

Minutes from Triple-L science workshop 28th of November (Julia Wernersson) and Triple-L scenario workshop 29th-30th of November (Eric Röhss)

Minutes of Scientific Meeting 28-11-2016

Venue: Vi Agroforestry, Kitale, Trans Nzoia, Kenya

Participants present:

1. Alfred Burian – Stockholm University
2. Anders Malmer - SLU
3. Astrid Hedman – We Effect
4. Benjamin Lokorwa – Triple L
5. Bramwell Sieta - Vi Agroforestry
6. Caroline Kawira - UoN
7. Collins Ouma - UoN
8. David Otieno - UoN
9. David Peltzer - ILRI
10. Deborah Muricho - UoN
11. Dereje Wakjin - IGAD
12. Ewa Wredle - SLU
13. Astrid Hedman – We Effect
14. Frida Simfors – Stockholm University
15. Gert Nyberg - SLU
16. Göran Bostedt - SLU
17. Isabella Ostovary – Vi Agroforestry
18. Julia Wernersson – University of Copenhagen
19. Laura Asperholm – We Effect
20. Lonah Mukoya – Vi Agroforestry
21. Morich Waronga – We Effect
22. Oscar Kvamme – Vi Agroforestry
23. Petter Nordkvist – Vi Agroforestry
24. Rebecca Karaya – Karatina University
25. Stephen Mureithi - UoN
26. Wangu Mutua – Vi Agroforestry
27. William Makoka – Vi Agroforestry

Minutes:

9.00 Welcome by Gert Nyberg, SLU:

This year the science meeting is shortened so that more time can be spent on the policy workshop. The plan is to have presentation of research up until lunch. After this we will split into groups and deal with the following questions in group form:

- Student projects: how do we proceed?
- What kind of funding can we apply for?
- What research applications are we going into?

Overall, the last year has been good.

- A few master students have published.
- One scientific article and several MSC theses have been published.
- We now have 6 scientific papers and 12 MSC studies, which is an achievement considering limited funds.
- Network money ends next year but is almost finished already. We need to think about how to proceed.

9.10 Welcome by Wangu Mutua, Vi Agroforestry:

As an NGO Vi Agroforestry started by working from the heart, but as we moved along, we have taken on research to guide in our work. Vi Agroforestry is keen to follow this research and happy to host Triple L.

9.20 Quick round of short presentations by participants

9.30 Presentations of Triple L Research:

Anders Malmer, SLU:

Triple L combines all of the challenges we find in drylands.

I do very much appreciate the cooperation established in Triple L between academia and the civil society, not least with Vi Agroforestry. Last week there was a launch of Agroforestry Network for actors interested in Agroforestry. You can sign up to this network if you are interested. Literature will be shared and will information about activities further on.

Dryland Development

Drylands imply a lack of water: the water aspects really frame which development can take place. This frame means livestock.

In the less dry areas we can also have cultivation, here there is room for innovation. Part of this is restoration or intensification, including ecosystem services, and climate adaptation.

The economy is central here too – we need to move from subsistence to more productive agriculture and market inclusive systems.

Dryland development is changing all the time. Important aspects need to be included such as urbanization, climate change, population increase, market increases etc.

The Role of Trees.

Drylands in Africa are extensive and trees are important in all drylands systems. For example, dry forests (e.g. Miombo), savannas', parklands, and grazing lands. However, being a bit broader, this includes the development of arable land vs need for food, biofuel, etc. There is a very high demand and it is a tremendous challenge. More bio-based production needed.

What do we do? Restoration is one way. There is 2 billion hectares of degraded land that can be restored. Most of these potential lands are mosaic types of restoration. However, the land is full of people. We cannot put back the forest. We need a productive landscape with ecosystem services (water, food, etc). Optimum use needs to be found.

Regarding the water aspect and trees:

Water will be lacking as it is used more intensively. However, trees restore soils. Litter fall improves soils. Although trees also evaporate more water from the ground water. The trade-off model, a classical model. Research is saying more trees means less water. However, the empirical basis is mainly forest plantations outside tropics and none in drylands.

In an example from Burkina Faso, the optimum tree density model showed an optimum ground water recharge from trees. Notably, there will be an optimum for every system.

9.55 Dereje Wakjira, IGAD:

Intergovernmental Authority on Development (IGAD)

Dryland/Pastoral Resilience Initiative

In the development context, we use the term pastoral system, not dryland. Perhaps Triple L might consider changing this?

8 countries are included Eritrea, Ethiopia, Djibouti, Kenya, Sudan, South Sudan, Somalia and Uganda. 60 % ASAL. This is a large amount of land constrained by water, experiencing recurrent droughts. Here, mobile livestock rearing is the dominant livelihood.

There have been 2 major developments since 2011.

1. IDDRSI – IGAD Drought Disaster Resilience and Sustainability Initiative

2011 Africa was hit by drought and many were affected. Member state came together and agreed to work as a region. From Karamojong in the West to Djibouti in the East, the pastoralists are crossing boundaries, moving from area to area looking for pasture. This also has implication on animal disease, and thereby also infrastructure. A clinic may be in one part of the country, then they move. The same problem occurs with water sources. So we want to think as a region. We do not want to be fire fighters but deal with challenges before they become serious problems.

The project started 15 yrs ago, including the WB, ADB, UN. The ASAL context dictated the possibilities. There are programming papers (these can be shared) from each area with seven priority intervention area pillars (see slide) with their specific components, subcomponents. The coordination unit is in Djibouti. There are also a couple regional projects initiated. Some countries are up to speed, like Kenya, others have fallen behind a bit.

2. ICPALD – Centre for Pastoral Areas and Livestock Development

Initiated in 2009 to facilitate bilateral agreements on disease control, but also contains other aspects of alternative livelihoods too.

Ethiopia, Kenya and Uganda are included in the Regional Pastoral Livelihoods Resilience Program. I coordinate at the regional level. The countries are at different speeds of implementation so the ambition is difficult. For example, one side of the border may vaccinate, but not the other. Other problems include, drought, pastoralist drop-outs, youth unemployment, low investment, land tenure and governance. Land is vulnerable to grabbing and being claimed by governments and others. Furthermore, extension services are mainly in an agricultural mind-set.

IGAD is looking for partners:

- Dealing with the fact that early warning systems are mainly focused on agriculture, not pasture. Better information is needed.
- Dealing with sustainable range management. This is why I'm here.
- IGAD is also interested in research partners; research is one of seven pillars of IGAD.
- IGAD is also interested in out-scaling research and development results.

Julia E V Wernersson, UoC:

PhD Status Presentation.

How Livestock Keeping Practices Shape Identities and State Subjectivities. Case Study: West Pokot County, Kenya

Identity as practice. Livestock keeping practices. From individual to state.

Topics of papers: Livestock watering, disease management, breeding, insurance, movement.

Paper 1 is submitted and looks at livestock watering: in this challenge of finding water, there is a discussion of what it means to be a livestock keeper both today and in the future.

Alfred Burian, SU:

Paper presentation with authors: Alfred, Rebecca, Benjamin, Mikael, Julia, Gert.

Population growth in semi-arid, agro-pastoral landscapes: A case-based system analysis and strategies to increase socio-economic resilience

Paper deals with population growth, climate change, growing seasons and variability.

