

**FACULTY OF AGRICULTURAL
AND FOOD SCIENCES**



**ANNUAL REPORT OF SPONSORED RESEARCH
PROJECTS AND SERVICE CONTRACTS**

October 1, 2005 – September 30, 2006

PREPARED BY

FAFS Research Committee:

Issam Bashour

Omar Obeid

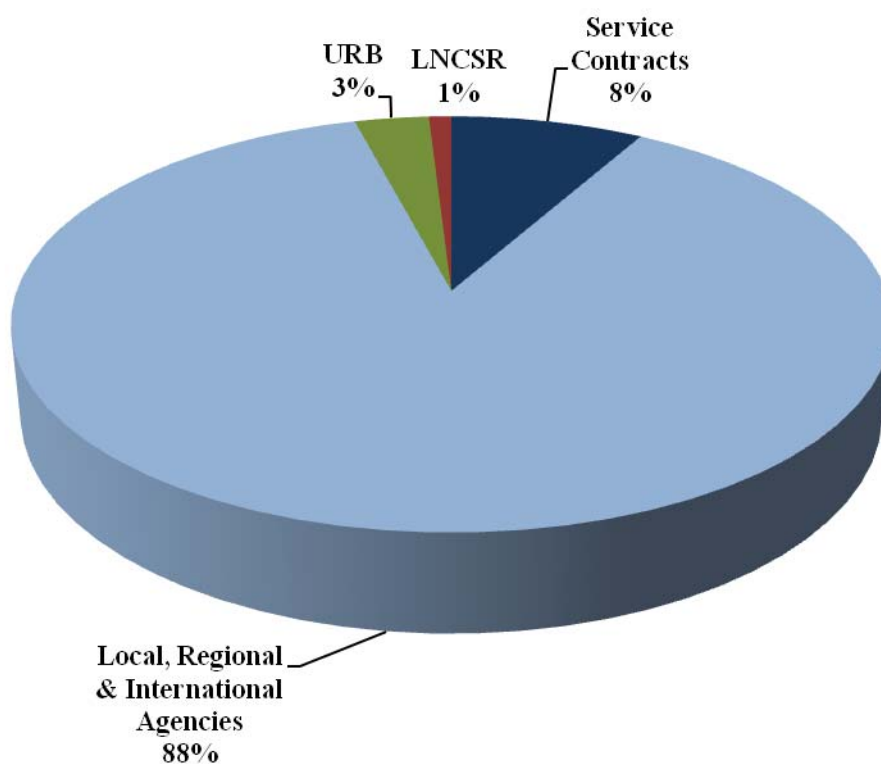
Ammar Olabi

Salma N. Talhouk (Chair)

During the academic year 2005-2006 the Faculty of Agricultural and Food Sciences was engaged in sponsored research and development activities amounting to 2,947,319 USD for periods ending between 2006 and 2007 (Table 1). External funds were major source of support for research and development, the university (URB) constituted only 3% of total sponsored research.

Faculty Research Funds and Service Contracts (2005-2006)

Source	Amount (\$)
Service Contracts	243,824
Local, Regional & International Agencies	2,581,520
University Research Board (URB)	93,725
Lebanese National Council for Scientific Research (LNCSR)	28,250
Total	2,947,319



The funds supported 25 research projects amounting to 2,606,770 USD. These projects fell under 15 research areas which are (*in alphabetical order*): Agribusiness, animal diseases, animal nutrition, biodiversity, clinical nutrition, community nutrition, ecological landscape design, environment, food safety, food sensory analysis, human nutrition, integrated pest management, soil nutrition, sustainable agriculture, and zoonotic diseases (Table 2, Table 3, Table 4).

The agencies and organizations that support activities at FAFS, besides URB and the Lebanese National Research Council, do so either through direct funding or through partnerships and are either for-profit or non-profit organizations.

For-profit organizations that are funding research at FAFS include Dr. Rath Research Institute, Mountajat Vet. Pharm. Co. Ltd, Oteri Company, Hitech FZE, Eng. Ezzedin. Non profit-organizations that are funding research at FAFS include: Mercy Corps, EU/Ministry of Economy and Trade, SRI, IAEA, Food and Drug Corporation, IDRC, UNEP, UNIDO, Ministry of Environment, University of Wisconsin, USDA, RUAF Foundation, and UNDP/Ministry of Environment (Table 3).

