동북아농정연구포럼 2007 활동보고서

어	명	근	선임연구위원
정	정	길	연 구 위 원
전	형	진	전문연구원
한	근	수	전문연구원
리	경	호	연 구 원

한국농촌경제연구원

연구 담당 어 명 근 선임연구위원 동북아농정연구포럼 운영사업 총괄 정 길 연구위원 공동연구 및 대외연구협력활동 전 형 진 전문연구원 중국 연락 및 실무담당 한 근 수 전문연구원 FANEA 홈페이지 관리 및 운영 리 경 호 연구원 공동연구 관리

머리말

이 연차보고서는 2007년도 『동북아농정연구포럼(FANEA)』사업의 활동보고서 이다. 동북아농정연구포럼(FANEA)은 한국농촌경제연구원이 중국 농업과학원 농업경제발전연구소(IAED/CAAS) 및 일본 농림수산정책연구소(PRIMAFF)와 더불어 농업, 농촌정책 관련 정보 및 자료의 교류와 학술 활동 촉진을 목적으로 2003년 10월 결성된 포럼이다. FANEA는 2003년 10월 서울 제1회 국제심포지 엄을 시작으로 2004년 10월 중국 웨이하이(威海)시에서 제2회 국제심포지엄, 2005년 10월 일본 동경에서 제3회 국제심포지엄, 그리고 2006년 서울에서 제4 회 국제심포지엄을 각각 개최한 바 있다.

올해로 5회째를 맞이한 FANEA 국제심포지엄은 중국 농업과학원 농업경제 발전연구중심(IAED/CAAS) 주최로 2007년 10월 15일 중국 북경에서 개최되었 다. 이번 심포지엄은 '농업금융과 보험, 고령화와 농촌개발, 그리고 바이오에너 지' 등 3개 주제에 관해 한·중·일 3국의 전문가들이 참여하여 연구결과를 발 표하고 토론하였다.

동북아농정연구포럼(FANEA)은 앞으로도 한·중·일 3국의 농업정책 연구 협력과 학술 교류를 촉진하고 역내 농업정책 분야의 공동연구를 활성화하기 위한 다양한 활동을 지속함으로써 궁극적으로 동북아 지역의 농정연구 네트워 크를 조성하기 위해 노력할 계획이다. 그동안 FANEA 포럼 운영 사업을 위해 수고해 주신 국제농업연구센터 관계자들께 진심으로 감사드린다.

2007. 12.

한국농촌경제연구원장 최 정 섭

요 약

1. 사업목적

동북아농정연구포럼(FANEA)은 한국농촌경제연구원과 일본 농림수산정책 연구소 및 중국농업과학원 농업경제발전연구소와 공동으로 동북아 역내 농 업·농촌의 정책 연구 개발과 정보 및 자료 교류, 학술활동 촉진 등을 위해 2003년 10월에 발족한 학술포럼이다. 2007년도 동북아농정연구포럼 운영사업 은 제5회 FANEA 국제심포지엄 준비 및 참석 관련 활동과 한·중·일 3국 연 구기관 사이의 연구 협력, 그리고 홈페이지 운영 등으로 구성된다.

2. 사업내용 및 결과

한국농촌경제연구원은 2007년 10월 15일 중국 북경시 우의빈관에서 개최된 제5회 동북아농정연구포럼 국제심포지엄에 참석하였다. 이번 심포지엄은 '농 업금융과 보험, 고령화와 농촌개발, 그리고 바이오에너지' 등을 주제로 선정하 였으며 한·중·일 3국의 전문가들이 참여하여 연구결과를 발표하고 토론하였 다. 이번 심포지엄에는 중국 농업부 농촌경제연구중심의 연구자들도 옵저버로 참여하여 최근 국제 농업부문의 현안과 동북아 역내 농업정책 변화 등에 관한 전문적인 견해와 다양한 식견을 접하는 기회가 되었다.

한국농촌경제연구원은 중국농업과학원 농업경제발전연구중심(IAED/CAAS)

이 주최한 중국 농업정책 관련 세계은행 연구과제의 최종보고회에도 참석하였 다. 또한 향후 중국 농업 관련 연구 수요 증가에 대비하여 중국사무소를 북경 시에 개설하였다. 중국사무소는 앞으로 본원 파견 소장과 직원 2인, 그리고 현 지 채용 직원들로 구성되며 중국 농업 관련 자료와 정보 수집, 연구 협력 업무 연락 및 출장업무 지원 등의 역할을 수행할 예정이다.

ABSTRACT

2007 FANEA Annual Report

The Forum for Agricultural Policy Research in Northeast Asia (FANEA) was established jointly by the Korea Rural Economic Institute (KREI), the Institute of Agricultural Economics and Development at the Chinese Academy of Agricultural Sciences (IAED/CAAS) and the Policy Research Institute under the Ministry of Agriculture, Forestry and Fisheries of Japan (PRIMAFF) in October 2003. This forum was launched to establish a collaborative relationship in agricultural research and related fields among Korea, China and Japan as part of their joint commitment to foster mutually beneficial research and development in the Northeast Asian countries.

As a major activity of FANEA in 2007, the Korea Rural Economic Institute has participated in the 5th FANEA International Symposium in Beijing, China. The 5th FANEA International Symposium was held under the themes of "Rural Finance and Insurance, Aging and Rural Development in Northeast Asia, and Bio-Energy Development as well as its Impact on Northeast Agriculture. In this symposium, hosted by the Institute of Agricultural Economics and Development at CAAS, nine papers dealing with three themes were presented and discussed by participants from the three member countries.

The Korea Rural Economic Institute also participated in the World Bank's "End-of-Project Conference" in Beijing. This conference was hosted by the IAED/CAAS for the discussion of the final report of the project on Chinese agricultural policy sponsored by the World Bank.

The Korea Rural Economic Institute has established its China office in Beijing to initiate research on Chinese agriculture and agricultural policies.

Researchers: Myong-Keun Eor(Ph.D), Chung-Gil Chung(Ph.D), Hyoung-Jin Jeon(Ph.D), Keun-Soo Han, Jing-Hu Li Report No: M84/Nov. 2007 E-mail address: myongeor@krei.re.kr

차 례

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운영 현황

- 1. 동북아농정연구포럼(FANEA) 운영 개요
- 동북아농정연구포럼(FANEA)은 한국농촌경제연구원이 일본 농림수산정책 연구소 및 중국농업과학원 농업경제발전연구소와 더불어 동북아 역내 농 업·농촌 정책 연구 개발과 정보 및 자료 교류, 학술활동 촉진 등을 위해 2003년 10월 발족한 학술포럼임.
- 『동북아농정연구포럼』사업의 일환으로 한·중·일 농업 및 농촌경제 분야 에 있어서 공조, 공생을 위한 협력 가능분야와 전략을 상호 모색하기 위해 FANEA 국제심포지엄을 한국, 중국 및 일본에서 해마다 개최하고 있음. 특 히, FANEA 국제심포지엄을 통해 한·중·일 농업분야 전문가간 지식 및 정보 교류를 확대함으로써 이 지역의 농업 및 농촌 분야 협력을 강화하는 데 큰 역할을 함.
- FANEA 국제 심포지엄의 주제는 창립 기념 2003년 서울 심포지엄이 "동북
 아시아 지역의 농업협력 필요성과 가능성", 2004년 제2회 중국 웨이하이 심

포지엄은 "세계화 시대의 식량안보와 식품안전", 2005년 제3회 일본 도쿄 심포지엄은 "세계화와 동북아 지역의 지속가능한 농업 발전", 2006년 제4회 서울 심포지엄은 "전환기 경제의 동북아 농업"임. 주제 발표 논문은 제1회 부터 제4회까지 발표된 논문 44편과 제5회에 발표된 논문 9편을 포함한 모 두 53편임(분야별 논문주제는 <부록1> 참조).

FANEA의 활동은 연례 국제심포지엄 개최 외에 공동연구 수행, 초청세미
 나 개최, FANEA 홈페이지 관리, 각종 국제세미나 참석 등이 있음.

2. 연혁

- 2003. 10 『동북아농정연구포럼』홈페이지(www.fanea.org) 구축
- 2003. 10 『동북아농정연구포럼』창립기념행사(MOU 체결) 및 제1회 FANEA 국제심포지엄 개최
- 2004.5 동북아농정포럼TFT 설치
- 2004. 10 FANEA 제2회 국제심포지엄 개최(중국 웨이하이시)
- 2005. 10 FANEA 제3회 국제심포지엄 개최(일본 도쿄)
- 2005. 11 동북아농정포럼TFT이 동북아농업팀으로 통합
- 2006. 9 FANEA 제4회 국제심포지엄 개최(한국 서울)
- 2007. 10 FANEA 제5회 국제심포지엄 개회(중국 북경)

3. 운영 조직

○ 동북아농정연구포럼의 보다 효율적이고 전문적인 운영을 위해 기존 동북아

2

농정포럼TFT가 동북아농업팀(팀장 어명근)으로 통합·재편되었음(2005. 11).

○ 운영진 구성: 어명근 중국사무소설립준비TFT팀장 외 4인

직 위	성 명	담당 분야
선임연구위원	어명근(팀장)	동북아농정연구포럼 운영사업 총괄
연구위원	정정길	공동연구 및 대외연구협력활동
전문연구원	전형진	중국 연락 및 실무담당
전문연구원	한근수	FANEA 홈페이지 관리 및 운영
위촉연구원	리경호	공동 연구관리

_제 2 ਨ

당해연도 주요 사업별 추진실적

1. 제5회 FANEA 국제심포지엄

1.1. 개최 목적

- 동북아농정연구포럼(FANEA) 국제심포지엄은 2003년 10월에 한국농촌경 제연구원(KREI), 일본농림수산성 농림수산정책연구소(PRIMAFF), 중국농 업과학원 농업경제발전연구소(IAED/CAAS)가 농업농촌 정책연구 개발과 정보 및 자료 교류, 학술활동 촉진 등을 위해 공동 창립한 「동북아농정연구 포럼(FANEA)」 활동의 일환으로 한·중·일 3개국에서 매년 1회 개최되 어 왔음.
- 올해로 제5회째를 맞이하는 동북아농정연구포럼 국제심포지엄은 "동북아 지역의 농촌 금융과 보험", "동북아 지역의 고령화와 농촌 개발", "바이오 에너지 개발과 동북아 농업에의 영향"이라는 3개 주제로 한·중·일 3개국 이 공통으로 안고 있는 과제와 농업정책 현황에 대해 파악하고 미래를 전 망해 봄으로써 동북아지역 농업분야 특히 구체적인 분야의 현안과 중요하

게 대두되고 있는 이슈들에 대한 견해를 상호 교환하고 미래 지향적인 대 응을 기함에 그 목적을 둠.

1.2. 개요

- 일시: 2007. 10. 14~18(4박5일)
- 장소: 중국 북경 우의호텔
- 주제:
 - 동북아 지역의 농촌 금융과 보험(Rural Finance and Insurance)
 - 동북아 지역의 고령화와 농촌개발(Aging and Rural Development in Northeast Asia)
 - 바이오 에너지 개발과 동북아 농업에의 영향(Bio-Energy Development and its Impact on Northeast agriculture)
- 참석자: 총 21명
 - 중국농업과학원 농업경제발전연구소: Qin Fu 소장, Li Suoping 박사, Li Xing 박사, Liu Xiaohe 박사 등(4명)
 - 중국사회과학원(CASS): Zhang Juwei 박사, Li Chenggui 박사 등(2명)
 - 중국농업경제학회: Duan Yingbi 회장(1명)
 - 일본 농림수산성 농림수산정책연구소: Kozo KONISHI 소장, Kosei HASEGAWA 박사, Tsutomu MATSUHISA 박사, Tatsuji KOIZUMI 박사, Shoichiro KAWAHARA 박사, Norihiro YAMASHITA 박사 등 (6명)
 - 한국농촌경제연구원: 최정섭 원장, 어명근 선임연구위원, 박현태 연구위
 원, 황의식 연구위원, 송미령 연구위원, 이상민 부연구위원, 마상진 부연
 구위원, 정호근 전문연구원 등(8명)

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1.3. 심포지엄 순서

□ 심포지엄 본회의:

- 일시: 2007년 10월 15일(월)
 08:30-09:20 등록(7호관 제1 회의실)
 09:20-09:50 개회식
 - 환영사(친푸 IAED/CAAS 소장)
 - 기조연설(두안 잉비 중국농업경제학회 회장)
 - 09:50-10:20 휴식
 - 10: 20-12:00 제1세션: 동북아 농촌 금융과 보험
 - ▷ 좌장: 최정섭(한국농촌경제연구원 원장)
 - ▷ 발표:
 - "한국농업 금융의 현재와 미래" (정호근, 한국농촌경제연구원)
 - "중국의 곡물 생산 및 위험지역 등급화와 농업보험 정책"(리싱, IAED/CAAS)
 - "일본의 농업 농촌 금융 현황" (하세가와 고세이, PRIMAFF)
 - ▷ 토론:
 - 가와하라 쇼이치로(PRIMAFF)
 - 판 솅엔(국제식량정책연구소, IFPRI)
 - 황의식(한국농촌경제연구원)