Evaluation of population growth: both positive and negative. Future outlook: capacity to withstand stress problematic.

Göran Bostedt, SLU:

Exploratory study, possibly a paper.

Saving for Dry, not Rainy days – Saving and Borrowing Behavior among Agro-Pastoralists in West Pokot.

Cross-sectional data (possibly a bit old). Banking. Pastoralists' monetary buffer, e.g. SACCO. Evaluation of the training people received, but also the types of saving forms, credit types (saving being a prerequisite for access to credit). Used for investment mainly (37%), school fees (18%), business (14%).

Classification Regression techniques

Dependent variable Independent variable

Continuous - - - > OLS

Binary - - - > Binary choice model

Multiple choice - - - > Multinomial choice models

Order choice - - - > Order choice models

Connections between diet, savings and credit.

Tim Letooyia, County drought response officer, West Pokot County:

NDMA in West Pokot. Drought focus.

Use a Drought Early Warning System. A community based system.

Pillars: Risk knowledge, Monitoring and warning services, Dissemination and communication, Response capability, Evaluating the EWS.

Sites in 3 livelihood zones analyzed. Including pastoral and Agro-pastoral.

Monitor food security also. Rainfall, environmental stability, triangulate with vegetation index (water sources), availability (rural economy), access to food, utilization. Also look at coping strategies.

Use household questionnaires for 30 sentinel site households. Also key informant questionnaires. Based on this, look at trends and determine if it is normal/alert/alarm/emergency. Leads to a monthly bulletin transmitted to County steering group, internet, and on the radio.

Collins Odour, UoN:

Presentation of ongoing master thesis study.

Effects of enclosures on the soil organic carbon, microbial population and greenhouse gases in West Pokot.

Assess grazing enclosures. Especially labile soil organic carbon fraction and microbial carbon, population of bacteria and fungi, aggregate size distribution and stability, and emission of CO₂ CH₄ and N₂O.

Comparing: grazing dominated/contractual grazing/open grazing and age of enclosure.

2 papers planned.

Deborah Muricho, UoN:

Master thesis proposal presentation.

A socioeconomic analysis of trends opportunities and challenges to pastoralists livelihood resilience in West Pokot County, Kenya.

- Encroachment, drought, marginalization. Demand for livestock products, integrated markets

Key concept: resilience. Theory of Induced Innovative Change. Vulnerability makes people choose according to a higher utility.

Wants to document the participation in coping livelihood strategies from developed governance. How has participation created more resilience? Productivity and yield.

Drought related shock leads to transformative structures and processes to get better resilience. Use Paired combinatorial logic that pairs choices.

Caroline Kawira UoN, University of Ghent:

Assessing the impact of restorative land transformation on household nutrition.

Focus groups. Frequency of household fruit and vegetable consumption. Three months of food insecurity.

Impacts of household nutrition. Quantification of themes based on baseline report.

Ditte Löfqvist and Freja Engström/Ewa Wredle, SLU:

Ditte: Pastures – quality, dry matter, protein, fibers, energy

30 farms. Sampled during the dry month of September. Wanted to see if there were farms that had the best practices. 10 selected as best. 20 random. Grass samples and interviews on practices (when animals are moved, average on cattle). Digestible matter should be over 55%, but they were at around 47%

Also samples on supplementary feeds. Hay was not dry enough – this can be poisonous for the animals.

Interestingly, those with most animals had also had the enclosures the longest.

Freja: Breeding – ruminants (cattle goats and sheep). A lot of variation.

Local Pokot Zebu, Crosses with Sahiwal and Ayshire. Local Pokot goats, Galla. Local Pokot Sheep, Dorper. 87 % using cross breeding to increase milk yield, bigger animals or more payoff. Most had planned breeding, by choice of males, improved breeds, or pure breeds. Can keep own animals for replacement. No documentation, only 2. Difference in bull ownership. No difference between random and best. Breeding with exotic can also risk the genetic material of the hardy Pokot Zebu. Blood sampling would be preferable, also for breeding programs.

Albert Gikonyo Ituka/Stephen Mureithi, UoN, Uni of Ghent:

Study on SOC

Impact of enclosure management and age on topsoil organic carbon stocks in Chepareria, West Pokot County, Kenya.

Determine the effect of management strategies on SOC, regarding enclosure age. Dug deeper in the soil – 30 cm (10, 20, 30 composite). Looked at enclosure/cultivated enclosure/open grazing. Three locations.

Available phosphorous differed. No significant difference in the management. Small difference for SOC for 2-8 and the 12-18 years. In Chepkopegh there was a significant difference for the age classes, the younger have more carbon, which is unexpected.

Confusing data with the age, also contradicting results. Reflects Svanlund's report.

Eric Röhss, GU:

Presentation of Master thesis.

Embedded Enclosures : A Study of Political nature of land management institutions.

Private enclosures as political institutions. Critical Institutional Analysis. Communal and Private enclosures.

Theory: Institutional bricolage, embedded tenure, and non-human agency. Possible to see how the land tenure is a combination of old and new institutions, stretching also to livestock inheritance. The flooding of Lake Baringo shows a non-human agency that pushes towards and restricts enclosures. Enclosures is political, related to access.

16.30 Brainstorm of the 3 topics

- **Student projects: How do we proceed?**
- **What kind of funding can we apply for?**
- **What research applications are we going into?**

Student projects:

- Swedish students can be assistants to the Kenyan students
- Link the market to the production, how to improve the process
- Water quality as a rising issue
- Nomadic people despite being sedentary
- Making a household economic survey – repeating the 2007 survey of Vi Agroforestry
- Land acquisition and transfer, land prices, power structures,
- Socio-economic impact of enclosures

- Alternative livelihood strategies
- Fuel, firewood strategies
- Destruction of enclosures – what drives that? Sustainability of enclosures? The lasting effect of Vi Agroforestry counseling.
- Survey of how familiar the pastoralists and farmers are with different livestock strategies.
- More gender perspective in all the topics in social and natural science – e.g. soil carbon women/men, when sons and daughters inherit.
- Other areas than West Pokot
- Motives of enclosures – e.g. in Uganda, some said they were there and might go back – do they use enclosure as a land claim and move animals to Uganda?
- Are we creating a resilient system with enclosures? How can we balance the two?
- Livestock per household decrease – why?
- Research local fodder markets
- Streamline agroforestry for pastoralists
- Breeding: what are people doing,
- Blood samples
- Markets: meat, milk, alternative livestock value chains like poultry and honey
- Conservation and production of hay
- Yearly vegetation aspect
- Diversity and richness vs nutrients (grass and brows)
- Nutrient management – how are people dealing with manure?
- Bush control - burning
- Water harvesting, water recharge, water pans, boreholes, nutrients

Funding:

- IFS (graduate student grants)
- Terra viva grants (for development grants)
- Funding for networking and student projects
- Other countries.
- Funding for dissemination.
- Look into funding for development, change, communication (documentary, stakeholder forums, ambassador structures, county government, dissemination as a funding source).
- Connect Triple L to development actors so that Triple can give out money
- EU funding (related to migration – how to sustain the system and improve the livelihood of youth and pastoralist) Land Livestock Livelihood – the system. A long term investment with partnerships. Development actors – all want to look at dryland and applied research is needed. Partner with people.
- Partner more! Use the development side of Vi Agroforestry to get development combined.
- To build the Triple L name.
- Streamline applications to the fund.
- AU
- IGAD
- CRPs – dryland area
- IFAD (International Fund for Agricultural Development)
- DAAD – for students (Germany)
- Nordic African Scholarship for Swedish students
- IDRC (Kenya Markets trust)
- SLEEK (Kenya)
- National research Council (Kenya)
- Circle Fellowships (post-docs)

- ADA (Austrian)
- USAID
- Denmark
- Success story: Humboldt university for 1 year – John Wairore.

