



Jimma University 2nd Annual Research Conference

(February 17-18, 2011), Jimma-Ethiopia

Grand Theme: Enhancing Multidisciplinary Research: A key to Invigorate Need-based and Demand Driven Research

Background papers:

- Overview of Research, Consultancy, Community Based Education and Post Graduate Studies Policy of Jimma University
- Integrating Graduate Research to Development Agenda of Commercialization of Smallholder Agriculture: IPMS Experience with Ethiopian Universities
- Promoting Multidisciplinary Research for a Better Impact: Experiences from VLIR-IUC Partnership Program in Jimma University
- Infant and Child Health in Ethiopia: Some Reflections on Patterns and Changes
- Challenges and Opportunities of Modern Technologies in Ethiopia
- Experience in Reorienting Forestry Research and Training in Ethiopia: The Case of Development Oriented Interdisciplinary Thematic Action Research (DOIT-AR) Program at Wondo Genet College of Forestry and Natural Resources

Organized by the Office of Research, Community Based Education and Post Graduate Studies-Jimma University

Welcoming speech

Berhany Belay

Welcoming speech

Your Excellency, Dr Fikre Lemessa, President of Jimma University

Invited guests

Conference participants

Ladies and Gentle men

On behalf of the 2011 JU Annual Research Conference Organizing committee and on my behalf, it is a great honor and privilege to me to well come each and every one of you to this Annual Research Conference.

Dear participants of the conference

Needless to say, higher Education in Ethiopia is mandated to deliver research, teaching and community services. However, the lion share in terms of budget and time allocation and infrastructure provision is mainly devoted for teaching and learning. The emphasis given for research and community service is dismal. The research undertaking is narrow in coverage, individually driven, fragmented and with little contribution to the overall goal of the institution and the development agenda of the nation and region.

Research is designed to generate or adapt technology, information and knowledge to be used by the end users that could be for the industry, policy makers, farm enterprises etc that fuel the development and transformation agenda of the nation and the region ultimately improving the livelihood of the community. To produce a sound technology, information and knowledge to the satisfaction of our customers at each level, the research output from the research effort should meet the quality and demands of these customers. The research output is easily adaptive and assimilated, if the technology, knowledge and information are generated on priority needs of the end users at each level.

The quality of research output is also judged on the adoption rate and use of the research output for policy formulation and development of industries, entrepreneurs, farm household, etc at each level. The quality of research is ensured when the research is designed and implemented by incorporating multidisciplinary teams and stretched from end to end. For example, in Agricultural research, research should redress itself to address from farm to fork and this is ensured through placing a multidisciplinary research theme in the need-based technology development of the research agenda. However, our past experience in research design and execution revealed that the research undertaking in Ethiopia is highly fragmented and not designed in multidisciplinary approach. Hence

there was no sound impact on the development of the nation and the regions. Recognizing this fact, Jimma University developed a research policy that signifies a multidisciplinary and need based research. This is once again to attest that our University is committed to advance multidisciplinary and demand driven research to reach the demands of the end user in technology and information generation. Our University is also working hard to review and revitalize in the sphere of thematic area development for research to ensure multidisciplinary, demand driven and need based research execution.

Dear participants

The experience in the developed countries and emerging economies of China and India has shown that the post graduate research projects are aligned with the research themes and agenda of the institution, the nation and the region. Post graduate programs have been designed to come up with double outcome that included capacity building and technology and information generation. There is disarray between the research undertaking and teaching and learning program in PG programs in Ethiopia. The research topics of PG programs are not picked from the research agenda of the institution and the national demand. The PG research projects are designed to meet academic requirements with little contribution in addressing the research problems of the region and the nation. The situation has demanded to reorient PG programs to play a win –win game in terms of capacity building and technology generation and adaptation. The research policy of Jimma University has a space to promote research based PG programs and align the program with research thematic areas of our University.

Dear participants

There are 53 departments and 49 post graduate programs in Jimma University. The staff profile of the university is improving from time to time. The improvement of the staff profile and the diversity of disciplines and programs are opportunities to place and ensure a multidisciplinary research projects in Jimma University. Our experience in the academic and research links with national and international institutions is also an opportunity to advance multidisciplinary research. Our University is committed to tap this great opportunity.

The diversity of disciplines, the existing national and international partnerships and the urgency and demand for multidisciplinary research has compelled us to identify the theme of this year's annual research conference to be **"enhancing a multidisciplinary research: A key to invigorate need based and demand driven research"**. In this conference seven invited and cross cutting papers will be presented and serve as a background and/or lead papers. The background papers are strategically selected to address the theme of the conference. Furthermore, more than 70 papers shall be presented in parallel sessions covering a wide range of disciplines such that: 11 papers in Social Sciences and Law, nine papers in Business and Economics, 13 papers in Natural sciences, 11 papers in Public health and medical sciences, 15 papers in Engineering and technology and 11 papers in Agriculture and Veterinary medicine. As a sequel to our previous endeavor, in this conference the

outstanding issues picked in each parallel session and the issues that may need immediate research and development effort shall be presented by the reporters of each college. The presentation is aimed at sharing the deliberations of each of the parallel session and also identifies and plan areas that needed a multidisciplinary research and cement the linkage of colleges, departments and our key stake holders. There shall be also a general discussion to address cross cutting issues so as to advance research culture and dissemination of the outcomes in Jimma University in the years to come.

Dear participants

The conference has involved participants from different institutions such as Ministries, NGO, private and public higher learning institutions, regional Bureaus and Agencies all having rich experience in research and development. It's my great believe that, we will complement each other to advance economic development through research, teaching and community services. As a sequel of these conferences the proceedings of the conferences shall be produced and distributed to the key stake holders before the next year conference.

Dear participants

May I know call up on Dr. Fikre Lemessa, President of Jimma University to officially open this Annual Research conference of Jimma University

Thank you

Opening Remarks

Fikre Lemessa

Good morning, ladies and gentlemen. I am delighted to welcome you to Jimma University Annual Research Conference. Since it was first launched, the Annual Research Conference has become one of the major National forums for researchers and policymakers to exchange their views about issues related to research, policy and development endeavor.

We, at Jimma University, do our best every year to put together the strongest conference program possible, but, it is ultimately the contributions of presenters, discussants, and participants that make our research conference successful. This year's event is a special one, as we are doing this for the second time, the conference with an outstanding program of papers learning from our previous experience and ups and downs.

Jimma University is the national pioneer in community based educational philosophy which is cherished innovative means to make education relevant to societal needs and priority based research to our national development effort.

Besides, in this year conference, we can also have some joy in the achievements of our institutional reform employed over the past year. Thanks to timely and effective research policy implementation undertaken at our university to make our University research based institute with immediate interventions strategies to tackle nation's demand driven researches and debates.

We cannot deny that there will be long-term difficulties associated with research funds, but the Our University is doing its level best to make alternative income generation scheme to encourage our teaching staffs to conduct need based researches in line with the national priority to tackle problem in the multidisciplinary approach. Surely, we have numerous policy challenges and economic constraints ahead of us, and we need to put the best economic minds to work to help us think through these highly complex problems in order to nurture our research skills and motivation.

Spirited debates, triggered by the national development endeavor and the Growth and Transformation Plan (GTP) over the next five years at our university have created conducive atmosphere for scientific forum and discussion. It is natural that we engage in this healthy debate as we search for the best solutions to overcome the multitude of difficulties coming from lack of scientific understanding. Scientific research which leads to a better understanding and knowledge of environmental issues is vital to protect our fragile environment but also to ensure its safe and sustainable use for many years to come for the present and future generations.

As with previous research forum episodes, there are lessons to be learned. So, what have we learned this time around? One can come up with a number of answers to this question. However, it is fair to say that, one of the most important lessons we painfully learned is that we need to have a much better understanding of the need for further linkages between research and development.

Today, research and development linkages are at the heart of the two-way interactions between the higher education and the national development agenda as a whole. Vulnerabilities stemming from lack of scientific knowledge and skills can amplify macroeconomic shocks, while weaknesses in the real scientific understanding and skills can undermine the stability of the national development in line with the priority need and national development endeavor. Poor linkage between development and research, in turn, can complicate and reduce the speed of national development. As we have witnessed over the past five years, such developments and research linkage in turn, can bring the national development in knowledge based economic system to overcome the quagmire of poverty. This year theme of the research conference is going on under the title **“Enhancing Multidisciplinary Research; a Key to Invigorate Need-based and Demand Driven Research”**. Jimma university is keen in contributing to multidisciplinary demand driven research in order to bring quality education and national development through disseminating relevant research outputs and technologies to relevant stake holders and academia in Ethiopia and beyond.

I am happy to see that the conference program provides an excellent sample of the innovative research and analyzing problems and link research to development. There is much to be learned from the papers being presented at this conference. As I was going over the conference program in the papers to be present such as:-

- Overview of Research, Consultancy, Community Based Education and Post Graduate Studies Policy of Jimma University
- Integrating Graduate Research to Development Agenda of Commercialization of Smallholder Agriculture: IPMS Experience with Ethiopian Universities
- Promoting Multidisciplinary Research for a Better Impact: Experiences from VLIR-IUC Partnership Program in Jimma University
- Infant and Child Health in Ethiopia: Some Reflections on Patterns and Changes
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- Experience in Reorienting Forestry Research and Training in Ethiopia: The Case of Development Oriented Interdisciplinary Thematic Action Research (DOIT-AR) Program at Wondo Genet College of Forestry and Natural Resources

Realization of the university's vision of becoming a national public primer, renowned in Africa and respected in the world cannot be achieved without fostering and nurturing the culture of research and scholarship among its staff and students.

Dear participants,

I would like to reassure you that “research is one of the core activities undertaken in our university”. It fuels our creativity and helps us to stay ahead of the curve. As we have learned from the well developed countries experience and universities in the civilized nations, we will continue utilizing the results of cutting edge research in order to carry forward the momentum of the national development effort in the next five years Growth and Transformation Plan (GTP). This year's conference is an exciting opportunity to enhance our understanding of important research issues with the help of frontier research papers. So, let me conclude by saying that I am very pleased to see you all here, and I am sure you will have very productive discussions over the next two days, and stay connected to this young and vibrant research university and prominent think tank group.

Finally, let me declare that this Second Annual Research Conference of JU is officially open and I profoundly wish you, and your stay in the historical city of Aba Jifar will be a memorable and enjoyable one.

Thank you for your attention!

Section I: Lead Papers

1. Overview of Research, Consultancy, Community Based Education and Post Graduate Studies Policy of Jimma University

Berhanu Belay, Abebe G/Mariam, Chali Jira, Waktole Sori and Amare Deribew

Abstract

A policy is a guiding principle to address quality, relevance and internal efficiency and effectiveness. Research, Consultancy, Community Based Education and Post Graduate Studies policy of Jimma university is a road map that directs the research undertaking and dissemination of the research out puts. The policy is broadly aimed at creating enabling environment for Research, enacting need based and quality research, and multidisciplinary research, Institutionalizing research projects and fostering collaborative research linkages. The policy is designed to stimulate the synergy between research undertaking, post graduate studies and community based education, thence integrating research, teaching and service delivery. The policy was drafted by offices working under the office of senior director for research, post graduate studies and community based education and circulated among the concerned offices and amended by the senate and signed by the president and distributed to the University community. The implementation of the policy depends on the coherence and clarity of the set procedures. Policy and procedure together empowers the people responsible in the process with the direction and consistency that need successful process improvement. The implementation of the policy demands concerted efforts for all concerned in research; Community Based Education and Post Graduate Studies. Policy is dynamic in nature which could be amended to accommodate the emerging issues and real situations on the ground.

2. Integrating Graduate Research to Development Agenda of Commercialization of Smallholder Agriculture: IPMS Experience with Ethiopian Universities

Azage Tegegne, Tesfaye Lemma and Dirk Hoekstra

Abstract

Ethiopia is an agrarian country where around 95% of the country's agricultural output is produced by smallholder farmers. Hence, the ability of the nation to address food and nutritional insecurity, poverty, and to stimulate and sustain national economic growth and development is highly dependent on the performance of agriculture. Yet achieving higher and sustained agricultural productivity growth remains one of the greatest challenges facing the nation. The production systems in Ethiopia have remained subsistent-oriented, natural resource-intensive and low input-output rain-fed systems. Within this context, market-led agricultural productivity growth is vital. Strategic shift in favor of knowledge – based transformation of smallholder agriculture is equally vital in dynamic demographic, economic and ecological conditions. There is increasing realization that Ethiopia needs new source of growth to propel its economy; and those contemporary challenges in agricultural systems-sustainable management of resource-base, climate change, and global competitiveness-require advanced knowledge to address. Enhancing agricultural knowledge base and facilitating its uptake and productive application is thus crucial. Successful knowledge-based agricultural productivity growth, in turn, requires enhancing capacities at different levels-individual, organizational and systems - for learning and innovation. To that end, the most promising pathway is repositioning and overhauling university academic programs in agriculture and allied disciplines. In particular, graduate programs need due attention to exploit their immense yet untapped potential to make meaningful contributions to development in several ways, both directly and indirectly. From an innovation systems perspective, higher learning institutions along with agricultural education and training system is an important, though not the only, source of knowledge and innovation. Universities are considered to be the central hub for capacity building and research; and have underutilized research potential and students who are 'an ever growing sources of new ideas' and who could be trained and encouraged to become the next generation of innovators and entrepreneurs. It is at graduate level that high level expertise are groomed for guiding policy, research, innovation and general vision for sustainable development. Investing in strengthening graduate programs would have multiplier effects through 'training-the trainers' capacity development for sustainability and can make especial contribution to creating and sustaining innovation capacities in agricultural systems. Strengthening the higher learning institutions along with agricultural education and training system entails realigning visions, mandates and practices with changing development agenda and needs of

stakeholders. In addition, reforms in higher learning institutions should focus on fostering networks and partnership. Conceiving and implementing educational reform is difficult, complex, and needs nuanced understanding and experiential learning. In this regards, an initiative by Improving Productivity and Market Success (IPMS) of Ethiopian farmers' project to link research and learning in graduate programs to commodity value chain development may be informative from practical point of view. The purpose of this paper is to make a modest contribution to the on-going discourse in Ethiopia as to how to ensure developmental relevance of graduate programs in agriculture and allied disciplines. Besides reviewing empirical literature, the paper presents and discusses experience of a development project, IPMS, in linking higher learning institutions through graduate research to value chain development and chain actors as well as the benefits of such an arrangement. It also discusses outcomes of the initiative of the project on the basis of qualitative and quantitative indicators. Finally, the authors draw out lessons and suggest some practical and strategic options to enhance the linkage between research and learning in the graduate programs and real- world and-time challenges.

3. Promoting Multidisciplinary Research for a Better Impact: Experiences from VLIR-IUC Partnership Program in Jimma University

Kora Tushune

Abstract

Generally, disciplinary researches have been at the forefront of generation and dissemination of scientific knowledge, discoveries and innovations. There is no doubt that society has benefited from these advances in many areas of human needs. However, there are societal challenges that may not neatly fit the disciplinary silos that we created for better investigation and understanding of various issues facing the humanity. Tackling these problems require transdisciplinary efforts that involve experts from different background to collaborate in a mutually learning environment. Multidisciplinary research approaches are better positioned to create a complementary interface between sciences and society providing a unique opportunity to address societal problems in an inter-disciplinary manner that involves a number of stakeholders. This process of collaboration itself improves the implementation and sustainability of the solutions brought forward from the collaboration.

Jimma University, being one of major institutions of higher learning in Ethiopia, is highly committed to harnessing research undertakings to address the felt problems of the society. Its educational philosophy of community based education and its commitment to integration of teaching, research and service have given the right backdrop to its efforts of promoting multidisciplinary research in teaching, research and community engagement/services. Although multidisciplinary research is yet at its infancy at Jimma University, some of the recently launched initiatives are quite encouraging and are creating conducive environment for multidisciplinary research. One of these and the most notable initiative is VLIR-IUC Partnership Program.

Launched in July 2007, the Program is the first of its kind in the University both in scope and coverage. It has five thematic research areas, namely, animal health and zoonotic diseases, child health and nutrition, environmental health and ecology, infectious diseases epidemiology and modeling, and soil fertility; besides there are two crosscutting projects, ICT and library and research coordination, that are designed to support the thematic areas and are also being implemented alongside the major projects. There are about 45 ongoing researches under these thematic and support projects; about 120 academic staff are involved in the research projects and 30 PhD candidates are following their study through the program (four staff have completed masters study in local and overseas institutions). The program is expected to last till 2016 leaving behind human, institutional and infrastructural capacity for teaching, research and service, more importantly, the tradition of multidisciplinary research that is vital for socio-economic development of developing countries like Ethiopia.

To sum up, multidisciplinary research is an important approach in dealing with issues and problems facing the society today. It crosses the traditional disciplinary borders that were created to generate specialized knowledge with limited thought about its application in real-life situation. Multidisciplinary researches significantly improve the quality, acceptance and sustainability of solutions forwarded by research to challenges of the society. But the road to multidisciplinary research is not rosy. It needs careful thought and putting in place disciplinary, institutional and policy arrangements that can lead the effort to fruition. It is of a particular importance in developing countries like Ethiopia where such efforts can improve the quality, acceptance and sustainability of scientific solutions.

VLIR-IUC Partnership Program with its thematic structure and involvement of researchers from various disciplinary backgrounds can be considered as a positive step towards multidisciplinary research. Its multi-faceted capacity building endeavors can significantly contribute to overall institutional transformation of Jimma University. The Program has generated valuable experiences on organization and management of effective collaborative programs between the north and south for mutual benefit of both sides. The knowledge, information and technologies generated through the partnership program can make a significant contribution to socioeconomic development of the country.

4. Infant and Child Health in Ethiopia: Some Reflections on Patterns and Changes

Degnet Abebaw

Abstract

The health condition of infants and under-five children is the most sensitive indicator of socioeconomic development. Recently, Ethiopia has registered improved infant and child health. However, the gains in improved health outcomes are not uniformly shared across the different regions in the country. The main purpose of this paper is, therefore, to shed light on the patterns and changes of infant and child mortality rates in Ethiopia. Using panel data, the results indicate high inter-regional disparities in both infant and child health outcomes. The estimation results reveal that inter-regional variation in infant and child health outcomes is due to significant cross-regional differences not only in health physical infrastructure and human capital but also in urbanization and per-capita public spending on health.