12:00-13:30 점심

13:30-15:10 제2세션: 동북아 지역의 고령화와 농촌개발

- ▷ 좌장: 친푸(IAED/CAAS 소장)
- ▷ 발표:
 - "일본 농촌의 연령구조 실태와 요인" (마쓰히사 쓰토무, PRIMAFF)
 - "한국 농촌 노인의 생산 활동과 관련 변수" (마상진, 한국농촌경제연구
 - 원)

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- "중국 농촌 인구 고령화의 경제적 영향" (장 쯔웨이, IPLE/CASS)
- ▷ 토론:
- - 송미령(한국농촌경제연구원)
 - 야마시타 노리히로(PRIMAFF)
 - 리 샨데(IAED/CAAS)

15:10-15:40 휴식

- 15: 40-17:20 제3세션: 바이오 에너지 개발과 동북아 농업에의 영향
 - ▷ 좌장: 고니시 고조(PRIMAFF 소장)
 - ▷ 발표:
 - "바이오 에너지 개발과 중국 농업에 미치는 영향(류 샤오헤, IAED/CAAS)
 - "브라질 바이오 에탄올의 대일 수출: 세계 설탕 시장의 계량경제적 시뮬레이션" (고이즈미 다쓰지, PRIMAFF)
 - "한국의 바이오 연료 생산 동향과 전망" (이상민, 한국농촌경제연 구원)
 - ▷ 토론:
 - 리 쳉귀(RDI/CASS)
 - 박현태(한국농촌경제연구원)
 - 엔도 요시히데(PRIMAFF)

17:20-17:50 폐회

□ 기관장 회의

- 일시: 2007년 10월 15일 오전 8~9시
- 장소: Friendship 호텔 우의궁
- 참석자: 최정섭 한국농촌경제연구원 원장, 친 푸 IAED/CAAS소장, 고니시 고조 PRIMAFF소장, 어명근 KREI국제농업센터 선임연구위원, 엔도 요시히데 PRIMAFF연구기획조정부 연구조정과장, 리 수오핑 IAED/ CAAS기획조정실장

- 주요 내용
 - 1) 2008년 제6차 FANEA 국제심포지엄 개최 일시
 - 2008년 10월경 일본 PRIMAFF 청사 이전 관계로 현 청사에서 2008년 6월 초 개최 제안 및 합의
 - 2) 제6차 FANEA 국제심포지엄 주제 관련
 - 일본은 제6차 국제심포지엄 주제 공개 모집 제안
 - 최정섭 원장의 농촌 개발 분야 중요성 강조에 동의하고 잠정적 주제에 포함

□ IAED/CAAS 세계은행 연구과제 최종보고회의 참석

- 일시: 2007년 10월 16일(화)
- 개회식(8:30-9:00)
 - 사회: 완 바오루이 전국인민대회 농업위원회 부위원장 사회
 - 환영사: 자이 후쿠 CAAS 원장
 - 축사: 재정부, 농업부, 세계은행 내빈

○ 기조 연설(9:30-11:00)

- 사회: 장 리지엔 CAAS 부원장
- 연설 1: "과제 소개"(친 푸 IAED/CAAS 소장)
- 연설 2: "중국의 농산물 교역정책"(친 케밍 농업부 농업촉진센터 소장)
- 연설 3: "농업 정책이 세계 농촌 개발에 미치는 영향"(조아킴 폰 브라운 IFPRI 소 장)

○ 논문 발표(11:00-17:40)

- 사회: 수에 리앙 농업부 총무국장
- 발표 1: "중국의 통합 농업생산성"(왕 지민 IAED 과장)
- 빌표 2: "WTO와 농산물 무역"(쑨 동셍 IAED 과장)
- 발표 3: "중국의 CGE 모형"(류 샤오헤 IAED 연구위원)

- 발표 4: "농업 과학과 기술 진보"(자오 지준 IAED 과장)

- 발표 5: "농업 보조와 보호 정책"(리 샨데 IAED 연구위원)

- 발표 6: "새로운 형태의 중국 농촌 건설"(쟝 혜핑 IAED 과장)

□ 현장 견학

- 일시: 2007년 10월 17일(수) 08:30-16:30
- 방문 기관 1: 북경시 방산구 한촌하(韓村河)촌
 - 방문 기관 개요: 한촌하 농촌 관광마을은 북경시에서 남서쪽으로 40km 거리에 있는 방산구에 위치하고 있음. 한촌하 마을은 북경시에서 관광풍 치지역 AAA 등급을 최초로 수여하였을 뿐만 아니라 전국에서 처음으 로 농업과 관광 시범 마을로 지정된 곳임. 당 위원회 티안 시옹(田雄) 위 원장의 지도 하에 개혁과 개방이 시작된 이래 한촌하 마을은 집단농장의 성공적인 개발 사례로 평가되고 있음. 또한 가난하고 낙후된 한촌하 마 을을 아름다운 농촌시가지로 변화시킴으로써 부락 주민들의 공동 번영 을 실현한 사례임.
 - 방문 결과 및 평가: 한촌하 마을은 빈곤한 농촌 부락을 수려한 경관과 높은 소득, 그리고 학교와 문화시설 등을 갖춘 현대적인 주거지역으로 변모시킨 사례로 북경시 지역은 물론 전국적인 명성을 얻어 왔음. 그러 나 이러한 변화의 원동력은 농업이나 관광산업보다는 집단 농장이 소유 한 시멘트 업체의 수익에 의한 것임. 견학 장소도 대부분 기념관과 박물 관 수준의 전시 사례에 불과하며 유리온실은 실제 생산용이 아닌 관광용으로만 이용되고 있는 실정임. 현재 마을 주민의 20% 정도만이 농업에 종사하고 있을 뿐 대부분은 시멘트 업체에 근무하거나 북경시로 출퇴근하는 베드타운으로 전락한 상태임. 따라서 한촌하 마을은 국민소득이 낮고 농업 여건이 어려운 중국 등 개발도상국에서 농업과 관광을 결합하여 고소득을 창출하고 쾌적한 주거형태로 변모시키는 것이 얼마나 어려운 지를 단적으로 보여주는 역설적 사례로 판단됨.

○ 방문 기관 2: 북경시 신발지(新發地) 농산물 도매시장

- 방문기관 개요: 북경시 남쪽 남4환로 인근에 위치한 신발지 도매시장은
 북경시 북부의 대종사(大鐘寺) 도매시장과 함께 북경에서 가장 규모가
 큰 양대 농산물 도매시장임.
- 방문 결과 및 평가: 시장 방문 시간이 오후인 탓에 거래 농산물은 마늘 종, 대파, 생강 등 일부 채소에 불과. 출하물량 산지는 하북성과 산동성 또는 흑룡강성이나 내몽골도 포함됨. 신발지 도매시장은 아직 경매 방식 의 거래 형태가 도입되지 않아 농산물 판매상 대부분은 트럭에 적재된 물량이 매진될 때까지 직접 시장에 체류하고 있는 실정임. 그만큼 비효 율적일 뿐만 아니라 여름철같이 고온다습한 기후에는 판매 대기 중 부패 등으로 인해 수확 후 손실이 많은 것으로 파악되고 있음.

2. 한국 발표 논문 요지

1) 한국 농업금융의 현재와 미래

(Present and Future of Korean Agricultural Financing) (정호근 전문연구원, KREI, 농업구조・경영연구센터)

농은 민간만이 담당하는 데는 한계가 있으며 이에 공공금융의 역할이 있다.
농업환경변화 그리고 금융시장환경의 변화에 농업금융이 적응해나가기 위해서
는 현재의 시스템을 점검하고 문제점과 해결방안을 알아보는 것이 필요하다.
우리나라의 농업금융은 자금의 공급처 면에서 보면 정부의 정책금융, 민간은
행을 포함한 일반금융, 사금융 그리고 정부에 의한 신용보증기금이 있다. 금융
을 담당하는 주체로 보면 정책금융과 신용보증기금을 담당하고 있는 정부 그

리고 일반금융에서 주도적인 역할을 하고 있는 상호금융을 하고 있는 농업협 동조합과 농협중앙회가 있다.

농업금융의 발전을 위해서 우선 정책금융에서 종합자금제도의 역할이 보다 강조되어야 한다. 현재의 운영자금지원에서 대부분의 사업부문을 종합자금제 도로 가져와 수요자가 양과 범위를 결정하는 시스템으로 바뀌어 나가야 한다. 신용보증기금은 특별보증 그리고 파산농가 증가 등의 이유로 기금이 고갈되고 있는 상태이다. 우선 기금을 추가하고 보다 경쟁구도로 운영될 수 있도록 시장 을 개방하여야 한다. 상호금융은 영세한 현재의 규모를 개선하는 것이 무엇보 다도 필요하다. 장기적으로 보면 조합 간의 합병이 바람직하지만 우선 신용센 터 운영과 같은 보완적인 방안을 시행할 필요가 있다.

민간금융과 공공금융이 균형을 이루어 나가고 수요자와 시장 중심의 구조로 나아가는 것이 농업금융의 발전과 이를 통한 농업경쟁력 강화를 위해 필요한 과제이다.

2) 농촌 노인의 생산적 활동과 관련 변인

(Productive Activities of the Korean Rural Elderly and their Related Variables) (마상진 부연구위원, KREI, 농촌발전연구센터)

우리사회의 고령화는 매우 심각하여 현재 고령화사회(aging society)에 접어 들었고, 2018년경에는 고령사회(aged society), 2026년경에는 초고령사회 (super-aged society)가 될 전망이다. 농촌의 경우는 더 심각하여 이미 초고령 사회에 접어들었고, 도시에 비해 20년 이상 고령화가 빠르다.

이와 관련하여 노령기의 복지를 연구하는 노년학(gerontology)자들의 성공 적 노령화(successful aging) 제안을 주목할 필요가 있다. 이는 노인을 무능하 고 의존적으로 보는 전통적 관점에서 탈피하여 독립적이며 생산적이라는 긍정 적 관점으로 전환하여 노인의 역할을 재평가하고 노인문제에 대한 새로운 해 결책을 모색하려는 시도이다. 생산적 노령화는 노인들이 자신의 잠재력을 활용 하여 신체적, 사회적, 심리적 복지에 도달하여 개인적으로나 사회적으로 기쁨 을 얻는 것을 의미한다. 이러한 노령화는 병이나 신체적 기능, 사회적 지지 등과 도 관계가 있지만 무엇보다 생산적 활동(productive activities)과 관계가 있다. 생산적 활동은 유료 또는 무료로 제품이나 서비스를 생산하는 모든 활동을 의미하는 것으로 일반적으로 경제활동(paid work), 가족지원활동(care-giving), 자원봉사(volunteering)로 나뉜다. 이 연구는 농촌의 노인들이 수행하는 다수의 활동들이 생산적이라는 관점에서, 어떠한 변인들이 이러한 활동과 관련 되는지를 구명하고자 하였다.

노인생활실태조사(2004) 데이터를 회귀분석 기법을 활용하여 농촌노인들의 생산적 활동 참여실태 및 개인특성변인과 생산적 활동의 관계를 분석한 결과 는 다음과 같다.

농촌 노인 중, 농업 종사를 통해 경제활동에 종사하는 비율은 47%로 이는 도시 노인의 경제활동 참여비율(20%)의 두 배 이상이었다. 농촌 노인 중 78% 는 다른 가족 구성원들에 경제적 부조, 간호, 아이돌보기 등의 가사지원을 하고 있었다. 한편 10%의 노인이 자원봉사활동을 하고 있었고, 이는 도시 노인들보 다 5% 정도 낮은 참여율이었다.

한편, 성, 연령, 교육 정도, 활동장애, 개인소득, 건강, 조직활동 참여, 가정구 조, 사회경제적 지위, 직업 등이 농촌 노인의 생산적 활동과 관련이 있었다. 특 히 직업이 농업인인 농촌노인의 경제적 활동 참여가 높았고, 교육 수준이 높은 노인이 비 경제적 생산 활동(가족지원, 자원봉사) 참여가 높았고, 좋은 건강상 태인 노인이 생산적 활동에 대한 참여가 높았다.