Applications:

- Come up with a project first, then apply. Be more proactive.
- Think: Who would be interested in the development of West Pokot (milk, meat industry....?) These companies with CSR departments – develop something together? Look for strategic partners that are interested in what is happening now. Have a concept note that we can send to companies.
- Connect to other countries than Sweden.
- Focus on other areas, other drylands, Ethiopia, Mali, etc. Or non-drylands?
- Connecting to other issues, climate change, issues of indigenous people, gender in relation to tenure security, fundamental challenge of the pastoral paradox of security but also tenure security – a core idea from recent literature from Africa where this is a challenge that has not been solved. Resilience of families, regions, groups... looking at the pastoral paradox as they become more sedentary. Become difficult to move for climatic or social reasons. When we talk about intensification we tend to move into more simple system. How can we keep diversity in socio-economic and biological values while making a system more intensive?
- Migration and the trade-offs.
- Have a focus on Isotopes with a practical application.
- Resilience building with a capacity development/empowerment aspect.
- Widening the scope – connect to other places. Relevance!
- Engage more with Vi Agroforestry and look for development funding with a research aspect. There is a lot of mutual interest here.

Minutes of Triple-L scenario workshop held in West Pokot on 29th-30th November, 2016.

Day 1 (29th November 2016)

Present

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| 1. Per Knutsson - University of Gothenburg | 15. Dereje Wakjira - IGAD |
| 2. Gert Nyberg - SLU | 16. Stephen Mureithi - University of Nairobi |
| 3. Julia Wernersson - University of Copenhagen | 17. Richard Onwonga University of Nairobi |
| 4. Eva Wredle - SLU | 18. Bramwell Sieta - Vi Agroforestry |
| 5. Eric Röhss - University of Gothenburg | 19. Stephen Lokato - Assistant Chief |
| 6. Göran Bostedt - SLU | 20. Jacob Simatwa - WLEO Chepareria |
| 7. Anders Malmer - SLU | 21. Ronald Juma – Ministry of Livestock |
| 8. Astrid Hedman - We Effect | 22. Michael Arekou - PAAO |
| 9. Laura Asperholm - We Effect | 23. Emmanuel Lomwatum - CLMC |
| 10. Oscar Kvamme - Vi Agroforestry | 24. Samuel Lonaoringole - Chief |
| 11. Caroline Kawira - University of Nairobi | 25. Samuel Kapelinkorok - Assistant Chief |
| 12. Jacob Lemtukei - Chief | 26. Joseph Loriso - Assistant Chief |
| 13. William Makokha - Vi Agroforestry | 27. Petter Nordqvist - Vi Agroforestry |
| 14. Rebecca Kigwe - JKUAT | 28. Isabella Ostovary - Vi Agroforestry |
| | 29. Collins Ouma - University of Nairobi |

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| 30. Deborah Muricho - University of Nairobi | 35. Carren Nastaki - Water Department |
| 31. Alfred Burian - University of Stockholm | 36. Elisabeth Kinug'ok - ASASP |
| 32. Benjamin Lokorwa - Triple-L | 37. Samuel Longoringle - Chief |
| 33. Joseph Lorooyarw - Chief | 38. John Arusha - Livestock |
| 34. Lonah Mukoya - Vi Agroforestry | 39. Evelyn Koskei - CDA Agriculture |

Round of presentation by participants

The participant introduced themselves by name, institutional belonging and academic/work field

Welcome and introduction of Triple-L: Gert Nyberg

The participants were welcomed by Triple-L coordinator Gert Nyberg and presented and explained the schedule for the workshop in more detail.

Triple-L is a research initiative that research on land, livestock and livelihood issues in the drylands and focuses on the ongoing transformation of the drylands in West Pokot. Thirty years ago, the drylands were used in pastoral system and have since transformed into an agro-pastoralist system based on livestock.

The difference between Triple-L and Vi Agroforestry was explained: Two separate organizations with close cooperation.

Triple-L is: SLU, GU, LU, UoN, JKUAT, ICRAF, ILRI, and Triple-L work closely with the county of West Pokot.

Triple-L hypothesize that the use of enclosures as a land rehabilitation strategy is the key for the transformation of drylands. However, enclosures are not the only variable in this change. There are also changes in population, markets, infrastructure, tenure, culture, agricultural diversification. This make Triple-L a multidisciplinary research initiative.

To date, 12 master thesis's, 6 scientific papers and 3 reports have been produced. One PhD course has been arranged and one workshop is arranged annually.

Enclosures: 90% adaptation among farmers in Chepareria, more soil carbon, more vegetation, livelihood less dependent on livestock migration. A transition between pastoralism and agropastoralism is witnessed (not to crop agriculture).

Much information is still missing: what are the limitations of the agropastoralist system? how small can farms get and still be sustainable? how well are the results from West Pokot applicable to other areas?

Trends: Agropastoralism; traditional knowledge is based on pastoralism and does not directly fit the new system; management of enclosures poorly understood; enclosures used as a privatization of land.

Welcome: Madam Evelyn Koskei

Madam Evelyn Koskei, County director of agriculture, wished the workshop participants welcome to West Pokot county. West Pokot is divided into four sub-counties: West Pokot, Pokot North (dry), Pokot

south (cold) and Pokot Central (partly dry/partly highland). Main livelihoods in West Pokot: Maize and beans in the highland areas and Sorghum in the lower areas. Most of the produce is organic, very little chemicals and fertilizers are used. Livestock: Sheep, goats, beef and dairy cattle, and more recently have camels been introduced to the dry areas and they are doing very well.

Ms. Koskei recognized Triple-L for the research that has been conducted in West Pokot County and suggested that two master or PhD students should conduct research on the topic of sand intrusion/erosion from the hills into agricultural land and how to stop this development. It was also expressed a wish from the West Pokot County, that Triple-L ensure that the published theses and scientific papers are made available at the local library, in order to strengthen the cooperation between researcher and implementer, and for the West Pokot County to benefit from the research.

Off the record: The research papers and theses had already been printed in advance for the workshop and was handed over to the County during the workshop.

The dryland context: Anders Malmer

The research conducted by Triple-L has so far focused on understanding the transformation of drylands in West Pokot, looking back 30 years in time. This research is valuable not only for the West Pokot County but also for other areas of the world with similar drylands. The research is needed to understand ecosystem services, human behavior etc. By understanding the historic development, we are in a better position to understand the future development of drylands.

What to focus on/Challenges for the future:

Water: Is the limiting resource for drylands, and people and land management will have to take water scarcity into consideration. Key issues are: rainwater harvesting, reducing surface runoff, and water management.

Livestock: Traditional way of using drylands; How to improve production; Animal health; increased risks with climate change; Fodder/grazing management.