Keywords: Infant and child health; regional disparities; Ethiopia.

5. Challenges and Opportunities of Modern Technology in Ethiopia

Berihanu Gizaw H/Mariam

Abstract

Key Words: Mind ware, hard ware, Soft ware, technological breakthrough, limitations of technology, technology sensitization

If we explore the trends of past development and co-evolution of man and technology, we will discover that technology not only extends the scope of human action but can also be regarded to act as a key, which can solve all social contradictions. Due to which the world is becoming a technological “Global Village” where Time and Space have no effect on behaviour. Hence, the contemporary world is influenced to a very considerable extent by technology which is creating both recurring and contemporary environmental problems.

- In a very weakly-educated civil society the role technology plays in developing and changing the social structure is enormous.
- Technology is also imperative so as to see a fertile ground for industrial growth and provide a tangible skill that will make change in the societal life.
- The gap between industrialized nations and non-industrialized countries could also be bridged via basic infrastructure and local S&T, which can improve the competitiveness of our technological exports¹.
- Since globalization continues to pose major challenges for us, we need deepen and intensify our “economic” reform² programmes and adapt effective strategies in order not be left behind developmental thinkers³ allege that technology is the most powerful tool of modern times that can offer great hopes of leapfrogging decades of development if put to effective implementation..

¹ **There is a need for technology to improve the distinguishing qualities of the traditional export.**

² **Our major challenge is whether we should undertake technology or development driven approach of economical advancement.**

³ **World Bank at one time decided that it is development that should be the driving force rather than technology**

- Engineering work and technology supply are completely different due to which digital divide/gap is created with severe lack of understanding of technologies.

This article doesn't conclude on determining precarious circumstances of technology diffusion neither does it dwell on listing the problems and constraints but determines the adocity of creating a hazard free human technology. Our logical brains, stuck in the technological world, struggle frantically to justify, rationalize, and explain the distinction between the important/relevant and the irrelevant, the pragmatic and the cosmetic, which has become blurred in this epoch. To overcome such problems, we should take an excursion in to this epoch of technology worldwide, and must implement laboratory based knowledge to come to acceptable decision. The technological sensitization issues that we will dwell with are collective self reliance and development of zest to experiment. As concluding finding and result it attempts to answer technology transfer process quires such as: What is our place in this technological world? What is the purpose of our developmental endeavor? *What is the potential impact of emerging technologies in view of converting these technologically backward societies?* How can we make the real world of technology to become a globally liable habitat? Should we accept the limitations⁴ that are being imposed upon us? Or should we strive to go beyond them and create something better?

¹ Treating someone as a global partner, while denying once existence in safe and human technological environment... to unearth the sins of the black listed manufacturers for we would discover what type inferior items they have implanted

6. Experience in Reorienting Forestry Research and Training in Ethiopia: The Case of Development Oriented Interdisciplinary Thematic Action Research (DOIT-AR) Program at Wondo Genet College of Forestry and Natural Resources

Habtemariam Kassa¹, Mulugeta Lemenih², Motuma Tolera² and Melaku Bekele²

Abstract

Throughout the developing countries forestry training tends to focus on biophysical aspects – silviculture, forest entomology, forest mensuration, forest soils, etc. These are crucial areas for ensuring sustainable forest management but are not sufficient for delivering benefits to people and forests. Increasingly, the focus is changing to incorporating more people-oriented forestry. Experiences in natural resources management research has shown that reducing complex development problem to single disciplinary research question is less likely to solve real world development problems. The need to view interactions between natural and social systems at different levels and the ability to work with both the whole (the environment and the people) and its parts (disciplinary issues) is increasingly recognized. This calls for doing research differently. This requires more social sciences, more policy analysis, more team work, more participatory action oriented research and more focus on recent advances in biophysical sciences (e.g. dynamic modeling, GIS) and on humanities (constructivist epistemology). This new paradigm of research calls for active involvement of major stakeholders, mainly the communities and other development partners, and requires involvement of all in an iterative way during the process of planning, implementation and evaluation.

Seven years ago Wondo Genet College of Forestry and Natural Resources was largely providing training in the classical areas of forestry. Through a Sida-funded program and largely with the technical assistance from the Swedish University of Agricultural University (SLU) and from CIFOR, the College made an attempt to begin the process of transforming its research and training program through the implementation of a program, known as Development Oriented Interdisciplinary Thematic Action Research (DOIT-AR). The objective of DOIT-AR is to contribute towards improved livelihood and conservation outcomes, to build capacity to do so in the College, and feedback to education and policy in natural resource management. Besides research, the program had also an institutional development component for training staff through creating awareness and interest and also building the capacity of the staff to do research differently. To this effect both formal training (through PhD training) and tailored short term training were conducted in collaboration with the Swedish University of Agricultural Science and CIFOR.

DOIT-AR was designed to be an iterative process for Wondo Genet College, its partners, the community and other stakeholders to combine scientific and local knowledge to addressing identified and pressing problems for which quick and immediate solutions were lacking, by carefully analyzing the problems/under exploited potentials and assessing the capabilities of all parties in determining entry points to improve the situation and thereby have a positive impact on livelihoods and conservation through natural resources related interventions. By jointly identifying and testing test natural resource management based interventions for poverty alleviation, the interest was also to learn from the experience at individual (experts, farmers) and institutional level (institutions engaged in forestry, agriculture and health education, research and extension), to accumulate and build on knowledge and experience in this regard, and to share with others the processes and outcomes for wider replications.

The research component of the program specifically promotes the active involvement of the communities in identifying and testing options to improve their situation. It stresses the need for learning by doing through the combination of scientific and local knowledge through situation analysis, planning what to do (by encouraging actors to develop a road map of action in a form of work packages than specific and details of activities), acting, observing the outcome and reflecting, then planning again until a desired level of improvement is achieved. The research component is supported by facilitation and mediation activities. The facilitation aspect is meant to address issues that no research as such is needed but assistance within the capacity of College could facilitate the implementation of the activities of program with the communities. Activities under mediation are for issues that the College has neither the technical competence nor institutional mandate to address them, but can help by bringing together responsible actors in view of helping the community to address its problems. Both facilitation and mediation are expected to strengthen the development aspects and impacts of the program.

After consultation with relevant regional bodies, the College decided to select and work on three contrasting sites but close to the college. These pilot learning sites, also called thematic areas, were all within a 50 km radius from the college but facing relatively different set of priorities – farm size fragmentation (around the College), conflict with forest enterprise in accessing and using forests (around Munessa shahaemene), and severe water shortage and crop failures (around Lnagano). After having conducted a base line survey, researchers from Hawassa University (Wondo Genet College of Forestry, College of agriculture, Health Faculty) and from Swedish University of agriculture were encouraged to submit concept notes. Initially over 35 project proposals were submitted. Later on some 60 university teachers from the three Colleges of Hawassa University did manage to implement over 20 projects.

DOI-AR was expected to deliver at community, staff and institutional levels. At local level, deliverables are those results that stakeholders consider real improvements (e.g. technologies adopted that reduce risk/vulnerability, increase productivity and income, and/or help better

manage natural resources). At individual staff level, expected outputs include increased knowledge and skill in experiential learning, system thinking, facilitation, ability to work in a team and capacity to tackle real world problems. Besides, attitudinal change to work with other stakeholders was expected so that researchers would become better managers of change processes. At institutional level it was hoped that the way researches are planned and implemented could be re-oriented, and participatory action research would become a norm in the College. The exercise was also to allow a different way of research management as opposed to the widely known experience of having a research proposal budget clearly written and budgets are stated in a pre-defined proposal format. Ultimately, it was also hoped that experience so gained would be used to influence the curricula and policy development process at Regional and national level.

Implementation of DOIT-AR was faced with a number of challenges. Staff time was a major constraint as teachers in the different colleges of Hawassa University are extremely busy with teaching and administrative assignments. Maintaining the research focus while ensuring immediate developmental impact remained a difficult task for most of the projects in the program. This continued largely unchanged for most projects despite the fact that projects were being continuously assessed and staff trained to ensure that activities of each of the projects in the program are different from government extension undertakings and from NGO development work. Projects of DOIT-AR were not supposed to promote known packages for wider use. They were expected to focus on trying out what works, where and how in addressing complex but pressing problems identified by communities and other stakeholders. But most failed to be engaged in complex topics and ended in doing extension type projects or simply academic oriented simple experiments and surveys. Research activities in the program should not have been merely research undertaking having purely academic purposes, nor are they expected to be simple extension type undertakings of promoting something that is known to work (that NGOs and extension workers are expected to do). They should be researches with sufficient scientific rigor to test for successful outcome on conservation and livelihoods and to facilitate scaling up and out.

Besides time, limited experience of the staff in social sciences and working with rural people in general and in action research in particular was a major bottle neck. The overall weakness in research (review, data analysis and scientific paper writing) also affected the publications output of the program. Thus, despite regular backstopping and training tailored training, achievements in documenting the process and outcome of the DOIT-AR experience in influencing research, education and policy remained much below expectation.

The other challenge is institutional constraint. This is associated with the difficulty to maintain the interest of researchers in action research given the promotion policies of the college that are based mainly on teaching. At individual researcher level, moving away from the tradition of disciplinary research project management has been difficult, at least for some.

The readiness of the College to managing this sort of program (its financial and personnel administration) was completely inadequate.

Over the years, we observed growing acceptance and understanding of the program amongst the College staff and management. There has been an increased recognition by the staff for the need to work in team to solve real world problems that farmers face. Slowly, the confidence of the communities in WGCF-NR was also improving. Effective implementation of the program and institutionalization of such a research undertaking could have assisted the efforts of the College to become a national center of excellence in the areas of people-focused management of natural resources in varying landscape mosaics. This in turn will enhance the role the College plays in forestry and natural resources management research and education in Ethiopia.

If the challenges can be addressed and opportunities to do similar research emerge, well planned and executed AR provides an opportunity to redirect research, to incorporate perspectives of stakeholders to make research more relevant, to building capacity to work as a team and to solve real world conservation and development problems by effectively mobilizing knowledge and resources of key actors. Well documented experiences of such processes and outcomes will also facilitate evidence based dialogue to influence policy making and curriculum content.

¹ CIFOR, Forests and Livelihoods Programme, Ethiopia Office; ² Wondo Genet College of Forestry and Natural Resources

Section II: Parallel Session-Abstract of Scientific Papers from Six Colleges of Jimma University

2.1. College of Social Sciences and Law, Jimma University

1. The Verb Morphology of Jijiga Somali

Tibebu Shite

Abstract

This research attempts to investigate and describe the verb morphology of Somali language. Somali is one of the Cushitic languages in the Afro-Asiatic Phylum. The data were collected from native informants, and the methods used for data collection were elicitation along with transcription.

The research has four chapters. The first chapter gives general information about the language and the people. Chapter two and three deal with the inflectional and derivational morphology of verbs. In the inflectional morphology; the tense system of the language, the aspect system, the mood system, negation and interrogative systems of the language are presented in brief. In the derivational morphology, it is discussed that how verbs of Somali are derived from verbal stems and noun stems. Finally, summary is given in chapter four.

2. Survey of Research Terms Used in Afan Oromo: With Special Reference to Three Universities in Ethiopia

Tariku Sime, Teshome Belayneh and Alemayehu Fekede

Abstract

This research is intended to investigate the status of research terms used in Afan Oromo in terms of their standardized level. The researchers' background observation shows that students are using different terms when they write a proposal or the report of their thesis. Having this, the major objective of this research is to survey the research terms used in doing both action and basic research in Afan Oromo in Jimma, Haramaya, and Addis Ababa Universities based on English research terms. However the data collected is limited to the third year Afan Oromo students who had took research courses and teachers in the departments. Moreover, samples of previous research works of graduated students from the departments were analyzed. Thus, instruments like questionnaire, interview, focused group discussion and written document analysis are used to collect data from the primary and secondary sources. Then, the collected data are organized, analyzed and presented quantitatively and qualitatively. According to the interpretation made based on the data analyzed, there is a significant variation in using research terms of Afan Oromo by the teachers and students of target universities. Terms or phrases are not used in standard forms. As a result, there are practical problems like communication gap in research dissemination, student's confusions, teacher's disagreement, and misunderstanding of ideas, low quality of research output and unreadable report, as well as inconsistent research format. Finally, the researchers have proposed that using standard research handouts and manuals as well as working together at central level are key solutions to overcome the problems.

3. The Oromia Rural Land Dispute Settlement Scheme, So Ambiguous and Expectedly Not Working

Birhanu Beyene Birhanu

Abstract

In a region where a great majority of the population lives in rural areas, rural land disputes deserve a unique treatment. It sounds very reasonable, in such regions, to design a unique dispute settlement scheme for rural land disputes. This is exactly what the Oromia region has done. However, the scheme set up by the region suffers from serious ambiguities, which inevitably makes the scheme not working. Therefore, in this paper an attempt is made to show where the scheme suffers from ambiguities and what evils may result from the ambiguities and how the ambiguities should be addressed. As the scheme is set out under Oromia Rural Land Administration and Use Proclamation No.130/2007, this work is limited to the analysis of this proclamation in light of general principles of alternative dispute resolution.

This paper is divided into **V** sections. Section **I** gives the outline of the scheme. Section **II** pins down the parts of the scheme suffering from ambiguity. Section **III** conjures up the evils resulting from the ambiguities. Section **IV** deals with the way forward. Finally there is a “conclusion and recommendation” section.

4. Implementation of the district level decentralization program (DLDP) to strengthen local development initiative: The case of Kersa and Tiro-Afeta Woredas in Jima Zone

Ermias Admassu

Abstract

Nowadays there is a trend towards decentralization in a bid to make government organs and decision making channels much closer to the people and to enable people to play the key role towards their own development. In Ethiopia the decentralization process has gone through its own process having followed peculiar steps hand in hand with the introduction of the federal system. Expanding decision making power to the lowest government tiers has become a matter of necessity than choice to enable all nationalities to exercise their constitutionally granted right to self government. This study is conducted to asses the contribution of District Level Decentralization Program (DLDP) in raising local level participation for development especially in service delivery in two selected woredas in Jimma zone of Oromiya National Regional State. The woredas are selected in consultation with officials based on their performance in implementing the DLDP. Structured and focus group interviews were held with officials at Zonal and woreda level and residents from sample kebeles in the two woredas to collect data for the study. The study finally revealed that, the DLDP introduced bloc grant transfer empowered the woredas' to plan their own activities within the limit of the resources available, unlike the centralized budgeting system practiced in the past that was geared less towards specific local needs and demands. Moreover, the program has also effected clear definition of power and functions to woredas that significantly reduced the intervention of the zone in woreda planning activities. This has further opened more room for the participation of the people in planning and implementation of projects at the local level. The role of sub kebele community structures called 'Gots' in inducing more popular participation is identified in addition to woreda officials frequent contact with the people to discuss on development priorities. The Community participates not only in planning but even also in putting projects in to practice mainly through their labor. However, it is also divulged through the study that development initiative at the local level is challenged by host of factors like; resource scarcity, lack of human resource capacity for planning at woreda level and the community's lack of experience and skill for participation. Therefore it is emphasized that, building woreda level officials capacity through training, exerting efforts towards increasing the resource capacity of woreda governments and nurturing more community participation could further upgrade the effectiveness of the program in raising local initiatives for development.

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5. A Review of the Roles of Information Communication Technologies in Education

Fisseha Mikre

Abstract

Information communication technologies (ICTs) at present are influencing every aspect of human life. They are playing leading roles in work places, business, education, and entertainment. Moreover, many people recognize ICTs as catalysts for change; change in working conditions, handling and exchanging information, teaching methods, learning approaches, scientific research, and change in accessing information. Therefore, this review paper discusses the roles of ICTs, the promises, and key challenges of integration to education systems. The review attempts in answering the following questions: (1) what are the roles of ICTs in education? (2) What are existing promises of ICT use in education systems of some developing countries? (3) What are the key challenges of ICTs integration to education systems?

6. Peoples' Beliefs, Attitudes, and Practice in the Use of Insecticide Treated Bed Net (Itn): The Case of Serbo, Nada, and Asendabo Towns

Gashaw Tesfa

Abstract

BACKGROUND: *The effort made to control malaria seems somewhat under the control of those people living in the malarious areas. Moreover, the tendency seems to shift from cure to prevention as malaria doesn't have effective vaccine or effective drug for mass chemoprophylaxis. In this regard, an attempt was made to see the belief, attitude, and practice of ITN use by peoples of Serbo, Assendabo, and Nada Towns. Researches also indicate behavior of people is highly mediated by their beliefs and attitudes about the action they are going to take-using ITN properly and consistently.*

METHODS: *Samples of 274 people were taken from Serbo, Assendabo, and Nada towns through multi-stage random sampling of lottery method. The response of 264 respondents collected through questionnaire was analyzed and interpreted.*

RESULTS: *The result shows people do have lower perceived susceptibility to malaria (78.8%), lower perceived severity of the disease malaria (73.1%), lower perceived self-efficacy in the use of ITN (56.4%), higher perceived barriers in the use of ITN (68.9%), and lower perceived benefit of ITN (56.4%). In addition, majority of the subjects (74.6%) were found to have negative attitude towards ITN. Moreover, households mentioned some unintended uses of ITN at home indicating abuse in the use of ITN. These all indicates that the households do have misconceptions and misunderstandings about malaria, negative attitude towards ITN and they don't have firm belief in ITN to protect them from malaria. More or less all subjects know that ITN is one means of malaria protection mechanisms.*

CONCLUSION: *These indicate some more concerted effort shall be made to clarify the misunderstandings and misconceptions that blurred the households' belief about ITN and attitude towards it. Added to that, households shall be advised and supervised whether they are using their ITN properly or not. Moreover, awareness rising, remainders, and reinforcements within each household shall be made to enhance ITN proper and consistent use in the fight against malaria.*

7. Efficacy of Play Therapy in Self-Healing and Enhancing Life-skills of Children under Difficult Circumstances: The Case of Two Orphanages in Addis Ababa, Ethiopia

Berhanu Nigussie

Abstract

The objectives of the study are to know whether play therapy can facilitate the self-healing process, to improve the academic performance, increase the attentive level, and to ensure self-confidence and esteem of children under difficult circumstances.