농촌이 이미 초고령 사회에 접어들었다는 것은 농촌의 사회 정책이 노인들을 고려하지 않고는 성공할 수 없음을 의미한다. 앞으로 점점 더 많은 사회, 경제, 문화, 자원 봉사 활동에서의 노인들의 참여가 지원하는 제도적 뒷받침이 필요 하다. 그리고 추후 연구에서는 농업종사활동 외에 최근 활발하게 이루어지고 있는 농촌관광 등의 농촌개발활동에서 농촌노인들이 하고 있는 다양한 활동들

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을 포함한 생산적 활동을 분석할 필요가 있다. 그리고 이들 생산적 활동과 그 활동의 경제적 보상, 심리적, 물리적 건강과의 인과관계를 구명할 필요가 있다.

3) 한국의 바이오연료 생산 현황과 전망

(Current and Future Aspects of Bio-fuel Production in Korea) (이상민 부연구위원, KREI, 산림정책연구실)

이 연구는 한국의 바이오연료 가운데 상용화 단계에 있는 바이오디젤을 중심 으로 생산현황과 관련 정책, 그리고 농업과 관계된 앞으로의 전망을 소개하였 다. 화석 연료 가격의 급등과 함께 세계적으로 각광받고 있는 바이오에너지, 특 히 바이오연료에 대한 한국의 개발 상황은 거의 초보적인 단계라 할 수 있다. 그러나 바이오디젤은 2002년부터 2005년까지 시범사업을 통해 총 2만 3,229kl (약 2만 546톤¹))를 생산하였으며, 2006년에는 약 5~6만 kl(4만 4,225톤 ~ 5만 3,070톤), 2007년에는 약 9만 kl(7만 9,605톤)를 생산할 것으로 예상된다. 현재 바이오디젤 생산업체는 외국산 대두유와 폐식용유를 원료로 사용하고 있다.

한국의 바이오에너지 생산은 1995~2005년 기간 동안 438% 증가하였으나 총 1차에너지에 대한 신재생에너지 비중은 2.1%에 불과하며, 신재생에너지 가운 데 바이오디젤을 포함한 바이오에너지의 비중은 3.7%로 매우 낮은 상태이다. 정부는 신재생에너지의 공급목표를 2011년까지 총1차에너지 예상 공급량의 5%, 2005년 공급량의 5.8%인 1,333만 5천 toe로 설정하고, 이러한 목표를 달성 하기 위해 신재생에너지 발전차액 지원, 세제와 융자지원 등 다양한 사업을 실 시하고 있다. 이 밖에 바이오에너지 개발을 위한 연구개발이 진행 중인데, 농업 에서는 안정적인 연료공급 기반 구축을 위해 바이오연료의 원료작물 개발을 위한 연구가 중요하게 부각되고 있다. 그 가운데 유채가 바이오디젤 원료로 가 장 유망하게 고려되어 다양한 시험결과를 토대로 유채생산 시범사업을 실시하

¹⁾ 바이오디젤 부피-무게 전환계수 0.8845 적용, 즉 1kg = 1ℓ× 0.8845

고 있다.

바이오디젤 1kl 생산과 소비과정에서 발생하는 비용과 편익을 계산하면, 보 리를 대체하여 생산할 경우 85만9,000원의 순편익이 발생한다. 반면 휴경지를 이용하여 유채를 생산할 경우 발생하는 비용이 편익보다 54만4,000원/kl가 많 은 것으로 나타났다. 한편 바이오디젤 원료작물 재배농가를 대상으로 경제성을 평가하면, 정부의 경광보존직불금 혜택을 받을 경우 순편익이 발생하나, 그렇 지 않을 경우 손실이 계측된다. 따라서 보조금 제도가 없을 경우 유채재배의 경제적 이윤은 없는 것으로 평가된다. 이러한 현상은 우리나라에서뿐만 아니라 모든 국가의 바이오연료 개발 초기에 발생하는 문제이다. 따라서 에너지 연료 작물 생산자의 경제성을 고려할 경우 지속적인 소득보전정책이 필요하다. 그러 나 이러한 금전적인 지원은 시장을 왜곡하여 균형 있는 자원분배를 방해하므 로 가능한 짧은 시기 동안만 적용해야 할 것이다. 장기적인 발전을 위해서는 부산물을 이용해 에탄올을 생산할 수 있는 제2세대 기술 개발을 위해 노력해야 한다.

3. 중국사무소 설립

- 한국농촌경제연구원 중국사무소를 개설·운영함으로써 양국 간 농업·농
 촌 연구관련 정보교류 활성화와 전문가 네트워크 구축 등 연구협력 기반 조
 성으로 심도 있는 중국연구 수행과 농업·농촌 분야의 상호 이해를 증진시
 키는 계기가 될 것임.
- 중국 내 정부기관, 연구기관 등과 네트워크 구축 및 정보교류: 중국 농업・
 농촌 관련 공동연구 추진, 중국의 농업과 농촌, 농산물소비 동향과 자료 수
 집·분석, 농산물 관측의 효과적 추진을 위한 중국 농산물 수급 동향 파악

- 중국농업과학원 농업경제연구소(IAED/CAAS)와의 협력과 동북아농정연 구포럼(FANEA) 운영 지원: 한·중·일 3국의 대표적인 농정 연구기관이 주축이 되어 삼농문제 등 다양한 공동 주제로 정기학술대회를 개최
 - · 한국농촌경제연구원은 중국사무소를 한·중간 협의 창구로 활용함으로써
 포럼 운영의 효율성 제고
- 공동연구 수행: 한·중 양국 농업부문에서 매년 1~2개의 연구과제를 선정
 하여 공동연구 추진
 - 예상 주제: "한·중 FTA와 양국 농업의 공동 발전 방안", "한·중 양국 농업의 상호보완성 강화 방안", "한·중 농산물 무역 패턴과 발전 방향", "주요 품목별 양국 농업 협력 증대 방안", "한·중 새마을운동(신농촌건 설)의 비교 분석" 등

FANEA 국제심포지엄(2003~2007) 분야별 발표 논문 제목

1. 농산물 유통 및 가공: 산지유통, 소비지 유통(도매, 소매)

- "한중일 농촌경제 협력의 선택: 1차 상품 유통조직 혁신", 우시우웬(길림성 정부 농촌경제정보센터, 제1회)
- "일본의 채소 수입 동향과 수입채소 유통의 특징", 고바야시 시게노리 (PRIMAFF, 제1회)

2. 식량 안보, 식품 수급

- "중국의 식량안보 정책과 유통체제 개혁", 슈샤오칭(국무원 발전연구중심, 제2회)
- "일본의 식량안보 문제와 정책방향", 마사토 이토(PRIMAFF, 제2회)
- "한국의 식량안보 문제와 정책반응", 임송수(KREI, 제2회)
- "중국의 곡물 수급 균형 분석", 주시강(IAED/CAAS, 제2회)

3. 농가 경제와 소득 문제

- "농가계층 변동의 특징과 요인", 하시즈메 노보루(PRIMAFF, 제1회)

- "중국의 농촌빈곤과 빈곤 경감 정책", 왕상구이(IAED/CAAS, 제3회)
- "농촌의 불균형", 싱리(IAED/CAAS, 제3회)
- "한국 농업의 구조변화와 양극화 실태", 김정호(KREI, 제3회)
- "한·중·일 농민 소득문제와 정부정책", 리센더(IAED/CAAS, 제3회)
- "신 핵심농가경영 안정화제도에 대한 예비연구", 요시이 쿠니히사 (PRIMAFF, 제4회)
- "한국농정의 최근 변화", 박성재(KREI, 제4회)
- 4. 식품안전: 유전자변형, 검역
- "중국의 농업표준화 개발 현황과 쟁점", 슈샤오준(중국 농업부, 제2회)
- "유전자변형 곡물: 국제 식품체계에의 영향", 타치카와 마사시(PRIMAFF, 제2 회)
- "한국의 식품안전 체계", 최지현(KREI, 제2회)
- 5. 환경농업: 다원적 기능, 유기농, 지속가능성
- "농업의 다원적 기능에 대한 논의와 정책과제", 고다모토유키(PRIMAFF, 제3 회)
- "농업의 다원적 기능에 관한 경제적 조망", 김창길(KREI, 제3회)
- "농업의 다원적 기능과 지역개발", 후즈췐(IAED/CAAS, 제3회)
- "농업의 지속가능성 평가", 다카하시 요시푸미(PRIMAFF, 제3회)
- "순환경제 매커니즘을 통한 농업의 삼차원적 오염 관리", 주리즈 (IAED/CAAS, 제3회)

6. 농업기술: 연구개발, 생산성

- "한·중·일 간 농업경제 연구방향 설정", 쑤에구이씨아(IAED/CAAS, 제1 회)
- "동북아지역 농정연구 협력의 필요성과 과제", 이동필(KREI, 제1회)
- "PRIMAFF 내의 연구협력 활동 개괄", 치바 오사무(PRIMAFF, 제1회)
- 7. 농업생산요소: 농지, 용수, 노동력, 농기계, 농자재
 - "일본 농지이용의 구조적 변화: 차지/대규모화 진행과 농지이용의 후퇴", 오노 도모야키(PRIMAFF, 제1회)
 - "일본 농촌사회의 인구문제", 하시주미 노보루(PRIMAFF, 제3회)
 - "일본의 산지마을과 고령자 생활", 아이카와 요시히코(PRIMAFF, 제3회)
 - "중국의 현행 농지제도: 정립과 평가", 시아 잉(IAED/CAAS, 제4회)
 - "급등하는 국제 원유가격이 일본의 농식품 분야에 미치는 영향 평가", 요시 다 타이지(PRIMFF, 제4회)
 - "유가급등이 시설원예 경영과 생산에 미치는 영향", 이용선(KREI, 제4회)
- "일본 농촌의 연령구조 실태와 요인", 마쯔히사 쭈토무(PRIMAFF, 제5회)
- "한국 농촌 노인의 생산 활동과 관련 변수", 마상진(KREI, 제5회)
- "중국 농촌 인구 고령화의 경제적 영향", 쟝 쯔웨이(IAED/CAAS, 제5회)
- 8. 농산물 무역: 수출입, 관세, 원산지 규정, 지재권

- "한·중·일 농업 및 무역정책 분석을 위한 모형 및 데이터베이스 구축",

리우샤오허(IAED/CAAS, 제3회)

- "동북아 국가의 농업무역 흐름과 쟁점들", 권오복(KREI, 제2회)

- "동북아 농산물 교역문제 연구와 토론", 리우샤오허(IAED/CAAS, 제2회)

- "세계 쇠고기 무역의 구조변화와 영향: Aglink 모형에 의한 시나리오 분석", 우에바야시 아쓰유키(PRIMAFF, 제2회)
- "DDA 이후 한국 농업 전망: 쌀 산업을 중심으로", 서진교(KREI, 제1회)
- "도하 개발 의제 이후 중국의 농업통상", 리우샤오허(IAED/CAAS, 제1회)
- "한중일 3개국 역내 농업교역에 대한 연구", 리우샤오허(IAED/CAAS, 제4 회)
- "협조적 게임이론에 따른 FTA 분석", 후쿠다 류이치(PRIMAFF, 제4회)
- "한미 FTA가 한국 쇠고기 시장에 미치는 영향", 김윤식(KREI, 제4회)

9. 국제협력: 역내 협력(동북아, APEC), 국제기구(OECD, FAO)

- "한·중·일 농업구조 분석: 역내 농업협력 가능성", 어명근(KREI, 제1회)

10. 농촌개발

- "주민참여를 기반으로 한 농촌개발", 유경희(PRIMAFF, 제3회)
- "한국에서의 도농간 발전격차 실태", 박시현(KREI, 제3회)
- "도농간 교류 프로그램의 새로운 단계", 에가와 아키라(PRIMAFF, 제3회)
- "중국의 신농촌건설과 한일 양국의 농촌발전 경험이 주는 시사점", 리센더 (IAED/CAAS, 제4회)

11. 농촌 금융과 보험

- "한국농업 금융의 현재와 미래", 정호근(KREI, 제5회)
- "중국의 곡물 생산 및 위험지역 등급화와 농업보험 정책", 리싱(IAED/CAAS, 제5회)
- "일본의 농업 농촌 금융 현황", 하세가와 고세이(PRIMAFF, 제5회)

12. 바이오에너지

- "바이오에너지 개발과 중국 농업에 미치는 영향", 류 샤오헤(IAED/CAAS, 제5 회)
- "브라질 바이오에탄올의 대일 수출: 세계 설탕 시장의 계량경제적 시뮬레이 션", 고이즈미 다쯔지(PRIMAFF, 제5회)
- "한국의 바이오 연료 생산 동향과 전망", 이상민(KREI, 제5회)

부록 2

제5회 FANEA 국제심포지엄 발표 논문

1) The Present and Future of Korean Agricultural Financing

(한국 농업금융의 현재와 미래) - 정호근 전문연구원, KREI, 농업구조·경영연구센터

1. Introduction

The rural economic activity in general, and agricultural production in particular, is strongly bound by the fact that inputs are transformed into outputs with considerable time lags, and that production and sale outcomes can be highly unstable because of the uncertainty of the nature and the volatility of commodity markets. In such environments, the ability of agricultural enterprises and rural households to make long term investments, take calculated risks, and create stable consumption streams will be constrained by a set of available financial instruments. If the available set of financial services is very limited, households may have to forego valuable investments and income generating activities.

