

BRIEF CURRICULUM VITAE

Name : Shellemiah Okoth Keya
Date of Birth : 22nd September, 1941
Nationality : Kenyan
Marital Status : Married with five children
Languages Spoken: English, Swahili, Luo
Profession : Soil Science
Current Positions : Professor: LARMAT University of Nairobi
& Chancellor Dedan Kimathi University of Technology, Kenya
Current Address : P. O. Box 2037800100, Nairobi, Kenya
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EDUCATIONAL BACKGROUND

B. Sc. (Agric), Makerere, M.Sc. & Ph.D. Cornell.

DISTINGUISHED AWARDS

Nine academic Prizes, Scholastic and Distinguished Awards, both locally and internationally, e.g. African Academy of Sciences/Ciba-Geigy Gold Medal & Soka Gakkai Awards of Highest Honour consisting of Gold Medal. University of Nairobi Staff Merit Award for outstanding contribution towards the University's Mission.

TEACHING EXPERIENCE

Conducted undergraduate and postgraduate courses including supervision of postgraduate students at Makerere, Nairobi and Moi Universities (1970 – 1995)

APPOINTMENTS AND RESPONSIBILITIES HELD

1. Director of Microbiological Resource Center (MIRCEN) 1976 - 1978
2. Chairman, Department of Soil Science, University of Nairobi, 1976 - 1988)
3. Dean, Faculty of Agriculture, University of Nairobi, 1984 - 1988
4. Principal, College of Agriculture & Veterinary Sciences, University of Nairobi,
5. External Examiner for five different Universities in Africa
6. Vice-Chancellor, Moi University, 1988 - 1994.
7. Executive Secretary, Technical Advisory Committee, CGIAR, FAO – Rome 1996 - 2000
8. Executive Secretary, Interim Science Council of CGIAR, FAO –Rome 2001 - 2003.
9. Assistant Director General, Research & Development-Africa Rice Center (WARDA) 2004-2007
10. Advisor to the Director General Africa Rice Center (WARDA) 2008- Jan 2009
11. Chairman of Council, Technical University College, Mombasa 2011 -2012
12. Chancellor, Dedan Kimathi University of Technology 2012 to Date

BOARDS AND COMMITTEES

Chairman: Kenya Forestry Research Institute (KEFRI) Board; Moi University Senate and its Committees; Board of Directors, KARI; African Centre for Technology Studies (ACTS). Member: ICIPE Governing Council, Tribunal of the Kenyan Industrial Property Organization. Served on various organizations as chairman

and or board member. Attended a number of International Conferences and travelled widely in all the five continents on scientific and professional endeavours.

SCIENTIFIC MEMBERSHIP

Member of ten (10) scientific societies and academies.

CONSULTANCY

Consultant for local and international bodies such as FAO, UNEP and UNESCO, World Bank, Kenya Sugar Authority on Review of National Sugar Research Programme. FAO/Ministry of Environment & Natural Resources on Lake Victoria Environmental Management Programme, Ministry of Agriculture & Livestock Development, Alliance for Green Revolution, Africa Harvest Biotechnology International, African Agricultural Technology Foundation, Kenya Agricultural Research Institute.

RESEARCH ACTIVITIES

Conducted and participated in thirteen (15) research projects funded by both local and international organizations, with a bias on Biological Nitrogen Fixation in Legume rhizobia symbiosis. Developed legume inoculants production in Kenya and promoted usage of legume inoculants in Eastern Africa. Soil health, Agricultural development and Environment.

PUBLICATIONS

Contributions include over fifty (50) scientific journals and proceedings. Co-authored ten (15) books/monographs. Delivered thirty (30) conference papers and prepared Over sixty (60) scientific reports.