The Faculty was also active in partnering with local and international organizations to engage in community development sponsored projects (Table 2). Eight development projects are ongoing during this year and they amount to a total of 243,824 USD. Partners and/or funding agencies supporting rural development include Mercy Corps, ESCWA, ACDI VOCA, IFAD, ADDR, and UNIFERT (Table 2).

The School published 46 articles in international refereed journals and 5 chapters in books published by international press. In addition, faculty members produced 32 technical and consultancy reports and their contribution to international and regional meetings and forum was recognized through 32 published abstracts and proceedings (Appendix I).

Table 2. Service Contracts to FAFS for the academic year 2005-2006

Research Area	Title	Department ^a	Coordinator	Funding Agency ^b	Period of Grant	Amount in USD as of Oct 1, 05	Total Approved budget USD
Agricultural Extension	Sustainable Forage II Development Program	ANSC	N. Dagher	Mercy Corps	Nov 7, 02- Dec 6, 05	150,000	2,155,000
Agricultural Extension	Sustainable Forage III Development Program	ANSC	N. Dagher	Mercy Corps	Dec 7, 05- Oct 31, 07	550,200	550,200
Agricultural Extension	Employment Creation & Income Generation through the Development of Micro and small Agro-Industries in South Lebanon	PLSC	M. Haidar	ESCWA	July 14, 05- May 1, 06	72,450	72,450
Agricultural Extension	Expanding Economic Opportunities in Lebanon Project-Action for Sustainable Agro Industry in Lebanon (ASAIL) Program	ANSC	N. Dagher	ACDI/VOCA	June 12, 06- July 12, 07	9,600	9,600
Agricultural Extension	Establishment of a National Training Unit in Lebanon	ANSC	S. Hamadeh	IFAD	June 1, 03- Dec 31, 05	1,500	100,000
Agricultural Extension	Technical Training Support & monitoring to field extension agents & the M&E team of C/MADP	ANSC	S. Hamadeh	IFAD	Aug 1, 04- Jan 31, 06	1,000	20,857
Agricultural Extension	Introducing New Agricultural Practices in Tobacco Growers in South Lebanon	PLSC	S.K. Yau	Association D'Aide au Developpement Rural	Jan 1, 06- Nov 30, 06	700	700
Crop Production	Vegetables Seeds trial at AREC	AREC	M. Farran	UNIFERT	March 1, 06- Nov 15, 06	8,024	8,024

a. ANSC: Animal Science; AREC: Agricultural Research and Extension Center; LWRS: Land and Water Resources; PLSC: Plant Science.

b. CDR: Lebanese Council for Development & Reconstruction; ESCWA: United Nations Economic & Social Commission for Western Asia; IFAD: International Fund for Agricultural Development.