It is very often the case in agriculture that we need to borrow money to purchase machinery or expand production capacity. When it is difficult to get a loan, a good opportunity for investment can't be materialized and the expansion of farming is not guaranteed. It is needless to say that profitability is bound by loan rate, and high interest rate only makes an opportunity less feasible. The task of agricultural financing is to allow farmers to have an access to funds with a reasonable interest rate whenever it is necessary.

Unlike the EU or the US, Korea's policies to support farmers have been highly dependent on financial aids rather than direct income payments. Its agricultural financial policy has traditionally focused on farmers' use of credit, supplying cheap policy loans and allowing agricultural cooperatives to monopolistically handle agricultural finance and mitigate the credit rationing problem of small farms. In the view of agricultural finance, we can say that Korea has a unique agricultural cooperative system.

There are four ways of getting funds required by farmeres to expand agricultural production. First, they can get a loan from financial instutions; among them, mutual credit from agricultural cooperatives plays a major role as a source of funds. That is why a transformation of agricultural cooperatives including the NACF is required, from which we expect a reduction of loan interest rate.

Second, there is public credit, i.e. agricultural policy financing, which is run by agricultural cooperatives on behalf of the government. Because the government bears a part of interest payment, farmers can borrow money from public credit at a lower interest rate. Though it has a high demand from farmers, the number of those who can obtain the credit is limited because of the constraints of the budget assigned as public credit.

Third, there is a public credit guarantee system. Farmers are usually

required to provide collateral in order to get a loan from financial institutions. However, their capacity is very limited because most of their capital including lands is "immovable" in the sense of selling. Public credit guarantee fund assures the borrowing; when a loan is not repayable, it pays back on behalf of farmers.

Fourth and the last, there is the private money market that used to be a major player in agricultural financing. In other words, the agricultural financing system has a tripod consisting of public credit, bank credit mostly from agricultural cooperatives, and the private money market as a source of funds. And we have the public credit guarantee as a back up system.

Agricultural cooperatives have played an important role in supporting the policy as a channel of fund supply and fund mobilization to lend loans in urban as well as rural areas. As a central organization of agricultural cooperatives, the National Agricultural Cooperatives Federation (NACF) conducts banking business like a commercial bank, which may be the only case in the world. It also functions as a central bank of agricultural cooperatives and manages the surplus fund left after lending loans to member cooperatives. In addition, policy loans are channeled to the agricultural sector through the NACF, and the NACF manages the credit guarantee fund as well.

The NACF and the Korean agricultural financial system face challenges in the changing environment of the agricultural and financial markets. Under the pressure of opening up the domestic markets, the prices of agricultural products have declined, while farm households suffer from stagnant income and increasing debts. The financial market becomes more competitive and the loan ratio to savings is getting lower, which means that the profitability of banking business is getting lower, and risks are getting higher. Many cooperatives have disappeared through mergers because of bad loans and accumulated losses. In the Korean financial market in general, the situation has changed from capital shortage to capital surplus. Hence, funding and risk management have become more important factors to survive and be profitable.

In this paper, I'd like to first discuss the changing environment, its implications, and the agricultural financial policy in general. Then the shape of Korean agricultural financial system, as well as major players in the fields of public credit, mutual financing, and government credit guarantee, is described. Third, the tasks to make the agricultural financial system better in a changing environment and the suggestions on getting close to the goals are addressed. Finally, a brief conclusion and summary is followed.

2. Changing environment

The financial system cannot be free from the structural transformation caused by a rapid development of IT technology and the globalization of the financial market characterized by fair competition among fianacial instutions, privatization of public banks, alleviation of regulations, and removal of entry barriers. These changes made business conditions worse as margins are squeezed and banks and financial companies are forced to merge. In the end, there is a common global movement to combine all the relevant financial acts into one and transform the financial industry to become more market oriented and compatible with the world market experiencing globalization and integration. In fact, this trend has made the industry more complex ironically. The share of foreign capital in commercial banks is getting bigger as the structural transformation of the financial industry progresses along with the market opening. New financial techniques have been introduced as the ownership of most commercial banks was taken over by foreign capital. The compatibility of domestic financial companies is getting worse compared with the overseas that have an edge in the capability to develop new products and manage risks.

The financial crisis of 1997, which swept the Asia without notice, almost collapsed the entire financial system in Korea and resulted in the workout of five commercial banks. In the hope of making a fast recovery, various structural reforms, such as workouts and mergers, were made. Since 2001, not only the goverenment but also banks have pursued economies of scale and compatibility through mergers and acquisitions. And this led to major mergers between banks (Kookim and Jootaek, between Hana and Seoul, and between Sinhan and Joheong, all of which were ranked within the top 10 in size). In the case of financial institutions other than commercial banks, there were also workouts from credit unions, crdit community cooperatives, and mutual depository banks.

In accordance with the changes in the financial market, the government eased or removed regulations in the financial market, expanding banksurance²), fund sales by securities, and salary transfers to security accounts in the hope that financial institutions can easily provide integrated financial services. In an aim to achieve a balanced development of the financial industry, financial policy changed its direction from the

²⁾ Bankasurance is a combination of bank and insurance. As a bank it can also issue and sell insurances.

one that centered on banking to one that also include securities and insurance as major players. One of the recent efforts made by the government is the newly introduced **Capital Market Integration Act**. According to the new law, banks can sell funds and insurance products as a subsidiary business. And securities and insurance companies, which are working hard to develop new products, can run bank accounts, call centers, and telemarketing, and benefit from synergy effects as an all round financial company similar to an LCBO (large complex banking organization).

All the changes already experienced or will be faced by the financial industry in general have several implications for the agricultural financial market. The introduction of the capital market integration act will make the integration and competition of the financial market more severe. Accordingly, the financial business of the NACF and primary cooperatives will not be safe any more in the safe cage protected by the government. The financial industry, which used to be focused on the deposit and loan business, will introduce various new products as regulation is relieved. The NACF and primary cooperatives have no choice but to expand their business scope and develop more attractive but riskier products that would require them to intensify fund management skills.

Special sales of deposits from the commercial banks that usually provide attractive interest rates put the pressure on the NACF to do the same thing. And their sales all together may jeopardize the financing business of primary cooperatives. Along with the severe competition in terms of interest rates, the decrease in the number of rural residents, which is caused by the shrinking of agriculture and the weakening of local business foundation caused by aging, also becomes a big threat to the agricultural financing system.

3. Agricultural Financial Policy

3.1. Policy Loan Schemes (public credit)

The primary goal of agricultural policy was to break the vicious circle of poverty and mobilize capital to invest in the agricultural sector. The agricultural policy loans have been used to support the agricultural sector suffering from the capital shortage by complementing commercial financial markets in rural areas. Policy loans, on the other hand, have been used as a way of encouraging technical innovation and structural adjustment in rural areas since the 1990s.

There are a lot of policy loan schemes covering a whole range of agriculture and forestry sectors, such as production, marketing, processing, price stabilization programs, input industry, infrastructure, housing, rural community development, etc. The policy loan schemes are very complicated in types and conditions, so it is not easy to see the whole picture. They are very diverse and complicated in terms of purposes, target groups, and conditions, such as loan terms and interest rates. However, such excessive diversity and complexity have limited loan allocation efficiency and effectiveness. Since one kind of policy loan is provided to only specific commodity, equipment, or facility, the borrower may not get enough money to fulfill his or her purposes, when it is necessary to make several investments. Moreover, the policy loan is usually provided once, and it takes 1~2 years to get the loan after application. Thus it was hard to get proper amount of loans on a timely
manner for investment.

To enhance the efficiency of policy loans following the market principle, the Integrated Loan scheme was introduced in 1999. The loan was supplied after evaluating borrower's creditworthiness and project profitability, enabling borrowers to implement timely investment. Unlike other policy loans that strictly restricted the destination of the loans, the loan allowed flexible uses. Furthermore, the borrower could consecutively apply for the loan if needed, as managing cost and capital investments for fixed assets. That is, the characteristics of Integrated Loan are basically similar to those of general loans of commercial banks.

It can be said that the Integrated Loan scheme has opened a new phase of agricultural financial policy. The government allowed commercial banks to handle the Integrated Loan in 2003, although the range of uses is restricted to livestock production. In other words, it means that the monopolistic position of agricultural cooperatives in dealing with policy loans was weakened. The entry barrier to agricultural financing will gradually be lowered.

3.2. Structural Adjustment Program and Policies against Market Imperfection

Korea has implemented a series of integrated agriculture and rural development programs since 1992, when structural adjustment and agricultural market competitiveness were raised as policy issues along with the opening of the domestic agricultural market. The investment stream into the agricultural sector has been strongly supported by policy loans. Currently, the government carries out the Integrated Program for Agriculture and Rural Development designed to invest 119 trillion won for the period of 2004 to 2013. The agricultural credit policy since the mid 1980s has been focused on lowering interest rates and mitigating credit rationing problems. The credit guarantee fund has been actively used to support farm households to make borrowings, since most of them have weak credit scores and are unable to offer collateral.

As the integrated rural development programs were launched in 1992, the government strongly encouraged the agricultural cooperatives to provide sufficient funds for farmers who are willing to invest in farming. However, the agricultural cooperatives were reluctant to provide loans because of their poor creditworthiness and default risk. Thus, the idea of making a fund for policy loan losses was accepted, which means that the fund would compensate for the losses of cooperatives caused by farmer's default. The Compensation Fund for Agricultural Policy Loan Losses was established in order to encourage the agricultural cooperatives to more willingly lend policy loans.

The farm household debt problem has been another hot issue since 1998 after the foreign currency crisis. The debts had steadily increased since the early 1980s because of the expansion of investment in relation to the commercialization and mechanization of farming. This resulted in a series of debt measures for farmers and fishermen from 1987 to 1989. As the market environment became more favorable due to the increasing demand for food and the government's implementation of a strong price support policy, the farm household economy became stable until the mid 1990s, although the debt size still increased. However, the repayment capacity could not follow the increasing debt burden since the late 1990s, which put a pressure on the government to establish debt measures again. From 1998 when the foreign currency crisis occurred in Asia, the debt measures were drafted and revised almost every year. The repayment schedule for most policy loans was postponed and extended to 20 years at maximum, and the interest rates were substantially lowered to 1.5 percent from 5 percent per year. Even the debts of Mutual Credit loans and cooperative loans were put off, and the interest rate was lowered with the government compensating for the interest gap between the lending and repayment interest rates. Because of the debt problem and the negative prospects of farming, the investment in farming has shrunk recently. Thus, the increasing rate of farm household debt has declined, and the repayment capacity has also gotten better, although the debt problem still remains as an important policy issue.

4. Agricultural Financial System

4.1. Overview of Agricultural Financial System

The Korean agricultural financial system consists of the following entities: financial institutions serving as intermediaries, the government serving as a regulator, the credit guarantee organization serving as a promoter of a system operator, and depositors and borrowers serving as final suppliers and demanders of financial transactions (Figure 1). Although the rural financial market is divided into formal and informal markets, the informal market only exists at the minimal level since it does not play significant roles anymore.

There are several kinds of financial institutions in rural areas, such as cooperatives (Agricultural Cooperatives, Community Credit Cooperatives, and Credit Unions), commercial banks, and postal savings. Among them, major agricultural cooperatives take a lion's share of the market, while



Figure1. Agricultural Financial System in Korea

their federation, the NACF, conducts an important function of supporting and regulating member cooperatives rather than conducting direct transactions with farmers.

The government, especially the Ministry of Agriculture and Forestry, regulates the system and provides policy loans through the agricultural cooperative system. It also contributes to the Credit Guarantee Fund for Farmers and Fisheries (CGFFF) managed by the NACF. Local governments participate in this system by screening borrowers of policy loans and supervising government supported projects.

The credit guarantee fund provides the financially weak farmers who do not have enough collateral to get loans an opportunity to use the funds. This promotes financial transactions by mitigating the market imbalance caused by information asymmetry. The CGFFF was introduced in 1972 and has been actively utilized since 1987 when the debt measure for farm households was taken.

In terms of regulation, the agricultural cooperatives have been strongly supported by the government. They have a monopolistic power in dealing with agricultural finance, and are allowed to perform other businesses on the sideline, such as banking, insurance, and other commercial activities that have been generally prohibited against other institutions up to now. However, the capital market integration act, which will be activated in 2008, will make the financial market more integrated. In that case, less attractive institutions will disappear and mergers and acquisitions will be more commonly noticed.

