



Citizens and cities facing new hazards and threats

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Session 5: Natural Hazard and Climate Change

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INTRODUCTION

- SMALLHOLDER FARMERS IN LESOTHO FACING THE IMPACT OF CLIMATE CHANGE; EVIDENT IN ERRATIC RAINFALL AND DROUGHT, HAILSTORMS AND SEVERE WINTERS (MEKBIB, ET AL., 2012; MATARIRA ET. AL., 2013)
- CROP PRODUCTION HAS EXPERIENCED A DECLINE SINCE THE 1990S
- CROP PRODUCTION EXPERIENCED THE BIGGEST SHOCK AS IT CONTRACTED BY 9.7 PERCENT IN 2018 AFTER A PROLONGED DROUGHT IN LESOTHO
- CONTRIBUTION OF AGRICULTURE TO GDP REDUCED FROM 11.8 TO 7.2 PERCENT, BETWEEN 1985 TO 1994 (KINGDOM OF LESOTHO, 2018).
- THE BUDGET STATEMENT REPORTS THAT CLIMATE CHANGE HAS REDUCED LESOTHO'S FOOD PRODUCTION BY 76 PERCENT FROM 2018 AND 2019 (THE KINGDOM OF LESOTHO, 2020).



WHY SMALLHOLDER FARMERS PERCEPTION ON CLIMATE CHANGE?

- LESOTHO IS HIGHLY DEPENDENT ON AGRICULTURE, AS THE SECTOR EMPLOYS 70 PERCENT OF THE RURAL POPULATION WHO ARE PREDOMINANTLY POOR SMALLHOLDER FARMERS (WORLD BANK, 2019).
- CLIMATE CHANGE IS CREATING CONDITIONS WHICH MAKE INEQUALITY AND POVERTY MORE CLEARLY VISIBLE FOR SMALLHOLDER FARMERS (HUNSBERGER ET AL., 2017)
- GOVERNMENT SPONSORED NATIONAL ADAPTATION STRATEGIES HARDLY CAPTURES THE VIEWS OF SMALLHOLDER FARMERS (RIBOT, 2014; WOOD, 2020)
- ENHANCING THE ADAPTIVE CAPACITY CAN REDUCE VULNERABILITY AND PROMOTE SUSTAINABLE DEVELOPMENT (LEMMA, 2016)
- THE MAGNITUDE OF CLIMATE CHANGE IMPACT ON LIVELIHOODS OF FARMERS WILL EXCEED THEIR AVAILABLE CAPACITY CONSIDERING FARMERS CURRENT CONDITIONS.



IMPACT OF CLIMATE CHANGE AND VARIABILITY ON CROP FARMING

- CLIMATE CHANGE RESULTS IN UNRELIABLE RAINFALL PATTERN, UNPREDICTABLE SEASONS WITHOUT ENOUGH RAINFALL, PROLONGED DROUGHTS AND EXTREME HEAT STRESS WHICH DECREASES CROP PRODUCTION (LOW LEVELS OF PRODUCTIVITY AND CROP FAILURE)
- THESE EFFECTS RESULT IN FOOD INSECURITY AND THUS EXPOSING SMALLHOLDER FARMERS TO HUNGER AND LIVELIHOOD THREATS (KIRBY ET. AL., 2016; MAHMOOD ET. AL., 2012 AND DATTA, 2013)
- AGRICULTURE IS RECORDING LOW LEVELS OF PRODUCTIVITY AND CROP FAILURE. ALSO THERE IS THE INCIDENCE OF DISEASE OUTBREAK, PEST AND DISEASES AND INADEQUATE WATER SUPPLY
- SIMILARLY, REDUCED RAINFALLS AND INCREASED TEMPERATURES LEAVE CROPS IN A SERIOUS WATER STRESS SITUATION (DATTA, 2013).
- PLANTING CALENDAR FOR CROPS CHANGES DUE TO TEMPERATURE INCREASE. UNCERTAINTIES IN PLANTING CALENDAR MAY DECREASE POTENTIAL CROP YIELD (OXFAM, 2008)

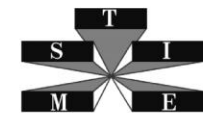


ADAPTATION MEASURES EMPLOYED BY FARMERS AT THE LOCAL LEVEL

- DEFINITION OF ADAPTATION TO CLIMATE CHANGE: A CORRECT ADJUSTMENT TO CLIMATE CHANGE AND VARIABILITY FOR SMALLHOLDER FARMERS TO ENHANCE RESILIENCE OR REDUCE THE VULNERABILITY OF THE EFFECTS ASSOCIATED WITH THE CHANGING CLIMATE (FADAIRO ET AL., 2019)