Table 3. Local, Regional and International Agencies

Research Area	Title	Dept.	Investigator	Funding Agency	Period of Grant	Amount in USD as of Oct1, 05	Total Approved budget USD
Agri-business	Establishment of a Business Development Centre called "Agripole"	NFSC	R. Tannous	Ministry of Economy and Trade/EC	Aug 2, 06- Dec 31, 07	840,000	840,000
Animal diseases	Evaluation the ingredients of epican forte on avian influenza flu	ANSC	E. Barbour	Dr. Rath Research Institute	March 30, 06- Sept 30, 06	9,185	9,185
Animal diseases	Evaluation of Florfenicol against poultry salmonellosis	ANSC	E. Barbour	Mountajat vet. Pharm. Co. Ltd.	Dec 1, 05- May 31, 06	3,500	3,500
Animal diseases	Evaluation of poultry and dairy tit dip disinfectants in the presence and absence of organic interfering substances	ANSC	E. Barbour	Oteri Company	Feb 10, 06- Apr 30, 06	3,290	3,290
Biodiversity	Bioprospecting in the Middle East	PLSC	S. Talhouk	Hightech FZE	July 1, 04- June 30, 07	788,500	1,198,680
Biodiversity	Lebanese Oregano Essential Oil	LWRS	S. Talhouk	SRI	Aug 29, 05	1,596	1,596
Biodiversity	A holistic landscape approach to biodiversity use in Lebanon: partnering with landowners	PLSC	S. Talhouk	W. Ezzeddine	Apr 1, 04- Dec 31, 07	129,433	307,332
Clinical Nutrition	Body fat and its relationship with metabolic syndrome indicators in overweight pre-adolescent children and adolescents in Lebanon	NFSC	N. Hwalla	IAEA	Jan 1, 2006- Dec 14, 07	9,000	9,000
Clinical Nutrition	Effect of Metformin on weight loss and body composition in obese insulin resistant subjects fed either a high or low carbohydrate diet	NFSC	N. Hwalla	Drug Company	May 31, 05	1,000	7,000
Community Nutrition	Wild Edible Plants: Promotion Dietary Diversity in Poor Communities of Lebanon	NFSC	M. Batal	IDRC	Nov 30, 04- May 31, 07	114,700	156,824
Environment	Global Environment outlook 4 (GEO-4)	LWRS	R. Zurayk	UNEP	Aug 30, 05- Aug 31, 07	10,000	10,000
Food Safety	Testing Microbiological Contamination of Meat Products in Lebanon	NFSC	R. Tannous	UNIDO	May 11, 05- Dec 11, 05	1,083	13,000
Integrated Pest Management	Integrated Management of Cedars Forests in Lebanon in Cooperation with other Mediterranean Countries	PLSC	N. Kawar	Ministry of Environment	July 1, 04- June 30, 07	374,441	530,500
Integrated Pest Management	Development of Tomatoes with combined resistance to tomato yellow leaf curl virus using both virus-derived resistance & molecular marker assisted breeding	PLSC	Y. Abou Jawdeh	University of Wisconsin	June 30, 04- Dec 31, 07	22,418	195,864

Research Area	Title	Dept.	Investigators	Funding Agency	Period of Grant	Amount in USD as of Oct1, 05	Total Approved budget USD
Integrated Pest Management	Development of a Regional Viral Indexing & Certification Program for Plant Propagation Materials in the Middle East	PLSC	Y. Abou Jawdeh	University of Wisconsin	Sept. 18, 00- Dec 31, 05	1,279	238,417
Integrated pest management	Selection of Cucumber for resistance to cucurbit yellow stunting disorder virus	PLSC	Y. Abou Jawdeh	USDA	June 1, 03- May 31, 06	1,000	45,000
Sustainable Agriculture	MENA Regional Short Courses on Urban Agriculture	LWRS	R. Zurayk	IDRC	Jan 14, 05- July 14, 07	230,685	384,995
Sustainable Agriculture	Enhancing Livelihoods of Poor Farmers in South Lebanon: Community Supported Agriculture	LWRS	R. Zurayk	Mercy Corps	May 1, 04- Oct 31, 05	974	230,520
Sustainable Agriculture	Cities Farming for the Future (RUAF-CFF)	LWRS	R. Zurayk	RUAF Foundation	March 1, 06- Dec 30, 06	36,938	36,937
Water resources	Conservation of Wetlands & Coastal Zones in the Mediterranean	LWRS	N. Farajalla	MOE-UNDP	Oct 12, 05- Febr 28, 06	2,499	2,499

- a ANSC: Animal Science; AREC: Agricultural Research and Extension Center; LWRS: Land and Water Resources; PLSC: Plant Science.
- b. IDRC: International Development Research Centre; SRI: Stanford Research Institute; UNDP: United Nations Development Program; UNEP/GEF: United Nations Environment Programme/Global Environment Facility; UNESCO: United Nations Educational, Scientific & Cultural Organization; UNIDO: United Nations Industrial Development Organization; USDA: United States Department of Agriculture.