Signed

Shellemiah O. Keya

Date

CURRICULUM VITAE

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Profession : Soil Science
Current Position : Professor: LARMAT, University of Nairobi, Kenya
Current Address : Central Close, Thome Estate
P.O. Box 20378 00 100, Nairobi, Kenya
Telephone 254 728 607673
Email: shelleemiahkeya@yahoo.com,

EDUCATIONAL BACKGROUND

<i>Schools/Universities attended</i>	<i>Year</i>	<i>Certificates</i>
Wang'apala Primary School, Kenya	1954-1958	K.A.P.E.
Kisii High School, Kenya	1959-1962	C.S.C.
Kakamega High School, Kenya	1963-1964	H.S.C.
Makerere University, Uganda	1965-1968	B.Sc. (Agric.) Hons
Cornell University, USA	1968-1970	M.Sc. (Soil Science)
Cornell University, USA	1972-1974	Ph.D. (Soil Science)

Postgraduate specialization: Major : Soil Science
Minors: Microbiology and Crop Sciences

ACADEMIC PRIZES, SCHOLASTIC AND DISTINGUISHED AWARDS

1967	Uganda Company Exhibition Prize; best 2 nd Year B.Sc. Agriculture Student	
1968	Muljibhai-Madhvani Prize; best graduating B.Sc. Agriculture Student	
1968-70	Recipient of U.S.A.I.D. Scholarship	
1972-74	Recipient of Rockefeller Foundation Fellowship	
1979	Elected Member of the International Cell Research Organization	
1980	Autobiography featured in WHOS'S WHO IN THE WORLD, 5 th Ed.	
1986	Fellow of Kenya National Academy of Sciences	
1991	The African Academy of Sciences (AAS) Ciba-Geigy Prize for Agricultural Biosciences,	Gold medal, Citation and Cash award
1992	Soka University, Japan, Award of the highest honour consisting of a gold	medal and certificate
1993	Elected Fellow of the International Institute of Biotechnology	
2001	University of Nairobi – Staff Merit Award – in recognition of outstanding	contribution towards the University's mission

A. TEACHING EXPERIENCE

1. **Research Assistant**, March - September, 1968, Department of Soil Science, Makerere University, Uganda
2. **Tutorial Fellow**, June 1970 - July, 1972, Department of Soil Science, Makerere University. Taught courses in Soil Fertility (AC. 301) and Soil Microbiology (AC. 202)
3. **Lecturer**, 1974 - 1976, University of Nairobi, Kenya

4. Undergraduate and Postgraduate courses taught since 1971: Soil Fertility, Soil Microbiology, General Soil Science, Soil Biology and Biochemistry, Introduction to Agriculture, Microbial Ecology. Supervised more than 20 M.Sc. and five Ph.D. students
5. **Senior Lecturer**, 1976 - 1983, University of Nairobi, Kenya
6. **Part-time Lecturer**, 1985 - 1986, Moi University, Eldoret, Kenya
7. **Professor of Soil Science**, 1983 - 1988, University of Nairobi, Kenya
8. **Professor of Soil Science**, July 1994 - March 1996, Faculty of Agriculture, University of Nairobi, Kenya
9. Professor of Soil Science, University of Nairobi, Kenya Sep 2009 to date

B. ADMINISTRATIVE EXPERIENCE

1. 1970 and 1971 at Makerere University, Uganda, organised field trips to various parts of Uganda and Kenya for agriculture students
2. **Resident Tutor**, Livingstone Hall, assisted the warden in hall administration of 400 students. Makerere University, Uganda, 1970 - 1972
3. **Chairman**, Department of Soil Science, University of Nairobi, Kenya, 1976 - 1986
4. **Director**, Microbiological Resources Centre (MIRCEN) Nairobi, Kenya, 1977 - 1988
5. **Dean**, Faculty of Agriculture, College of Agriculture and Veterinary Sciences, University of Nairobi, Kenya, March 1984 - 1988
6. **Principal**, College of Agriculture and Veterinary Sciences, University of Nairobi, Kenya, April - June, 1988
7. **Vice-Chancellor**, Moi University, Eldoret, Kenya, July 1988 - June 1994
8. **Executive Secretary**, Technical Advisory Committee of the Consultative Group on International Agricultural Research (CGIAR), 1996 - 2000
9. **Executive Secretary**, interim Science Council of the CGIAR, 2001 – 2003
10. Director of Research, West African Rice Research Association (WARDA) 2004 2006
11. Assistant Director General Africa Rice Centre 2007
12. Advisor to the Director General Africa Rice Centre 2008-2009

C. EXTENSION EXPERIENCE

March - June, 1966 and 1967, during the long vacations, worked under District Agricultural Officer, Ministry of Agriculture, in Kisii and South Nyanza Districts, Kenya.