CROP-BASED APPROACHES INCLUDE:

- GROWING IMPROVED CROP VARIETIES AND USING DIFFERENT CROP VARIETIES THAT SURVIVE IN ADVERSE CLIMATIC CONDITIONS (GBETIBOUO, 2009)
- GROWING EARLY MATURING CROP VARIETIES AND INCREASING DIVERSIFICATION BY PLANTING CROPS THAT ARE DROUGHT TOLERANT AND/OR RESISTANT TO TEMPERATURE STRESSES SERVE AS AN IMPORTANT FORM OF INSURANCE AGAINST RAINFALL FLUCTUATIONS (GBETIBOUO, 2009).
- GROWING DIFFERENT CROP VARIETIES ON THE SAME PLOT OR ON DIFFERENT PLOTS REDUCE THE RISK OF COMPLETE CROP FAILURE AS DIFFERENT CROPS ARE AFFECTED DIFFERENTLY BY CLIMATE EVENTS
- IMPROVING THE USE OF IRRIGATION
- CHANGING PLANTING DATES THROUGH EARLY AND LATE PLANTING OPTIONS
- PLANTING TREES IN THE FARM TO SERVE AS SHADE AGAINST SEVERE TEMPERATURE



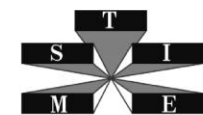
RESEARCH METHODOLOGY

- STUDY DESIGN: CROSS-SECTIONAL DESIGN
- PRIMARY DATA USED USING STRUCTURED INTERVIEW GUIDES WITH THE HELP OF AGRICULTURAL EXTENSION OFFICERS
- ALL FARMERS IN THE 10 DISTRICTS OF LESOTHO WERE USED
- 200 FARMERS WITH MORE THAN 15 YEARS EXPERIENCE IN FARMING WERE INTERVIEWED
- DATA ANALYSIS: LIKERT SCALE



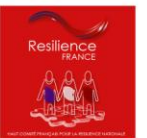
RESULT AND DISCUSSION

| Variables | Value | Percent |
|--------------------------------|--------------|---------|
| Sex | Male | 58 |
| | Female | 42 |
| Age | ≤40 | 53 |
| | 41-50 | 31 |
| | 51-60 | 13 |
| | 61+ | 3 |
| Education level | Standard 7 | 25 |
| | JC | 13 |
| | COSC | 16 |
| | Diploma | 25 |
| | Degree | 21 |
| Experience in crop farming | ≤ 20 years | 86 |
| | 21-30 years | 9 |
| | 31-40 years | 5 |
| | ≥ 41 years | 0 |
| Size of land cultivated(acres) | ≤ 5 acres | 45 |
| | 6- 10 acres | 29 |
| | 11-15 acres | 12 |
| | ≥15 acres | 14 |
| Household size | ≤ 5 members | 58 |
| | 6-10 members | 33 |



PERCEIVED EXPERIENCES AND EVIDENCE OF CLIMATE VARIABILITY AND CHANGE

| Experiences / evidence | Very High | High | Neutral | Low | Very Low | Total | Mean |
|--|-----------|------|---------|-----|----------|-------|------|
| Drying up of streams / rivers (severe drought) | 65 | 102 | 23 | 5 | 5 | 200 | 4.09 |
| Delayed onset of rainfall | 88 | 51 | 47 | 9 | 5 | 200 | 4.05 |
| Severe frost/ cold | 50 | 64 | 82 | 5 | 0 | 200 | 3.80 |
| Low rainfall | 60 | 56 | 56 | 23 | 5 | 200 | 3.72 |
| Strong winds | 33 | 86 | 62 | 14 | 5 | 200 | 3.64 |
| Warmer temperatures | 33 | 74 | 70 | 23 | 0 | 200 | 3.58 |
| Heavy snowfall | 18 | 82 | 64 | 36 | 0 | 200 | 3.41 |
| Hail storms | 29 | 48 | 76 | 29 | 19 | 200 | 3.19 |
| Severe flooding | 10 | 48 | 100 | 29 | 14 | 200 | 3.05 |