Innovative cultivation: Need for new crops; Can production be increased by combining different crops and livestock?

Intensification/restoration: What ecosystem services exist and how are they affected by changing livestock and crop management: Water; traditional medicine; fire wood; fruits/herbs.

Livelihoods: How will livelihoods develop with new markets and increased demands of food; will livelihood development be fair and sustainable; there is a need for general infrastructure.

All challenges are interconnected and relates to the research Triple-L has been conducting in West Pokot, looking back 30 years. The task is now to understand how current developments and practices will affect the future of drylands.

Dereje T. Wakjira, IGAD

Dereje represents IGAD and the director of ICPALD, Livestock and dryland development based in Nairobi. Dereje expressed that his objective at this workshop was to get informed of the research

conducted in West Pokot and of the experience of the initiatives taken in this area, and how these can be transferred into other areas in the IGAD region.

West Pokot County has received many students and researchers, and much information has been gathered on the management of drylands in the area. Other dryland areas in the IGAD region are still struggling and have been subject for little research. There are many policy gaps, and there is a need to maintain but also extend this research outside West Pokot County.

IGAD background: The mission is to assist and collaborate with the member countries on issues of food security, economic integration and cooperation, peace and security, and environmental protection.

Approximately 60 % of the IGAD region is semi-arid and livestock herding is the most common livelihood strategy. However, the semi-arid area of the IGAD region is not purely pastoral. Agro-pastoral activities are becoming more common, and there are also government supported irrigation schemes in the area. The drylands constitute a huge area and resource for the IGAD region and can therefore not be overlooked. There is therefore a need to develop a way to sustainably develop the production of the ecosystems in the dryland areas.

Why does IGAD focus on pastoralist development?

Risk and vulnerability: Climate change and variability causes risk and vulnerability and have brought the IGAD countries together to find a solution. Rainfall is becoming more unpredictable and the number of serious droughts has increased. Natural resource access conflict over grass and water are common and often include arm, which has affected the socio-economic development in the region negatively. Lack of governance is another issue, with many of the drylands left to govern themselves. With changing conditions in the rangeland, the traditional management institutions are not able to mediate between different interests and conflicts arises.

Member states left behind: General lack of development in the members states for years with the pastoral areas particularly marginalized, with extreme poverty as a result. 60 % of the household heads in southern Ethiopia have no formal education; corresponding figure is 72 % for Karamoja region in Uganda.

Local livelihood and national economy: 30 % of the regions 226 million people live in the pastoral areas and are predominantly depending on livestock and pastoralism for their livelihoods. 60-70 % of the national livestock population is in pastoral areas, supporting the large cities and export markets with meat.

Cross-border mobility: Pastoralists are moving with their herds over the national borders. Pokots are found both in Uganda and in Kenya. This means that the national governments need to work together to solve issues such as animal disease that arises with animal mobility. There are 75 cross-border livestock trade markets where people come to trade livestock but none are formalized and operates under difficult conditions. This activity should be supported instead.

Biodiversity: Many of the animals and plants in the drylands have been adapting to the areas for many years and constitute a genetic resource unique for the area that needs to be protected. Many of the conservation areas of Eastern Africa are found in the dryland areas with potential tourist benefits.

Some of the challenges:

- There is no data on the number of livestock in the region. None of the 8 IGAD countries has livestock population data.
- Degradation of communal rangeland; acute problem; invasive species.
- Governance of land: drylands are traditionally communal, and are now slowly being privatized through different processes varying from place to place. A general trend is that people with money fence big land areas and exclude others. The formal system is not up to speed for the demands of the people and they therefore grab land for themselves.
- Unemployment: Livestock is a major resource but the value chain is/has not developed.

Introduction to scenario workshop: Per Knutsson and Gert Nyberg

The participants were informed that Eric Röhss had been assigned to document the workshop in paper and photo and develop a document/brief based on the achievements of the 2 day workshop.

The intention of scenario development can vary, in many cases they are assessments of what will happen in the future. In this Workshop however, the development of scenarios was rather a process where different possible but not necessarily the most likely scenarios should be explored based on the competence of students, researchers and practitioners with expert knowledge in various academic fields and the context of West Pokot. The scenarios were to be viewed as qualified guesses of the development of the next 30-40 years in West Pokot rather than exact predictions.

The intention of the workshop was to identify a number of important drivers that may change the future development of drylands in West Pokot. Based on these drivers, the different scenarios were to be developed. The goal was, that based on these scenarios, at the end of day 2, to present and compare 3-4 different possible scenarios, their effects and consequences, and the future policy and research needed to be addressed in order to avoid potential problems that could derive from each scenario. In short the idea was to address both the potential problems but also potential opportunities of the specific scenario, and how these could be improved by research and policy.

The scenario model based on Driver → Effect → Consequence → Knowledge/science needs → policy issues (Figure 1) was introduced and explained. Some of the recent developments since the 80's and their effects since then are already known and have been investigated /studied by the Triple-L. This model shows where we stand now, with drivers that can take different directions and the model should be understood as a way of thinking when developing the potential scenarios. Based on the current Triple-L research, Per and Gert had identified three different drivers, i.e. things that have the potential to change the future development of West Pokot depending on the direction they take. These were Climate change, Population development and Economic development. These are not the only drivers and participants were allowed to add driving forces to the model. Participants were however advised to consider the complexity of the model and the increase of potential scenarios if drivers were added to the model. Only with these three drivers there are 27 possible scenarios. The groups were advised to try to develop three very different scenarios portraying three alternative futures, they did not need to be the most likely, but they had to be possible.

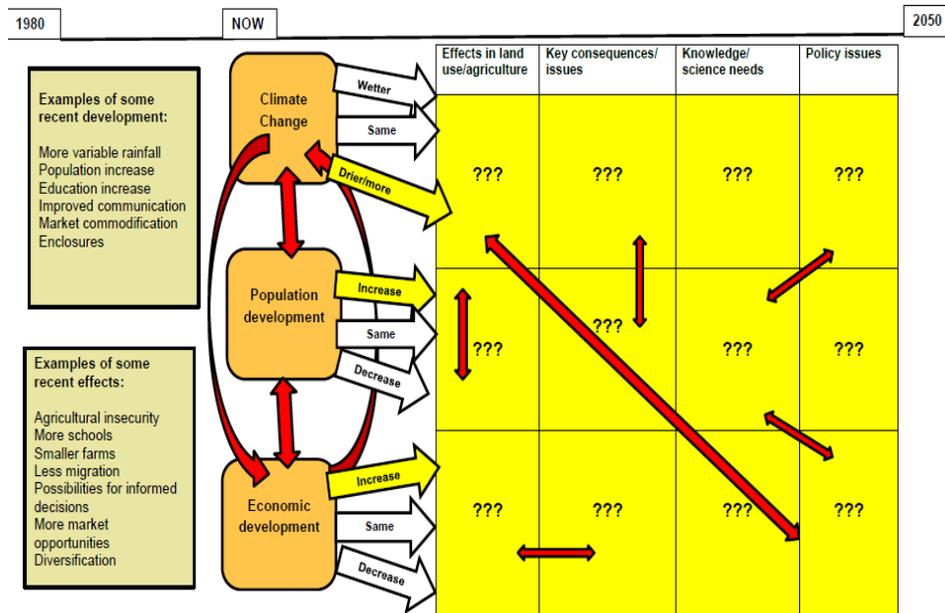


Figure 1

Examples from previous workshops (**Gert Nyberg**)

The prime idea of scenario development workshops from a scientist’s perspective is to develop scenarios and identify research gaps and needs, so that research can be conducted on topics that will be relevant and useful for the local, regional national policy context in the future, and not only look back at the development of the last 30 years.