D. OTHER RESPONSIBILITIES

1. Undertaken two book reviews
2. Referral editor, East African Agricultural and Forestry Journal 1977 - 1988
3. Examiner for the East African Examination Council 1970 - 1976
4. External Examiner, Ministry of Education, Kenya 1975 - 1980

5. External Examiner, Egerton College, Njoro, Kenya 1976 - 1978
6. External Examiner, University of Dar-es-Salaam, Tanzania 1978
7. External Examiner, Makerere University, Kampala, Uganda 1980 - 1983
8. Moderator/Panel, Kenya National Examinations Council 1981 – 1987

E. BOARDS AND COMMITTEES

1. Member of Faculty Board of Agriculture and University of Nairobi Committees including Senate, 1974 - 1987
2. Freedom from Hunger (Council for National Development), 1976 - 1980
3. Specialist Committee for Soil Fertility and Plant Nutrition (East African Agricultural and Forestry Research Organization), 1975 - 1976
4. Alternate Member of UNESCO/ICRO Microbiology Panel, 1978 - 1983
5. Chairman, Kenya Bureau of Standards, Cereals and Pulses Technical Committee, 1975 - 1980
6. Chairman, Field Station Advisory Committee, University of Nairobi, 1975 - 1985
7. Member of Ministry of Agriculture, Kenya Soil Science Research Advisory Committees and Pasture Research Advisory Committee, 1979 - 1984
8. Chaired the Third Review Mission of Kenya Soil Survey, 1977 – 1980
9. Chairman, Faculty of Agriculture Environmental Studies Committee, University of Nairobi, 1979 - 1982
10. Member of International Institute of Tropical Agriculture (IITA) Nitrogen Fixation Advisory Committee, 1979 - 1982
11. Chairman, Kenya Agricultural Teachers Association, 1979 - 1982
12. Member of Committee on Natural Sciences, Kenya National Commission for UNESCO, 1983 - 1986
13. Member of Board of Governors, Moi Institute of Technology, Kenya, 1986 -1990
14. Member of Board of Governors, Ringa Secondary School, 1990 - 1995
15. National Co-ordinator, Kenya - East African Technology Policy Studies, 1985 - 1988
16. Member, Governing Council, Kenya National Academy for the Advancement of Arts and Science, 1981 - 1985
17. Chairman, African Association for Biological Nitrogen Fixation, July 1986 - 1988
18. Member of WHO/FAO/UNEP Panel of Experts on Environmental Management for Vector Control (PEEM), elected 1986 - 1989
19. Member of Editorial Committee of MIRCEN, *Journal of applied Microbiology and Biotechnology*, Oxford University Press, 1983 - 1988
20. Member of Board of Governors for Jomo Kenyatta College of Agriculture and Technology, July 1985 - 1988
21. Board Member, Coffee Research Foundation, Kenya, May 1985 - 1988
22. Member, Bioscience Subcommittee, Kenya National Academy of Sciences, 1985 - 1988
23. Member, Editorial Committee East African Forestry and Agricultural Journal, 1983 - 1988
24. Member, Tea Research Institute, Kenya: Advisory Committee, 1987 - 1989