Table 4. University Research Board (URB)

Research Area	Title	Dept *	Investigator	Budget USD
Animal nutrition	Some Physiological, Biochemical and Hormonal Changes in Water-Stressed Dry Awassi Ewes Supplemented with Vitamin C	ANSC	Hamadeh, Shady	9,000
Clinical nutrition	Prospective Evaluation of the Effects of Calcium Intake on Weight Loss and Body Composition in Lebanese Adults	NFSC	Ghaddar, Sana	10,000
Ecological Landscape design	Educational Garden, Lebanon	PLSC	Hussain, Ali	6,225
Ecological Landscape design	Moments of Deviation. An Investigation of the Potentials of Vacant Lots in Beirut	PLSC	Weltzien, Julie	6,000
Food safety	The Effects of Nisin and Natamycin on the Keeping Quality of Kashta and Nisin as Inhibitor of <i>Listeria Monocytogenes</i> at Refrigeration Temperatures	NFSC	Kassaify, Zeina	8,000
Food sensory analysis	The Use of Hedonic Reference Food in Acceptability Tests	NFSC	Olabi, Ammar	7,000
Food sensory analysis	Determination of Sensory Thresholds of Selected Constituents of Thyme (<i>Thymus Vulgaris</i> L.) and their Antioxidant Potential in Edible Oils	NFSC	Toufeili, Imad	6,500
Human nutrition	Effect of High Protein Diet on PYY and Ghrelin Levels in Subjects Post-Gastric Banding	NFSC	Hwalla, Nahla	10,000
Human nutrition	Hepatic Fuel Partitioning of Copper Deficient Rats Following Starch and Fructose Manipulation of the Diet	NFSC	Obeid, Omar	8,000
Soil fertility	Non Nutritive Trace Elements Content of Synthetic Fertilizers in Lebanon	LWRS	Bashour, Issam	10,000
Sustainable agriculture	Effects of Rumen Digestion by Sheep on Germinability and Viability of Common Weed Seeds of Lebanon	PLSC	Haidar, Mustapha	8,000
Zoonotic diseases	Surveillance and Control of Newly Emerging Avian Influenza Outbreaks in Different Poultry Types in Lebanon	ANSC	Barbour, Elie	5,000

* ANSC: Animal Science; LWRS: Land and Water Resources; NFSC: Nutrition and Food Science; PLSC: Plant Science.

Table 5. Lebanese National Council for Scientific Research (LNCSR)

Research Area	Title	Dept*.	Investigator	Budget \$
Animal nutrition	The effect of supplementing laying hen diets with local crop oils on performance, yolk lipid and fatty acid profile, and quality of fresh and stored eggs	ANSC	Daghir, Nuhad	\$ 7,957,55
Animal nutrition	Fat Mobilization and Some Hormonal Changes in Dry Awassi Ewes in Response to Water Stress and Vitamin C Supplementation	ANSC	Hamadeh, Shady	\$ 5,305.00
Sustainable agriculture	Productivity Improvement of the Domestic Honeybee Race	PLSC	Haidar, Mustapha	\$ 5,172.41
Sustainable agriculture	Preliminary Evaluation of Conservation Tillage in Lebanon	PLSC	Yau, Sui-Kwong	\$ 5,172.41
Integrated pest management	Identification and Evaluation of Local Strains of Fungi and Viruses as Biological Control Agents of Pests of Major Economic Significance to Lebanese Agriculture	PLSC	Abou-Jawdeh, Yusuf	\$ 4,641.90

* ANSC: Animal Science; LWRS: Land and Water Resources; NFSC: Nutrition and Food Science; PLSC: Plant Science.

APPENDIX I. PUBLICATIONS

This section includes internationally referred journals, chapters in books published by international publishers, technical and consultancy reports, and published abstracts and proceedings.

An * has been placed to indicate that the citation is an interdepartmental publication which has been reported by more than one department to recognize contributions by faculty members affiliated with different departments.