Gert presented experiences from the SSA agricultural scenarios from 2012. At that workshop, larger global scales issues and their effects on Sub-Saharan Africa were discussed with a focus on population, climate and economic issues. Based on these discussions, 4 different scenarios were developed based on different power developments at the global arena: A changed balance of power; A world in balance; A fragmented world; An overexploited world. A common way of working with scenarios is to develop a positive, a gloomy and a ‘business as usual’ scenario. Based on these scenarios a number of critical research areas were identified: Governance and infrastructure for agriculture; Sustainable and productive farming systems; Investments and risk management in agriculture; Innovation and adaptation of technology in agriculture. However, for the propose of the present workshop, this level of scales of research areas were regarded as too abstract for the West Pokot County level, and the propose was to be more concrete for the local West Pokot scale.

A second example was explained, and that was the Parkland (traditional agroforestry systems) scenarios in Burkina Faso 2012. Also here 4 scenarios were developed: A business as usual; Foreign/Corporate agriculture and land grab (Lang grabbing on the global agenda 2012); Mixed system with a rural middle class of successful farmers buying land from unsuccessful farmers; Parklands prevails, similar to mixed system but more equal. That scenario workshop identified four critical key research areas, similar to the SSA agricultural scenario, but the scale was more focused on the nation of Burkina Faso: Governance and policies for agriculture; productive and sustainable farming systems for the parkland system; scales and markets in agriculture; innovation, adoption and dissemination of knowledge and technology in

agriculture. For each research area a number of potential research topics identified in the workshop scenario were then presented.

The idea for presenting these two examples was to show some of the ways of thinking when developing scenarios for the global and national scale. The West Pokot scenario focused on the local scale, but some experience and topics discussed in previous workshops could be helpful. Some (but not all) concepts/issues to consider in the workshop discussions were: How sustainable and resilient is the scenario like to be; What are the consequences of the scenario for equity, gender relations and vulnerability; What scales are active in the scenario, local/national/global governance, markets, land size/sub-division/sustainability; Incentives, regulations, policies relevant for the scenario, How general/specific is the issue, only for Chepareria, the whole of West Pokot or drylands in general; Economics/markets; Water; Detailed management.

The workshop was an iterative process; the work will not stop there. An end product of the workshop will be the 3-4 scenarios and a number of research and policy issues. But the thinking and the discussions should not stop there. How should research communication be enabled and disseminated from researchers to end users and vice versa in order for research to focus on relevant issues for the local context. This discussion needs to be continued.

Group discussions:

Each group was assigned to discuss, develop and present three scenarios.

Presentation group 1: Caroline Kawira

Scenario 1: Main driver, A wetter climate

The climate will become wetter and this leads to economic development. The economic development will then affect population growth in one of two ways; scenario 1A the population increases resulting in effects connected to population growth. Or scenario 1B where the population becomes stable or decreases.

In short:

Scenario 1A: Wetter climate → Increased economic development → Increased population.

Scenario 1B: Wetter climate → Increased economic development → Stable or decreasing population.

Scenario 2: Main driver, Urbanization

Urbanization will lead to low rural populations, and with low rural populations the development can take two paths; 2A decreased food production with lower economic development as a result. 2B food prices will increase in Kenya, this leads to an improved economy in West Pokot and improved technology

In short:

Scenario 2A: Lower rural population → Economic decline

Scenario 2B: Lower rural population → Economic development

Scenario 3: Main driver, Governance

A scenario of good governance was explored. With good governance West Pokot will experience economic development resulting in improved infrastructure, technology, climate adaptation, education and improved people development

In short:

Scenario 3: Good governance → Economic development

Presentation group 2: Isabella Ostovary

Scenario 1: Climate variability increase → Population increases → Economic development

Climate Change: Effects: Biodiversity decline, decline in crops and livestock (particularly cattle), more droughts and floods, invasive plants will increase, diseases and pests will increase. *Consequences*: decreased productivity, conflict, gender inequality.

Population development: Effects: Biodiversity decline due to increase human population, more land degradation, potentially more infrastructure, land pressure increases, land sub-division increases and more conflicts.

Economic development: Effects: More infrastructure, introduction of GMOs, urbanization (educated people will move to cities), urban development, more gender inequality, more job and livelihood opportunities.

Scenario 2: Climate variability increase → Population increases → Economic decline

Scenario 2 is a flipside of scenario 1 since all drivers are the same except the economy that goes down.

Scenario 3: Climate variability increase → Population decline → Economic decline

Climate change: Same effects and consequences as the two first scenarios.

Population decline: Effects: More land available per household, possible increase in animal biodiversity, revegetation. *Consequences*: Decreased conflicts, increased human-wildlife conflicts, woman empowerment, poor social service.

Economic decline: Effects: increased economic stratification, decreased infrastructure, localization of economy, decreased productivity.

Presentation Group 3: Stephen Mureithi

Looking at the three drivers; climate change, population development and economic development. This group argued that the most likely scenario is that the climate becomes dryer or more variable, the population of West Pokot increases, and that an increase in the economic development occurs.

Depending on a fourth driver "Governance", this scenario was then developed into two scenarios, where scenario 1 is based on good governance and scenario 2 is based on poor governance where the effect and consequences of climate change, population growth and economic development differ depending on the governance driver.

Scenario 1: Good governance

Climate change: The effect is that there will be increased investments in climate change adaptation and mitigation strategies, including investments in pastures conservation and fodder development. The consequence will be increased resilience in pastoral livelihoods

Population increase: The effect is that there will be increased demand for natural resources with land degradation as a result. But with good governance there will be investments in land restoration. The consequence will be improved health and nutrition and a higher level of education.

Increased economic development: The effect is market development, allocation of funds from the national level to the counties and money will be allocated to where it is needed. The consequence will be access to finance, economic empowerment and the development of agricultural and livestock based value chains.

Scenario 2: Poor Governance

Climate change: The effect is an increase in pasture and water scarcity. The consequence will be resource conflicts as people will migrate from low lands to high lands in search of pastures. Young people will move to cities. Livestock production will decrease. Gender inequality will increase due to higher work load for women.

Population increase: The effect is that there will be increased demand for natural resources with land degradation as a result. With poor governance this will lead to less land available with an increased number of pastoral drop outs. The consequence will be loss of pastoralism and increased resource conflicts.

Increased economic development: The effect is that the money will go to the pocket of few people; there will be inequality and corruption. The consequence will be landlessness.

Presentation group 4: Göran Bostedt

Group 4 based their scenarios on the climate change driver since they argue that this is the most exogenous of the three drivers, climate change, population growth and economic development. Early on the idea of a wetter climate was discarded. Therefore the scenarios are based on either a stable climate or a more variable climate.

4 scenarios were established based on either a negative or positive development based on either a stable or more variable climate.

Scenario 1: A stable climate and a positive development.