25. Board Member, Kenya Agricultural Research Institute, 1986 - 1995
26. Member, University of Nairobi Council, 1986 - 1988
27. Member, National Council for Science and Technology - Agricultural Sciences, 1986 - 1989
28. Fellow of Kenya National Academy of Sciences - elected 1986
29. Chairman, Bioscience Sub-committee of the Kenya National Academy of Sciences, 1987 - 1989
30. Organised more than four international short training courses and two international workshops, 1976 - 1988
31. Chairman, Senate, Moi University, 1988 - 1994
32. Member, Moi University Council, 1988 - 1994
33. Member, Commission for Higher Education, Kenya, 1988 - 1994
34. Member, Board of Governors, Moi Teachers College, 1988 - 1990
35. As the Vice Chancellor of the University, Kenya, responsible for chairing various Senate and Council Sub-Committees, 1988 - 1994
36. Director, African Centre for Technology Studies, Nairobi, Kenya, 1988 - 1993
37. Chairman, Kenya Forestry Research Institute (KEFRI), 1991 - 1996
38. Member of UNESCO Biotechnology Action Council, Paris, 1995 - 1996
39. Member of Governing Council of the International Centre for Insect Physiology and Ecology, 1993 - 1996
40. Member of the Tribunal, Kenya Industrial Property Organization, 1990 – 1996
41. Member of University Council, University of Eastern Africa Baraton, 1992-1995
42. Member of Policy and Planning Advisory Board at FAO by virtue of office, 1996-2003

F. APPOINTMENTS

Chancellor, Dedan Kimathi University of Technology 2012 to date

Chairman of Council Technical University College of Mombasa 2011-2012

Adviser to Director General, Africa Rice Centre (WARDA), 2008

Assistant Director General-Research and Development, WARDA, 2005-2007

Director of Research, Africa Rice Center (WARDA), 2004-2005

Executive Secretary, Interim Science Council of CGIAR, 2001-2003

Executive Secretary, TAC of CGIAR, 1996 – 2000

Vice Chancellor, Moi University, Eldoret, Kenya, 1988 -1994

Principal, College of Agriculture and Veterinary Science, University of Nairobi, Kenya, 1988

Professor of Soil Science, University of Nairobi, 1983 - 1988/1994 – 1996; 2009 to date

Senior Lecturer, University of Nairobi, 1976 – 1983

Director Microbiological Resources Centre-Eastern Africa, University of Nairobi, 1977-1988

Chairman Department of Soil Science, University of Nairobi, 1976 – 1986

Lecturer, University of Nairobi, 1974 – 1976

Tutorial Fellow, Makerere University, Uganda, 1970 – 1974

Research Assistant, Makerere University, Uganda, March - September 1968

Teacher/Headmaster, President Kennedy High School, Nairobi, March - June 1965

Clerk, Standard Bank, Nairobi, January - February 1965

G. OTHER PROFESSIONAL EXPERIENCE

Has attended a number of international conferences and travelled widely on all continents on scientific and professional endeavours.

H. SCIENTIFIC MEMBERSHIP

1. International Soil Science Society
2. Kenya Agricultural Teachers Association
3. American Society of Agronomy, Soil Science Society and Crop Science Society of America, 1970 - 1980
4. Kenya National Academy of Sciences
5. Soil Science Society of East Africa
6. Society for International Development
7. Agricultural Society of Kenya
8. Association for the Advancement of Agricultural Science in Africa
9. International Soil Science Society, 1983 – 1989

I. CONSULTANCY

1. 1974, Consultant Lecturer to UNESCO Regional Training Course in Tropical Ecology held in Nairobi, Kenya, August - October 1974
2. 1995 - 1977, 1984, Consultant to FAO of the United Nations on Biological Nitrogen Fixation in Ethiopia, Sudan, Zambia, Malawi and Kenya
3. 1980, National Council for Science and Technology Kenya. Co-ordinator of the Coast Agriculture Study Group
4. Consultant to UNEP on World Soils Policy, 1983
5. Consultant to Kenya Sugar Authority on the Review of National Sugar Research Programme, 1995
6. Consultant to UNEP on Microbiology; its Application on Global Environment Management, 1984
7. International consultant to African Academy of Science on Biotechnology - Soil and Water Issues in Africa, 1986
8. Regional consultant to Ministry of Environment and Natural Resources, Kenya and FAO on Lake Victoria. Environmental Management Programme on Land Use and Non-point Source of Pollutants, 1995
9. Consultant to Agricultural Sector Coordination Unit (ASCU), Ministry of Agriculture and Livestock Development on the Formulation of National Agricultural Research Policy for Kenya 2009-2011
10. Consultant to Africa Harvest Biotechnology International 2009-2010
11. Consultant to the World Bank Kenya Office on Kenya Agricultural Productivity and Agribusiness Project 2011-2014
12. Consultant to Kenya Agricultural Research Institute on external review 2013