Data for this study were the case works of the researcher (for about two years), as a play therapist and Clinical Supervisor. Pre- and post-therapy measures using the SDQ (The Goodman's Strengths and Difficulties Questionnaire-a standardized instrument) were obtained from 17 children (9 females and 8 males) and analyzed. The study used quantitative data as its major source of information even though there were some qualitative data obtained from the direct observation of the children, focus group discussions and interviews with counsellors, social workers, teachers and caregivers.

The results of the study revealed that there was a statistically significant difference between Pre-SDQ and Post-SDQ results showing a reliable improvement of the conditions of the children due to play therapy. That is, matched t-test indicated that the scores difference is statistically significant: $t(16) = 13.94, p < 0.05$. Moreover, qualitative data from direct observation of the children, focus group discussions and interview results obtained from counsellors, social workers, teachers and caregivers have supplemented the above quantitative results. Ideas for future interventions were presented and implications about the well being of the children were discussed.

8. An Analysis of AU's and UN's Response to Sudan's Crisis in Darfur: What Lessons Learned from Burundi?

Alemu Kassa Reta

Abstract

Since the eruption of the horrendous conflict in Darfur that reached its zenith in 2003, a number of diplomatic and military measures have been put in place by African Union, and the United Nation. As the findings of the study show the diplomatic and military attempts taken and put forward by both organizations have not changed to the positive the situation of Darfurians. The study displayed that little or no serious attention had been given by both organizations on the political solution of the conflict. The study concludes the endeavor exerted to persuade Khartoum to stop its heinous act and bring into board with other warring factions for political settlement is limited. Moreover, though the AU and the UN start with good measures and intentions, the problem of implementation is found profoundly. Practically the kinds of measures taken on the ground are slender, if not null.

9. Villagisation in Arssi: Was it Agent of Development or Impoverishment?

Ketebo Abdiyo

Abstract

Villagisation (concentration of rural homesteads in one locality) is often considered as a socialist oriented phenomenon. Actually it cannot only be associated with socialist policies and practices. It took place in many non-socialist countries so to address different problems according to the realities of the concerned states. In Ethiopia it was widely practiced during the Derg times in post-1974 period.

Villagisation was one of the controversial state policies which the peasantry were obliged to obey. The state officials claim to bring about provision of socio-economic facilities which could not be delivered because of the former traditional scattered settlements all over rural Ethiopia.

The paper attempts to assess whether the Derg provided what it promised. The work among others attempts to answer questions like was villgisation an agent of development or impoverishment? Had the Derg implemented it for what it claimed to achieve? The work would dwell on these. It also investigates the course and the consequences of villagization in Ethiopia taking Arssi as a case. It would also explore whether or not villagisation could be a force of rural development. The result of the study hopefully could broaden the scholarly works so far exist on some of the Derg policies which are said to be implemented to achieve development.

10. A look into Afan Oromo Spelling Errors and Faulty Translations on Billboards: with Special attention to Jimma town

Amanuel Raga and Samuel Adola

Abstract

Jimma as one of the popular towns in Ormia region uses Afan Oromo as a working language. As it is the case with most of commercial towns, sign posts, posters, billboards, etc are among the means of communication and advertisement in the town. The majority of these road-side and on-wall written signs being in Afan Oromo, critical observation and careful reading reveal tremendous amount of spelling errors and faulty translations all over the town. This study is confounded to the writings on signposts and billboards in and around Jimma town. The primary source of data for this research is road-side ads written in Afan Oromo on walls and or plates in selected sites in Jimma town. To obtain information related to factors that might have brought about spelling errors and faulty translation, interview is made with randomly sampled stakeholders and owners of the various institutions, agencies, centers, shops, etc. advertised in the selected sites of the town. In addition, individuals who are engaged in producing and printing ads in the town are interviewed. As the analysis of the data shows, the errors are of two major types: structural and orthographic representation. The structural errors are phonological, morpho-syntactic, and semantic. The phonological errors identified include vowel length and consonant germination, clustering at the beginning and end of words, sequences of more than two consonants word medially and its hypercorrection, sequences of two differing or more (similar or differing) vowels word medially, and use of abbreviated words. The morpho-syntactic category of errors found are lengthening of word final vowels which encode cases, while also changing the structure and thus the meaning of the phrases, fronting names of businesses or the names of the owners, and errors relating to use of wrong forms of morphemes. The semantic errors uncovered errors relating to choice of words, ordering of the constituents of a phrase, as well as faulty translation. The second major topic, orthographic representation, on the other hand, shows the prevalence of incorrect correspondences of Oromo phoneme-grapheme.

2.2. College of Business and Economics, Jimma University

1. Loan Recovery Performance of Development Bank of Ethiopia (a study on the bank specific factors)

Matiwos Kebede and Shankar Kumer sing Jha

Abstract

Lending as major banking operation may pose a default risk resulted from failure to collect the loan and interest on the agreed upon time. Although loan recovery related problem is a typical characteristic of state owned banks in Ethiopia, it is found to be very serious in DBE, due to the fact that the very existence of this bank is to finance priority sector development projects that require a huge amount of long term funds. This study is therefore, conducted with the basic objective of evaluating the loan recovery performance of Development Bank of Ethiopia and find out the major factors contributing for default risk by emphasizing on the bank specific factors. In completing, the study a descriptive research design was adopted in which both primary and secondary data pertinent to loan recovery performance and the loan service process are gathered and analyzed. The result of the analysis revealed that the loan recovery performance of DBE was unsatisfactory as the rates of nonperforming loan during the periods covered under the study were very high. It was also proved that the annual credit provision is increasing in response to the demand by different sectors of the economy industry, agriculture and other business, however unless the bank's loan service process is streamlined the increased rate of growth in credit is expected to aggravate the rate of loan loss. In line with this it is recommended that the need to maintain an optimum balance between the annual credit growth and improvement of the loan service process, so that it will be possible to improve overall quality of loan portfolio and ensure subsequent recovery. A further and comprehensive study covering different banks is also recommended, so as to come up with a better solution and policy ideas that will benefit the banking industry as a whole and the overall economy.

2. Scenarios of Ethiopian Sugar Industry: Problems and Suggestions

Chalachew Almaw

Abstract

As it has favorable climatic condition for sugar production, Ethiopia is not utilizing its maximum potential from sugar industry sector due to a number of problems that beset the industry. But this study has looked at three core areas for the growth and expansion of industry. Therefore, the main objective of this research is to assess capital budgeting, research and development(R & D), and marketing strategy of Ethiopian sugar industry which are the major determinants for the growth and expansion of the industry. Explanatory research design is used to come up with the empirical finding. The finding shows that Ethiopian sugar industry is facing capital budget problem, inadequate research and development and inappropriate marketing strategy due to distribution and pricing strategy problem. Finally, the study recommends the industry to make detail study on each of problems to tackle them properly.

3. Corporate Entrepreneurship in Meta Abo Brewery

Yared Asamirew Dessie

Abstract

Entrepreneurship is the symbol of business strength and growth. Entrepreneurs are the founders of today's business success. Development is more than ever linked to entrepreneurship. This necessity of entrepreneurship in already operating large companies (Corporate entrepreneurship) is quite significant activities by facilitating and enhancing organizational performance.

The purpose of this paper is to examine the practice of corporate entrepreneurship in terms of innovation and marketing development and level of existence of corporate entrepreneurship in Meta Abo Brewery.

A structured questionnaire with two stage sampling approach was adopted and data was collected from customers from each distribution route of the organization. Both descriptive statistics like mean, median, mode, standard deviation, and inferential analysis like linear regression and correlation was used for analyzing the data.

Findings – Corporate entrepreneurship exists in the company under study-Meta Abo Brewery. However, the level of existence in the company is insignificant. It is found that organizational variables like work process flexibility, lack of free time for employees to think of new ideas, low level of motivation and insufficient amount of freedom of organization wide view of employees are significantly related to both innovations.

In order to solve major challenges of the company allowing employees to make decisions about their work process, letting employees have time to incubate their ideas, providing rewards contingent on performance; and encouraging employees to look at the organization from a broad perspective are put.

Concerning marketing and production related problems of the company, new product development and product innovation, and efficient and quality marketing services are recommended.

4. Financial and Operational Performance of Private and State Owned Commercial Banks in Ethiopia (A comparative study)

Anteneh Gorfu

Abstract

The purpose of this study is to classify the commercial banks in Ethiopia based on their financial and operational performance on the basis of their financial and operational activities and bank specific characteristics revealed by the financial ratios and statistical outputs. A total of four commercial banks were financially and operationally analyzed, and a multiple regression was used to estimate the impact of bank size, operational efficiency, asset management, liquidity, asset quality and management quality on the financial and operational performance of these banks. The study found that the bank, with higher deposits, credits, capital or total assets does not always mean that has the better financial and operational performance. And finally the banks were ranked based on their performance accordingly.

5. Evaluation of Service Quality Management Practice in Jimma University

Zelalem G/tsadik

ABSTRACT

This study attempted to evaluate service quality management practice of Jimma University from the view point of stakeholders' mainly current students, alumni, and staffs. The specific objectives of the study were: to see whether there is an improvement in overall service quality, to identify the achievement level with regard to research and outreach activity, to investigate internal quality assurance effort and outcome and to find out possible measures that can be taken by the concerned bodies.

To this end, 363 current students, 28 academic staff, and 200 alumni were selected to fill in questionnaires. Moreover, interview with employer organizations, college deans, APO and QA office, research, graduate studies and CBE coordinator offices and analysis of relevant documents were made.

The result of the study revealed that stakeholders rated tangible, competence, content dimension of JU as of good quality. But, the attitude, delivery and reliability dimension of JU are rated as not of good quality .Regarding improvement; there is a no significant improvement over time in tangible and content dimension of JU. On the other hand, a significant improvement is observed in competence, attitude, reliability and delivery dimensions of JU. The overall service quality of JU is rated as average and there is a significant improvement over time. The study also highlighted a difference in extent of research activity college-wise and the practicality of outreach activities of JU is declining due to number constraints. Moreover, the study shows that quality assurance systems, policies and procedures are not fully in place. To improve the service quality different ways of uplifting competence, attitude, tangibles, content, and delivery and reliability dimensions of quality were recommended.

6. Performance Measurement Yardsticks of Microfinance Sector and their Applications in Ethiopia

Abiy Getahun

Abstract

Microfinance is the provision of a broad range of financial services such as deposits, loans, payment services and insurance to the poor and low-income households and their microenterprises. MFIs aim at not only financial services provision but also addressing social concerns. They must be financially viable in order to provide intended services and expand outreach. Thus, it would be necessary to have better measures of performances. This paper tried to find out measures of MFIs' financial and social performances. Indicators of social performance have not extensively dealt by literature; yet, the paper attempted to address the importance these social measures of performance have on MFIs. An attempt has also made to study the relationship between social and financial efficiency measures, and the relationship between measures of efficiency and effectiveness, such as profitability.

The difficulty of measurement becomes more apparent when one tries to measure MFIs' social objectives. This study has attempted to contribute answers to such questions as: are there relevant yardsticks to measure social and financial efficiency and effectiveness of MFIs available, how the yardsticks could be used, and what importance do the yardsticks have in achieving objectives of Ethiopian MFIs. The paper had a target to critically analyze and explain the need for using performance yardsticks to measure MFIs performance and to compare performance across the industry.

The significant of this research project would remain an important issue in providing information about the benefits performance evaluation yardsticks have in order to ensure the viability of MFIs' services to the poverty alleviation goal. This paper attempted to build a methodology to assess the performance of MFIs. Thus, the results of the paper would address the majority poor through the assurance of sustainability of MFIs if their performances are properly evaluated.

The method of data collection employed in this study is questionnaires and unstructured interview for gathering primary data and published and unpublished materials for collecting secondary data. The data collected were analyzed accordingly. Descriptive analysis method is applied to come up with conclusions made in the paper and remedies were also forwarded from results of the study.

7. A Study on the End Use of Borrowings and Follow up made by Commercial Banks in Illubabor Zone

Tadele Mengesha

Abstract

Identifying the end use of the borrowings and the follow up made are the decisive factor for the effectiveness of the banks. Hence the study was aimed at examining usage of the entire loan for the intended purpose by the borrower, reasons of loan diversion, visits of banks over the operation of the borrowers, provision of consultancy to the borrowers on loan utilization and visits of collateral by the bank. The study was conducted in Illubabor zone and used mainly primary data. The data were collected through questionnaire and unstructured interview with the branch managers of the banks. Stratified random sampling technique was employed to select the sample borrowers.

The results of the study indicates that most of the borrowers were not used the entire loan for the intended purpose and there was inadequate supervision of borrowers operation by the banks. In addition to this, supervision of collateral by the bank is inadequate and consultancy given to the borrowers on loan utilization was unsatisfactory. Hence the banks are advised to make controls over the borrower operation and the collateral entrusted to the bank. In addition to this, provision of consultancy by the bank to their borrowers is important.

8. Greener Marketing: A Global Perspective on Greening Marketing Practice

*Nitin Gupta * and Neeta Gupta***

ABSTRACT

"Progress is possible, No one can stop it, but obstacle is there, we have to face it."

- Amartya Sen

Old news: green products don't work and consumers won't pay a premium for them. New news: investment in environmentally preferable products and technologies can lead to a potent new source of innovation and competitive advantage. Take heed! Yes, green marketing is a golden goose.

Although environmental issues influence all human activities, few academic disciplines have integrated green issues into their literature. This is especially true of marketing. As society becomes more concerned with the natural environment, businesses have begun to modify their behavior in an attempt to address society's "new" concerns. Some businesses have been quick to accept concepts like environmental management systems and waste minimization, and have integrated environmental issues into all organizational activities.

One business area where environmental issues have received a great deal of discussion in the popular and professional press is marketing. Terms like "Green Marketing" and "Environmental Marketing" appear frequently in the popular press. Green marketing is the marketing of products that are presumed to be environmentally safe. Thus green marketing incorporates a broad range of activities, including product modification, changes to the production process, packaging changes, as well as modifying advertising. Yet defining green marketing is not a simple task where several meanings intersect and contradict each other; an example of this will be the existence of varying social, environmental and retail definitions attached to this term. Other similar terms used are Environmental Marketing and Ecological Marketing.

Greener products are now available within every industry and are a part of our everyday lives. But they didn't get to be so ubiquitous just because they are better for the planet. Whether they were promoted as such or not, sales of green products grew because they were appreciated by a growing chorus of consumers for the value they provide—expressed as safety, comfort, good taste, or simply convenience

Many governments around the world have become so concerned about green marketing activities that they have attempted to regulate them (Polonsky 1994a). For example, in the United States (US) the Federal Trade Commission and the National Association of Attorneys-General have developed extensive documents examining green marketing issues [FTC 1991, NAAG 1990]. One of the biggest problems with the green marketing area is that there has been little attempt to academically examine environmental or green marketing. While some literature does exist [Carlson, Grove and Kangun1993, Davis 1992, Davis 1993], it comes from divergent perspectives.

Sensing the opportunity, the authors, will try to attempt the following points in this research paper: 1) To introduce the terms and concepts of green marketing; 2) Briefly discuss why going green is important; 3) Examine some of the reason that organizations are adopting a green marketing philosophy; and 4) Mention some of the problems with green marketing.

Key words: *Green Marketing, Environmental Marketing, waste minimization, product modification*

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9. Awareness About Consumer Rights In India in the Globalized Business Environment -An Empirical Investigation of Andhra Pradesh State

N. Praveen Kumar Reddy and K. Jayachandra Reddy

Abstract

The consumer has been ill-treated since a long time in the market milieu in developed, developing as well as under developed countries. Consumers are being miserably cheated and misled by the unscrupulous middlemen and the manufacturers of goods and services at large. Certain malpractices like adulteration, under-weighting, supply of inferior quality of goods and services, selling of duplicate goods, misleading advertisement, deceptive sale practices and the like are adopted by the middlemen, traders and manufacturers to get benefit on the cost of consumer. It is continuing still in India with various degrees of exploitation in the entire sphere of trade due to lack of awareness about the consumer rights among the consumers. In India a plethora of legal measures came into force to protect the interest of consumers. In this process the Consumer Protection Act recognizes six specific rights of the consumers i.e., Right to Safety, Right to be Informed, Right to Choose, Right to be Heard, Right to Consumer Education, Right to Seek Redressal. A good number of programmes are organized by the government to educate the consumers regarding their rights at different levels. But still there are consumers in rural area totally unaware about their rights because of various reasons like low literacy level, lack of initiation from the government side, lack of interest of consumers, lack of media support, etc.

The present research paper is an attempt to highlight the level of awareness about the consumer rights and the various laws, which are in force to protect the consumer interest in India in general and the state of Andhra Pradesh in particular with a sample investigation of 600 respondent consumers.