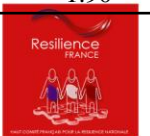
PERCEIVED IMPACTS OF CLIMATE VARIABILITY AND CHANGE

| Impacts | Very High | High | Neutral | Low | Very Low | Total | Mean |
|---------------------------------------|-----------|------|---------|-----|----------|-------|------|
| Declining crop yield | 87 | 62 | 31 | 10 | 10 | 200 | 4.0 |
| Below normal yield (less quality) | 87 | 61 | 30 | 11 | 11 | 200 | 4.0 |
| Increased attack of pests and disease | 55 | 85 | 45 | 15 | 0 | 200 | 3.9 |
| Crop failure | 55 | 80 | 40 | 20 | 5 | 200 | 3.8 |
| High post-harvest losses | 40 | 100 | 40 | 20 | 0 | 200 | 3.8 |



CLIMATE CHANGE AND VARIABILITY ADAPTATION STRATEGIES OF SMALLHOLDER FARMERS IN LESOTHO

| Adaptation strategies | Frequently used | Do not use it at all | Less frequently used | Total | Mean |
|--|-----------------|----------------------|----------------------|-------|------|
| Use of fertilizer | 150 | 40 | 10 | 200 | 2.70 |
| Use of soil conservation practices (eg mixed and crop rotation) | 149 | 36 | 15 | 200 | 2.67 |
| Traditional medicine to control pest and diseases | 135 | 51 | 14 | 200 | 2.61 |
| Fruit tree Planting | 140 | 40 | 20 | 200 | 2.60 |
| Water conservation practices such as mulching and compost | 138 | 42 | 20 | 200 | 2.59 |
| Crop diversification | 134 | 49 | 17 | 200 | 2.59 |
| Keyhole garden | 137 | 40 | 23 | 200 | 2.57 |
| Roof water harvesting technology to store water for dry season | 128 | 48 | 24 | 200 | 2.52 |
| Adjustment of planting calendar | 123 | 55 | 22 | 200 | 2.51 |
| Making ridges across farm and trenches | 102 | 54 | 44 | 200 | 2.29 |
| Planting of improved stress-tolerant, water-saving varieties | 90 | 55 | 55 | 200 | 2.18 |
| Shifting from vegetable production to other non-agricultural enterprises | 93 | 49 | 59 | 200 | 2.17 |
| Construction of channels to drain off excess water | 79 | 56 | 65 | 200 | 2.07 |
| Adjustment of planting calendar / time | 70 | 70 | 60 | 200 | 2.05 |
| Reduced space of land put under cultivation to minimize chances of loss | 73 | 63 | 63 | 200 | 2.05 |
| Temporary / permanent migration | 14 | 152 | 33 | 200 | 1.90 |



CONCLUSION AND POLICY RECOMMENDATIONS

- THE STUDY HAS JUSTIFIED, BASED ON NATIONAL STATISTICS THAT CROP PRODUCTION IS KEY FOR THE SURVIVAL OF THE ABOUT 75 PERCENT OF LESOTHO'S POPULATION LIVING IN RURAL AREAS, GIVING THE FACT THAT FARMING IS THE MAJOR ECONOMIC ACTIVITY FOR THESE RURAL DWELLERS LIVING IN A COUNTRY, WHO ARE MOSTLY POOR.
- COUPLED WITH THIS CHALLENGE, CLIMATE CHANGE EFFECTS HAVE NEGATIVELY AFFECTED THE LIVELIHOODS OF THESE RURAL DWELLERS, WHOSE LIVELIHOODS DEPEND STRONGLY ON THE ENVIRONMENT FOR THEIR LIVELIHOOD.
- WITH SEVERE DROUGHT, DESERTIFICATION AND LAND DEGRADATION EVIDENT BY HIGH SOIL EROSION LEAVING THE LAND TO GULLY FORMATION AND ABANDONMENT OF LAND (MEKBIB ET AL., 2011; MINISTRY OF NATURAL RESOURCES, 2000; SEKALELI & SEBUSI, 2013). THIS EMPIRICAL PAPER HAS PROVED THAT THIS IS TRUE.
- THE STUDY REVEALS THE CURRENT SITUATION AND THE CHALLENGES SMALLHOLDER FARMERS IN LESOTHO ARE FACING DESPITE THE INCREASING INTERVENTIONS FROM THE GOVERNMENT OF LESOTHO THROUGH ITS MINISTRIES IN DEALING WITH THE NEGATIVE IMPACT OF CLIMATE CHANGE ON FARMERS IN LESOTHO. THE RESULT REVEALS THAT EITHER THE INTERVENTIONS PROMOTED BY THE GOVERNMENT OF LESOTHO ARE EITHER ABANDONED BY THESE SMALLHOLDER FARMERS, WHO ARE SUPPOSED TO BE THE BENEFICIARIES OF SUCH INTERVENTIONS OR THE INTERVENTIONS NEVER REACHED THE BENEFICIARIES (SMALLHOLDER FARMERS).