13. Consultant to Alliance for Green Revolution (AGRA) on Curriculum Review in Soil Science covering seven universities in Africa. 2012
14. Consultant and Member of second Review Panel for African Agricultural Technology Foundation 2014

J. MAJOR RESEARCH GRANTS/PROJECTS UNDERTAKEN

<i>Title</i>	<i>Sponsor/Amount (US\$)</i>	<i>Duration</i>
1. Nodulation and nitrogen fixation by beans	Deans Committee University of Nairobi 4,000	1974-1978
2. MIRCEN projects and related activities	UNEP/UNESCO 850,000	1977-1988
3. Production/promotion of legume inoculants and Technology, Kenya	National Council for Science 20,000	1980-1983
4. Response of soya beans to inoculation	IITA 2,000	1979-1980
5. Response of cowpeas to inoculation	IITA 1,000	1982
6. Determination of N ₂ fixation by ¹⁵ N	FAO/IAE 17,500	1980-1986
7. Fast growing Nitrogen fixing Trees, co-investigator	National Academy of Science (USA)/BOSTID 8,000	1983-1988
8. Environmental factors affecting N ₂ fixation of beans in Kenya	NAS/BOSTID 167,000	1983
9. Dissemination of technology	IDRC 45,000	1982-1987
10. Nitrogen and Phosphorous balance in soils	International Fertilizer Development (IFDC) 12,000	1983-1985
11. Field application of microbial Tech nologies for biological nitrogen fixation and microbial insecticides	UNEP 100,000	1985-1986
12. Quality control of legume inoculants	ICRO 6,000	1985-86-87
13. Production and dissemination of legume inoculants	FAO 250,000	1978-1988
14. Ending Hunger in the Horn of Africa, PI	FAO 100,000.00	2017

K. RESEARCH INTERESTS

Biological Nitrogen Fixation (BNF) in legume rhizobia symbiosis covering pasture, trees and grain legumes, particularly cowpeas, *Phaseolus* beans and soya beans. Culture collection of rhizobia associated with these legumes in Kenya. Effects of Nitrogen, phosphorus, trace elements and nodulation of legumes. Production of legume inoculants, their usage and extension. Technology policy studies on BNF and socioeconomic aspects of bio fertilizer use. Science Policy, Food security, Agricultural development, Agricultural education, Higher education in Africa, Mentorship of academic staff and university students, curriculum review, programme and management review of research.

L. ACHIEVEMENT IN RESEARCH AND DEVELOPMENT

Development of legume inoculants process in Kenya, improvement, promotion and usage of legume inoculants in Kenya.

M. PUBLICATIONS

1. Thesis

1. Keya, S.O. (1970). Factors Affecting *Rhizobium-legume* Specificity in *Rhizobium trifolii*, M. Sc. Thesis, Cornell University, Ithaca, New York.
2. Keya, S.O. (1974) Effect of parasitic *Bdellovibrio* and predatory protozoa on survival of cowpea *Rhizobia* in culture and laboratory soil, PhD Thesis, Cornell University, Ithaca, New York.
3. Keya, S.O. (1974). Effects of Parasitic *Bdellovibrio* and Predatory Protozoa on Survival of Cowpea *Rhizobium* in Culture and Laboratory Soil, Ph.D. thesis, Cornell University. In *Dissertation Abstract International* Vol. 25/5.7, pp. 3136-8.