DEPARTMENT OF ANIMAL SCIENCES

INTERNATIONAL REFERRED JOURNALS

1. Abdelnoor, A.M., Rahal, E., Zeidan, J.A., and Sleiman, F.T. 2006. Preparation of anti- *Candida albicans* antibodies in an egg- laying hen and their protective efficacy in mice. *Journal of Applied Research*. 6: 62-68.
2. Barbour G., M. T. Farran, A. Darwish, N. Usayran, H. Mashlab, M. Hrubby, M. Uwayjan, V. Ashkarian, 2006. Nutritional evaluation of three local barley varieties and the impact of dietary enzyme on their apparent metabolizable energy. *The Journal of Poultry Science*, 43:228-234.
3. Barbour, E.K., Sagherian, V.K., Sagherian, N.K., Dankar, S.K., Jaber, L.S., and Farran, M.T. 2006. Avian Influenza outbreak in poultry in the Lebanon and transmission to neighboring farmers and swine, *Veterinaria Italiana*, 42(2): 77-85.
4. Barbour, G. W., M. T. Farran, M. G. Uwayjan, V. M. Ashkarian, A. H. Darwish, and N. N. Usayran, 2006. Effect of soybean oil supplementation to low ME diets on production parameters of broiler chickens. *J Appl. Poultry Res*. 15:190-197.
5. Farran, M. T, W. S. Halaby, G. W. Barbour, M. G. Uwayjan, F. T. Sleiman, V. M. Ashkarian, 2005. Effect of feeding dietary ervil (*Vicia ervilia*) seeds soaked in water or acetic acid on performance and internal organ size of broilers and production and egg quality of hens. *Poultry Sci*. 84:1723-1728.
6. Hamadeh, S. K., N. Rawda, L. S. Jaber, A. Habre, M. Abi Said and E. K. Barbour. 2006. Physiological responses to water restriction in dry and lactating Awassi ewes. *Livestock Production Science*, 101:101-109.
7. *Nehme, P.A., Barbour, E. K., Sagherian, V.K., Hamadeh, S.K., and Zurayk, R. 2006. Baseline data on enumerated tracheal bacterial flora and drug susceptibility in chicken reared under different systems. *International Journal of Applied Research in Veterinary Medicine*, 3(4):372-377.
8. *Omeira, N., Barbour, E.K., Nehme, P.A., Hamadeh, S.K., Zurayk, R., Bashur, I. Microbiological and chemical properties of litter from different chicken types and production systems. *Science of the Total Environment*, 367(1): 156-162
9. Barbour, E.K., Dankar, S., and Jaber L. 2005. Essential oils of Eucalyptus and peppermint improve the homogeneity of immune responses and performance in MG/H9N2-infected broilers. *Journal of the American Holistic Veterinary Medical Association*, 24: 23-27.
10. Barbour E.K., El-Hakim R.G., Kaadi M.S., Shaib H., Gerges D. D., Nehme P. A. and Harakeh S. 2006. Pathology of the Respiratory System in Essential Oil-Treated Broilers Following a Challenge with Mucosal Bacterium and/or a Haemagglutinating Virus. *The Journal of the American Holistic Veterinary Medicine Association*. In Press.
11. Barbour E.K., El-Hakim R.G., Kaadi M.S., Shaib H., Gerges D. D. and Nehme P.

2006. Evaluation of the hispathology of the respiratory system in essential oil treated broilers following a challenge with *Mycoplasma gallisepticum* and/or H9N2 influenza virus. *International Journal of Applied Veterinary Medicine*. 4(4): 293-300.
12. Barbour E. K. , Abou Chakra N. S., Jaber L., Nehme P. A., Shaib H., Usayran N., Sadek R. and Gali-Muhtasib H. 2006. Hematological parameters, plasma polypeptide profile and anti-cancer bioactivity of *Testudo graeca* and *Testudo horsfieldii* tortoises. *Chelonian Conservation and Biology Journal*. In Press.
 13. *Harake S., Yassin, H., Gharios, M., Barbour E.K., Hajjar, S., El Fadel, M., Toufeili, I., and Tannous, R. 2005. Isolation, Molecular characterization and antimicrobial resistance patterns of *Salmonella* and *Escherichia coli* isolates from Meat-based fast food in Lebanon. *The Science of the Total Environment*. 341:33-44.
 14. *Barbour, E.K., Sheib, H., Sagherian, V., Talhouk, R. and Talhouk, S. 2005. Immunopotential activities of *Calendula officinalis* and *Centaurea aintensis* against IBD (Gumboro) virus in chicken broilers. *Journal of the American Holistic Veterinary Association*, 23(4): 15-20.
 15. *Barbour, E.K., Shaib, H., Jaber, L. and Talhouk, S. 2005. Standardization and evaluation of RAPD-PCR in subspecies-typing of *Mycoplasma gallisepticum*. *International Journal of Applied Research in Veterinary Medicine*, 3(2): 138-149.
 16. *Harakeh, S, M. Batal, and, E.K. Barbour. "Nutritional Consequences Related to "Mad Cow disease" Among Homemakers and Medical Care Practitioners in Lebanon." *Ecology of Food and Nutrition*. no. 42(3)(2003):241-254.