Anyone can deposit at the agricultural cooperatives, but the loans to non farmers are internally regulated through the limit of the total loan amount to non members. Of the total loans of primary agricultural cooperatives, at least two thirds should be lent to cooperative members. Furthermore, the CGFFF provides loans to agricultural, fishery, and forestry cooperatives, as long as they are used for production purposes.

The agricultural financial system in Korea was constructed when the fund shortage was severe. It focused on attracting savings and supplying funds to the agricultural sector. However, the socio economic environment has substantially changed. The fund surplus problem, rather than savings mobilization, is more importantly considered. Farm managerial capacity and profitability have become more important factors in screening eligible borrowers. The system is required to improve its efficiency and effectiveness to contribute to the farm household economy and rural society development.

4.2. Tasks of Agricultural Financial System

An efficent financial market is a prerequisite of agricultural development. The supply of loans with a low interest rate doesn't guarantee agricultural development, because if the loans with a low interest rate are used inefficiently, it only ends up with a lower profitability. When funds flow into commodities where oversupply and the deterioration of profits are expected, it only makes the situation worse. Meanwhile, if a fund is not provided where required on the grounds of lack of collateral, or is available only with a high interest rate, it will delay the development. An efficient agricultural financing is reachable only when commercial and public financings are well balanced.

On the whole, there are five tasks for the agricultural financial system to achieve. First, the supply of funds to farmers or the commodities with better future prospects needs to be made smoothly. For this, it is important to let the funds flow into where profitability is better rather than where collateral can be easily secured. At the same time, a system to prevent funds from going to where profitability is poor needs to be designed. Second, an upgrading of the financial services provided to farmers is quite necessary because the welfare of farmers is so much dependent on it. It is required to provide various kinds of financial services, including an efficient portfolio that is quite fit with farmers whose production and daily life are not separated. Third, the credibility of farmers needs to be reconsidered. Farmland accounts for most of the capital farmers own, and their value as collateral is low because restrictions are imposed on owning and using farmland. Hence, the land is not effective as a collateral asset, and the cross guarantee among farmers has been commoly used. Having joint liability of a guarantee together, when a farmer goes bankrupt, it has a detrimental ripple effect on the whole village. Fourth, in order to stabilize the rural economy and promote the compatibility of agriculture, farmers need to be relieved of the excessive financial burden. It is more desirable to achieve this at the will of the market rather than through policy influence. Fifth, a more severe competition ignited by an opening of the agricultural market will lead more farms to be failed. A proper rescue program for the farmers who are in danger, as well as workout programs that can provide more opportunities for new capable market entry in the end, needs to be built.

4.2.1. Public Credit

Some types of government intervention can clearly serve the useful purpose of promoting financial market trade between private parties. For example, the transaction costs between private parties may be reduced if the state is able to provide impartial and accessible legal mechanisms for the arbitration and enforcement of contracts. Similarly, the prudent regulation and supervision of deposit taking financial intermediaries may promote deposit mobilization and encourage efficiency enhancing market competition between banks. Even some forms of more direct government intervention, including direct loans and government loan guarantees, may arguably at times help 'crowd in' private sector financial intermediation that may have otherwise been reluctant to operate.

A public credit system needs to be renovated. The long-term public credit is a very important capital asset for agricultural development, and it needs to be made based on business successability rather than based on collateral. For this, the expansion of the integrated loan scheme, where the usuage of fund is decided by farmer's choice, is necessary, and this can be accomplished by integrating several dispersed public credits. Most of the public credit from integrated loan went to livestock. In 2004, more than 60%, 325 billion won, of integrated loan scheme used for livestock and second largest beneficiary was sepecial products as 14%, 74 billion won.

There is the farm operating loan, a short term one year loan, which is the biggest public credit with a capital of 3.8 trillion won and used by largest number of farmers. Rather than combining it into an integrated loan scheme, it is beneficial to downsize and leave it as a welfare fund for petty farmers. Instead, the operation fund for the full time farmers who manage a large farm is provided under the integrated loan scheme so that all the loans for the purpose of promoting the compatibility of agriculture can be made from it.

To improve the efficiency of administrating agricultural public credit, it is necessary to allow any financial institution to be an administrator of public credit. Since the decision to approve loans from the integrated agricultural loan scheme is made by a financial institution, the NACF and the current system denies any institute other than the NACF to play

							mon won, <i>i</i>
	Year	Vegetable	Fruit	Flower	Special Products ³⁾	Livestock	Total
	2002	764(12.7)	726(12.1)	300(5.0)	566(9.4)	3669(60.9)	6027(100)
	2003	465(11.6)	425(10.6)	176(4.4)	559(14.0)	2377(59.4)	4003(100)
	2004	541(10.3)	465(8.8)	262(5.0)	743(14.1)	3252(61.8)	5262(100)

 Table 1. Supply of agricultural integrated loan by commodity

 Unit: 100 million won %

Source: the NACF

3) Special products include ginseng, tobacco, tea and cotton.

the administrating role, the current monopolistic administrator has a temptation to make loans based on safe procurement of collateral rather than business potential. Then, the usefulness as a public credit disappears and there is no need to compensate the interest difference and guarantee the credits. Indeed, by facilitating competition among financial institutions we need a system to minimize such a moral hazard, which in turn will lower the public fund spending.

For the new entrants who haven't verified their business capability and have a few assets as collateral, it is appropriate to provide a new loan with low interest rate, which is separated with the integrated loan scheme and less strict in requiring collateral. When the government makes a policy to combine it with a subsidy, it in return lowers the size of the loan and thus the burden of administrator from a loan failure. As a new entry proves its credibility, the government can gradually make the size of a subsidy smaller and allow a loan to be made from the integrated loan scheme.

Establishing such a public credit scheme is not sufficient for the agriculture to be equipped with enough compatibility. It is necessary to prepare an early warning system where administrators regularly monitor the financial situation of farmers and build a data base to perceive future problems in advance. In the early warning system, a comparison is made among several management indexes such as debt ratio, margin, cost, and the productivities of similar commodities or farms of similar size. When a bad sign is found, farmers are notified and referred for consultation to solve the problem before it is too late.

The public credits and subsidies from the government is the primary funding source in agriculture. If we expect to see more innovated business units in agriculture, a public credit scheme in the shape of investment is required. Sometimes it is necessary to support highly risky and adventurous businesses with a potential for high returns. When organizing a venture capital for this cause, the government, financial instutitons, and non agricultural firms should participate and invest in the venture. In order to improve the liquidity of the funds invested in a venture capital, it is better to choose an open type investment fund in which financial institutions and firms participate by buying government stocks transferable to a third party. The government, which issues stocks for a certain percentage of a venture capital, bears the risk prior to any one and subtracts a part of its investment, when there is a loss of a venture capital. Venture capital in agriculture will make agricultural financing one step closer to an advanced system.

4.2.2. Public Credit Guarantee Scheme

The public credit guarantee scheme (PCGS) makes up for the credibility that is necessary for farmers, who has a nice business plan but lacks of collateral, to get a loan. When a farmer applies for the credit guarantee, it evaluates the eligibility of the application then issues a letter of guarantee with a small fee if approved. Then the farmer can get a loan from financial institutes without collateral. If the farmer cannot pay back in time, the PCGS subrogates and has an obligatory right from the farmer.

Its capital consists of contributions from government, participating banks, and operating profits of the PCGS fund. It recorded a remaining guarantee, 19.2 trillion won, and a new guarantee, 9.8 trillion won in 2004. Because of the expansion of special guarantee and increase in subrogration, the remaining fund of the PCGS was only 0.9 trillion won in 2004

Unit: 100 million wo								
Year	Government Contribution	Banking Contribution	Operating Profit	Remaining Fund	New Guarantee	Remaining Guarantee		
2000	4,260	191	1,181	9,048	90,567	144,605		
2001	3,765	203	1,508	11,508	124,684	186,066		
2002	2,562	227	2,860	11,437	59,929	193,889		
2003	1,000	321	3,208	9,550	62,410	191,004		
2004	3,478	438	3,854	9,612	98,782	192,241		

Table 2. Size and record of public credit guarantee scheme

Source: Park, S.J. et al.2006.

This is designed to persuade financial institutions to make a loan based on business prospects rather than collateral value. However, it is criticized not to accomplish its goals and only expand the size of subrogation through more special case guarantees which they hope would complement the farm debt policy. The first priority of improving the scheme is to expand the size of the fund because its capital has been deteriorated from the expansion of subrogation. Until 2000, the fund size of the public guarantee scheme had increased as the profits made from managing the fund had been larger than the subrogation. The situation has reversed since then, and the public guarantee system is less capable of making a new guarantee. There are two factors explaining the situation. First, the risk of a farm failure increases as the rural economy gets worse. Second, the special guarantee as a tool of debt policy for farmers, who are less capable of repaying, only ended up with subrogation. We estimated that the minimum size of the fund needed to smoothly run the guarantee system stands at 1.2 trillion won, whereas the current size is lower than 1 trillion won.

It is necessary to create an independent institute that can administer the PCGS. The role and responsibility become ambiguous in the current system where credit guarantees and loans are made by the same institute. We need to separate the credit guarantee role from the institute to prevent moral hazard and bad practices of the institute. In the sense that the current public guarantee scheme operates regional guarantee centers, most of the infrastructure needed to propel the scheme is already in place. Another task to improve the public guarantee scheme is to change it from a one to one matching guarantee to a partial guarantee. The public guarantee system only guarantees 90 % of principal and financial instutions bear a 10 % risk without collateral. Then it will encourage financial institutions to intensify business evaluation and make a decision on lending based on business prospects.

The expansion of a business terrority in a public guarantee scheme is desirable for revitalizing the marketing in production areas. For example, many marketing firms in production sites do business on credit, and end up with a large loss when buyers don't fulfill the contract. In this case, a certain portion of the contract amount can be assured by a public guarantee scheme as a contract assurance. The accumulation of the record associated with contract fulfilling assurance will make it possible to sort out capable and reliable firms and ultimately decrease the risk of marketing failures in production sites.

4.2.3. Mutual Credit

Since a large number of farmers use mutual credit as a source of their funding, the core task to improve agricultural financing is to promote the compatability of mutual credit by agricultural cooperatives. But, the mutual credit is fragile and, since the late 1990s when there was an oversupply of funds in general, it has even become an obstacle to improve the agricultural financing system. The mutual credit system is criticized on the grounds that it provides poor financial services compared with other financial institutions. In 2006, the loan rate in commercial banking was 6.2% and the one offered by the NACF was 5.9%. Meanwhile, the loan rate of the mutual credit was 6.6% and this meant that farmers were paying more for using the funds⁴). In terms of the spread, which is the difference between deposite rate and loan rate, Mutual credit has 1.83% and its spread is between the one of the NACF, 2.63% and the one of commercial banks, 1.49%.

The reason for the higher interest rate derives from the poor business size of farmers. This is well reflected in the fact that the labor cost accounts for more than 70% of the gross revenue. The interest gap between deposits and loans is the main source for making up the labor cost, and that is why agricultural cooperatives need to charge a higher interest rate for a loan. To make it worse, the business district of an agricultural cooperative for mutual credit is restricted to a certain small

Table 3. Comparison of interest rate among financial institutions (2006)Unit:%

	Deposit	Loan	Spread	
Mutual Credit (A)	4.80	6.63	1.83	
The NACF (B)	3.27	5.90	2.63	
Commercial Bank (C)	4.60	6.19	1.49	
A B	1.53	0.73	•	
A C	0.20	0.44	•	

Source: the Bank of Korea, the NACF

⁴⁾ Interest rates for deposit and loan are the average from all the new transactions in December, 2006.

boundary, thereby making its business expansion very difficult. And several kinds of mutual credit compete together in a same district and only deteriorate the profitability.

Most of the mutual credits categorized as rural cooperatives are located in a town area and, since their business sizes are so small, more than 70% of the cooperatives have a deposit of less than 100 billion won. To the contrary, more than 50% of the mutual credits in large cities enjoy a deposit volume bigger than 300 billion won. The loan rate of mutual credit is higher in rural areas because the mutual credit in city areas is much bigger and the competition with other financial institutions is much severe.

Hence, it is a first priority to make agricultural cooperatives bigger for improving the agricultural financial system, and the merger between the city and rural markets is one way to achieve this. At least, the ratio of labor cost to gross revenue needs to be lower than 45% in order to improve the level of financial service. It is also necessary to integrate the financial business at least up to city or county (Gun) size.

Table 4.	Comparison	of	deposit	volume	in	different	areas
	Companoon		aopoon	Volumo		unioroni	aiouo

				Unit	t: percent
Area	Less than 30 billion	30 ~ 100 billion	100 ~ 300 billion	More than 300 billion	Total
Large City, Province	4.1	16.5	27.8	51.5	100
City, County	9.7	24.8	34.0	31.6	100
Town ⁵⁾	19.9	64.0	15.3	0.9	100

Source: Park, S.J. et al. 2007.