2. Scientific Journals and Proceedings

4. **Keya, S.O.** and Alexander, M. (1975). Factors Affecting Growth of *Bdellovibrio* on *Rhizobium* Arch. *Microbiol.* 103, 37-43.
5. **Keya, S.O.** and Alexander, M. (1975). Regulations of Parasitism by Host Density: The *Bdellovibrio Rhizobium* Interrelationship. *Soil Bio. and Biochem.* 7, 213-237.
6. Danso, S.K.A., **Keya, S.O.** and Alexander, M. (1975). Protozoa and the Decline of *Rhizobium* Populations added to Soil. *Can. J Microbiol.* 21, 884-895.
7. **Keya, S.O.** (1975). Nodulation and Nitrogen Fixation in Legumes in East Africa. In *Biological Nitrogen Fixation in Farming Systems of the Humid Tropics*. Ayanaba, A. and Dart, P.J. (eds.) John Wiley and Sons. Chichester, pp. 233-243.
8. **Keya, S.O.** (1977). Ecological Aspects of Feeding of *Bdellovibrio* on Cowpea *Rhizobium*. *East Africa Agric. For. J.* 42, 3 97-407.
9. **Keya, S.O.**, (1977). Soil Management with Respect to Liming, Manuring and Other Soil Amendments in East Africa. *Improved Use of the Plant Nutrients*, FAO Soils Bulletin 37, 56-59.
10. Mutea, J, **Keya, S.O.** and Gurah, A.M. (1977). The Effect of Various Types of Mulches on Soil Moisture in a Coffee Field at Kabete, Kenya. *Organic Recycling in Africa*. FAO Bulletin 43, 129-144.
11. Mukunya, D.M. and **Keya, S.O.** (1978). Yield Performance and Selection for Resistance in Beans (*Phaseolus vulgaris* L.) to Common Diseases in Kenya. *East Africa Agric. For J.* 43 No. 4.
12. **Keya, S.O.** and Byalebeka, J. B. (1979). Gene Pools of *Rhizobium*-MIRCENS. In Proceedings of the 5th International Conference on Global Impact of Applied Microbiology, Bangkok, Thailand (1977) P. Matangkasombut (ed.), pp. 37-45.
13. **Keya S.O.** (1979). Implementing the Network Programme, Strengthening Rhizobiology through Networks, Conferences and Training Courses. In *Planning an International Network for Legume Inoculation Trials: The Proceedings of Workshops held at Kahului, Maui, Hawaii, Jan. 15-19, 1979*, S.C. (ed.), pp. 193-201.
14. **Keya, S.O.**, Mukunya, D.M., Muruli, B. 1. and Onim, M.H. (1979). Legume Research at the University of Nairobi. In *Planning an International Network of Legume Inoculation Trials - The Proceedings of Workshops held at Kahului, Maui, Hawaii - Jan. 15-19, 1979*. Harris S.C., (ed.), pp. 27-37.