CHAPTERS IN BOOKS PUBLISHED BY INTERNATIONAL PUBLISHERS

1. Farran, M. T., C. Kayouli, A. Soukehal, R. Metzger, M. L. Hayek, I. Nahhal, Z. Jaber, N. Fahd, and V. M. Ashkarian, 2005. Improvement in general traditional livestock management practices in South Lebanon through different interventions. In: *Comparative Advantages for Typical Animal Products from Mediterranean Area*. Published by Elsevier, Wageningen Academic Publishers. 205-212.
2. *Hamadeh, S., Haidar, M. and Zurayk, R. 2006. *Research for Development in the Dry Arab Region*. International Development Research Centre and Southbound Publishers, Penang. 124pp.
3. *Zurayk, R., Haidar, M and Hamadeh, S. 2005. The Local Users Network: A Participatory Communication Forum. In: Mear, A. (eds.). *Food and Water for Millions: Participatory Communication for Land and Water Management*. Montreal, Canada. pp: 17-25.

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Farran, M. T., C. Kayouli, A. Soukehal, R. Metzger, N. Fahd, , I. Nahhal, Z. Jaber, M. L. Hayek, 2005. *Practical guide in livestock production and milk processing*. Published by The Ministry of Agriculture, Republic of Lebanon and Food and Agriculture Organization of the United Nations. pp. 1-127.

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Farran, M.T., A.N. Kadi, G. W. Barbour, 2006 Performance and egg quality of laying hens fed Egg Shell 49 or Replamin. To be presented at PSA 2006 Annual Meeting, July 16-19,2006, Edmonton, Canada.

DEPARTMENT OF LAND AND WATER RESOURCES

INTERNATIONAL REFERRED JOURNALS

1. *Yau S.K., M. N. Nimah and I. Toufeili. 2006. Quality And Yield Of Red Stigmas Of Different Saffron Strains At Contrasting Mediterranean Sites. *Experimental Agriculture*. Volume 42.
2. Sidahmed, M. M., M. D. Taher and R. B. Brown. 2005. A virtual nozzle for simulation of spray generation and droplet transport. *Biosystems Engineering* 92(3): 295-307
3. *Haidar, M., M. M. Sidahmed, R. Darwish, and A. Lafta. 2005. Selective control of *Orobanche ramosa* in potato with rimsulfuron and sub-lethal doses of glyphosate. *Journal of Crop Protection* 24(8):743-747
4. *Haidar M. A. and M.M. Sidahmed. 2006. Elemental sulfur and chicken manure for the control of branched broomrape (*Orobanche ramosa*). *Crop Protection* 25: 47-51.
5. *Nehme, P.A., Barbour, E.K., Sagherian, V.K., Hamadeh, S.K., and Zurayk, R. 2006. Baseline data on enumerated tracheal bacterial flora and drug susceptibility in chicken reared under different systems. *International Journal of Applied Research in Veterinary Medicine*, 3:372-377.
6. *Talhouk, S.N., Van Breugel, P., Zurayk, R., Al-Khatib, A., Estephan, J., Ghalayini, A., Debian, N., and Lychaa, D. 2005. Status and Prospects for the Conservation of Remnant Semi-natural Carob *Ceratonia siliqua* L. Populations in Lebanon. *Forest ecology and Management*. 206, 49-59.
7. *Talhouk S. N., Dardas, M., Dagher, M., Clubbe, C., Jury, S., Zurayk, R. and Maunder, M. 2005. Patterns of Floristic Diversity in Semi Natural Coastal Vegetation of Lebanon and Implications for Conservation. *Biodiversity and Conservation*. Vol.14, 903-915.
8. Baalbaki, R., N. Hajj-Hassan, and R. Zurayk. 2006. *Aegilops* species from Semiarid Areas of Lebanon: Variation in Quantitative Attributes under Water Stress. *Crop Science Society of America*. Vo. 46, 799-806.
9. *Omeira, N., Barbour, E.K., Nehme, P.A., Hamadeh, S.K., Zurayk, R., and Bashour, I. 2006. Microbiological and chemical properties of litter from different chicken types and production systems. *Science of the Total Environment* (367), 156 – 162.