Climate is stable, positive economic development, increased production and food security, improved human health and education, improved living conditions and infrastructure, and the development will be equitable.

Scenario 4: A stable climate and a negative development.

Climate is stable but macroeconomic development is negative which affects West Pokot. This leads to an increase in livestock, lower demand, weak household economy, lower education, increased migration

within and away from West Pokot. This leads to no new investments in infrastructure and the increased livestock leads to soil erosion and deteriorating local climate.

Scenario 2: Climate change goes on and a positive development.

This is an adaptation to climate change scenario. Here the population is stable and the economic development is average. The adaptation takes the form of improved land management, climate smart production which gives improvement in human health and a number of positive effects.

Scenario 3: Climate change goes on and a negative development.

This is a failed climate change adaptation scenario. This leads to water scarcity, decreased food security and land degradation. This leads to community conflicts and increased crime, increased child mortality and migration away from West Pokot, which leads to an aging population

Development of 3-4 scenarios: Open floor discussion

Whether or not to include governance as one of the driver in the scenario model was discussed. Some participants argued that this driver may change every 5 years and therefore should not be included, where as others argued that this driver is visible in 3/4 group scenario models and is an important aspect for the future development of West Pokot. The outcome of the same climate, population and economic development can vary greatly depending on good or poor governance. Governance was also argued to be one of the most unpredictable drivers compared to climate change and population growth which are relatively known. Therefore different scenarios of governance would be interesting to explore.

It was agreed upon that issues of governance were to be discussed during the second day at the workshop. However, the discussion of governance should relate to the research and policy needs that arise and need to be addressed for each specific scenario. Whether or not these needs then are fulfilled, leads to either good or poor governance (gives the work of Triple-L more importance).

It was argued that the most exogenous driver for the development in West Pokot in relation to these scenarios is Climate change and therefore there should at least be two scenarios based on either a stable climate or a more variable climate, i.e. scenarios based on that the world either succeeds or fails to mitigate climate change. Scenarios with a drier climate would have many livelihoods effects in common with scenarios where the climate variability increases (not necessarily becoming overall drier); hence these two (higher climate variability and drier) are lumped together in the scenarios. There are of course differences between drier and more variable climate effects, but these are not covered here. Based on this, the different scenarios could be developed based on different outcomes of the other drivers. Climate change is also a driver that the people of West Pokot can do very little to influence, and it was therefore argued that this driver is important to explore since the West Pokot county need to prepare for both scenarios.

It was expressed that one positive, pessimistic and one in-between scenario should be chosen. Gert made a short summary of the discussion so far, and conclude that the workshop participants had decided that the scenarios should be based on a pessimistic and positive climate change development, where the pessimistic climate development leads to a more variable climate in the sense that it becomes both drier and wetter. The positive scenario means that the climate stabilizes.

To develop the scenarios further, the population and economic development was then discussed. If a positive and a negative development for both the population and economy was kept this would lead to $2 \times 2 \times 2 = 8$ scenarios, which was considered to be too many. It was therefore decided that the development of either the population or the economy need to keep constant in order to limit the scenarios to 4.

Per suggested that the economic development should be kept as positive. Not necessarily for the global economy, but for the local West Pokot economy it is likely to be a positive economic development since people do adjust to the conditions they face. However, the economic development can look different depending on the different scenarios. It was argued (Göran) that economic development is conditional on population and climate development and that, like governance, the economy can be discussed in relation to science and policy needs for ensuring good governance and local economic development.

Based on the discussion it was decided among the participants that: The climate driver will either stabilize or become more variable; the population driver will either decrease or increase and the local economic driver will be positive. This resulted in the following four scenarios:

1	Climate: More variable Population: Decrease	3	Climate: More variable Population: Increase
2	Climate: Stabilizes Population: Decrease	4	Climate: Stabilizes Population: Increase

Minutes of Triple-L scenario workshop held in West Pokot on 29th-30th November, 2016.

Day 2 (30th November 2016)

Recap from day 1: Per Knutsson and Gert Nyberg

Per and Gert refined the four scenarios developed during the first day. Increased climate variation included both a generally drier scenario and a scenario with larger variations (including occasional floods) since many of the issues relating to livelihoods would be problematic in a similar way for larger variation and for a generally drier climate. The scenarios were based on increased climate stress on the Y axis and more people on the X axis, this gave 4 basic scenarios. For each scenario the groups also had to think about what external and internal economic factors that may be relevant for the development of West pokot in this scenario.

Table 1 Scenarios for Day 2

Scenario 1: MORE VARIATION, LESS PEOPLE	Scenario 3: MORE VARIATION, MORE PEOPLE
<p>INCREASED CLIMATE VARIABILITY</p> <p>LOW RURAL POPULATION PRESSURE</p> <p>EXTERNAL ECONOMIC DRIVER?</p> <p>INTERNAL ECONOMIC DRIVER?</p>	<p>INCREASED CLIMATE VARIABILITY</p> <p>HIGH RURAL POPULATION PRESSURE</p> <p>EXTERNAL ECONOMIC DRIVER?</p> <p>INTERNAL ECONOMIC DRIVER?</p>
Scenario 2: LESS VARIATION, LESS PEOPLE	Scenario 4: LESS VARIATION, MORE PEOPLE
<p>TODAY'S CLIMATE</p> <p>LOW RURAL POPULATION PRESSURE</p> <p>EXTERNAL ECONOMIC DRIVER?</p> <p>INTERNAL ECONOMIC DRIVER?</p>	<p>TODAY'S CLIMATE</p> <p>HIGH RURAL POPULATION PRESSURE</p> <p>EXTERNAL ECONOMIC DRIVER?</p> <p>INTERNAL ECONOMIC DRIVER?</p>

A recap of key issues, raised by the groups in relation to the scenarios, and from Gert's examples of prior experiences from working with workshops was made. Each group was asked to keep these issues in mind when discussing their assigned scenario:

- ✓ Conflicts
- ✓ Gender equality
- ✓ Markets
- ✓ Land management
- ✓ Food security
- ✓ Urbanization
- ✓ Human health
- ✓ Infrastructure
- ✓ Water
- ✓ Scales (are farms getting smaller/bigger etc)

Four new groups were formed. Each group was assigned one of the scenarios (Table 1). Each group should work systematically with effects → challenges/opportunities → knowledge/science needs →

policy/governance consideration. For example, the group with scenario 1 should start with exploring what effects more climate variation and less people will have. Based on these effects the group should then continue and ask what are the challenges and opportunities, here the key issues could be used as a checklist. Based on this the group should then continue to ask what are the knowledge that we need or the research that needs to be conducted in order for this scenario to become sustainable. And lastly based on the effects, challenges/opportunities and research needs what are the policy and governance considerations that need to be made for this scenario to become sustainable, i.e. good or bad governance. Policy/governance consideration could both be made in order to reach a desirable outcome and to avoid reaching an undesirable outcome.

Presentation Scenario 1: More climate variation, less people

Effects: Migration of both livestock and people in search for pastures will increase. The composition of livestock will move towards drought resistant animals such as camels, goats and sheep since grass will be a scarce commodity during much of the year.

Challenges/Opportunities: Increased migration of both humans and livestock will lead to increased spread of diseases that affect both human and livestock. Increased migration will also lead to increased conflicts when humans are searching for scarce water and pasture resources.

