultivation is an advanced farming system for soil and water harvesting and utilization of mountainous lands.**



**Absence of regular**

**maintenance** is one of the most important factors of terraces abandonment terrace system is threatened in a lot of places

**Yemen**









# **RESEARCH OBJECTIVES: -**

**Based on the stated hypothesis,  
the main objectives of this  
research can be summarized as  
follows:**

# **1. Identification of the underlying causes of the degradation of the Terraces systems and the Role of Terraces on Land and Water Conservation in Yemen**

**2. To determine if there is possibility of change the labor time**

**3.To analysis the  
relationships between  
labor and other factors**

**4. Recommending practical and feasible methods to re-allocation the labor time for maintaining and repairing terraces.**

**Table 2. Number of families  
that have members working  
in and out the field At  
Kuhlan-Affar/ Wide Sharis  
Districts**

| <b>Gender</b>                                | <b>Male</b> |             |               |             | <b>Female</b> |             |               |             |
|--|-------------|-------------|---------------|-------------|---------------|-------------|---------------|-------------|
| <b>Variable</b>                              | <b>Boys</b> |             | <b>Adults</b> |             | <b>Girls</b>  |             | <b>Adults</b> |             |
| <b>Status</b>                                | <b>No</b>   | <b>%</b>    | <b>No</b>     | <b>%</b>    | <b>No</b>     | <b>%</b>    | <b>No</b>     | <b>%</b>    |
| <b>Member of family Working in the field</b> | <b>28</b>   | <b>16.3</b> | <b>122</b>    | <b>53.1</b> | <b>61</b>     | <b>35.7</b> | <b>191</b>    | <b>83.8</b> |
| <b>Member of family Working out field</b>    | <b>144</b>  | <b>83.7</b> | <b>108</b>    | <b>46.9</b> | <b>110</b>    | <b>64.3</b> | <b>37</b>     | <b>16.2</b> |
| <b>TOTAL</b>                                 | <b>172</b>  | <b>100</b>  | <b>230</b>    | <b>100</b>  | <b>171</b>    | <b>100</b>  | <b>228</b>    | <b>100</b>  |



The results of regression analysis (see the tables) indicated a negative relationship between percent of degraded area (Y) and the family working hours in the field (X). That mean if the family daily working hours in the field decreased by one hour the degraded terraces will increase by 1.33%

$$Y = 47.629 - 1.33 X$$

**The majority of the farmers 164 (86%) reported losing land due to erosion management decisions should emphasize protecting catchments for rainwater harvesting, controlling wadi flood, minimizing water losses in delivery systems and improving groundwater abstraction techniques**

# Components of Surface Discharge

surface discharge, which is also frequently called total flow or total runoff, is the water flow which is observed in a stream or wadi channel. It is commonly differentiated into three components

## **(i) Storm or Direct Runoff:**

**this is the surface discharge which originates as hill slope runoff and reaches a stream channel shortly after the rainstorm. It is considered *direct* runoff since it reaches the stream channel directly by an overland or surface path. As such, direct runoff which is observed in a stream channel is essentially the same as floodwater flow,**

## (ii) Base flow:

**this surface discharge originates when rainwater percolates down to the water table - i.e., recharges the groundwater aquifer(s) - and then moves, at much lower velocities and by longer subsurface paths, to the stream channel reaching it over long periods of time. Therefore, base flow is an *indirect* type of runoff, since the water enters the ground and becomes part of the groundwater storage prior to emerging (later on) as natural groundwater discharge. Base flow is also often called delayed flow to distinguish it from the "quick" direct runoff and**

## **(iii) Interflow:**

**this surface discharge originates by a process similar to that of base flow, except that the percolating water is discharged into the stream channel before reaching the water table. Thus, interflow re-emerges (or is discharged) to the surface quicker than base flow but slower than direct runoff.**

**Commonly, interflow accompanies major floods in which the floodwater overflows the stream channel and percolates into the stream banks to form what is called bank-storage.**

# Water equations at the birthplace of algebra

*Hartmut Fiebig / text and photos*



**The abandonment of terraces and the traditional water harvesting systems has Environmental degradation which added to water problems, Deforestation, and the consequent degradation have provoked widespread soil erosion, increasing risks of floods.**



# ***8 Kilometers to water***











0558

4 996



# Summary & Recommendations

**Terraces in the highlands  
of Yemen were built  
by the family,  
community assistance  
and participation.**



**\* Lack of a national understanding of the Role of Terraces on Land and Water Conservation in Yemen.**

**\* As the terraces on the slopes fall into disrepair, or are abandoned, runoff is increased, which not only erodes the slopes but leads to destructive floods to the wadi bed.**

**Enhancing nation capacity  
for economics & policy  
analysis of terraces  
degradation and its effect  
to water and agricultural  
land**

**Girls and Boys in the area are devoted only 36% and 16% of their time to the fieldwork. Also, 36% and 96% of the girls and boys are attending the formal education. So the reallocation time can be done only in the girls and boys time in the summer holidays. Since, Population less than 16 years old in the area is about 47%. Implementing training programs for students in summer holiday for the terraces maintenance practices, will be suitable cheap and quicker solution in the short run**

**\*\* For a better use of time and resources allocation and it's affected in terraces Maintenance some kind of relationship and coordination between zones, NGO's, Local community Internationals Organizations should be developed to improve terraces maintenance and conditions.**





■ Thanks