2.3. College of Natural Sciences, Jimma University

1. Bioactivity of Some Essential Oils Against the Mediterranean Fruit Fly (*Ceratitis Capitata*) Under Laboratory Condition

*Abebe Asale*¹, *Emiru Seoyum*² and *Mekuria Tadesse*³

Abstract

Mediterranean fruit fly is one of the most important fruit damaging pests worldwide with its origin is believed to be sub-Saharan tropics. It is a major pest in Ethiopian orchards causing annual loss of about 15,000 quintal of orange and mandarin in Upper Awash Agro-Industry Enterprise (UAAIE) above only. Different pest management strategies are currently advised against the pest and the use of bio derived pesticides are known to be widely adopted practical intervention as major components of integrated pest management (IPM) strategies to tackle the med-fly problems in fruit production. Hence, the bioactivities of essential oils from local plants were tested against the adult and immature stages of the fruit fly (*Ceratitis* sp). Essential oil bearing local plants species were collected from Wondo Genet and Addis Ababa growing areas. Essential oils were produced using hydro-distillation method using Clavenger Apparatus. The repellent action of essential oil extracts of *Chenopodium ambrosiodes*, *Laggera tomentosa*, *Schinums molle*, and *Ocimum suave* were tested against the Mediterranean fruit flies in choice bioassay system. Samples of citrus fruits (n=2) were placed in the two bottles separately. Samples in one of the glass bottle was treated with the natural products (100ppm, 150ppm, 200ppm, 250ppm, 300ppm and 500ppm) and while the other jar was not treated (control). Then, air was pumped at a rate of 1.5 litres per minute with regulated air pump into the gas washing bottles containing activated charcoal for filtration through Teflon tube. The filtered air then passed into the gas washing bottles having different treatments (Essential oil and guava as compared with air and guava). After this set up following the method of Jembere et al. (1995), twenty five adults of Mediterranean fruit flies of mixed sex and age were released into the “Y” olfactometer glass. After 30minutes, the numbers of insects which moved into the untreated (Nc) and treated bottle (Nt) were counted. The result indicated that more than 90%, 85% and 41% of the adult flies were repelled using *C. amrosiodes*, *L. tomentossa* and *S. molle* respectively, using 1000ppm of essential oils. Essential oils extracted from the leaves and succulent parts of *O. suave*, showed no significant difference ($p > 0, 05$) in repellency. To determine the prophylactic effects of each essential oils against immature stages (maggots) six different levels of test concentrations (100, 150, 200, 250, 300, 500 ppm) were studied. Each test preparation was sprayed on pre-infested guava fruits 12, 24, 36 and 48 hours after infestation with three replicates for each period. Number of adults emerged from each cage after 21-30 days were counted and comparison was made

with untreated cages to know the efficacy of the oil. The essential oil extracts caused significant reduction in number of progeny (>74% mortality) except for *O. suave*, which caused no significant ($p>0.05$) mortality in all cases. Thus, products of essential oils both from *C. ambrosiodes* and *L. tomentosa* are found to be future promising botanicals against the Mediterranean fruit fly.

2. The Prevalence and Antibigram of Salmonella and Shigella Isolated from Abattoir, Jimma Town, Southwestern Ethiopia

Anbessa Dabassa and Ketema Bacha

Abstract

Foodborne disease due to Salmonella and Shigella are among the major challenges worldwide. Evaluation of the current safety status of foods, including meat and meat products, is a pro-active measure to minimize the possible danger due to associated foodborne pathogens. To this effect, the prevalence and antibiogram of Shigella and Salmonella in meat samples collected from abattoir in Jimma town (Ethiopia) over a 5-month period between December 2009 and May 2010 were evaluated. In total 180 animal samples composed from cattle, goat, and sheep, meat and feces were analyzed for microbial load determination using conventional culture method. Among the samples only Goat faeces sample was not contaminated with Salmonella whereas Shigella was not isolated from any samples. The prevalent Salmonella species were further characterized using API 20E kit. Isolated Salmonella strain was displayed multidrug resistance to several antibiotics including ampicillin, Nalidixic Acid, Streptomycin; Tetracycline, and Chloramphenicol. The present study revealed that despite low contamination rate, foodstuffs particularly beef, chevon and mutton parts could be a potential vehicle for foodborne infections and implementation of preventive measures and consumer food safety education efforts are needed.

Key Words/Phrases: prevalence, antibiogram, *salmonella*, *shigella*, *meat*, mdr

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3. Evaluation of Locally Available Substrates for Cultivation of Oyster Mushroom (*Pleurotus ostreatus*) in Jimma, Ethiopia

Beje Gume¹, Diriba Muleta¹ and Dawit Abate²

Abstract

The potential of using low cost substrates and materials that are commonly considered as wastes for mushroom cultivation has been offering nutritional, commercial, and medical benefit to people in many countries in the world when it is integrated into the existing production system. To this effect, a total of eight locally available substrates and substrate combinations were tested for their productivity and biological efficiency (BE) for cultivation of *Pleurotus ostreatus*. Sorghum grains were steam sterilized at 15 psi for one hour, inoculated with pure oyster cultures, and incubated at ambient temperature (22±2 0C). Similarly, main substrates were steam sterilized at 15 psi for one hour. The main substrates were inoculated with 10% spawn and incubated at ambient temperature (22±2 0C), arranged in a completely randomized design on shelves in the mushroom growing room. Relative humidity of the mushroom growing room was controlled by manually spraying water on the walls and placing open containers filled with water in the corners of the room. Rate of mycelial invasion, times of incubation, time of primordial formation and maturation, pileus diameter and stipe length of matured fruit bodies, number of matures and aborts, fresh weight per flush and total yield were recorded and the data was analyzed using SPSS. The substrate types had significant ($P < 0.05$) effects on the rate of mycelial extension, mean incubation period and yield at 2nd & 4th flushes, number of matured fruit bodies & aborted pinheads, weight of matured fruit bodies, and biological efficiency. Mean durations of pinning-to-maturation were also varied significantly among substrates. The fastest (mean value 0.69cm/day) and the slowest (mean value 0.17cm/day) mycelial extension were realized from sdZcCh (combination of Sawdust of 'Wanza', Sawdust of 'Kerero', corn cobs & coffee husks) and Ch (coffee bean husks) substrates, respectively, where mycelial growth in Ch was completely ceased after 15 days. The results revealed that differences in mean incubation periods at the 1st & 3rd flushes, duration of pinning-to-maturation at the 3rd flush, pileus diameter, and stipe length were insignificant ($p > 0.05$) among substrates. The first pinning took 29±2.3 days, followed by 12±6.3, 7.6±2.3, and 6.4±2.5 between the 2nd, 3rd and 4th flushes, respectively. Mean durations from pinning-to-maturation ranged from 3 to 5 days. The mean pileus diameter of mushrooms ranged from 3.8-5.2cm whereas the mean stipe length ranged from 1.4-1.9cm. The highest BE was obtained from sdZcCh (77.38%), followed by Zc-corn cobs (55.78%), sd1Ch-combination of sawdust of 'Wanza' and coffee bean husks (55.35%), sd2A-sawdust of 'Kerero' (52.03%), sd2Ch-combination of sawdust of 'Kerero' and coffee bean husks (48.55%), ZcCh-combination of corn cobs and coffee bean husks (43.48%), sd1C-sawdust of 'Wanza' (29.07%). All substrates that gave over 40% BE could be recommended for oyster mushroom cultivation.

Key words: biological efficiency, edible mushrooms, *Pleurotus ostreatus*, spawn, substrates

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4. An Account on Taxonomy and Distribution of Old World Bamboo Genus *Oxytenanthera Munro* in Africa and Asia

M. Remesh

Abstract

The genus *Oxytenanthera* was first proposed by Munro in 1868 based on an African bamboo *Bambusa abyssinica*. Munro described 5 species under this genus such as *O. abyssinica*, *O. nigrociliata*, *O. albociliate*, *O. thwaitessi* and *O. stocksii* from African and Asian continent. The genus was widely accepted by subsequent workers and added several other genera *Oxytenanthera sinuata*, *O. parvifolia* and *O. bourdillonii*. The bamboo taxonomist faced a great confusion to delimit many of the species described under *Oxytenanthera* from allied genera like *Dendrocalamus* and *Gigantochloa* and some of the species included under the genus *Oxytenanthera* have been transferred in to other genera. The paper tries to describe exact taxonomic position of the genus *Oxytenanthera* among the other old world bamboos with an emphasis on its phytogeographical significance in a new angle. The detailed description, nomenclature and identification keys are also provided.

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5. Wetlands of Ethiopia

Gelaye G/Michael

Abstract

Ethiopia possesses a great diversity of wetlands, which are widely distributed in all climatic regions of the country. Wetlands of Ethiopia are grouped ten depending on habitat type and biological and physical characteristics. Ecological and socio-economic functions of wetlands are very high, which make them significant at national and international levels. Even if the resource bases of Ethiopian wetlands are not well accessed, it is known that there is high biodiversity in Ethiopian wetlands. From the Rift valley lakes, 206 species of phytoplankton have been identified. Among these, about 10 species are new to science. Wetlands of Ethiopia host a great diversity of plants, zooplankton, >145 fish species and 538 bird species. Because of lack of awareness of the current status of wetlands, and in the absence of any concerted conservation efforts, wetlands of Ethiopia have depleted at an alarming rate throughout the country. Intensive irrigation, expansion of human settlement, over-utilization, pollution, deforestation of catchment areas and conversion of wetlands for various land-uses are main threats to the wetlands ecosystem in Ethiopia. These activities limit the ability of wetlands to maintain ecological, socio-economic and hydrological functions.

Keywords: Ecological importance, Ethiopia, socio-economic functions, wetlands

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6. Microbiological Study of Cassava-Teff Mixed Dough Fermentation

Nigussie Tesemma¹ and Ketema Bacha^{2}*

Abstract

Cassava is a staple food in many tropical areas. It has also been cultivated in some parts of Ethiopia. Cassava is drought resistant plant capable of growing in poor soils. However, it contains the toxic substance, cyanide, and deaths have been reported due to improper processing methods. Fermentation is one of the methods being used to reduce the cyanide content besides improving product flavor, aroma as well as safety. Nowadays, fermentation of cassava mixed with teff is practiced in some parts of Ethiopia, including Gamogofa zone, South Nations and Nationalities Peoples Region (SNNPR). This study was designed to evaluate microbiological dynamics, changes in physicochemical parameters, and cyanide content in the course of cassava-teff mixed fermentation. Preliminary information pertaining to cassava-teff mixed dough fermentation was gathered through pre-designed questionnaire. Controlled fermentation of cassava-teff mixed dough was carried out in microbiology laboratory following the information obtained from local communities (traditional fomenters) in the study area. Analysis of microbiological and some physicochemical changes during fermentation were made following standard microbiological methods between November, 2009 and May, 2010. At early stage of fermentation, different microbial groups including aerobic mesophilic bacteria (AMB), Enterobacteriaceae, aerobic spore former (ASF), coliforms, lactic acid bacteria (LAB), staphylococci, yeasts and molds were encountered with varying mean counts. With progress in fermentation period, however, some of the groups showed a progressive decline [AMB, coliforms, Enterobacteriaceae and staphylococci from 7.79 to 5.68, 3.38 to 2.31, 3.03 to 2.06 and 1.75 to 1.49 log CFU/g, respectively] while the counts in ASF, LAB, and yeast showed progressive increment in the course of fermentation [from log 4.38 to 7.31, 2.46 to 3.72, 1.09 to 2.37, respectively]. The titratable acidity (TA) increased from 1.11% to 2.4% while pH dropped from 6.65±0.74 to 5.30±0.79 in the course of fermentation for 24 hours when the product was ready for baking. Likewise, the mean calculated µg HCN equivalents/gm dropped from 57.0233 ± 6.94 to 35.84 ± 6.3579. Thus, the cassava-teff mixed fermentation for the making of Ethiopian staple food, 'enjera' has improved the cyanide content of the final product. Change in pH and TA are among the factors that could contribute to the microbial succession in the course of fermentation. It could be concluded that the fermentation of cassava-teff mix for the making of 'enjera' lowers the cyanide content of the raw material improving the nutritional quality of the final product.

Key words: Cassava, Cyanide content, 'Enjera', Ethiopia, Fermentation, 'Teff'.

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7. Electrochemical Study of Human Dental Enamel

Bayisa Meka

Abstract

Previous studies have shown that there are surface potentials in the separate tooth sections and a whole tooth. To confirm the existence of the surface potentials in extracted tooth and research the development of the potentials, the surface potentials between mid-spots of enamel crown's buccal side and tooth root were measured with electrochemical methods. The effects of KCl concentration and acid corrosion were also examined in the present study. All the teeth developed the surface potentials, and when 0.1 mol/L KCl solutions were used, the average surface potential was +20.835.70 mV. The potentials increased along with the ascending of KCl concentration and after being acid corroded. The results of this study suggested that there are also surface potentials in tooth as a whole tissue, and the potentials can be affected by the electrolyte surroundings and are developed mostly by the dental crystal structure and established in the outer layer, an electric double layer. The passage of an electric current through enamel causes degradation and a carious appearance. The fluoride ion minimizes the variations in natural electric potentials and inhibits electric current. These are indications of an electrochemical mechanism of caries formation and the beneficial effects of fluoride.

Key words: - tooth, surface potential, KCl, fluoride ion, electric current, corrosion, electrochemical

8. Characterization of Selected Natural Products from *Strobilanthes ciliatus* Nees

Reneela, P^a and Shubashini, K.Sripathi^b

Abstract

Strobilanthes is one of the most interesting genera in the family Acanthaceae known for its diversified habits, gregarious nature and infrequent but elegant flowering. Out of the 59 species of *Strobilanthes* seen in south India 39 are endemic to peninsular India. *Strobilanthes ciliatus* is one of the species endemic to Western Ghats, India. It is widely used in Ayurveda, the traditional system of medicine in India. Detailed phytochemical investigation on the stems of *Strobilanthes ciliatus* Nees was conducted. The separation of the chemical components was carried out by chromatographic techniques. Two triterpenoids, two sterols and one lignan were isolated. The structures of the compounds were elucidated by spectroscopic methods namely UV, IR, NMR and Mass spectral techniques. The deals with the systematic steps involved in structural elucidation of unknown compounds from *Strobilanthes ciliatus* Nees in detail and also specify the role of such chemical characterization for over exploited medicinal plants.

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9. A Study on the Level of Heavy Metals in the Soils and River Waters Around Awash and Addis Ababa Tanneries in Addis Ababa, Ethiopia

Girma, S. Tarekegn, B. Dejene, A.

Abstract

Environmental pollution is a great global concern. It can arise due to a number of causes and one of these is the heavy metal pollution of soils and water bodies receiving untreated effluents emanating from tanneries. Such pollutions can inflict serious environmental degradation and could be threats to human and animal health specifically those who are residing near the polluted sites. Therefore, to minimize or avert the damage from industrial pollutants assessment of the extent of pollution on the soils and water bodies near such potentially vulnerable areas is mandatory. Thus this study was conducted to assess the extent of heavy metal pollution of the soils and river waters around Addis Ababa and Elico-Awash leather industries.

Grab river water and effluent samples were collected randomly from the two tanneries and composited in 500 mL polyethylene bottles. Similarly, soil samples were collected randomly by five point mixture method from peripheral distances of 50 m, 100 m and 150 m from the effluent discharge points. The effluent and river water were digested on a hot plate using concentrated nitric acid while the soil sample was digested on hot plate using Aqua regia. Finally, analyses of Zn, Cu, Co, Pb and Cr were carried out using Flame Atomic Absorption Spectrophotometer (FAAS).

The results of the study indicated that there exists substantial accumulation of heavy metals in the effluents, soils and river water samples collected around the two tanneries. The concentrations of the heavy metals in the effluents of Addis Ababa and Elico-Awash tanneries were found to be in the order $Cr > Co > Pb > Zn \equiv Cu$ and $Cr > Pb > Co > Zn \equiv Cu$ respectively while in the water samples collected from the nearby rivers into which the tanneries discharge their effluents were in the order $Cr > Co > Pb > Zn \equiv Cu$ and $Cr > Co > Zn > Pb > Cu$ respectively. In addition to this, the obtained results show that the effluent discharged from Addis Ababa tannery was highly polluted with chromium (443.6 ± 0.178 mg/L) while that of Awash tannery had a chromium concentration of 1.398 mg/L which is below the level recommended by EPA (2 mg/L).

The average concentration of chromium in the water samples collected from the rivers nearby Addis Ababa and Elico-Awash tanneries were found to be 1.31 ± 0.02 mg/L and 0.09 ± 0.005 mg/L respectively. Both values were above the EPA guideline value (0.05 mg/L). This indicating that both nearby river waters were polluted with chromium. But the concentrations of Pb, Co, Zn and Cu were below the guideline values set by EPA.

The order of heavy metal concentrations in the soil samples collected near both tanneries were found to be $\text{Co} > \text{Cr} > \text{Cu} > \text{Pb} > \text{Zn}$. The average concentrations of all the metals studied, except zinc, were found to be above the recommended concentration interval for unpolluted soil. Moreover, the concentrations of all the metals, except that of cobalt, were found to be below the EPA guideline value (500 mg/kg) in the nearby soil samples. However, the level of cobalt in the soil samples collected nearby both tanneries was found to be greater than the maximum allowable limit (100 mg/kg) and cobalt has polluted the nearby soils of both tanneries.

Key words: Heavy metals pollution; Tannery effluents; soil; River water; FAAS; Addis Ababa.

10. Therapeutic Efficacy of Chloroquine for Treatment of *Plasmodium vivax* malaria cases in Halaba District, South Ethiopia

*Tsige Ketema*¹, *Ketema Bacha*¹ and *Keefelegn Getahun*²

Abstract

Chloroquine is anti-malarial drug being used to treat *Plasmodium vivax* malaria cases in Ethiopia. Currently, the emergence of chloroquine resistant strains of the parasite has been challenging the efficacy of the drug. Therefore, the aim of this study was to assess the effectiveness of chloroquine against *P. vivax* strains in one of such malaria endemic areas, namely Halaba district, South Nations and Nationalities Peoples Region (SNNPR), South Ethiopia. A total of 87 participants were enrolled in this study. Only 80 of them complete the 28-days follow-up. Seven of them were dropped from the study due to different reasons. Among those who completed their follow-up, 69 of them were classified under adequate clinical and parasitological response (ACPR). However, the remaining 11 cases were categorized under treatment failure due to recurrence of parasitemia on day 7 (four patients), day 14 (six patients), and day 21 (one patient). The age of all cases of treatment failures were found to be less than 20 years. The load of parasitemia of patients with treatment failure on day of admission (4709.4/ μ l) was higher than day of recurrence (372.37/ μ l). Parasite reduction ratio (PRR) of treatment failure cases was 12.6/ μ l. This report revealed the highest treatment failure (12.6% [95% CI= 0.098 - 0.252]) ever reported from Ethiopia. It signals the spreading of chloroquine resistant *P. vivax* (CRPv) strains to malaria endemic areas of Ethiopia. Therefore, concerned body should take corrective measures to reduce further expansion of the problem.