CHAPTERS IN BOOKS PUBLISHED BY INTERNATIONAL PUBLISHERS

1. Bashour, I. 2005. Soil Chemistry and Soil Fertility. In *Encyclopedia of Life Support Systems (EOLSS)*, UNESCO, EOLSS Publishers, Oxford, UK, <http://www.eolss.net>.
2. *Hamadeh, S., Haidar, M. and Zurayk, R. 2006. *Research for Development in the Dry Arab Region*. International Development Research Centre and Southbound Publishers, Penang. 124pp.
3. *Zurayk, R., Haidar, M and Hamadeh, S. 2005. The Local Users Network: A Participatory Communication Forum. In: Mear, A. (eds.). *Food and Water for Millions: Participatory Communication for Land and Water Management*. Montreal, Canada. pp: 17-25.

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1. Nimah M.N. 2005. Water and Wastewater Management Issues in Urban Areas. Proceedings of the Symposium on Regional Municipal Workshop on Environmental Management. 14-18 November. UNEP/ESCWA/ Environment & Development Magazine.
2. Nimah, M.N. 2006. Waste water treatment in Kura region and its reuse: Suggestions & Alternatives. Waster Water Management in Kura: Problems and solution Workshop, NDU / Lebanese Social Society.
3. Nimah, M.N. 2006. Irrigation Water requirements and Irrigation Scheduling. In Training workshop on the Management of Irrigation and Fertigation, sponsored by BADEA (Bank for Economic development in Africa) and ACSAD (Arab Center for the Studies of Arid Zones and Dry Areas). Mar 6 – April 2, 2006, Damascus, Syria.
4. Bashour I. Fertilization of Potato in Akkar region, Lebanon. In association with SRI / INMA. May 2006.
5. Bashour I. Fertilization of Banana in Tyr, Lebanon. In association with SRI International / INMA. May 2006.
6. Bashour I. Fertilization of Forage corn in Akkar region, Lebanon. In cooperation with Renee Mouad Foundation / April 2006.
7. Bashour I. Fertilization of Vegetables in Hermel region, Lebanon. In association with YMCA./ May 2006.
8. Bashour I. Collection of representative soil and plant tissue samples from agricultural land. In association with YMCA / March 2006.
9. *Abu Jawdeh Y., I. Bashour, M.R. Darwish, M. Haidar, M.N. Nimah, M. Sidahmed and F. Suleiman. 2005. Forage Crop Production in Lebanon. AUB – MercyCorps – USAID, Beirut, Lebanon. 110 pages.
10. Darwish M. R., “Assessing the Economic Feasibility of Mechanized Forage Production: *“Towards a Sustainable Future of Forage Production in Lebanon”*”, Mercy corps, AUB, 2005.
11. Darwish M. R., and Munif M. Abu-Rish, “Economic Assessment for Stimulating Markets and Rural Transformation Program (SMART)”, Final Report, YMCA-USA, Lebanon, 2005
12. M.R. Darwish Technical editor and producer of chapter four of the training manual:
13. M. R. Darwish, Sawsan Hajjar, Mohammad Jamil, Ziad Moussa, and Philippe Zghieb, *Investigating Financial Appraisals for Developmental Projects (IFAD Pro)*, Environmental and Sustainable Developmental Unit, FAFS, AUB, April 2006.
14. *Nimah M.N., S.K. Yau and I. Toufeili. 2006. Introduction of Saffron in the Bekka – Lebanon: Selection and Agronomic Studies. Final Report to LNCR.
15. Nimah M.N. Irrigation Water Requirements and Irrigation Scheduling. The Training Workshop on the Management on Irrigation and Fertigation. ACSAD, Damascus, Feb –Apr, 2006. pp. 41.
16. Nimah M.N. Waste water treatment in Kura region and its reuse: Suggestions & Alternatives. Waster Water Management in Kura: Problems and solution Workshop, NDU / Lebanese Social Society, April 2006.
17. Nimah M.N. Water in Lebanon: Problems & Solutions. Rotary Club Tripoli, North Lebanon, March 29, 2006.
18. Nimah M.N. Monitoring Water Quantity. FAO/NDU – TCP Irrigation Project, May 10 – 11, 2006.
19. Nimah M.N. Irrigation of Forage Crops (In Arabic). USAID, CHF, FRM, May 19, 2006.