15. **Keya, S.O.** (1979). The Role of Biological Nitrogen Fixation in Agroforestry. International Council for Research in Agroforestry, *Soils Research in Agroforestry*, Proceedings of an Expert Consultation, March 25-31, 1979, Nairobi, H.O. Mongi and P.A. Huxley (eds.), pp. 243-270.
16. Mongi, H.O., **Keya, S.O.** and Ahn, P.M. (1979). Standardization in Methodology and Research Approach. International Council for Research in Agroforestry, *Soils, Research in Agroforestry*, Proceedings of an Expert Consultation, March 25-31, 1979, Nairobi, H.O. Mongi and P.A. Huxley (eds.), pp. 539-568.
17. **Keya, S.O.** and Ngugi, D.N. (1979). The Influence of Agricultural Practices on the Environment. In Proceedings of the 2nd Conference of the Kenya Agricultural Teachers Association 27-31 August, 1970, Mombasa, Kenya.
18. Ssali, H. and **Keya, S.O.** (1980). Phosphorus and Cultivar Effects on Nodulation, Growth, Dinitrogen Fixation and Yield on Cowpea (*Vigna Unguiculata*). *East Africa Agric. For. J.* 45(3) 188-193.
19. Ssali, H. and **Keya, S.O.** (1980). Nitrogen Level and Cultivar Effects on Nodulation, Dinitrogen Fixation and Yield of Grain Legumes Part I. Cowpea Cultivar. *East Africa Agric. For. J.* 45 No. 4, pp. (???)
20. Ssali, H. and **Keya, S.O.** (1980). Nitrogen Level and Cultivar Effects on Nodulation, Dinitrogen Fixation and Yield of Grain Legumes Part II. Common Bean Cultivars. *East Africa Agric. For. J.* 45 No. 4, pp. 247-254.
21. **Keya, S.O.**, Ssali, H. and Balasundaram, V.R. (1980). Potentials and Constraints for Inoculation of Grain Legumes in Kenya. In Current Perspectives in Nitrogen Fixation. Gibson, A.H. and Newton, W.E. (eds.) Australia Academy of Sciences, pp. 512.
22. Ssali, H., **Keya, S.O.** and Balasundaram, V.R. (1981). Influence of Phosphorus Application Rates and Placement in the Nodulation, Growth and Yield of Beans and Soybeans Growth at two N Levels. Kenya Journal of Science and Technology (B) 29-98.
23. **Keya, S.O.** (1981). Training and Education in Agricultural Microbiology in Africa. In *Global Impact of Applied Microbiology* (GIAM), vi. Emejuaiwe, W.O., Ogunbi, O and Sanni, S.O. (eds). Academic Press, London and New York, pp. 601-609.
24. Arshad, M.A. Mureria, N.K. and **Keya, S.O.** (1982). Effect of Termite Activities on Soil Microflora. *Pedobiologia* 24, pp. 161-167.
25. **Keya, S.O.**, Mureria, N.K. and Arshad, M.A. (1982). Population Dynamics of Soil Micro-organisms in Relation to Proximity of Termite Mounds in Kenya. *J. Arid Environments*, Vol. 5 (4) 353-360.
26. Dasilva, E.J., Freire, J.R.J., **Keya, S.O.** and Halliday, J. (1982). The Role of MIRCENS in Rural Development, Agricultural Training and Environmental Management *Training for Agriculture and Rural Development*. FAO/UNESCO/ILO Journal N. 26, pp. 23-28.
27. **Keya, S.O.**, Balasundaram, V.R., Ssali, H. and Mugane, C. (1982). Multilocational Field Response of *P. Vulgaris* to Inoculation in Eastern Africa. In *Biological Nitrogen Fixation Technology for Tropical Agriculture*. Papers presented at a Workshop, Centro Internacional de Agricultura Tropical, Colombia, March 9-13, 1982. Graham, P.H. and Harris, S.C. (eds.) CIAT, pp. 231-234.
28. **Keya S.O.**, (1982). Fermentation Technology. In *Commonwealth Science Council, African Natural Products Programme*. Report on Project Group Meetings, 29 Nov. - 4 Dec. Commonwealth Secretariat, pp. 73-82.
29. **Keya, S.O.** (1982). The Role of Nitrogen Fixation in Crop Production in Kenya. In *Third FAO/SIDA Seminar on Field Crops in Africa and the Near East*. FAO, pp. 73-75.
30. **Keya, S.O.** (1983). Development and Production of Legume Inoculation for Eastern Africa at Nairobi MIRCENS. In *L'impact de Biotechnologies sur le Tiers monde*. Colloque organisé dans le cadre du

programme FAST de la Commission des Communautés Européennes en Coopération avec la COVRS et l'UNESCO, 2 - 4 février 1982, pp. 48-66.