The decrease in population will also lead to fewer investments in infrastructure in West Pokot County. Meanwhile, the demographical composition will change towards a higher percentage of women, since men are moving out of the county to migrate with their livestock and in search of job opportunities. This will increase the burden for women to take care of the household and the sheep.

The migration of animals will also lead to an underutilization of the land, which means that most land is free. This constitutes an opportunity for other utilization of the land, or to increase livestock herd per households further. However, the climate will also lead to a challenge of underutilization of land, especially in crop areas where it will be difficult to predict when to plant. The underutilization of land in combination of larger livestock herds and erratic weather patterns also risk leading to a land degradation and flooding.

Knowledge and science needs: More disease surveillance to reduce or monitor human and livestock diseases as well as more knowledge on the spread of human and livestock born diseases will be needed.

More knowledge is needed on the livestock value chain, from the start of the production to the end of the consumption. There is a need of more information on how to improve the value chain and value addition to the produce.

More research is needed on the empowerment of both women and men. This, since the lower population probably would lead to a more marginalized population. Thus, there is a need to find a way to empower the people who remain in West Pokot.

More knowledge is also needed on how to secure water resources in West Pokot and how to improve land restoration.

Policy/governance considerations: There is a need for flexible education policies, for example the migrating community will need mobile schools that could follow the migrating community.

Insurance policies are needed both for social insurance and for livestock insurance in order to ensure the social and economic safety of the people of West Pokot when the weather becomes unpredictable.

Policies are needed for an early warning system for droughts etc. Such policies are probably already there, but the issue is dissemination; they are not used/functioning/informed about. This needs to be improved.

Land use policies are not available currently and need to be introduced.

There is a need for policies that describe/legitimize pastoralism as an agribusiness where you can actually make money out of your livestock.

There is also a need for policies that will improve and govern water infrastructure and water harvesting technology.

Presentation scenario 2: Less climate variation, less people

Scenario set up: The lower population and the drive towards privatization currently witnessed in West Pokot will lead to a few private big plots of land. The lower population is a result of urban migration. Occupation will move towards more off farm activities. However, agriculture remains important, it will still be based on livestock and it will not be diversified. The land use will become very mixed; some areas will be efficiently used while other areas will become underused. Animal migration will be reduced due to the increased sedentarization and urbanization of people. Relating to markets, the group assumes that, a honey market will emerge, an increased demand for livestock and meat will increase prices, the quality of livestock will improve while the quantity will decrease, it will be difficult for white collar workers to find work. Conflicts were defined as of rural, urban and rural/urban character. Rural conflicts will stay low, urban conflicts will remain as is and no urban/rural conflicts will emerge. Infrastructure will remain the same in rural areas.

Effects and challenges: Due to privatization and underutilization of land, there will be an increase in small sized wildlife. Livestock migration will be reduced. Instead more land owners will invest in buying/producing fodder and in their animals by improving the livestock breeds. This means that some well managed pastures will be improved since their owners want to create value addition to their animals and land.

However, due to the lower population, land plots will become larger which leads to mismanagement of land and soil erosion. Due to the lower population, some previously open areas will transform to forest or semi-forest areas and there will be a need of forest management.

Due to policies from the government, there will be improved gender equality since women will be able to own land in West Pokot and improve their economy.

Main challenges and opportunities: There will be corruption, infrastructure development, urban migration, gender inequality. Furthermore, there will be a need for land and water

restoration/management which constitutes both a challenge and opportunity since the practice is difficult but the end result is more productive land and better access to water.

Knowledge gaps: More knowledge is needed on sustainable livestock management including: sustainable feeding, breeding, disease and pest management.

Within the agricultural sector in West Pokot, there is also a need for more knowledge regarding fruit trees. This relates to research both on existing cash crops such as mango but also on indigenous crops and how to commercialize them.

More knowledge is needed on how to improve and create markets for resources from West Pokot, such as honey and indigenous plants. Such markets already exist but need to be improved.

More research is needed on soil conservation and the implementation of soil conservation measures, since the implementation of existing knowledge on soil conservation often fails. There is also a need for research on sustainable mining since some mineral deposits have been found in the area.

Research on the drivers and reasons for inequality in relation to land and agriculture is needed due to the risk of increased gender inequality in the current scenario.

Policy and governance (Only presented in writing)

Policies relating to: Urban housing, More social services: Devolution policies (in ordinance with the Kenyan constitution): Forest management: Education: Improved gender equality: more extension workers: Anti corruption laws.

Presentation Scenario 3: More climate variation, more people

Introduction to the scenario: It is one of the most challenging scenarios but the group chose to try to focus on the opportunities that may derive from this scenario, although they may be hard to achieve.

Effects: Production will be affected by a more variable climate in the sense that it will be harder to predict where and when there will be rain and droughts. This means that some areas may be exposed to dry spells while other areas are exposed to floods. Thus, production of the land in West Pokot will become vary more between areas and years.

Land and human disturbances relating to land degradation, landslides and land erosion will occur due to a combination of heavy rains and bad land management, e.g. encroachment of, and farming on slope lands due to the high population pressure. This will lead to a loss in soil fertility.

This scenario leads to an increased pressure on land, since the land available per capita decreases and less fertile land must sustain more people. This is worsened with an increased sub-division of land.

Challenges/opportunities: Water management is one of the key factors for the future of West Pokot. Water scarcity and distribution of water between household, farming and livestock needs will be a major challenge for the future that can with the help of good water management be turned into an opportunity.

Regarding infrastructure, a more variable climate and increased human population will create a challenge for the existing road network and will increase the demand for new roads.

There will be an increased need to manage, adapt and mitigate more extreme weather events. These events may cause human conflicts over resources, famines, droughts, floods, spreading of diseases, and increase the institutional demands for capacity innovation building for dealing with extreme events.

Adaptation/innovation may be an opportunity due to the need to address human and environmental stress and challenges in a new and innovative way.

Gender relations and structures constitute a challenge, since the increased environmental and social stress may increase the burden for women both within the household and in the farm/livestock work.

Knowledge and science: There will be a need for more knowledge on water management: Where can a sustainable water source be found?; How can water be stored between wet and dry seasons?; Need for irrigation techniques adapted for different regional and local settings.

More knowledge is needed on climate smart agriculture: How should land be managed sustainable and adapted to changing climate condition in West Pokot? How can soil fertility be improved in a sustainable manner? How can farming in slope land be conducted? More information and knowledge, on how to use agroforestry techniques is needed.

More research is needed on how to create cheap energy and move away from fossil and expensive oil usage. The cost of solar energy is decreasing, how can this be utilized in West Pokot?

Improved knowledge of and how to manage conflicts is needed on a general level. This regards gender conflicts and inequalities as well as conflicts between farmers and herders and between different tribes

Policy and Governance: With a higher climate and population pressure and stress, West Pokot and Kenya as a whole, need to develop policies and programs that ensures that the region becomes self-sufficient in e.g. agriculture and food security, while also ensuring that the region is ecologically resilient.

For land and water management, policies that target sustainable water and land management must be developed. Policies need to address the issues of how to harvest and store water, how individuals should manage their lands. A general sustainability, self-sufficiency and resilience need to be included in the management.