20. Zurayk, R. Enhancing Livelihoods of Poor Farmers in South Lebanon: Community Supported Agriculture (Final report)
21. Zurayk, R. Regional Training and Knowledge Sharing in Urban Agriculture for the Middle East and North Africa (First progress report)

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1. Lteif, A., I. Bashour, N. Nimah and R. Darwish. 2005. Selenium Levels in Beqaa Valley in Lebanon. Proceedings of the 15th International Plant Nutrition Colloquium, Sep. 13 – 20, 2005, Beijing, China.
2. Bashour I. 2006. Investigating New Fertilizer Management Programs. Proceeding of MEED's Middle East Fertilizers Conference, Dubai 5 – 6 March (CD copy).
3. Nimah, M.N. and N. Muhar. 2005. (Invited paper). Irrigation Schemes between Tradition and Technology. Proceedings of the 12th Scientific Meeting of Saudi Arabia. Agricultural Scientific Association, September 28, King Saud University, Riyadh Saudi Arabia.
4. Moukarzel, S.N. and M.N. Nimah. 2005. Virtual Water and Water Productivity as a Strategic Plan for Water Governance in the ESCWA region. Seminar on Water Governance: Role of stakeholders and civil society institutions in water management. 14/11-15/11/2005, ESCWA, Lebanon. E/ESCWA/SDPD/2005/WG.5/22
5. Nimah M.N., S.N. Moukarzel, M. R. Darwish, N. Farajalla, and I. Bashour. 2006. Water Productivity a basic tool for sustainable Irrigation. Transaction of Wessex Institute of Technology: International Conference on Sustainable Irrigation. (pp127-136).
6. Bashour I., M.N. Nimah and S. Yanni. 2006. Water Availability and Fertilizer Use in the Middle East. AFA 12th International Annual Fertilizer Conference. Cairo – Egypt. February 6 - 8, 2006.
7. Farajalla N. 2006. A Spatial Decision Support System for Siting Wastewater Treatment Facilities – Case Study in Lebanon. AWRA Specialty Conference on GIS in Water Resources, May 8 – 10, 2006, Houston, Texas, USA.
8. *Farajalla N., Yau S.K., and M. Mhanna. 2006 Rainfall and temperature effects on rainfed barley yield under different rotations in Central Beka'a, Lebanon. Proceedings of the IX European Society for Agronomy Congress September 4 – 7 2006, Warsaw, Poland.
9. I.P. Saoud and N. Farajalla. 2006 Dual use of water in aquaculture: Design, management and costs of building and operating a system. ASA-IM 11th Annual Regional Conference, September 9-10, 2006, Cairo, Egypt.
10. *Yau S.K. and M. N. Nimah. 2005. Potential of Safflower to Mitigate Nitrate Leaching Under Irrigation. Proceedings of the International Annual Meeting of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, Salt Lake City, USA.
11. Nimah M.N. and S. Yanni. 2005. Deep Root Watering for Landscape and Fruit Trees. Saudi Arabia Agricultural Fair Conference, Riyadh, Saudi Arabia, September 24.
12. M.N. Nimah. 2006. Water Quality Monitoring. FAO/NDU Workshop May 10-11, 2006, Beirut, Lebanon.
13. *Haidar M.A., Sidahmed M.M. and Darwish R. 2006. Orobanche ramosa management in potato with sub-lethal doses of glyphosate. Proceedings 46th Weed Science Society of American, New York, USA, Abstract (43).

DEPARTMENT OF NUTRITION AND FOOD SCIENCES

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