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11. Effect of Coffee Management Intensity on Forest Structure and Composition in South Western Ethiopian Coffee Forests: Implications for Forest Coffee Conservation

Kitessa Hundera^{1,3}, Olivier Honnay², and Bart Muys¹

Abstract

The effect of coffee management intensity on forest composition and structure was studied in Jimma Zone, SW Ethiopia along three traditional coffee management systems. Species composition and structural data were collected from ninety one plots of size 20x20m. the result indicated that tree abundance, basal area, percent canopy cover and canopy closure were significantly lower in the semi-forest plantation coffee as compared to the forest coffee as a result of intensive management of the forest to maximize coffee productivity. There was also a significant difference between the semi-forest plantation system and the forest coffee system regarding the presence of epiphytes and lianas on the trees. Floristic composition, species density and the structures of the forest has been influenced as a result of conversion of a forest coffee into a semi-forest coffee plantation coffee system. The conservation and sustainable use of the species and their supporting ecological processes within the SFPC and SFC system needs urgent action.

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12. Reproductive Biology in *Plumbago zeylanica* L. : a medicinal plant

Balcha Abera^{1, 2}, *Legesse Negash*¹, *Jochen Kumlehn*²

Abstract

Plumbago zeylanica L. is an important medicinal plant traditionally used for the treatment of various diseases. Phenology from seed germination via vegetative growth to reproductive development was studied under different growth conditions. Seeds rapidly germinated on a mixture of nursery soil and cattle dung in a ratio of 3:1 filled in pots or on cultivated soil under nursery conditions as a prerequisite for vegetative and flowering phenological studies. Hypogeal germination characterizes the emergence of seedlings. Subsequent vegetative and flowering phenology between glasshouse and nursery field populations showed significant difference ($p < 0.05$) in terms of time, duration and yield. Glasshouse populations completed their phenophases (aseasonally) ($72.3 \pm 1.03\%$) within 133 days (15 March to 20 July 2006) being under controlled conditions while field-grown seedlings extended to 225 days (15 March to 30 November 2006) after seed sowing. Rainy season was the cause for the continuous damage of apical shoots, and consequently stunted vegetative growth of field-grown seedlings. Plant size (≥ 95 cm in height), leaves number (33-38) and seasonal climate (cold season for field-grown populations) were found to be the most eliciting signals for the initiation of flowering buds. 100 ppm GA3 was the most effective for early flowering (i.e., before 6 days) and production of higher number of flowers ($32.6 \pm 1.6\%$) compared to the control ($22.5 \pm 1.33\%$). The mode of reproductive biology appeared to be cross-pollination and showed significant ($p < 0.05$) compared to the control. The final flowering percentage ($95.3 \pm 1.71\%$) and/or seed-set ($89.4 \pm 1.41\%$) were obtained under glasshouse condition compared to the nursery, which dropped as low as 50% in flowering and seed-set. The study found that rainy season, plant size, leave number, low temperature, cross pollination and glasshouse conditions were found to be the most determining factors for the phenology of *P. zeylanica*.

Keywords: Growth regulators, medicinal plant, seasonal climate, plant size, growth environment

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13. Genetic Diversity Analysis of the Wild *Coffea arabica* L. Populations from Harena Forest, Bale Mountains of Ethiopia, Using Inter Simple Sequence Repeats (ISSR) Marker

Solomon Balemie

ABSTRACT

Wild *Coffea arabica* L. Plants are a perennial wild species distributed and occur as undergrowth in the Afromontane rainforest of Southwest and South West Ethiopia, which is considered to be its centre of origin and diversification. It has been one of the most important coffee species which contributes over 67 percents as the sources of foreign currency for Ethiopia. But the accelerated and uncontrolled use of the forest in SW and SE leads to severe deforestation. In spite of their importance the level and distribution of wild *Coffea arabica* L. in Harrena has not been extensively examined in depth with molecular markers. The current study conducted in the Harena Forest of Bale Mountain found in the southeast part of Ethiopian. The levels and distribution of within and among genetic diversity of one hundred wild *Coffea arabica* L individuals representing four populations: two from semi-disturbed (Bale-I and Bale-3) and two from undisturbed (Bale-4 and Bale-6) regions of the forest were collected and evaluated with Inter Simple Sequence Repeats (ISSR). A total of nine primers which contains different simple sequence repeat (SSR) were used and tested for PCR amplifications. A total of one hundred thirty seven bands were detected. The number of bands per ISSR markers ranges from ten (10) to twenty one (21), with an averages of 15.2. These were then used to estimate the genetic diversity. Out of the total bands produced, 61(44.53%) were polymorphic and the number of polymorphic bands per ISSR markers ranges from one (1) to ninety (19), with an averages of 6.77. The similarities between individual genotypes were estimated using UPGMA and NJ analysis. The populations were found to be clustered on the basis of their respective origin. The UPGMA cluster analysis showed that the four populations form two major clusters (Undisturbed and semi-disturbed populations together) according to locations from which they collected. The two major clusters further divided in to two corresponding. Analysis of molecular variance (AMOVA) was also made and indicated that population level genetic diversity was relatively high (56.8%). Shannon's diversity index showed the same patterns and indicated that the within and between genetic diversity of *Coffea arabica* L. populations are significantly different. That is, a considerable proportion (83.6 %) of the total genetic diversity was distributed within populations (i.e., due to differences among individuals within the populations) rather than among populations (16.4%), inconsistent with the predominantly selfpollinating nature of the species. This could be because of gene flow via insect pollinators, seed flow by wild animals, birds and human. Generally on the basis of

samples of 137 bands in the four populations, ISSR was able to reveal low to moderate levels and distribution of genetic diversity within and among populations of Harrena Forest of Bale Mountain. Key Words: *Coffea arabica* L, ISSR marker, Harena, Intra-regional analysis, Ethiopia

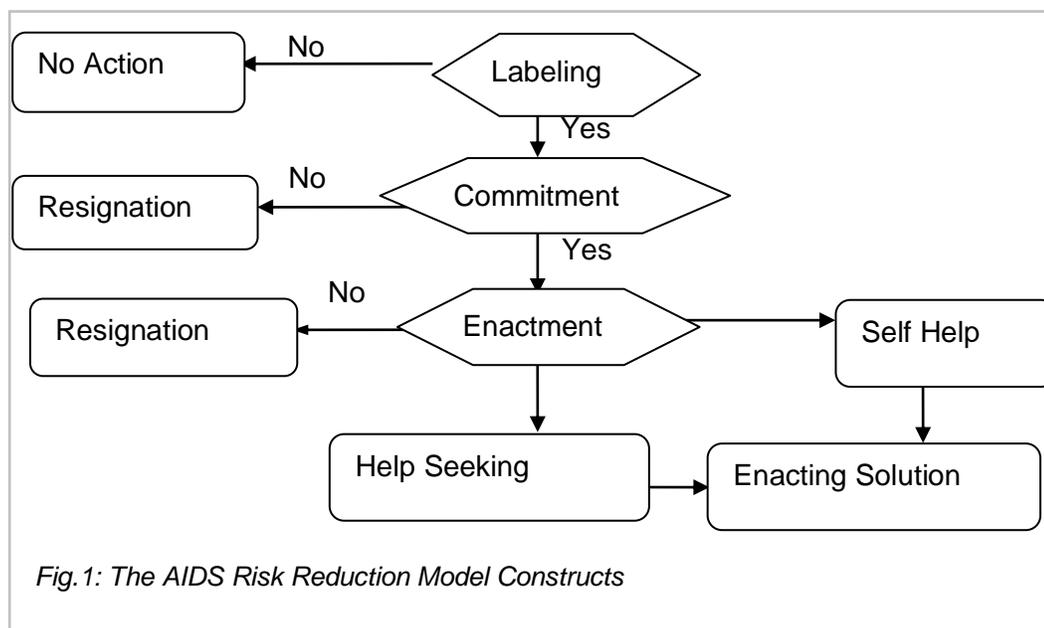
4. College of Public Health and Medical Sciences, JU

1. Young Adult's Risk Perception, Commitment and Practices in Self Protection against HIV Infection: Using Aids Risk Reduction Model in Metu Town, Southwest Ethiopia

Lakew Terefe

Abstract

Background: in the face of lack of cure, the intervention against HIV/AIDS infection mainly focuses on “ABC”. Thus, the objective of this study was to identify perceived personal risks, commitment, sexual practices and underlying personal predictors using ARM.



Method: a community based cross-sectional study, using quantitative and qualitative methods, was done from 06-14 March 2007.

Results: 402 (95.3%) of the sampled participants were interviewed. Perceived self-efficacy, 278 (69.1%), perceived susceptibility, 25(6.2%), response efficacy of

condom 248(61.7%) and personal risk labeling 22(5.5%) show statistically significant association with the commitment to use condoms consistently in the next 12 months ($P<0.05$). perceived susceptibility and personal risk labeling also show significant statistically association with the commitment to abstain from sexual intercourse during the next 12 months ($P<0.05$). However, only personal risk labeling shows statistically significant association with the commitment to stay faithful with sexual partner during next 12 months, 316(78.7%), ($P<0.05$). Knowledge and socio-demographic and economic variables are not found predicting the commitment of using “ABC” prevention methods. During FGDs, however, lack of income was mentioned repeatedly by majority participants as a major vulnerability to HIV infection risks.

Conclusion: personal risk labeling shows significant statistical associations on “ABC” prevention methods followed by perceived susceptibility and response efficacy.

Recommendation: besides the affective domain of behavior change process, cognitive domains need to be addressed so that young people can think critically, reason out how a young adult label own personal HIV infection risks and act or practice appropriate prevention methods based on the situation at hand.

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2. Indigenous Community Insurance (*Iddirs*) As an Alternative Health Care Financing In Jimma City, Southwest Ethiopia

Shimeles Ololo, Challi Jirra, Yohannes Hailemichael, and Belaineh Girma

Abstract

Background: Studies showed that shortage of finance is the ‘single most’ important factor that affects the performance of health sector in developing countries. There has been recently increased interest in community-based health insurance as a promising approach to health financing reform. The objective of this study was to assess feasibility of introducing Iddir-based health insurance schemes in Jimma City, Southwest Ethiopia

Methods: A cross-sectional community based study was conducted in Jimma City in February 2007 using a pre-tested structured questionnaire. A multi-stage random sampling technique was employed to select study subjects. Four Kebeles out of the total thirteen were selected randomly. Samples were allocated proportional to the size of the population of the selected kebeles. A total of 849 households were selected from those four kebeles using systematic sampling procedure. Data were entered and analyzed with SPSS for Windows version 13.0.1. Ethical clearance was obtained from Ethical Clearance Committee of Jimma University.

Results: Eight hundred three (94.6%) study subjects participated in this study. Six hundred fifty nine (82.1%) of the total households were participating in Iddirs; 614 (76.5%) of the respondents showed willingness to join Iddir Based Health Insurance Scheme. Mean willingness to pay for the scheme was 7.60 Birr (0.89 USD). Family income, educational status, and participation in Iddir were found to have significant association with willingness to join.

Conclusion: The observed high amount of willingness to join Iddir-based Health Insurance Scheme in the City could have a good entry point to mitigate deficits in health care financing and negative outcome of globalization and privatization against the poor. Therefore it is suggested that indigenous institutions should be encouraged to undertake community mobilization so as to generate sustainable resources.

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3. Knowledge and Behavior Related to Oral Health among Jimma University Health Sciences Students, Jimma, Ethiopia

Darout I and Wondwossen F

Abstract

BACKGROUND: Oral health practice is essential for prevention of dental and other associated systemic diseases. Little information is available on oral health practices among Jimma University health sciences students. This study explores health sciences students, with the respect to frequency and quality of use and socio-demographic distribution of oral health knowledge and behaviour.

METHODS: Self-reported questionnaires were distributed to be completed by the participants from Jimma University health sciences students involving the first and second years of the schools of dentistry, health officer and health education respectively. These students were selected at random after having read a consent letter. Three hundred students, (males 206 and 94 females) completed the questionnaires.

RESULTS: 119 (57.6%) males and 53 (52.5%) females scored highly in knowledge of caries. The corresponding rates regarding the knowledge of gingivitis were 102 (49%) and 46 (44%) respectively. Tooth brushing and the use of mefakia (chewing stick) ≤ 2 times a day was confirmed by 117 (56.8%) males and 68 (58.2%) females and by 154 (74.8%) males and 59 (62.8%) females, respectively.

CONCLUSIONS: Awareness of oral health issues is high, but specific misconceptions exist. There is a gender equality in knowledge and practice of oral hygiene among health sciences students. Mefakia was equally used with toothbrush for oral hygiene practice.

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4. Structure, reliability, and applicability of the Amharic version of the Hospital Anxiety and Depression Scales (Amharic-HADS) in a Community Sample of Orphan Adolescents in Addis Ababa, Ethiopia

Fentie Ambaw

Abstract

Background: The HADS were developed as a self-assessment tool to identify anxiety and depression in non-psychiatric hospital departments in patients of age 16-65 years. There is no documented evidence whether it can be useful in younger age groups and illiterate populations. The purpose of this study was to examine the structure, reliability, and applicability in early adolescents in a community sample of orphan adolescents.

Methods: Secondary data which was primarily collected from randomly selected 804 orphans using interview administration of the Amharic –HADS in 2010 in Addis Ababa was used in this study with permission. Confirmatory factor analysis with principal components extraction and oblique rotation ($\Delta=0$) was computed. The number of factors to be extracted was decided using Cattle's scree test. The internal consistency of the scales was assessed using Cronbach's alpha and the correlation between the sub scales was assessed using Pearson correlation coefficients.

Results: In the whole sample (11-18 years), two factors explaining a total of 45.9% of the variance were found. All the items in the scale loaded clearly and strongly to one of the components except anxiety item seven that loaded to both anxiety and depression components with loadings of 0.53 and 0.31 respectively. The depression item number eight has loaded to the anxiety component clearly with a loading of 0.50. In the 11-15 years sub sample, two components were extracted explaining a total of 45.7% of the variance. The anxiety item number seven was found to cross-load to the anxiety and depression components with loadings of 0.48 and 0.34 respectively, and the depression item number eight was found to load only to the anxiety component with a loading of 0.52.

The Amharic-HADS had Cronbach's alpha value of 0.81 and 0.76 in the whole sample of orphans for the anxiety and depression sub-scales respectively. In the 11-15 years sub-sample the corresponding alpha values for anxiety and depression scales were 0.80 and 0.77 respectively. The correlation between the anxiety and the depression subscales were 0.66

($p < 0.001$) and 0.67 ($p < 0.001$) for the whole sample and for the 11-15 years age group respectively.

Conclusion: Meaningful data was obtained by interviewer administered Amharic HADS starting from the age of 11 suggesting successful applicability of the scale with adaptation made on item eight.

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5. Boy/Girl Friend and Virginity Values, and Stigma Related To Condom among Jimma University Students

Fentie Ambaw, Andualem Mossie, and Teshome Gobena

Abstract

Background: Individual factors such as the value given to virginity and boy/ girl friend, and stigma attached to condom can strongly affect success in preventing early sexual initiation and in using condom consistently. However, no literature was available in Ethiopia on these issues until the time of this study. The objective of this study was to assess the value given to virginity, boy/ girl friend, and stigma related to condom.

Methods: A cross-sectional survey was conducted on a random sample of 1986 students in May 2009 in Jimma University using both qualitative and quantitative techniques. Data were collected using piloted and precoded questionnaire. Six focus group discussions were conducted. Quantitative data were analyzed using SPSS version 13. Descriptive statistics, ANOVA, and t-test were computed. P-value less than 0.05 was considered statistically significant. Effect size was measured in Eta squared. The qualitative data findings were triangulated with the quantitative ones.

Result: Of 1986 respondents, 1612 (81.2%) were males, 365 (18.4%) were females and 9 (0.4%) with no sex reported. The age of respondents ranged from 17- 45 years with median of 20 years. Virginity value-scores were significantly lower among females ($p < 0.001$, Eta squared= 0.023). In contrast to many males, most females were not concerned about virginity in the focus group discussions. Many respondents of both genders reported that boy/girl friend is very important in campus life. Although the stigma to condom was slightly higher among females ($p < 0.001$, Eta squared= 0.009), most respondents of both genders had a stigmatizing attitude.

Conclusion: Lower virginity value among females with high value given to boy/girl friend shows the liberalization of sex. Liberalization of sex and stigma to condom were occurring together. Sex education providers targeting university students should focus on problems of liberalized unprotected sex in relation to success in life.

Key terms: *virginity value, boy/ girl friend value, stigma to condom*

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6. Sexual Practices and their Pattern of Development among Jimma University Students

Fentie Ambaw, Andualem Mossie, and Teshome Gobena

Abstract

Background: Traditional views of sexual behaviors are frequently changing with changes in the factors influencing them such as socio-cultural forces. Therefore assessing sexual practices that are not part of the tradition is necessary. The objective of this study was to identify the type of sexual practices, their pattern of development, and how the pattern of development exposes students to sexually transmitted infections and unplanned pregnancy.

Methods: A cross-sectional survey was conducted on a sample of 1986 (1612 males, 365 females, and 9 no sex reported) Jimma university students with age ranging from 17-45 years (median = 20) using both quantitative and qualitative techniques in May 2009. Data were collected using a piloted, precoded questionnaire and 6 focus group discussions. Logistic regression and descriptive statistics were computed and qualitative findings were triangulated with quantitative findings. P-value less than 0.05 was considered significant.

Results: Practice of penis to vagina sex, masturbation, kissing, oral sex, and anal sex were reported by 567 (28.9%), 688 (36.7%), 840 (42.4%), 179 (9.2 %) and 83 (4.3%) of the respondents, respectively. Respondents had a two years (one year with condom and one year without) sexual experience before marriage. Sixty percent of those with sexual experience were exposed to sexually transmitted infections and 46.6 % were exposed to both unplanned pregnancy and sexually transmitted infections. Forty seven percent of those who practiced oral sex and 29% of those who practiced anal sex did not consider their acts as sexual intercourse.