Policies and programs that address disaster management must be developed: How will people be informed of ongoing disasters? How will coming disasters be predicted? In general, there is a need to develop strong and resilient institutions that can ensure social, environmental and economic resilience in the West Pokot County.

There is also a need to develop resilience on different scales when weather and other factors become unpredictable. Farmers may want to develop support organizations locally, support systems need to be developed at the county level and counties need to be supported at the national level. Diversification, both within farming and away from farming towards other livelihood activities, will be needed. Security systems need to be developed through which areas that are struck hard from droughts etc., are helped by areas that are less affected. In short, more security and relief systems in terms of food and livelihood need to be developed and institutionalized.

Presentation scenario 4: Less climate variation, More people

Effects: Diminishing land sizes and Land degradation was argued to be one of the major effects of this scenario.

Population increase will lead to the encroachment of water towers, loss of habitats and biodiversity.

The population increase will lead to urbanization, and there will be a strained access for the West Pokot people in terms of health care, education and security.

Challenges: Land degradation will lead to: deforestation, livestock overgrazing on remaining land, soil erosion and reduced land productivity as an end result.

Due to the rising population, it is likely that problems of food security and water scarcity will emerge. The growing population and the diminishing sizes of land plots also mean that the livestock mobility will decrease and the numbers of livestock per household will decrease as well. The higher population will lead to a higher land pressure, which will lead to encroachments on commons such as the communal grazing lands. Commons will be privatized and less area will be open for communal uses. These issues can be counteracted through water harvesting, revalidation and afforestation practices.

There are opportunities to develop the value chains of agriculture, livestock and fodder products, e.g. to harvest fodder during wet season and store it for use or sale during the dry season. The growing population will mean that the market for agriculture, livestock and other goods and services will grow; producers will earn more which can lead to an economic development of the West Pokot County

The reduced mobility of livestock also means that there will be a reduction in the spread of transboundary animal diseases with a healthier livestock population as a result.

The growing population was also argued to lead to increased conflicts in terms of disputes over land ownerships. There will be conflicts within families relating to sub-division and inheritance. There will be conflicts between neighbors relating to issues of land boundaries, there will be conflicts between the Pokot and neighboring communities, such as the Turkana, and there will be conflicts between the local residents of West Pokot and the government of Kenya, since the growing population will lead to encroachment of government land such as the Nasolt game reserves. There will also be increased conflicts between humans and livestock on the one hand and wildlife on the other, due to the human encroachment on wildlife feeding grounds. There is also an expanding mining sector in West Pokot, which may lead to land conflicts between the local residents and external/government interests.

In terms of conflicts, there are also opportunities of peace building activities that include NGOs, CBOs, the Kenyan government and local elders.

Knowledge and science: Due to the effects and challenges connected with land degradation, more research and outreach is needed on practices of land reclamation. More research is needed in nutrient management and improved agroforestry systems and practices. There is also a need for the development of sustainable crops and livestock varieties that are well adapted to the West Pokot conditions, such as the development of specific millet or sorghum varieties.

There is a need of research on and dissemination of the knowledge of how to create a value addition to agriculture, livestock and fodder products. There is a huge need to disseminate the knowledge that is already there, and will be there in the future, to the people of West Pokot, so that they know the best practices of how to grow and use fodder, how they can intensify production and practice "zero grazing" and improving breeds of livestock. There is also a need to research and gain knowledge on how to use water harvesting and to expand irrigation in the area.

Policy and Governance: There is a need for a land planning policy review to ensure that agricultural land is not used for settlements, and that land in general is used for the right and sustainable purposes. There is also a need to ensure the implementation and enforcement of already existing laws and regulations that govern land, water, agriculture etc. For example, enforcement of the section of the Forest act that states that 10% of every plot should be allocated for trees.

In terms of conflicts, one policy suggestion was that the government should allow livestock to enter game reserves in times of severe droughts and scarcity.

Summary: Gert Nyberg

The final result of this workshop is important, but the most important outcome of these two days is the discussions during which the different scenarios have been developed and explored within the groups; "The experience to get there is more important than the final product".

Although some scenarios portray relatively contrasting developments, an interesting reflection is that many of the research and policy needs expressed by the different groups are very similar. Some of them may be phrased differently, but the general field of research and the need for policy development is the same for many scenarios.

Gert and Per summarized the research/knowledge needs and the policy/governance needs in two boxes. Each workshop participant was then asked to place one mark for the three research/knowledge needs and the three policy/governance needs they believe are the most important/relevant/interesting to focus on for the future.

Research/knowledge needs	Marks	Policy/Governance needs	Marks
Animal disease management	3	Education and educators	2
<u>Livestock management</u>	14	Social and livestock insurance	3
Gender and inequality	4	Disaster management	4
<u>Water security and management</u>	13	<u>Land use policy</u>	18
Biodiversity assessment	5	<u>Water use and management policy</u>	11
Crop and fruit development	1	Agribusiness	3
Soil conservation management	8	Urban housing	1
Marketing and value addition	9	Coordination	0
Mining and oil	1	Devolution policies	4
Sustainable construction	1	Gender policies	4
Energy	4	Local self-sufficiency and resilience	4
<u>Climate smart agriculture</u>	20	<u>Institutions for economic resilience</u>	10
Conflict management	4	Land planning policy review	4
Intensification	2	Enforcement of existing policy and law	1

Research/knowledge needs	Marks	Policy/Governance needs	Marks
Agroforestry and rehabilitation	2	Family planning services	4
Sustainable engineering	2	Extension and dissemination	9
		Anti-corruption law	0

“Climate smart agriculture”, admittedly a wide research field, ranked as the most important research issue, “Livestock management” and “Water security and management” ranked second respective third and “Marketing and value addition” was prioritized as the fourth most important research/knowledge need. For the policy/governance needs “Land use policy” was considered the most important one, followed by “Water use and management policy” and “Institutions for economic resilience” as second and third and “Extension and dissemination” prioritized as fourth.

Thank you and good bye: Madam Evelyn Koskei

Madam Evelyn Koskei thanked all participants of the scenario workshop and their tireless work conducted during the two days.

Climate change have become a huge problem for the entire world, more so for countries in Africa that does not possess the same means to mitigate and adopt to climate changes. Therefore, this kind of workshop is very important for the people of West Pokot, farmers and livestock herders. The workshop has opened the mind of local residents and practitioners, county officials as well as researchers. The county officials will take this experience and knowledge learned back with them, and practice scenario development in their future work.

The outcome of the workshop is important since it has identified research topics that are important for the future development of West Pokot, and now students and researchers can pick from the list and come back to West Pokot and conduct research on the needed topics. However, Madam Koskei recommended the Triple-L initiative to expand the research to not only include West Pokot but also other counties in Kenya or to other areas within West Pokot. There is a need to conduct the same type of research, as that conducted in West Pokot, in other counties, similar and different to West Pokot in order for the results to be compared.

According to Madam Koskei there is a West Pokot County document on climate smart agriculture that describes the challenges that faces the implementation. There is a wish that master students will look at this document and identify potential research topics.

Madam Koskei thanked everyone for their love towards West Pokot and delivered a special thanks to Vi Agroforestry and to Mr. Dereje Wakjira from IGAD, and asked for the exploration of possible IGAD financed student research in partnership with the Triple-L in the future.

Madam Evelyn Koskei officially closed the workshop with applauds.