⁵⁾ The administration districts smaller than a city or county (Gun) are Eup and Myeon. And town represents Eup and Myeon.

Since the merger among small mutual credits is a very slow process, we in the short run need to operate regional loan centers that can take care of loans bigger than a certain size so that one small mutual credit cannot handle alone. We expect that more efficient business operations and a lower loan rate can be achieved by establishing regional loan centers, every one of which is run by several mutual credits in a certain area. Each mutual credit transfers all funds except the reserves for small loans and required reserves, and the loan center can take care of large loans instead of individual mutual credits.

It only impedes the stability of the whole agricultural cooperative system if petty cooperatives are allowed to stay in business with the support either from the NACF or the government. It is necessary to renovate or work out unreliable cooperatives by enforcing the act of remedy, which is activitated when the ratio of net capital is lower than 4%. At the same time, it is necessary to have a careful evaluation of cooperatives and find out which are so much dependent upon the support by the NACF and take appropriate actions. Special funds to speed up the merger among small size cooperatives might be necessary. Remaining small and inefficient cooperatives only make the government policies associated with the mutual credit and agricultural financial system less effective. Proper enforcement of a remedy act and incentives from special funds will speed up the merger and make mutual credit bigger and more competitive.

5. Conclusion

The policies associated with agricultural finance have traditionally focused on farmers' use of credit by supplying policy loans. The agricultural cooperatives, together with the NACF, have successfully performed their roles as a resource mobilizing institution and the conduit for supplying agricultural funds. The credit guarantee system and the compensation instrument for policy loan losses have been actively utilized to mitigate the credit rationing problem incurred from information asymmetry.

However, the policy of expanding the supply of cheap policy loans, which have been distributed by a government organization, proved to be unwise. A number of investment failures and the rapidly increasing farm household debt became an obstacle to rural development, which turned out to be very difficult to solve.

Though agricultural financing has worked fairly well in providing necessary funds to farmers and rural areas, there are still numerous tasks to achieve in order to enhance the system. Most of all, an efficient public credit system needs to be established to improve the efficiency of agricultural policy and develop agricultural financing. Fair distribution of funds is the first priority in the system; however, it is doomed to be failed if it only secures collateral for the safe recovery of loans. The governemnt needs to categorize farmers or funding purposes according to several target groups. There are poor or isolated groups, commercial farming that leads the agricultural industry, next generation farmers, and risky projects that could gain high profits and provide social benefits if they become successful.

The public credit targeted industry development needs to be assigned according to business analysis rather than fairness or collateral value. And a good business analysis, which can lead a reasonable conclusion, can be achieved with enough data analysis, strict examination, and removal of unnecessary restriction. The integrated loan scheme was introduced for this purpose, and the expected benefits can be achieved only when all the industry purpose loans are integrated with it, thereby inducing competition by allowing any financial institution to run the integrated loan schem on behalf of the government under its own responsibility. It is also necessary for all the participated institutions to prepare an early warning system to notify any problem in advance by properly monitoring all the loans.

Public credit guarantee scheme is very important in improving the efficiency of public credits, and a better system is achievable when it is run by an independent institute that estimates farmers' credit and independently makes decisions on providing guarantees. It is not desirable to integrate the public credit guarantee system for agriculture with the general public credit guarantee system. The current one to one matching of guarantees needs to be changed into a partial guarantee system in order to improve the efficiency of the system. Partial guarantee system, which is widely used in advanced countries, encourages the institutions that run the credit guarantee business to work hard in managing their guarantee loans.

Improving the efficiency of mutual credit from agricultural cooperatives, which will ultimately lower the interest rate charged, is as important as improving the public credit system. Though there are numerous tasks to be performed to achieve this, overcoming their small size in business is most important than anything else. When their business size is small, the cost associated with mediating funds is high and there is no choice but to pass the burden to users who are mostly members of cooperatives. Hence, the government, the NACF, and cooperatives all together need to put their efforts on making the scale and scope of mutual credit larger possibly by means of mergers among cooperatives.

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2) Productive Activities of the Korean Rural Elderly and their Related Variables

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Abstract

The purpose of this study was to identify the factors influencing productive activities of the Korean rural elderly. Utilizing data from the 2004 survey on the Living Profile and Welfare Service Needs of Older Persons in Korea, this study predicted the productive activities of the rural elderly. All of the ten predicting variables selected from the survey and literature review — age, gender, education, activity limitation, personal income, health, organization, family status, socio economic status, and job — were found to have significant partial effects on such productive activities as paid work, care giving and volunteer work. The following are major conclusions: The rural elderly women had more care

giving, whereas men had more volunteer work. Participation in religious or social organizations was a good predictor for participation in a volunteer work. Single family status was a negative factor for care giving. Being a farmer or not could explain the paid working time most effectively. The rural elderly with a relatively high socioeconomic status have more inclination to participate in a volunteer work. Aging reduces the possibility of sharing the experiences of a paid work or care giving. Activity limitation had a negative partial effect on care giving. Good health was the only valuable predictor for all kinds of productive activities. Personal income was positively related with paid work and care giving. The highly educated were more likely to do unpaid productive work.

Introduction

Korea is one of the fastest aging nations in the world. With rising life expectancy and a sharp decline in fertility rates, Korea became an aging society in 2000, and will be an aged society in 2018 when the elderly population (aged 65 and over) is projected to reach 14.3%, and a super aged society by 2026 with an estimated ratio of the elderly population reaching 20.0%⁶). Korea's elderly dependency rate (EDR)⁷) becomes higher and higher⁸), which poses significant challenges such as the need for long term care or substantial medical or social support. In terms of aging, the rural community has already entered the super aged society with the elderly taking up an 18.6% share of the population as of 2005. The EDR of rural community was 8.2 in 1970, which reached 29.0 in 2005. The rural community is aging faster than the urban community by about 20 years.

In the face of this longevity, gerontology scholars have focused on well being within those extended years and proposed that successful aging is related with productive activities as well as low probability of disease, high functioning, and social support (Rowe & Kahn 1998). Productive

⁶⁾ According to the United Nations, "aging society" is defined as a society where people aged 65 and over (the elderly) accounts for more than 7% of the entire population. By the same token, a society with the elderly accounting for higher than 14% is called "aged society," and a society with the elderly accounting for higher than 20% is called "super aged society."

⁷⁾ The ratio of elderly to the working age population

⁸⁾ The EDR went up from 5.7% in 1970 to 12.6% in 2005.

activity is any activity that produces goods or services, whether paid for or not (Bass, Caro, & Chen 1993). Productive activities such as volunteering, working, and care giving are clearly a subset of activities in which older adults engage, and they have a common element: they have social benefit, benefits that extend beyond the individual.

While it depends on the types, quantity, and conditions of activity, volunteering, working, and care giving are assumed to have such personal benefits as mental health, psychological well being and survival of the elderly (Glass 1999). In addition, older adults engaged in these productive activities are performing valued functions for the benefit of society. There would be increased demand for elders in these roles in future years. The labor market will demand longer work lives (Blondal & Scarpetta, 1998). Growing social problems and reduced public expenditures will demand increased volunteerism (Cnaan & Cwikel, 1992). Increased numbers of the oldest old will require a larger force of caregivers. Thus, our society may require the productive engagement of older adults.

Purpose and Objectives of the Study

The purpose of this study was to identify the factors influencing productive activities of the Korean rural elderly. The objectives of this study were as follows:

- Describe the productive activities and the selected predicting variables of the rural elderly.
- Identify the factors influencing productive activities of the rural elderly.

Theoretical Background

Activity has long been associated with improved well being in later life. However, it is possible that not all activity is created equal - to the individual, the family, and society. Productive activity is any activity that produces goods or services, whether paid for or not (Bass, Caro & Chen 1993). Activities included in this definition are volunteering, working, and care giving. These activities are clearly a subset of activities in which older adults engage, and they have a common element: they have social benefit, benefits that extend beyond the individual.

Key research findings

A substantial body of literature documents a positive relationship between employment and well being, even when health and financial status are considered. In a recent review of the literature on job loss, retirement, and health, Kasl and Jones (2000) conclude that unemployment is associated with a 20 30% increase in mortality in most studies and that unemployment increases physical illness and psychological distress. Furthermore, Gallo, Bradley, Siegal, & Kasl (2000) found that older adults who were involuntarily laid off had poorer physical functioning and mental health, even after considering their health before the job loss. These researchers conclude that late stage job loss has important consequences for well being. They point out that older workers are displaced from jobs more than younger adults and older adults often enter retirement involuntarily.

Many researchers have documented that volunteers have higher levels of well being and life satisfaction than non volunteers, suggesting that volunteering can play an important role in maintaining good health in later life. Musick, Herzog, and House (1999) document in an eight year study of more than 1,200 adults over the age of 65 that volunteers have a lower risk of dying than non volunteers, even after considering the effects of physical health, socioeconomic status, and social connectedness. Moen, Dempster McClain and Williams (1992) studied a sample of 300 women over a 30 year period and found that volunteering at an earlier time was related to functional ability at a later time.

While paid work and volunteer work are reported to have positive relationships with physical and mental health, there is abundant evidence, from almost 20 years of research, that care giving for a dependent relative can negatively affect physical health, mental health, and financial status. Biological studies have shown that caregivers are at increased risk of higher blood pressure, weight gain, and other metabolic changes than non caregivers. Schulz & Beach (1999) document that spousal caregivers reporting care giving strain had mortality risks 63% higher than non caregivers, after controlling for health and other socio demographic factors. However, care giving outcomes are improved in certain situations, and caregivers with higher levels of religiosity and with involvement in several roles (like volunteering or paid working) had higher levels of emotional health (Moen, Robinson, Dempster McClain, 1995). Potential benefits reported include enhanced sense of self efficacy, improved relationship with care recipient, congruence with one's religious or ethical principles, sense of purpose and meaning, and reassurance that care recipient is getting optimal care (Morrow Howell, 2000).

Variables that influence productive activities

There are at least four distinct categories of variables that influence the

productive activities of older people: environmental variables, situational variables, individual variables, and social policy (Bass and Caro, 2001). The environmental variables that influence individual productive participation include the general state of the economy, the norms within a distinct culture or subculture, larger world events (such as war), political developments, demographic changes, and cohort membership. These variables are largely outside the control of the individual, but, in some respects, they can be influenced by social policy. It is less likely, for example, for an older person to find employment in an economic recession than in a time of low unemployment.

Situational variables include prescribed roles, obligations and responsibilities, socioeconomic status, educational attainment, organizational circumstances, traditions, community context, and health. For the most part, an individual has little choice over situational variables; they are part of the individual's milieu. The way in which these circumstances are configured, however, can create either constraints or opportunities for productive aging.

Individual variables are those that are most frequently discussed when examining productive outcomes. These variables include motivation, drive, creativity, attitude, aptitude, habits, gender, race, ethnicity, physical features, and genetic profile. While there is often room for the adjustment of individual variables, some variables are inherited and cannot be changed. Individualized variables can influence one's interest in productive participation.

Finally, and perhaps least considered in its influence, is social policy. Social policy determines government and employer policies, pension policy, organizational rules, taxation regulations, priorities, and public and private programs.

Impingement from any one of these four categories can limit the ex-

tent to which a person chooses to participate in a productive activity. Alternatively, an incentive or encouragement from any of these variables, particularly from social policy, can encourage greater participation. It is here where economists, policymakers, and planners have begun to consider ways in which policies can remove barriers and provide incentives to encourage those who choose to participate in some form of productive activity.



Figure 1. Productive Activity in Later Life

Methods

Data

The analysis reported here utilized data from the survey on the Living Profile and Welfare Service Needs of Older Persons in Korea, which was conducted by Korea Institute for Health and Social Affairs (KIHASA) in 2004⁹). The total number of rural respondents aged 65 and over was 1,055.

Variables

The dependent variables in this study were such productive activities as paid work, care giving, and volunteer work. Care giving includes the economic support, nursing, childcare, housework, shopping, transportation, and counseling, which the elderly give to relatives or neighbors. The independent variables were selected from those variables which were reported to influence productive activities and were available from the survey, including age, gender, education, activity limitation, personal income, health, organization, family status, socio economic status, and job (farmer or not)¹⁰). See Table 1 for a detailed list and operational definition of the variables.

⁹⁾ The aim of the survey was to provide information on the living profile of older persons and suggest ways to adequately respond to dramatic changes in both population ageing and socioeconomic development. The survey was conducted by KIHASA from June 13 to September 10, 2004 (75 days) on 3,278 elderly persons aged 65 and over.

¹⁰⁾ Organization variable was recoded into two dummy variables (religious, social).