Conclusions: University students are high risk groups that need more focused research and concerted health care. The term 'sexual intercourse' should be consciously defined in future use in Ethiopia. Service providers and researchers should address all types of sexual practices.

Key terms: *oral sex, anal sex, Jimma*

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7. Antihelmentic Effects of the Extracts of Selected Medicinal Plants against *Haemonchus contortus*

Jemal Hussien¹, Kaba Urgessa², Fayissa Regassa³, Awol Jemal⁴, Sultan Abajebel⁵, Nezif Hussien⁶

Abstract

BACKGROUND: *Haemonchus contortus*, a blood feeding parasite, is notoriously known for causing significant reduction of an efficient production of small ruminants. **OBJECTIVE:** The present work was aimed at investigating the antihelmentic effects of the extracts of eight medicinal plants against *H. contortus*. **METHOD:** *In vitro* experimental study employing the egg hatching test (EHT) was conducted to determine the ovicidal/antihelmentic potential of the extracts of the selected plants against *H. contortus*. The inhibitory concentration in 50% of test organisms (IC₅₀) of the extracts was determined and the antihelmentically superior plant was identified. Furthermore, the major phytochemical profiles of the methanol extracts were screened using chemical methods. **RESULT:** The essential oil and crude methanolic extracts demonstrated inhibitory effects against hatching of eggs at all concentration levels. At the highest concentration (1% v/v), all the essential oils investigated exhibited more than 80% egg hatch inhibition with mean percent inhibition ranging from 81.8±0.6 (*E. kebericho*) to 100±0 (*O. gratissimum* and *R. chalpensis*). Similarly, at the maximum dose of 5mg/ml, the 80% crude methanolic extracts of *O. gratissimum*, *P.abbyssinica* and *P.eminii* leaves inhibited 90.5±1.55, 75.8±0.282 and 78.2±0.848 percent of eggs from hatching respectively. The intensity of egg hatching inhibitory effect of the essential oils was observed to vary in a dose dependent fashion (P<0.05). Among the extracts, the essential oils of *O.gratissimum* (IC₅₀ 0.0784% v/v), *R.chalpensis* leaf (IC₅₀ 0.0876% v/v) and fruit (IC₅₀ 0.0944% v/v) were most active against *H. contortus* egg hatching. Generally, at higher concentration, the efficacy of most the essential oil extracts and methanolic extracts of *O. gratissimum* were comparable to the commercially available antihelmentic, thiabendazole (0.5µg/ml). **CONCLUSION:** The result indicated the potential activity and utility of the plants in the control of egg shedding into the environment to prevent infection of new hosts during grazing. **RECOMMENDATION:** *In vivo* antihelmentic efficacies and toxicity studies of the plants should be established.

Key Words: *Haemonchus contortus*, Antihelmentic activity, Egg hatch test, IC₅₀, Medicinal plants

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8. Food Insecurity, School Absenteeism and Educational Attainment of Adolescents in Southwest Ethiopia

Tefera Belachew, Craig Hadley, David Lindstrom, Abebe Gebremraim, Carl Lachat, Patrick Kolsteren

Abstract

Background: Food insecurity and malnutrition affect not only physical growth and health of children but also their intellectual development school attendance, growth, academic performance, social skills and their future as an adult. Although food insecurity is common in the study area, to what extent it impacts on school attendance and educational attainment of adolescents is not documented. We hypothesized that food insecure adolescents would be more absent from school and have lower grades attained after 1 year compared to their food secure peers.

Methods: We used data of first two consecutive rounds of the five year longitudinal family survey of 2084 adolescents aged 13-17 years from Southwest Ethiopia. Stratified random sampling was used to select adolescents. Regression analyses were used to compare school absenteeism and the highest grade attained after 1 year of follow-up in food secure and insecure adolescents. The analysis was adjusted for demographic factors, reported illness and workload.

Results: Significantly more (28.0%) food insecure adolescents were absent from school compared with their food secure peers (14.6%), $P < 0.001$). Independent of gender, place of residence and household headship, adolescent food insecurity (OR 1.77 [1.34-2.33]), household food insecurity (OR 1.62 [1.27-2.06]), illness during the past one month (OR 2.26 [1.68-3.06]), the highest grade aspired (OR 0.92 [0.88-0.96]), and number days of labor per week (OR 1.16 [1.07-1.26]) were independent predictors of school absenteeism. Similarly, adolescent food insecurity, household food insecurity, illness during the last one month, female sex and rural and semi-urban residence were negatively associated with highest grade attained while, age and the highest grade intended to be completed were positively associated with highest grade attained ($P < 0.001$).

Conclusions: Adolescent and household food insecurity are positively associated with school absenteeism and lower educational attainment. In food insecure situations girls are more likely to be absent from school. Programs aiming to achieve universal access to primary education in food insecure environments should integrate interventions to ensure food security in adolescents.

Key words: Food insecurity, absenteeism, educational attainment, adolescent, Ethiopia

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9. Objective Structured Clinical Examination (Osce): Examinee's Perception at Department of Pediatrics and Child Health, Jimma University

Belay Shitu¹ and Tsinuel Girma²

Abstract

BACKGROUND: Objective Structured Clinical Examination is one of several methods of assessing the clinical competence of medical students. Though popular in most medical schools globally, its use in Ethiopian medical schools appears limited. The department of Pediatrics in Jimma University is the only clinical program with a relatively long (9 years) experience with this assessment format. The major objective of the study was to evaluate students' perception about the validity, comprehensiveness and acceptability of the test.

METHODS: A cross-sectional survey of three successive batches of medical students, who had been examined with Objective Structured Clinical Examination, was conducted and data related to the general conduct, validity, objectivity and comprehensiveness of the test in pediatrics was collected using a structured self-administered questionnaire. Data were entered and analyzed using EpiData version 3.1. The study was conducted in March 2007.

RESULTS: Of 144 eligible medical students, 122 completed the questionnaire representing close to 85.0% of all the students in the 3 batches. Eighty-seven (71.3%) of the respondents reported that clear and adequate instructions were given at each station and 74(60.7%) perceived that the test created a good learning opportunity highlighting their areas of weakness. Moreover, 66(54.1%) also agreed that the exam covered common and relevant topics consistent with stated teaching objectives 71(58.2%). However, a considerable number of them, 53(43.4%), expressed their experience that examiners at manned stations were intimidating and individual feedback was offered only to a minority, 31(25.4%). Sixty-seven (54.9%) respondents expressed their opinion that the test was fair in assessing knowledge and skills and 87(71.3%) further stated that personality, gender and other attributes of candidates do not affect test scores.

CONCLUSION: Overall, students' evaluation of Objective Structured Clinical Examination was remarkably encouraging. Nevertheless, the added advantages of the evaluation of medical students can be maximized only if standard procedures are followed in its preparation and timely feedback are offered on the performance of candidates. To this end, we recommend that continuing appraisal and refinement of Objective Structured Clinical Examination be done by the department.

KEY WORDS: OSCE, assessment, evaluation, perception, Jimma University

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10. Evaluation of the Performance of Carestarttm Malaria Pf/Pv Combo Rapid Diagnostic Test for the Diagnosis of Malaria in Jimma, Southwestern Ethiopia

Zelege Mekonnen

Abstract

Introduction: In Ethiopia, malaria is the leading cause of morbidity and mortality. The main malaria control strategies in Ethiopia include early case detection and immediate treatment, sustainable vector control and prevention and control of epidemics. Early diagnosis of cases must be accomplished either through laboratory diagnosis at health centers and hospitals or through clinical diagnosis or Rapid Diagnostic tests (RDTs). **Objective:** To evaluate the diagnostic performance of CareStartTM Malaria Pf/Pv Combo test relative to microscopy, for the diagnosis of falciparum and vivax malaria in Ethiopia.

Methods: Two hundred and forty febrile patients visiting the Serbo health center in Jimma zone, southwestern Ethiopia, were involved in this study in 2008. Giemsa-stained thin and thick blood smears were prepared and microscopically examined under a 100× oil immersion microscope objective for Plasmodium species identification and determination of parasitemia respectively. CareStartTM Malaria Pf/Pv Combo test was performed as per the manufacturers' instruction.

Findings: The validity of CareStartTM Malaria Pf/Pv Combo test for the diagnosis of Plasmodium was very good with a sensitivity of 95.8%, specificity of 100%, positive predictive value of 100% and negative predictive value of 96%. The test performed equally well for the identification of Plasmodium falciparum and P. vivax. The diagnostic performance of this CareStartTM test is comparable to light microscopy of thin and thick blood smears.

Conclusion: Although CareStartTM Malaria Pf/Pv Combo test and blood microscopy have comparable diagnostic performance for Plasmodium detection, the CareStartTM test has the added advantage of being simple to interpret, cost-efficient, and hence it is preferable to use this rapid diagnostic test for malaria diagnosis in areas where microscopy is not accessible and during times of malaria epidemics that are observed approximately every 4–5 years in Ethiopia

Key words: *Malaria, RDTs, CareStartTM, Malaria Pf/Pv Combo test, Microscopy*

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11. In-vitro Susceptibility of *Candida albicans* from Oral Cavities of HIV/AIDS Patients, Jimma University Specialized Hospital, Southwest Ethiopia

Nasir Tajur

Abstract

Background: The genus *Candida* (yeasts) is considered super infecting microorganism and can lead to oral candidiasis and *periodontitis* especially in immunocompromised patients. The chronic use of antifungal agents, in the treatment of *candidiasis* mainly in HIV/AIDS patients leads to the selection of strain resistant to this therapy. The objective of this study was to evaluate the *in vitro* susceptibility of *Candida albican* to commonly used antifungal agents in Jimma University Specialized Hospital.

Methods: An experimental study was conducted to determine susceptibility of *Candida albicans* to the commonly prescribed antifungal agents in *Jimma University Specialized Hospital*. The samples were collected randomly from WHO stage III AIDS patients who did not begin *antiretroviral* treatment. The clinical strains (yeasts) were differentiated from moulds using staining technique, and germ tube test was employed to identify *Candida albicans*. Antifungal susceptibility patterns against five different antifungal agents, clinically used drugs, comprising of polyenes (amphotericin B and nystatin) and azoles (ketoconazoles, clotrimazole and fluconazole) were investigated using disk diffusion method.

Results: A total of 77 clinical samples of yeast were collected from non-hospitalized WHO stage III HIV/AIDS patients at ART clinic. About 42 clinical *Candida albicans* isolates were identified after germ tube test. In this study amphotericin B (97.6%) was found to be the most effective drug. Moderate rate of resistance, against Nystatin (11.9%) and clotrimazole (9.5%) was observed. On the other hand, the isolates showed highest rates of resistance against fluconazole (40.5%) and ketoconazole (40.5%).

Conclusion: The *in vitro* antifungal susceptibility testing of *Candida albicans* in this study showed relatively high resistance to commonly used azoles. Strict infection control measures should be taken to decrease horizontally transferable resistance. Additional periodic screening for resistance in all clinical isolates of *Candida Spp.* must be conducted.

Key words: Antifungal agents, resistance, *Candida albicans*, *Southwest Ethiopia*.

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5. College of Engineering and Technology, Jimma University

1. Experimental Investigation of Fluidization Dynamics and Characteristics of Coffee Husk for Gasification

A.Venkata Ramayya & Balewgize Amare

Abstract

This paper presents results of the experimental investigation of fluidization dynamics and characteristics of coffee husk for gasification. A two-dimensional fluidized bed test set up has been designed, fabricated and used for cold bed experimental measurements and observation of coffee husk with sand as the bed material. Bed pressure drop and local heat transfer measurements have been made in addition to the coffee husk mixing and segregation characteristics. To characterize the void fraction related data, actual density measurements have also been carried out for coffee husk and sand. A narrow particle size distribution from 500 μm to 600 μm with a mean particle size of 550 μm has been employed. Bed height expansion and bubble growth related measurements have been carried out using bed pressure drop as well as video-graphic recording of the entire fluidization regime at different operating velocities. In addition the cyclone performance and pressure drop characteristics have been obtained. Fluidization characteristics of coffee husk are discussed in detail in the full paper vis-à-vis the appropriate bed particle size, attrition, elutriation and entrainment and mixing zones.

Key words: Fluidized bed gasification, Coffee husk, Fluidization dynamics, mixing characteristics

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2. Measurement of Solar Insolation in Jimma with a Customized Low Cost Set Up

Yohannis Mitiku and A.Venkata Ramayya

Abstract

A low cost measurement set up has been conceived and fabricated to facilitate local measurements of global and diffuse solar radiation intensity in Jimma, without the need for solar pyrheliometer and pyranometer.. A non-contact laser thermometer has been used to precisely measure the incident radiation surface measurement as well as the sky temperature. Time dependent thermo-physical properties have been employed while estimating the natural convective heat transfer coefficients. These measurements have been carried out from dusk to dawn to track the variation of solar insolation parameters which would prove to be handy for optimal design of a range solar collectors in Jimma. Comparisons have been made using the predictions from Bird's model with approximated parameters concerning albedo. The uncertainties associated with the measurement are quantified and the utility of these results are discussed. Some of the sample results are indicated here, while the full results will be discussed in detail in the full paper.

Key words: Solar insolation, local measurement, global radiation, diffuse radiation

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3. Up gradation of Gera-Dusta Microhydro Rural Electrification Scheme

Biniyam Abate, Tamene Adugna** and A.Venkata Ramayya**

Abstract

This paper reports the details of the upgradation of Gera-Dusta micro-hydro rural electrification project carried out with Jimma University participation for community development. The existing watermill based power unit has been replaced with locally fabricated Cross-flow turbine along with the erection of a penstock section and installation of a forebay. With joint participation of civil, mechanical and electrical engineering departments in conjunction with rural technology center, all the associated components have been designed after water potential assessment and detailed data collection, subsequently fabricated, tested and the project successfully commissioned. The downstream unit of the Gear-Dusta project has been upgraded to 7.5kW from the original rating of 2kW being generated with the highly inefficient water mill based power unit. The details of this whole project are presented and discussed in detail along with the photographs of various stages of the project.

Key words: Micro-hydro power, Cross flow turbine, Local manufacturing, Water Mill, Rural Electyrification

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4. Compressed and Stabilized Earth Blocks for Affordable Building

Efrem Wakjira

Abstract

This research project explored the possibility of using local soils for making compressed and stabilized earth blocks, CSEB for the construction of affordable buildings. The blocks were made of local soils with block press machine that delivers a high compressive effort. The blocks were made from local soils with cement and lime applied as a stabilizer. The blocks were tested for dimensional stability and compressive strength. The result obtained proved that cement stabilized compressed earth blocks showed stable block dimension during production, curing and use as well as the highest compressive strength than lime stabilized earth blocks. Moreover, the local soil requires modification with addition of river sand in order to make it suitable for cement stabilization.

Key Words: Compressed and Stabilized Earth Blocks (CSEB), Compressive Strength, Dimensional Stability and Stabilization.

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5. Assessment of the Potential and Challenges of Microfinance Institutions to enable the uptake of Household Biogas in the National Biogas Program of Ethiopia

Biruk Tadesse Woldearegay

Abstract

Despite its essentiality in sustaining people's livelihood, modern energy is one of the scarce commodities to rural households. Biogas, a methane rich gas produced by anaerobic fermentation of organic material, is distinct from other renewable energy sources because of its importance in controlling and collecting organic waste materials that, if untreated, could cause severe public health and environmental pollution problems. The earliest biogas digesters in Ethiopia were installed in the 1970s and since then a number of attempts has been made to introduce biogas technology but the wider dissemination has been limited due to different reasons among which lack of financial capacity by rural households takes the upper hand.

This dissertation focuses on the assessment of potential and challenges of Ethiopian Microfinance Institutes (MFIs) to enable the uptake of household biogas in the National Biogas Program (NBP) of Ethiopia. This dissertation met these twin research objectives through an extensive study of relevant literature and the implementation of practical research. The empirical research was carried out through a survey research strategy using semi-structured questionnaire distributed to seven participating MFIs from all the four regional states of the country where the NBP is being implemented.

This research produced a number of key findings: the survey confirmed that Ethiopian MFIs are highly dependent on funds from external sources and they will find it difficult to extend loans for biogas users while satisfying the current financial needs of their clientele; they also lack human resource capacity to participate in the NBP; they exhibited low level application of modern technologies such as MIS as a result of their limited financial capacity; majority of the surveyed MFIs are not aware of biogas technology and its benefits to the society, the environment and the business opportunity for their own organization provided through new loan products; even if there is a lack of proper infrastructure which could result in higher interest rates for rural households to compensate the resulting higher transaction costs, Ethiopian MFIs are not charging rural clients higher interest rates, they rather vary the interest rate based on the lending methodology, the type of loan products and the repayment period which is the same for all rural, semi-urban and urban clients.

The main conclusions drawn from this research were that without building their financial, human resource and institutional capacity, with their current limited capacity Ethiopian MFIs will find it difficult to participate in the NBP; lack of awareness about biogas

technology lead MFIs to think that providing loan for biogas user is a risky business and they put forward a number of pre-requisites and additional guarantee requirement for biogas digesters for the sake of their security; their lack of awareness found out to be a low level problem that could be addressed by continuous training and awareness raising campaigns.

Based on the experience of India, Nepal, China and Bangladesh government role in the early stage of their domestic biogas program, this research has recommended to avail gradually withdrawable fund in a declining basis for the MFIs in order to help them engage in the NBP and build their capacity; another source of fund could be to tap in to the potential of fund from an international NGO; the requirement of an intermediate NGO to address the knowledge gap and facilitate the communication between MFIs and Energy companies is emphasized.