31. **Keya, S.O.** (1983). Agricultural Education and Training for Rural Development in Africa. In UNESCO/ILO/FAO *Journal on Training for Agriculture and Development*, No. 26 pp. 59-67.
32. Ssali, H. and Keya, S.O. (1983). The Effect of Phosphorus on Nodulations, Growth and Nitrogen Fixation by Beans. *Biological Agriculture and Horticulture*. Vol. I, pp. 135-144.
33. Ssali, H. and **Keya, S.O.** (1983). Effect of Nitrogen Fertilizer on Yields of Beans Inoculated with *Rhizobium phaseoli*. *Kenya Journal of Science and Technology*, series (B) 3: 87-89.
34. Nout, M.H.R. and **Keya, S.O.** (1983). Cultivation of *Pleurotus Sajor-Caju* in Kenya. *Mushroom Newsletter for the Tropics*, Vol. 4. No. 2, pp. 12-14.
35. **Keya, S.O.** (1983). The Role of Biological Nitrogen Fixation in Crop Production. *More Food From Better Production*, FAO, Homes, J.C. and Tahir, W.M. (eds.), pp. 418-426.
36. Ssali, H. and **Keya, S.O.** (1983). Phosphorus and Cultivar Effects on Nodulation, Growth, Nitrogen Fixation and Yield of Cowpea (*Vigna unguiculata*). *Tropical Agriculture* (???)
37. **Keya, S.O.** (1985). State of the Art on Biological Nitrogen Fixation in Africa. In Proceedings of the First Conference of Biological Nitrogen Fixation held in Nairobi, Kenya, July, 1984. Ssali, H. and Keya, S.O. (eds.), pp. 30-36.
38. Anyango, B., **Keya, S. O.**, Widdowson, D., Wangaruro, S., Mugane, C. and Karani F.N. (1985). Current Status of Legume Inoculant Production in Kenya. In Proceedings of the First Conference of Biological Nitrogen Fixation held in Nairobi, Kenya, July, 1984. Ssali, H. and Keya, S.O. (eds.), pp. 213-223.
39. Anyango, B., **Keya, S.O.** and Balasundaram, V.R. (1985). Assessment of Filtermud as a Carrier for Legume Seed Inoculation. Physico-chemical Properties of Filter mud, Growth and Survival of *Rhizobium Phaseoli* in Filter-mud. In Proceedings of the First Conference of the African Association for Biological Nitrogen Fixation held in Nairobi, Kenya, July 1984. Ssali, H. and Keya, S.O. (eds.), pp. 180-196.
40. **Keya, S.O.** and Imbamba, S.K. (1986). The East African *Rhizobium* MIRCEN. A Framework for Promoting Regionally Co-ordinated Biological Nitrogen Fixation. *MIRCEN Journal* 2: 325-338.
41. Mutitu, E.W., Mukunya, D.M. and **Keya, S.O.** (1989). Effect of Organic Amendments on *Fusarium yellows* Disease on the Bean Host. *Discovery and Innovation*. Vol. I No. 4, pp. 67-70.
42. Emongor, V.E., Chweya, J.A., **Keya, S.O.** and Munavu, R.M. (1989). The Effect of Nitrogen and Phosphorus on Growth and Flower Yield of Chamomile. *E. Afr. Agric. For. J.* Vol. 55 No. 1: 63-68.
43. Mutitu, E.W. Mukunya, D.M. and **Keya, S.O.** (1991). Control of *Fusarium yellows* of Beans using Bacterial Antagonists. *Discovery and Innovation* Vol. 3 No. 4: 83-86.
44. Dreyfus, B.L., Diem, H.G., Freire, J., **Keya, S.O.** and Dommergues, Y.R. (1987). Nitrogen Fixation in Tropical Agriculture and Forestry. In *Microbial Technology in the Development World*, pp. 8-50.
45. Gitonga, N.M., Widdowson, D. and **Keya, S.O.** (1989). Interactions of *Phaseolus vulgaris* Cultivars with Thermotolerant Isolates of *Rhizobium leguminosarum* biovar phaseoli from Kenyan Soils. *MIRCEN Journal* 5, 493-504.
46. **Keya, S.O.** (1992). The Importance of Biotechnology Applications for Development in Africa. In Proceedings of the African Regional Symposium on Biotechnology for Rapid Development, Nairobi, Kenya, 17-21 February 1992: African Biosciences Network, pp. 21-35.
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Signed:.....Date:7th June 2017.....

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