Analysis

The data were analyzed using the SPSS 12.0 for Window. A multiple linear regression analysis was used to explain the percent variance in such productive activities as paid work and care giving related to elderly individual and situational variables. A binary logistic regression was employed to identify the significant variables affecting volunteer work. The alpha level was established a priori at 0.05. Also, appropriate descriptive statistics — frequencies, percentages, and means — were used to describe the data.

Results

Description of productive activities and the selected variables

Forty seven percent of the rural elderly was working, and their average working hours per week was 16.36, which was almost double of that of the urban elderly. Seventy eight percent of the rural elderly had experiences of care giving, averagely 2.04 of total score which came from 2 point (1=experienced, 0=not experienced) seven questions on care giving experiences such as economic support, nursing, grandchild daycare, housework, shopping support, commuting support, counseling, which was almost the same score as that of the urban elderly. About ten percent of the rural elderly had donated their time to volunteer work, which was 5% less than that of the urban elderly¹¹.

Of the urban elderly, 20% was working, and their average working hours per week was 8.25. Eighty two percent of the urban elderly had experiences of care giving, and their care giving score was 2.10. About sixteen percent of the urban elderly had spent their time on volunteer work.

Variables	Definition and Measurement	Statistics		
Dependent				
Paid work	work working hours per week			
Care-giving	2.04			
	range: 0~7 (0= experienced none, 7= experienced all of them)			
Volunteer Work	1= experienced, 0=otherwise	10.2%		
Independent				
		Proportions		
Gender	1=female, 0=male	62.2%		
Organization	-Religious 1=participating, 0=otherwise	43.2%		
	-Social 1=participating, 0=otherwise	32.1%		
Family	1=single, 0=otherwise	23.5%		
Job	1=farmer, 0=oth- erwise 35.7%			
Socioeconomic	1=middle or high			
Status	class, 0=other- 35.9% wise			
Activity Limitation	1=yes, 0=otherwise	7.2%		
Health	1=bad, 0=otherwise	38.4%		
		Means		
Age	Age in years	74.36		
Personal Income	Monthly personal income in 10 thousand won	36.74		
Education	Years of education	4.55		

Table 1. Operationalization and summary of descriptive statistics of variables

Of the rural sample, 62.2% was female. The age was 74.36, and the total number of education years was 4.55, on average¹²). About forty three percent had memberships of religious organization, and 32.1% of social organization. Single family has the proportion of 23.5%. Over a third of the rural elderly were farmers (35.7%) and those who thought they were middle or high socio economic class (35.9%). Seven point two percent of the rural elderly had activity limitation, and 38.4% of them thought their health status was bad. The mean personal income of the rural elderly was 367.4 thousand won per month.

Table 2 showed the regression predicting productive activities of the Korean rural elderly. Linear regression on paid work of the rural elderly reflected that four variables had significant partial effects: job, β =0.469; age, β = 0.206; personal income, β =0.181; and health, β = 0.070. The completed model had an adjusted R square of 0.403, F=65.421, and P<0.001. The rural elderly whose jobs were farming spent more time on paid work than the rural elderly with other jobs. Aging was negatively related to the amount of time spent on paid working, while personal income and good health were positively related.

During linear regression on care giving, eight variables were found to have important predictability: single, β = 0.428; age, β =0.203; gender, β =0.183; activity limitation, β = 0.177; personal income, β =0.115; education, β =0.089; job, β =0.078; and health, β = 0.075. The completed model had an adjusted R square of 0.323, F=46.565, and P<0.001. Whereas the single rural elderly had less experience, the female had more experience in care giving than the otherwise. Aging, personal income, good health,

¹²⁾ Twenty three percent of the rural elderly were illiterate and 49% of them had not experienced formal education.

Variables	Paid Work ^a		Care-giving ^a		Volunteer Workb	
variables	b	β	b	β	В	Odds Ratio
Gender	0.866	0.019	0.586***	0.183	-0.832**	0.435
Organization Religious	0.255	0.006	0.110	0.035	0.655**	1.926
Social	1.683	0.036	0.057	0.017	0.921***	2.512
Family	-3.192	-0.062	-1.569***	-0.428	-0.184	0.832
Job	21.468***	0.469	0.253**	0.078	-0.341	0.711
Socioeconomic Status	-0.743	-0.016	-0.126	-0.039	0.812***	2.253
Age	-0.702***	-0.206	-0.049***	-0.203	-0.028	0.973
Activity Limitation	-0.017	-0.002	-0.102***	-0.177	0.067	1.069
Health	-3.174**	-0.07	-0.238**	-0.075	-0.572*	0.565
Personal Income	0.094***	0.181	0.004***	0.115	-0.003	0.997
Education	-0.321	-0.053	0.038**	0.089	0.175***	1.191
Constant	60.142***		6.612***		-2.301	0.100
Model F(df) / chi-square (df)	65.421 (11,1041)		46.565 (11,1041)		156.395 (11)	
Р	0.000		0.000		0.000	
Adjusted R ² / Correct Predictions	0.403		0.323		90.3%	

Table 2. Regression Predicting Productive Activities

a: Linear Regression, b: Binary Logistic Regression *P<0.05, **P<0.01, ***P<0.001

education, and farmer had positive relationships with care giving activities.

Logistic regression analysis was employed to predict the probability that the elderly would spend their time on volunteer work. A test of the full model versus a model with constant only was statistically significant, $\chi^2(11, N=1,053)=156.395$, p<0.001. The model was able to correctly classify 90.3%. Out of eleven predicting variables, six variables were identified as explainable predictors of volunteer work. Social organization has the odds ratio of 2.512, socioeconomic status of 2.253, religious organization of 1.926, education of 1.191, health of 0.565, and gender of 0.425. The odds radio for social organization indicated that when holding all other variables constant, the rural elders with a membership of a social organization was 2.512 times more likely to do volunteer work than a rural old people without the membership. Inverting the odds ratio for gender revealed that male was 2.136 times more likely to have volunteer work. The higher the socioeconomic status, the more the education and the better the health, and the probability of doing volunteer work rose up.

Conclusion & Recommendation

This study was to identify the factors influencing productive activities (paid work, volunteering, and care giving) of the Korean rural elderly. To predict productive activity, this study employed ten variables available from the 2004 survey on the Living Profile and Welfare Service Needs of Older Persons in Korea, which was conducted by KIHASA. All of the selected variables — age, gender, education, activity limitation, personal income, health, organization, family status, socio economic status, and job — had been reported to influence productive activities by previous researches, and this study has found that they had the following significant partial effects on productive activities:

- Gender was a predictor of care giving and volunteer work. The rural elderly women had more care giving, whereas men had more volunteer work.
- Religious organization and social organization membership were closely related volunteer work, but not paid work and care giving. which meant that their participation in those organizations raised the possibility to do volunteering work.

- Family was negatively related with care giving, which meant single family status of the rural elderly was a negative factor of care giving.
- Job was the best predictor of paid work, even though four other variables were related with it, which meant that the rural elderly farmers had more time in paid work than the other elderly.
- Socioeconomic status was positively related with volunteering, which meant that the rural elderly of a relatively high socioeconomic status had more inclination to participate in volunteer work
- Age was a negative predictor of paid work and care giving, which meant that the aging of the rural elderly reduced the possibility to share the experiences of paid work or care giving
- Activity limitation had a negative partial effect on care giving, whereas it was not a significant predictor of paid work or volunteer work.
- Health was the only valuable predictor of all kinds of productive activities. It was assumed that good health could be a prerequisite condition for productive activities.
- Personal income was positively related with paid work and care giving, but had not significant relationship with volunteer work. Personal income could be not only the outcome of paid work but also the predictor of it, whereas it also could be one of the essential conditions for care giving.
- Education was the good forecaster of care giving and volunteer work, which meant that the rural elderly who are highly educated are more likely to do unpaid productive work.

The rural community of Korea has already entered the super aged society, which means any rural social policy could not succeed without considering the elderly. There would be more and more social need for the elderly to participate in social, economic, cultural, recreational, and volunteering activities, which would contribute to the growth and maintenance of personal and social well being.

Dealt with such productive activities as paid work, care giving, and volunteering, this study could not include all of the productive activities of the rural elderly for the data limitation. The rural elderly have been doing many other productive activities in their communities, playing such roles as a village guider and a traditional game facilitator for rural tourism.

In addition, the outcomes of productive activities were not investigated in this study. Future study should include more broad and specific rural productive activities and find the relationships these activities have with mental and physical health or well being, and financial status.

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3) The Current and Future Aspects of Biofuel Production in Korea¹³⁾

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Introduction

Bioenergy, such as methane, LFG (Landfill Gas), bioethanol, biodiesel, or biogas, is made from various biomass, and they are used for transportation, heating and generating power. Besides fossil energy, bioenergy is made of renewable and environmentally friendly resources. It reduces greenhouse gas emissions and mitigates the concerns about future energy security. The most interesting feature of bioenergy in the agricultural sector is that it helps rural development by increasing the demand for agricultural feedstock and opening new markets for agricultural crops. The growth of bioenergy production will cause a transition in agriculture from its traditional role as a producer of food and fiber to a producer of energy in addition to food and fiber.

The development of bioenergy, however, is not an easy task because of the difficulty in securing feedstock and the difficulty of developing a variety of technologies needed to process numerous types of feedstock to be used. Also, the development of bioenergy could destroy the environment if resources are overused.

Bioenergy may be gaseous, liquid or solid. The worldwide interest in

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biofuel, a liquid type of bioenergy, is growing because it is a feasible substitute for the conventional fuels, while the price of crude oil increases and global warming, due to heavy dependence on fossil fuels, causes environmental problems.

Bioethanol and biodiesel are representative biofuels, which replace gasoline and diesel. Biodiesel is produced through a relatively simple chemical reaction called transesterification which involves the mixing of methanol with vegetable oils, animal and fish fats, or recycled cooking oils. Grain based biodiesel results in life cycle greenhouse gas as well as carbon dioxide (CO2) reductions compared to conventional diesel. European countries are the main producers of biodiesel.

Bioethanol is made from biomass containing transferable starches or fibers into sugars. Corns are the main feedstock for ethanol production in the U.S., the country that recently moved ahead of Brazil to become the world's leading ethanol producer, while sugar canes are the main feedstock in Brazil. As for Europe, sugar beets, wheat and barley are used for the production of ethanol.

Another way of producing bioethanol is converting cellulosic and lignocellulosic biomass, such as wood, straw and grass, into sugar for fermentation. Since it requires more complex mechanical and enzyme based processes than processing the starches from grains or processing the sugars in sugarcane and sugarbeets, it is not commercially viable yet. Cellulosic and lignocellulosic ethanol, called the second generation biofuel, would be one solution for the problems that arise in using grains for biofuel feedstock.

It may be said that Korea's development of bioenergy, particularly biofuel, is at the beginning stage. And with a sudden rise in the price of
a fossil fuel, bioenergy is in the limelight. This study introduces the current production situations and affiliated policies concerning mainly biodiesel, which is in the early stages of commercialization, and its prospects from an agricultural perspective.

Production

In 2006, the global production of biodiesel amounted to 5.5 million tons, and ethanol production was estimated to be 51 billion liters¹⁴). Most of the biodiesel, about 4.9 million tons, were produced by the members of EU, and partly by the U.S., about 600 thousand tons. Germany appeared to be the largest biodiesel producer among EU members with 2.68 million tons, or the equivalent of 48.5% of all EU production. Italy produced about 0.86 million tons of biodiesel, while France produced 0.76 million tons.

			unit: Thousand tons
Country	2004	2005	2006
Germany	1,035	1,669	2,681
France	348	492	775
Italy	320	396	857
Austria	57	85	134
Spain	13	73	224
U.S.A.	100	300	600

Table 1. Biodiesel production by country

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Sources: European Biodiesel Board, The National Biodiesel Board (http://www.biodiesel.org)

Notice: The original data of the U.S. by the gallon has been converted to the ton for convenience, and the applied number for conversion is 0.004 ton per gallon.

14) Renewable Fuels Association (http://www..ethanolrfa.org/). Martin Van Vaals (2007)

The feedstock for biodiesel production are liquid vegetable oil extracted from rapeseed, sunflower seed, palm, peanut, soybean, recycled cooking oil, or animal fats. Rape is the most widely used oilseed plant for the production of biodiesel because of its higher oil content than other seeds.

Korea produced 23,229 kiloliters (KL), or the equivalent to 20,546 ton s^{15}), of biodiesel during the pilot project period from 2002 to 2005. The production in 2006 amounted to 50 thousand to 60 thousand KL (44 thousand to 53 thousand tons), and it is expected to rise to 90 thousand KL in 2007. The estimated production capacity is about 300 thousand to 400 thousand KL.