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6. Biomass Gasification for Production of Producer gas using Wood chip, Saw dust, Trash papers and Other Agricultural Wastes

Shewangizaw Werkagegnehu and Kibrom Yemane

Abstract

Renewable energy such as solar, wind, and bio-fuels can play a key role in creating a clean, reliable energy future. The benefits are many and varied, including a cleaner environment. Electricity is often produced by burning fossil fuels such as oil, coal, and natural gas besides hydropower. The combustion of these fuels releases a variety of pollutants into the atmosphere, such as carbon dioxide (CO₂), sulfur dioxide (SO₂), and nitrogen oxides (NO_x), which create acid rain and smog. Carbon dioxide from burning fossil fuels is a significant component of greenhouse gas emissions. These emissions could significantly alter the world's environment and contribute to global warming. Renewable energy, on the other hand, can be a clean energy resource. Using renewables to replace conventional fossil fuels can prevent the release of pollutants into the atmosphere and help combat global warming. For example, using solar energy to supply a million homes with energy would reduce CO₂ emissions by 4.3 million tons per year, the equivalent of removing 850,000 cars from the road. Equally important, renewable energy technologies contribute significantly to local economies, creating jobs and keeping energy expenses in the local economy. This paper will introduce you to renewable fuel technologies which are not petroleum-based, so they're cleaner burning.

Wood charcoal has always been the primary fuel for cooking in Ethiopia because it is cheaper, burns cleanly and easy to find. As the price of kerosene and propane gas tank is higher 90% of homes depend traditionally on charcoal while others exploit wood, thus leaving the country with a little less than 3% of its forest.

Researches made on biomass gasification suggest that many types of agricultural waste, such as peanut and coffee hulls, coconut shells, wood chips, and scrap papers of offices and saw dust can be converted into charcoal after biomass gasification. These means the use of the wood and those agricultural wastes are being doubled in such a way that the gasification process gives the producer gas that can be used as fuel and the byproduct of the gasification process will be further processed in to charcoal briquette.

Generally this work consists of producing syngas or the producer gas by gasification of wood chips and saw dust of Jimma University's wood work shop wastes and scrap papers of each faculty and administrative office of the university which are being burned in the garbage pit as a waste, grass and other agricultural wastes. The producer gas containing carbon monoxide,

hydrogen, methane and some other inert gases mixed with air can be used in burners for cooking and in gasoline or diesel engine with little modifications. So that in this project the manufacturing of two types of biomass gassifiers has been carried out and the test is being conducted for making comparison between the two gassifiers for better result. The two types of gassifiers are stratified type and imbert type.

Furthermore the combination of exploiting local resources for clean energy production, local commitment and use of local labor and improvement of the environment and saved emissions are all factors that improve the general living quality. Like wind, water and solar power, wood should be actively promoted by the government as a renewable resource that can help reduce pollution.

***Key words-** Biomass, Syngas, Renewable energy, Cleaner environment, Gassification, Stratified and Imbert, Exploiting local recourse*

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7. Blood Lead Level and Associated Risk Factors among Garage Workers in Jimma Zone

Yalemsew Adela, Dejene Ayele and Argaw Ambelu

Abstract

Lead is one of the prevalent toxins known in the environment which accumulates in the living physiology especially in human beings with no known importance. It is released from various sources commonly those very near to mankind day to day activities entering into human body via inhalation, ingestion and rarely through dermal penetration. In adults the main sources of lead poisoning are environmental and occupational exposure whereby the later is more dangerous. The aim of this study was to carry out a comparative cross-sectional study on the blood lead level of garage workers around Jimma town and assess the associated risk factors. The study encompassed 45 garage workers and 41 non-garage workers. Among the 45 garage workers, 27 were welder, 15 painter and 3 workers involved in both job categories. These study subjects were selected purposively whereby individuals engaged in either of the labour of divisions and having experiences of five months and above included in the study. The blood lead level was analyzed using flame atomic absorption spectroscopy. The mean blood lead level (BLL) of the garage workers ($19.76 \pm 4.46 \mu\text{g/dl}$) was found to be significantly higher than that of the non-garage workers ($11.16 \pm 3.55 \mu\text{g/dl}$) at $P < 0.001$. Among the garage workers the mean BLL of the painters ($21.12 \pm 5.59 \mu\text{g/dl}$), had shown higher value than that of the welders ($19.19 \pm 4.08 \mu\text{g/dl}$) and those involved in both job categories ($17.98 \pm 4.93 \mu\text{g/dl}$) despite statistically not significant ($P\text{-value} = 0.322$). The study also revealed that, among the identified risk factors smoking habit ($P\text{-value} = 0.002$) and “Khat” chewing at the work place ($P\text{-value} = 0.036$) were found to be significantly associated with high blood lead level of garage workers. Furthermore, age ($r = 0.298$, $P\text{-value} = 0.005$) and service year ($r = 0.333$, $P\text{-value} = 0.025$) of the garage workers had shown a positive correlation with blood lead level. Symptomatically, the garage workers manifested being more prevalent for symptoms of depression, sleep disturbance, wrist drop, tingling and numbness in fingers and hands, nausea and decreased sexual feeling. In conclusion, the outcome of this study has clearly shown that garage workers are significantly affected by lead poisoning as compared to people who are non-garage workers. The blood lead level of the garage workers was also found to be aggravated by the smoking and Khat chewing habits of the workers.

Key words; *Associated risk factors, Blood lead level, Lead poisoning.*

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8. Computational Modeling of Shell-and-Tube Heat Exchanger

Getachew Shunki

Abstract

Heat exchangers are devices used to transfer heat (energy) from one medium to another. Shell-and-Tube heat exchangers are the most commonly and widely used types of heat exchangers in almost every industry. Irrespective of their wide applications shell-and-Tube heat exchangers have complicated geometry and fluid passages, which make their analysis very difficult. To make their analysis easier usually simplifying assumptions are applied.

In this work the heat transfer and fluid flow in a shell-and-Tube heat exchanger has been modeled using computational fluid dynamics software. Finally, the effect of different geometric parameters of the pressure and temperature distribution in the heat exchanger has been studied.

Key words: heat exchanger, modeling, computational fluid dynamics, heat transfer, fluid flow.

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9. Computational Fluid Dynamics Modeling of Turbine Driven Pump

Yohanis Mitiku, Getachew Shunki

Abstract

The current Ethiopian economy is agriculture driven. Irrigation is the best option of improving agricultural production through independency on seasonal rain water (producing more than once a year). The turbine driven pump is a green technology which pumps water using the free energy obtained from the water itself.

In this paper the flow of water in the pump has been modeled using computational fluid dynamics software. The effect of different geometric parameters of the pump on the power generated has been studied.

Key words: turbine driven pump, modeling, computational fluid dynamics, agriculture, irrigation

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10. Design, Fabrication and Testing of Rotary Enjera Baking Machine

Solomon Mulugeta, A. Venkata Ramayya and Balewgize Amare

Abstract

In this project a low cost automated injera baking machine has been designed and manufactured by considering the design and material constraints of the previous works. . The machine has eight commercial electric injera baking stoves supported by a **circular support structure (1)**. The structure rotates at 0.3 rpm obtained by a **gear reduction system (4)**. The batter splashes on the surface of a heated stove in a circular manner by **sliding type pouring system(2)**, at the time of pouring, to avoid relative motion between the pouring system and the stoves **tracking system(3)** is developed. The stove cover is opened and closed by a **cam mechanism (5)** to decrease the number of man power involved in the baking process. Electric power is supplied to the rotating stove though a system called **slip ring (6)** with grounding system. The machine can be operated by a single person only to remove the cooked injera out of the stove. The machine can produce **160** traditionally accepted injera per hour and it can be increased up to **4000** injera by increasing the structure or the number of stoves.

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11. GIS based Accessibility Analysis of Public and Private Health Service Centers in Kirkos Sub-city of Addis Ababa, Ethiopia

Amare Degefaw

Abstract

The study is conducted on Kirkos sub city of Addis Ababa, where there is uncontrolled population growth and lower accessibility to health service centers, upon which the society is found dependent mostly. Besides, a health care system can be called effective once it can be able to maximize proximity. Therefore, this project is designed with the aim to assess the distribution and availability of both public and private health service centers and to simulate new potential locations. To accomplish the objectives of the project primary and secondary sources of data like population density, road, existing health service centers, railway, road, land use, slope and government centers are used. Primary data are obtained using GPS to collect point data and secondary data are obtained from Administrative of Addis Ababa city, tourist guide map and from CSA (Central statistic Authority) Hand Book. All the data has been organized within the GIS environment by creating spatial database (geodatabase) and analysis carried out by setting up parameters for each factors being considered. The relative importance or weight has been assigned using pair-wise comparison method to obtain the relative influence on the analysis. Based on this comparison population was considered as a major influencing factor from all other factors. The result of this project revealed that thirty-five areas get the value of very suitable and have areas ranges from 400 square meters to 354,963 square meters. The minimum area of the suitable polygon fulfills the minimum requirement of the criteria to establish small clinics. The project largely utilizes the ESRI product Arc GIS 9 with Spatial Analyst, 3D Analyst and Geostatistical Analyst Extensions, especially Spatial Analyst, which is capable of querying data to identify locations that meet sets of criteria combining datasets.

Key words: GIS, Geo-database, Spatial Analyst

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12. Design and Manufacturing of Wood Working Machine

Shewangizaw Werkagegnehu and Getachew Shunki

Abstract

Foreign currency is concerned in the growth of our country on top of the other requirements. Currently foreign currency exchange is rising fast and almost all woodworking machines currently in use are imported from abroad incurring some foreign currency exchange. So that there must be some sort of solution towards this problem. Researches made in this area will help for the development of the country and all the community. In this project the design of the machine parts made to identify the safest components dimension and the fabrication of the machines prototype to full size is done. This project tries to demonstrate the design and development of combination wood working machine locally with materials available at local market and in order to manufacture it locally with less cost and at least same capacity as the imported ones. All the components of the machine are found in the local market and can be manufactured in medium scale workshops. The design has no intricate components that are difficult to manufacture. This project is intended to show that by developing the wood working machine here locally and using woods for the purpose of house holed furniture, it is possible to reduce the foreign exchange. In comparison to the imported machine these machine offers maintainability and replacement of parts if any are damaged. The combination machine which is developed through this project has a separate shaft from the planner but in the imported one the shaft and the planner are made from single material so if one fails the whole part will be thrown away. But this is not happening in the combination wood working machine developed by this project, if the shaft or the planner fails only one of them are being replaced. So far the fabrication of combination wood working machine is not performed in our country yet, except few tried to develop the slitter machine. Most of the Ethiopian carpenters use the imported wood working machine which causes high investment cost to import the machine from other countries. But we are concluding from our project that it is possible to manufacture wood working machine in our country with minimum cost and acceptable standard. This machine could minimize considerable losses caused by foreign currency exchange and it can operate at considerably low operating cost.

Key words: *Component dimension, foreign exchange, maintainability and replacement, no intricate components*

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13. Status, Potential and Prospects of Renewable Energy Sources in Jimma Zone: South Western Part of Ethiopia

Abera Melesse and Balewgize Amare

Abstract

Energy is an important element in Ethiopia's development strategy, because it could be a source of foreign exchange and is a catalyst for industrial progress. In order to bring sustainable and equitable development in Ethiopia, the utilization of renewable energy source which can be renewed by nature and whose supply is not affected by the rate of consumption should be promoted.

Though there exist a renewed interest in renewable energy utilization, the country couldn't benefit from its resources. The need to search for renewable, alternate and non polluting sources of energy assumes top priority for self-reliance in the county's energy supply.

The article assesses the available energy that can be obtained from different renewable energy sources, such as wind, geothermal, solar, biomass, hydropower energy and the bottlenecks that inhibit its development. It also presents a detailed overview of the current energy utilization in Jimma zone, south western part of Ethiopia and sub-regions suitable for tapping of these energy sources are mapped which provide a picture of the potential.

Key Words: Energy, Renewable, Sustainable, development.

14. Fabrication of Nanobiosensors for the Detection of Phenolic Compounds

Moses Jeyakumar Rajesh* and Leelavathy Rajesh*

Abstract

Phenolic compounds are important contaminants in medical, food and environmental matrices. They are highly toxic and are widely used in wood preservatives, textiles, herbicides and pesticides, and released into the ground and surface water. Therefore, the identification and quantification of these compounds are of great importance in environment monitoring. In view of their high toxicity, reliable analytical procedures are required for sensitive determination at low level in various matrices. The most usual determination methods of phenolic compounds are colorimetry, gas chromatography, liquid chromatography, capillary electrophoresis and spectrophotometric analysis. These methods involve complex sample pre-treatment procedures and they are unsuitable for on site or field based analyses. They are expensive, time-consuming, need skilled operators, and sometimes require preconcentration and extraction steps that increase the risk of samples loss. A biosensor is a device for the detection of an analyte that combines a biological component with a physicochemical detector component. Biosensors are powerful tools aimed at providing selective identification of toxic chemical compounds at ultra trace levels in industrial products, chemical substances, environmental samples (e.g., air, soil, and water) or biological systems (e.g., bacteria, virus, or tissue components) for biomedical diagnosis. Combining the exquisite specificity of biological recognition probes and the excellent sensitivity of laser-based optical detection, biosensors are capable of detecting and differentiating big/chemical constituents of complex systems in order to provide unambiguous identification and accurate quantification. The soil bacterium *Agrobacterium tumefaciens* causes formation of the neoplastic disease crown gall on many dicotyledonous plants and on some monocots. The infection results from transfer and integration of a piece of DNA (the T-DNA) from the bacterial Ti plasmid into the nucleus of plant cells. Hence the immobilization of this virA protein to a suitable support material may provide us with a biocompatible and efficient biosensor.

Key words: Biosensors, *Agrobacterium tumefaciens* and Phenolic pollutants.

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15. Visualization and Representation of Molecular Structure of Xanthosine Methyltransferase Enzyme from Ethiopian Coffee, Using Bioinformatics Tool

Prakash Chandra Mishra[†] and Subhadarsini Mishra

Abstract

Ethiopian Coffee (*Coffea Arabica*) contains Caffeine (1,3,7-trimethylxanthine) which is its important secondary metabolite. The molecular structure of enzyme Xanthosine Methyltransferase (PDB ID 2EG5) that mediate caffeine biosynthesis have already been elucidated by X-Ray Diffraction. We have used bioinformatics approach to retrieve the protein structural domains and represent these domains for different formats in molecular visualization tool (RasMol). Upon retrieval of the sequences it was revealed that the four domains are identical in amino acid composition and sequence. The DSSP formats of sequences depicted the portions of the sequences forming either helix (Brown coloured), Pleats (Yellow coloured), or loops (Pink coloured). The other six types of formats also explained the 3D structure of the protein contributing to a stable 3D conformation.

Key words: Caffeine, Enzyme, RasMol, Bioinformatics, Domain, Visualization.

2.6. College of Agriculture and Veterinary Medicine, JU

1. Comparative Analysis of Soil Nutrient Balance in the Selected Sites of Gligel Gibe Catchment; Jimma Zone

Abebayehu Aticho^{a}, Eysau Elias^b, J. Diels^c*

Abstract

The purpose of this study was to examine the role of farmers' resource endowment to maintain and improve soil nutrients through via nutrient in and out flow analysis. Soil nutrient depletion is one of the major challenges for sustainable agricultural production. Nutrient balance is one of an indicator for the sustainability of agricultural production system. This study assessed the balance of N, P and K at farm level by analyzing the flow of nutrient in to the system through mineral fertilizer (IN1), manure (IN2), nitrogen fixation (IN3), and wet deposition (IN4) and out of the system by crop product (OUT1), crop residue (OUT2), leaching (OUT3), gaseous loss (OUT4), and erosion (OUT5) with Ntmon (Nutrient monitoring) model. IN1, IN2, OUT1 and OUT2 were measured in the field whilst others hard to measure in the field were estimated by using transfer functions. The study was conducted in two locations (highland and lowland) on nine case study farm. The case study farms were selected on the bases of wealth groups (rich, medium and poor) identification through participatory rural appraisal program. The means of CEC (meq/kg), OC (%), N (%), P(ppm), K(mg/kg) and pH generated from laboratory test of the study farms soils were compared by LSD (0.05) test while nutrient depletion rate between and within wealth groups was compared by Duncan multiple test ($p = 0.05$). Also, t-test correlation analysis was employed to determine the relationship of nutrient depletion and locations. Statistical analysis revealed that, high value of soil parameters were observed in the highland due to differences in soil forming factors and land management. But, it was varied among wealth groups. In both location, none significant ($p = 0.05$) difference was observed for nutrient depletion between wealth groups; strong across wealth groups. Within wealth groups highly significant ($p < 0.01$) differences were observed in both location. Soil nutrient depletion rate was positively correlated ($r = 0.91, 0.88, \text{ and } 0.07$ for N, P and K, respectively) with locations due to difference in mineral fertilizer addition and natural factors such as rainfall amount, soil parent material and landscape. As a result, crop production per unit area was decreasing through the time. Therefore, to increase productivity and ensure sustainable agricultural production, integrated soil nutrient management practice should be adopted.

Keywords: Nutrient flows, Nutrient balance, Wealth groups, Location, Sustainable agriculture

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2. Functional analysis of antagonistic bacteria with activity against *Sclerotium rolfsii*, causal agent of stem rot of groundnut (*Arachis hypogaea* L.)

Daniel T. Lopisso¹, Jos M. Raaijmakers², Le Nhu Cuong² and Rodrigo Mendes²

Abstract

Groundnut is the most economical important food legume which ranks first among the world oil crops in terms of acreage and production. Several biotic and abiotic factors are known to affect the productivity of groundnut among which plant pathogens cause the majority of economic yield losses. *Sclerotium rolfsii* Sacc. is one of the most damaging pathogen which causes stem rot (Southern blight) disease. As it is a soil born pathogen with wide host range characteristics, several management strategies used to control this pathogens were ineffective, costly, or not eco-friendly. However, due to its unique characteristics, use of biological agents (biological control) is a promising strategy especially for controlling soil-born pathogens like *S. rolfsii*. The present study was conducted to investigate the biocontrol activity of antagonistic bacteria against *S. rolfsii* and identify the mechanisms, genes and metabolites involved in the biocontrol activity under laboratory and greenhouse conditions during 2009/10 in Phytopathology Laboratory, Wageningen University, The Netherlands. A total of 16 bacterial strains were evaluated for *in vitro* and *in vivo* antagonistic activity. To further identify the genes involved in biocontrol activity, plasposon inserted mutant derivative strains were analyzed and secondary metabolites responsible for antagonism were also identified. Furthermore, unidentified groundnut indigenous bacterial isolates were grouped based on BOX-PCR analysis and representative isolates were identified to species level by 16S rRNA sequencing. The result showed that *Pseudomonas fluorescens* Pf-5, *P. chlororaphis* PHZ24, *P. sp.* C52 and *P. fluorescens* Q8r1-96 and *Bacillus subtilis* were able to effectively inhibit *in vitro* mycelial growth of *S. rolfsii* H-001. However, these antagonists did not significantly inhibit sclerotial germination. Moreover, RP-HPLC and TLC analysis and *in vitro* studies confirmed that the antagonists were able to produce the secondary metabolites cyclic lipopeptides, Phenazines, 2,4-diacetylphloroglucinol, Pyoluteorin and Pyrrolnitrin and some these compounds were responsible for *in vitro* and *in vivo* antagonism. Studies on molecular characterization of groundnut indigenous bacterial strains (isolated from groundnut rhizosphere in Vietnam) revealed that diverse bacterial species belonging to different phyla (*Chryseobacterium* spp., *Burkholderia cepacia* and *Bacillus subtilis*) inhabit groundnut rhizosphere. However, mechanisms and/or metabolites involved in antagonistic activity of indigenous bacterial isolates are not known and need to be further investigated. Moreover, studies on structural elucidation of metabolites, molecular characterization and biocontrol efficacy of the indigenous bacterial strains under field condition should be the focus of future studies.

Key words: *Pseudomonas*, *Biocontrol*, *antibiotics*, *Sclerotium rolfsii*, *stem rot*, *groundnut*

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3. Prevalence of Honey Bee Nosemosis and Pests in Three Districts of Jimma Zone

Mihreteab Bekele¹, Ayantu Lemmesa², Yilkal Asfaw³

Abstract

A cross sectional epidemiological study was conducted from November 2008 to March 2009 in Jimma Zone of south western Oromia to determine the prevalence of nosemosis and pests. A total of 292 honey bee colonies in 51 apiaries were selected from three districts of the zone and examined for the presence of nosemosis and pests. The prevalence of nosema during the study was 32.2% and 26 % in modern and traditional hives respectively. There was no statistically significant variation in overall prevalence of nosema infestation between modern and traditional during the study period ($P= 0.264$). However, there is statistical significance of nosemosis between the districts in traditional hives ($p<0.002$); and in modern ($p<0.05$). The modern and traditional hives inspection revealed the existence of 4 different types of honey bee pests and **enemies. The total prevalence of pest infestation recorded in traditional hives of the three districts of Jimma zone were 16.8% and the total prevalence of pest infestation recorded in modern hives of the same districts of Jimma zone were 30.8%**. The result indicated that nosemosis and pests are important honeybee diseases with high economic significance that affect the productivity of this sector; hence there is a need for establishing a systematic disease control and prevention methods in these areas.

Key words: Jimma Zone, Nosemosis, Pests, prevalence

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4. Isolation and Identification of *Staphylococcus* Species from Ethiopian Cottage Cheese (Ayib) and Raw Bovine Milk in Debre Zeit, Ethiopia

Mekonnen Addis Tegegne

ABSTRACT

In this study, investigation of the presence of *Staphylococcus* and determination of its prevalence and distribution, identification of *Staphylococcus* species and determination of their prevalence and distribution and characterization of the isolates in order to determine their ability in synthesizing coagulase, from Ethiopian cottage cheese (*ayib*) and raw bovine milk samples were conducted from October 2008 to April 2009 in Debre Zeit. Cottage cheese (200), buckets milk of farms (100) and tanks milk of milk collection centers (100) were analyzed. The identification results showed 24%, 33% and 46% prevalence of *Staphylococcus* in cottage cheese, buckets milk and tanks milk, respectively with an overall prevalence of 31.8% (127/400) in the examined foods. The 127 staphylococci isolates were finally identified by their biochemical characteristics for species assignment. They were divided into 4 groups: the first comprised the species *S. aureus* with a total of 28 (7%) isolates the second and third were represented respectively by the species *S. intermedius*, with 28 (7%) isolates and *S. hycius* with 20 (5%) isolates; the last contained 51 (12.8 %) isolates that were found to be coagulase negative staphylococci (CNS). Comparing the proportion of each *Staphylococcus* species isolated to the total number isolates (127) in the current study, CNS was the dominant (40%) followed by *S. aureus* and *S. intermidius* (22%) each and *S. hicus* (16%). The 48 isolates proved to be *Staphylococcus* from cottage cheese samples were tested for species assignment. They were grouped into *S. aureus* with 10 (5%) isolates, *S. intermedius* with 11 (5.5%) isolates, *S. hycius* with 8 (4%) isolates and CNS with 19 (9.5 %) isolates. Comparison of the prevalence of *Staphylococcus* in raw bulk milk samples showed a relatively higher prevalence in tanks milk (46%) than buckets milk (33%). However, this difference was not statistically significant ($p>0.05$). The 33 isolates identified as staphylococci from samples of buckets milk were tested for species assignment. They were grouped into *S. aureus* with 8 (8%) isolates, *S. intermedius* with 6 (6%) isolates, *S. hycius* with 6 (6%) isolates and CNS with 13 (13%) isolates. The 46 isolates identified as staphylococci from samples of tanks milk were tested for species assignment. They were grouped into *S. aureus* with 10 (10%) isolates, *S. intermedius* with 11 (11%) isolates, *S. hycius* with 6 (6%) isolates and CNS with 19 (19%) isolates. There was no significant difference ($p>0.05$) among these proportion of isolates in both buckets and tanks milk. All the isolates were tested for the production of coagulase to determine their pathogenicity. The prevalence of coagulase positive staphylococci (CPS) in the study were found to be 14.5%, 20% and 27% in cottage cheese, buckets milk and tanks milk, respectively with an overall prevalence of 19% (76/400). The CPS isolated in the present study comprises 60% (76/127) of the total *Staphylococcus* isolates. Comparison of the prevalence of CPS in the raw milk samples collected from two critical points showed a relatively

higher CPS prevalence in tanks milk than buckets milk. However, this difference was not statistically significant ($p>0.05$). The high level of *Staphylococcus* isolate found in the cottage cheese and raw milk samples in the present study represent a poor keeping quality and public health risk to the consumer. This suggests the need to implement strict hygienic control measures along the food chain to improve the hygienic conditions during manufacturing, handling, storage and commercialization of cheese and milk in order to guarantee the quality of these highly popular products in Debre Zeit in order to decrease the risk of staphylococcal food poisoning.

Key words: Buckets milk, Cottage cheese, Debre Zeit, Prevalence, *Staphylococcus*, Tanks milk

5. Honey Market Chain Analysis: The Case of Burie Woreda, West Gojjam Zone, Amhara National Regional State

Getachew Nigussie

ABSTRACT

This research thesis examines marketing chain of honey in Burie woreda, West Gojjam Zone, Amhara National Regional State. The thesis report attempts to identify marketing channels, and the role and linkages of marketing agents, analyze the costs and margins for marketing channels and identifying factors that affect the amount of honey supplied to the market in the study area. Burie woreda is one of the potential honey producing areas from West Gojjam Zone. The total honey production of the woreda in 2007/8 was estimated to be 146 tons and this particular study revealed that about 135 tons of the produce which account 92% in 2007/8 was supplied to the market. Structure, conduct and performance model was used to analyze marketing channels and the role and linkages of marketing agents. About 17 major marketing channels were identified in this study. Woreda wholesalers and cooperatives purchased about 34.5 and 23.43% of beekeepers production respectively. The findings of this study suggests that Addis Ababa wholesalers handled large amount of honey purchased and the Concentration Ratio index also confirms that 92.3% of purchased honey was handled by four large wholesale traders at Addis Ababa. Analysis of marketing costs and margins were also used to investigate honey market performance and accordingly this study indicates that high transaction costs and marketing margin were found in the channels starting from rural markets and ending in Addis Ababa markets where multiple actors are involved between the producers and the consumers. Heckman two stage model results indicate that; income from farm and nonfarm activity, beekeeping experience, beekeeping training, apiary visit and access to improved beekeeping equipments were the variables that affect positively the amount of honey supplied to the market by beekeepers in the study area.

6. Pollen Viability and Fruit Set of Tomato Introgression Lines (*Lycopersicon Esculentum* X) *L.Chmielewskii* as Affected by Moderately High Temperature Regimes

Kassaye Tolessa^{1*}, Ep Heuvelink² and Sjaak Van Heusden³

Abstract

Tomato (Lycopersicon esculentum Mill.) is one of the most important, widely grown and consumed vegetable crops next to potato in the world. However, the rise of global temperature now a days is becoming the most important problems in all crops including tomato productivity. Thus, breeding for high temperature tolerance is better option to overcome such problems. This study was conducted to identify moderately high temperature tolerant tomato genotypes developed from L. esculentum (Moneyberg) x L. chmielewskii (La 1840) cross and to elucidate physiological and possibly genetic background of such possible tolerance. To accomplish this, 58 tomato genotypes were subjected to two moderately high temperature regimes, 28/22 °C and 25/19 °C (day/night) one after the other on the same plants in multi-span Venlo-type greenhouse. The experiment was arranged in Randomized Complete Block Design with three replications on rock wool slab. The result showed significant interaction effects between genotype and temperature for pollen germination and fruit set percentage. Fruit set percentage was affected at moderately high temperature regimes in genotypic dependent way. Genotype 1, 5, 7, 12, 14, 16, 17, 44 and 56 performed well in their fruit set at both temperature regimes where as fruit set on genotype 6, 23, 46, 48, 51, 60 and 61 was severely affected especially at 28/22°C. Genotypes which have had higher fruit set percentage also showed higher pollen germination percentage. This indicated that the reduction in fruit set percentage of the genotypes could be explained by poor pollen germination at moderately high temperature stress. Genotype 56, introgression on chromosome 10+11, was the leading genotype in all parameters considered in this study. This genotype and those performed well can be used under moderately high temperature regimes for production. But, it is important to investigate the links between the phenotype and introgression position to find out genes responsible for the enhanced high temperature tolerance.

Key words: tomato, pollen viability, fruit set, temperature

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7. Assessment of Farmers' Perception on the Current Artificial Insemination Delivery System in Ethiopia: a Case of Adami Tullu District

Tatek Woldu⁵, Yosef T/Giorgis² and Aynalem Haile³

Abstract

This case study was conducted in urban and rural areas of Adami Tullu district with objectives of documenting experiences of farmers in using AI service, identify pertinent constraints and suggest options for improving the efficiency of AI delivery system. Results are based on diagnostic survey of 80 sample households and focus group discussions. It was found that majority of the farmers did not get a reliable and consistent AI service due to shortage of AI technician in the study area (71.4%), shortage of input (68%) and communication problem (8.6 %). Farmers also complained for the birth of high proportion of male calves as a result of using AI. Repeated insemination was another constraint raised and it was found out that average number of service per conception was high (2.85). The level of awareness on the major symptoms of heat among farmers was encouraging; however the most accurate signs of heat are less known by farmers. To solve the critical shortage of AI technicians in the study area it is recommended to implement community based AI delivery system. In addition, looking for options of introducing semen sexing technology is suggested to cater for the higher demand created for female calves in Ethiopia.

Key words: *Artificial insemination; urban; rural; service per conception; heat detection*

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8. Utilization of Starch from Selected Crops as a Partial Substitute for Barley Malt in Brewing Technology

Habtamu Admassu, Adamu Zegeye and Amare Gessesse

Abstract

Brewing process generally involves the steps of malting, mashing and fermentation. The main purpose of malting is the development of amylolytic enzymes in the grain with simultaneous degradation of high molecular substances in the cell walls enabling the achievement of a distinctive character. Barley malt is the principal ingredient in the manufacturing of beer and has traditionally been the grain of choice in the brewing industry. However, it is not always economically feasible to brew with 100% malted barley, and today's breweries are forced to minimize their costs without changing the quality or the character of their beer. Therefore, the present study was initiated to utilize Maize, Potato and Enset starch as a partial substitute for barley malt and to evaluate some physico-chemical quality attributes of the beer. All the experiments were conducted at Addis Ababa University's laboratories (Science Faculty) and Meta Abo Brewery. The quality parameters of the starch (composition and degradability) were tested. The beer underwent four series of experiments in triplicate involving the starch from the three crops (10%, 20% and 30% starch substitute from each) with full barley malt serving as a control. The major attributes of the beer (alcohol content & flavor) were evaluated for each of the 10%, 20% and 30% substitutes from the three crops with reference to the control beer. Accordingly, the collected data were subjected to statistical analysis using SPSS software with emphasis on alcohol content and sensory attributes (flavor). The results showed that 30% substitution of barley malt with Maize and Enset starch is promising in the beer production. Beer produced using these two crops showed no statistically significant difference from the control barley malt beer ($p \leq 0.05$). The present study indicated that it is possible to partially substitute full barley malt up to 30% as it is feasible in many ways. Based on the findings, a production technology involving maize starch as a partial substitute for barley-malt has been suggested.

Key words: *Barley; Beer; Partial Substitution; Starch*

9. Study on the Way of Making Plain Wax Foundation Sheet and its Effect on Honey Yield

Kebede Debele

Abstract

On the objective of making plain wax foundation sheet and its effect on honey yield, the plain wax foundation sheet was made by wood and the effect of this foundation sheet on honey yield was tested. The plain wax foundation sheet was given to the colonies and the colonies were able to construct cells on the plain wax foundation sheet i.e. the combs were completely drawn out. This showed that the honeybees could easily accept the plain wax foundation sheet as that of embossed wax foundation sheet. Honey was harvested from the colonies provided with plain wax foundation sheet and compared with honey harvested from colonies provided with embossed wax foundation sheet and showed no significance difference ($P>0.05$). The cell depth was measured and compared with that of cell depth and showed no significance difference ($p< 0.05$). The cost incurred to buy the casting mold that is used to prepare embossed foundation is about 3000-4000 Eth birr whereas the mold to prepare plain foundation sheet could be made with locally available materials that costs less than 80 Eth.birr. The amount money spent to prepare one frame of plain and embossed wax foundation sheet were calculated and it was found to be 30 cents and 80 cents respectively. In addition with one kilogram of pure beeswax only 8-9 embossed wax foundation sheets can be made whereas this amount of beeswax, 10-12 plain wax foundation sheets can be prepared. Since the honey bees can easily accept plain wax foundation and the honey yield are not significantly different from that of embossed wax foundation sheet ($p>0.05$), a beekeeper could make the plain wax foundation sheet with local available materials such as from piece of wood or plywood and could easily alleviate the problem of casting mold.

**10. Determinants in Adoption of Rainwater Harvesting Technology to
Combat the Ever-changing Climate Variability in Lanfuro Woreda,
Southern Region, Ethiopia**

Aziz Shikur

ABSTRACT

Under the current crop farming system, an adequate) volume of food grain could be grown, when the rainfall distribution is fairly even. The grim reality, however, is that the magnitude of rainfall variations in Ethiopia has been scaling up through time. To resolve this problem the Ministry of Agriculture and some nongovernmental organizations have promoted RWH structures, most commonly trapezoidal type RWH. The major concern of this study was, therefore, to identify socio-economic, physical, psychological and institutional constraints & opportunities that could determine the adoption of RWH technology with a special emphasis to trapezoidal rain water harvesting structures. The study was conducted in Lanfuro Wereda, Silte Zone of South Nations Nationalities and People's Regional State. Likert scale was employed to measure the attitude of farmers towards RWHT. An econometric model, binary logit model, was employed for determinants in adoption of RWH technology. A sum of explanatory variables for the binary logit model was used out of which some variables were found significant to affect the adoption of RWH technology. These are labour availability in man equivalent, indigenous water harvesting experience of the household, distance of market from residence, sex of the household head farm size of the household head, total tropical livestock unit owned, off-farm income of the household head, training in areas of RWH, perception of farmers towards security of land ownership and extension service in areas of RWH. Any effort in promoting RWH practice, however, should consider the social, economic, institutional, physical and technological characteristics for better adoption of the same.

11. Screening *Arabidopsis thaliana* T-DNA Mutants for Resistance towards *Verticillium dahliae*

Mulatu W. Jalata*, Koste A. Yadeta** and Bart P.H.J. Thomma**

Abstract

To investigate for sources of resistance towards *Verticillium* wilt disease, *Arabidopsis*, a model plant, has been used to search for genes involved in the enhanced *Verticillium* resistance which could eventually be used for resistance breeding in tomato. In order to determine genes responsible for the enhanced resistance in these mutants, T-DNA knock-out lines for the genes located in the vicinity of the activation tag insertion site were ordered from NASC, UK. Thus, the objectives of this project were to screen T-DNA knock-out *Arabidopsis* lines (mutants) for resistance towards *V. dahliae* and to determine the position of activation tag insertion site for these two mutants, A3 and A4. About 16 *Arabidopsis* T-DNA mutants were screened for resistance towards *V. dahliae* strain JR2 under greenhouse conditions at Unifarm, Wageningen University, The Netherlands. As an indicator of *Verticillium* disease severity, parameters such as measuring plant height, percentage of diseased leaves, and quantification of *Verticillium* biomass were taken and analyzed. From these screening, mutants M880, M884, P37, P80, M050 and M070 found to be susceptible to *V. dahliae*. This suggests that most likely, the corresponding genes of these mutants could be responsible for the enhanced resistance of the respective activation tagged mutants. On the other hand, P05/3, P45-2, and P60 were as susceptible as the wild type (Columbia-0), which might indicate the role of these genes in *Verticillium* resistance is unlikely. For the other mutants, it needs to be repeated to draw a reliable conclusion. Among the parameters analyzed, plant height is not a good indicator of stunting as none of the T-DNA mutants showed difference when compared to Columbia-0.

Keywords: Activation tagging, *Arabidopsis thaliana*, T-DNA mutants, *Verticillium* spp.

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