Based on a forecast of the total biodiesel consumption in 2007, an MOU (Memorandum of Understanding) was signed between oil refiners and the government on taking a 0.5% blend of diesel. It amounted to 90 thousand KL of biodiesel. When the demand for diesel increases, the consumption of biodiesel also goes up. A 1% blend of diesel, which is planned for 2008, would raise the biodiesel consumption to 180 thousand KL.

The number of biodiesel companies registered in 2007 was 17, and 12 companies are actually producing biodiesel currently. Originally, all the factories were not designed to produce biodiesel, but they have been remodeled to produce biodiesel recently. The main feedstock for Korea's biodiesel production is the imported soybean oil, which accounts for 77% of all feedstock while recycled cooking oil accounts for the rest.

In 2006, the global ethanol production was estimated at about 51 bil-

¹⁵⁾ The conversion factor from volume to weight is 0.8845, such that $1 \text{kg} = 1 \ell \times 0.8845$.

lion liters, an 11% increase from the previous year, and approximately 36 billion liters were used for fuel.

The U.S. and Brazil are the major ethanol producers, and they produced 354 billion liters of ethanol, or equivalent to 69% of global production in 2006. In Asia, China has built up quite a capacity and produced 3.85 billion liters, and India produced 1.9 billion liters of ethanol in 2006.

The Korean ethanol production was estimated at about 61 million liters in 2006, which is a decrease of 22 million liters from the production volume in 2004¹⁶). A 93% of ethanol was utilized for making alcoholic beverages, and the rest was used as raw materials for such industries as food additives, medical supplies and etc. Unpolished rice, cassava, wheat and corns are the main feedstock for ethanol. However, no ethanol has been used for fuel.

			Unit: Million liters
Country	2004	2005	2006
U.S.A.	13,381	16,141	18,378
Brazil	15,100	16,000	17,000
China	3,469	3,800	3,850
Japan	117	114	114
Korea	83	64	61

Table 2. Ethanol production by country

Source: http://www.ethanolrfa.org

¹⁶⁾ This number is different from the Korean statistics of 300 million liters of ethanol in 2006.

Korean Policy

The research on alternative energy in Korea started during the oil crisis in the 1970s. Eleven sources of energy, such as solar heat and sun light, were developed in the 1980s, and advancing technologies led to the development of new devices such as solar water heating devices and waste incinerators from the mid 1980s.

An integrated and systematic technology development plan was prepared in 1997. The plan set up a target to substitute 2% of the total primary energy production with new and renewable energy (NRE) by 200 6¹⁷). In the second National Energy Basic Plan of 2002, the target was revised upward to 3%.

The growth rate of bioenergy production was 438% over the 11 year period from 1995 to 2005. This was a remarkable feat given that the production of primary energy grew by 52.4% during the same period. However, the proportion of NRE to the primary energy increased only by 1.5% points from 0.6%.

The share of bioenergy (including biodiesel) in NRE was just 3.7% in 2005. As for biodiesel, the total production volume accounted for just 0.006% of the primary energy and 0.3% of the NRE.

The government set the goal to supply NRE at 13.33 million tonnage of oil equivalent (TOE), which is 5.8% of the total primary energy supplied in 2005 or 5% of the expected supply of 2011. The plan requires a decrease in the share of waste and hydro power and an increase of

¹⁷⁾ New and renewable energy includes eleven types of energy from different sources such as solar energy, bioenergy, wind power, hydro power, ocean energy, waste energy, geo-thermal, fuel cell, hydrogen cell, coal liquefaction and gasification and coal mixed oil.

						Uni	t: Thousa	and TOE
		1995	2000	2001	2002	2003	2004	2005
Total prima	ary energy	150,438	192,888	198,410	208,636	215,067	220,238	229,334
	Total	906.9	2,127.3	2,453.3	2,917.3	4,437.4	4,582.4	4,879.2
	Solar thermal	22.1	41.7	37.2	34.8	32.9	36.1	34.7
	Photovoltics	0.6	1.3	1.5	1.8	1.9	2.5	3.6
New and Renewable Energy	Bioenergy(others)	59.2	82.0	82.5	115.9	129.4	129.5	167.9
	Biodiesel				0.8	1.7	5.4	13.4
	Wind power	0.1	4.2	3.1	3.7	6.2	11.9	32.5
(INKE)	Hydro	20.4	20.5	20.9	27.6	1,225.6	1,082.3	918.5
	Fuel cell							0.5
	Waste	804.5	1,977.7	2,308.0	2,732.5	3,039.3	3,313.3	3,705.5
	Geothermal				0.1	0.4	1.4	2.6
Proportion (of NRE	0.6	1.1	1.2	1.4	2.1	2.1	2.1

Table 3. Trend of NRE and primary energy productions

Note: Large hydro has been included in the summation of hydro energy since 2003.

bioenergy to make the supply rate of NRE at 7.9% of the total primary energy. This would be an increase of 5.8% points from 2005.

A bioenergy supply plan is also devised, and the production target of biofuel is set at 552 thousand KL for 2011, which is a 200% increase from the 2005 supply of 184 thousand KL.

The government implements various policy measures for NRE to activate and achieve such a goal. Typical measures focus on four key areas:

- Influencing demand: biofuel blending mandates,
- Influencing supply: reduction or elimination of motor fuel taxes and capital grants for the facilities,
- Ensuring agricultural participation: research and capital investment on agricultural feedstock,
- Influencing technology: government funding for science and innovation. The representative measures implemented in Korea are feed in tar-

iff, tax incentives, loans, and fiscal support to rape producers. In a feed

in tariff program, the government compensates for the differences between the power generating prices of NRE and fossil fuels. Since 2002, the tariff has been applied to photovoltaic, wind, small hydro, waste, ocean and landfill gas electricity, and the tariff ranges from $61 \/kWh$ to $716\/kWh$.

The government provides supports to the factors used in the production, especially capital plant. A ten percent of total capital investment is deducted from income tax. The tariffs with a 65% reduction are applied to the imported production inputs used for solar thermal, photovoltaic, wind, hydrogen, fuel cell, and bioenergy. There are also government loans (totaling 15 billion won or 14.6 million dollars in current exchange rate with a 3.75% interest rate) for production facilities and management cost. The loans provided in 2005 were over 10 billion won (9.8 million dollars).

The fiscal support to the farmers who grow rape is also related to the biofuel policy program, and this was proposed to build a foundation for a reliable and efficient feedstock supply network. From 2007 to 2009, the farmers who grow rape in the designated areas of 1,500 hectares will be paid 1.7 million won per hectare annually by the central government.

Like most biofuel producing countries, Korea set up government funded programs to support the research into the different stages of the supply procedure. The development of feedstock, especially agricultural products, is recognized as an important pending issue. Various agricultural products are considered as feedstock and rape is one of the most suitable ones for biofuel production in Korea. The feedstock would minimize the opportunity cost of alternative uses, since it substitutes for barley, the consumption of which gradually decreases recently. It also enriches the rural landscape to help increase farmers' income with tourism. Other crops are also examined to find out their feasibility to be used as the feedstock for biodiesel, and soybeans and peanuts are found to be good candidates. As for soybeans, the production structure is well mechanized, and it is relatively easy to produce seeds and distribute the final products. Weather is unlikely to be a limiting factor of cultivating soybeans in this country. Soybeans, however, have relatively low oil content and are a very important food crop heavily dependent on imports. Peanuts contain a lot of oil. In addition, the productivity per unit area is 2.4 times higher than soybeans. They can, however, be cultivated in set aside areas or paddy fields to substitute for rice, since their cultivation period is long enough.

As for the bioethanol feedstock, researches are focused on sweet potatoes, barley and corns. The high starch density under dry conditions and the high productivity per unit area make sweet potatoes the most suitable crop for bioethanol.

Barley and rye can be double cropped with rice since they overwinter. There would be least technical barriers in developing them into bioethanol feedstock because they have already been utilized as ethanol feedstock. They have similar growth periods as rape. However, optimal allocation plans should be seriously considered according to the biofuel development program.

Corns are also considered a good feedstock in Korea since their bioethanol productivity is relatively high. The plant is also an important livestock feed, and heavily dependent on imports, however, it may have serious effects on the livestock market, as well as the feed market, if the grain is used as a biofuel feedstock.

Cost-benefit analysis of biodiesel production in Korea

The items of the cost benefit analysis of biodiesel in production stages are reviewed in accordance with the following figure.

Figure 1. Biodiesel production flow and costs and benefits accrued



It is assumed that rape is domestically cultivated and biodiesel is made from it. First of all, the production cost accrues when rapeseeds are produced. However, straw, the by product of rapeseed, can be the raw material for wood chips. In addition, the associated benefit of adding beauty to the rural landscape by growing rape creates an aesthetic value that is hard to measure. A large and important co product in the production of biodiesel is solid meal that remains after extracting oil from oilseeds. The extracting cost also accrues at this stage. At the final stage of the process, another cost accrues while the important by product glycerine and the substitution effects for crude petroleum bring about benefits. At the consumption stage, the society will derive great environmental benefits from the reduction of CO2 and other greenhouse gases.

Since the subsidies, tax reductions, and other payments transfer from

the government or consumers to producers, they are excluded from the social cost benefit analysis.

The analysis should compare the flow of costs and benefits under the conditions with the project and without the project. The project in this case is the production of rapeseed as a biodiesel feedstock, and it should be compared with the production of barley for the double cropping case or compared with the fallowness of set aside fields.

Previously studied¹⁸) and newly researched data are as follows: For every 10 ares, about 448kg of rape seed is produced¹⁹). For every ton of rapeseed crushed, 476 kiloliters (421kg) of oil and a half ton of solid meal are obtained. The extraction cost of oil from oilseed is assumed the difference of import prices between oilseed and oil, and it is 142 won per every kilogram of rapeseed in terms of the average price for 2002~2006. The price of solid meal was estimated to be 200\/kg. Straws, another important co product, are obtained at a 98% rate of rapeseed in terms of weight. It is estimated that the price of meal is 10 thousand won per ton²⁰). A ton of rapeseed produces about 0.3522 ton (0.3115 k ℓ) of biodiesel²¹).

The production cost of rapeseed was 268,352 won for every 10 ares²²). To compare it with the production cost of barley, the average income data of barley from 2000 to 2002 was adjusted to the value of 2006, and it was 195,840 won/10a.

¹⁸⁾ Lee, Sang Ho and et al., (2005). Bae, Jung Hwan (2006).

^{19) &#}x27;Seonmang,' mixed breed of the first generation developed in 2002.

²⁰⁾ Bae, Jeong Hwan (2006).

^{21) 1}kg of biodiesel equals 0.8845 ℓ .

²²⁾ The last year that income data of the rape farming surveyed was 1992, and the average of three year (1990~1992) data was transferred into the current value of 2006 with price indexes.

The average cost of 307 won/liter to produce biodiesel was assumed in accordance with the data from Korea Biodiesel Association²³).

Five different kinds of gases were considered for the calculation of environmental benefits, and they are carbon dioxide (CO2), sulfur oxides (SOx), nitrogen oxides (NOx), total suspended particulates (TSP), and carbon monoxides (CO). For every ton of diesel burnt, it discharges 3.07 tons of SOx, 0.017 ton of NOx, 0.0023 ton of TSP, and 0.00025 ton of C O²⁴). As for BD100, an abatement rate of CO2 is 78.45%, SOx 100% and TSP 47%. The emission of TSP, on the other hand, is estimated to increase by 10% over the conventional diesel²⁵). For every ton of each gas emission, the environment costs amount to 3,431 thousand won for SOx, 2,661 thousand won for NOx, 9,117 thousand won for TSP, and 3,639 won for CO²⁶). For the cost of carbon dioxide, the emission trading price of EU is applied. The direct payment program for rural landscape preservation pays 1,700 thousand won per hectare for rape growing.

The social cost of rapeseed production is 268 thousand won per 10 ares while the social cost of barley is 196 thousand won. If barley is substituted with rape, the social cost increases by 73 thousand won per10 ares. The benefit accrued from the production and consumption of one kiloliter of biodiesel is 2,141 thousand won. Consequently, the social benefit is larger than the cost by 859 thousand won if rape substitutes for barley.

If the rape is cultivated in set aside fields, on the other hand, the social cost accrued becomes larger than the benefit by 544 thousand won per KL.

²³⁾ Bae, Jung Hwan and et al. (2007).

²⁴⁾ Bae, Jeong Hwan (2006). Park Jong Gil (1997).

²⁵⁾ Lee, Jin Seok (2004).

²⁶⁾ Yoo, Seung Jik (2000).

		Unit:	Thousand won/KL
	Item	Sub. for barley	Set aside field
	Rapeseed production	520	1,922
Coat	Oil extraction	456	456
Cost	Biodiesel production	307	307
	Subtotal	1,283	2,685
	Direct payment of rural	1,218	1,218
	landscape preservation		
	Sales of solid meal	321	321
	Sales of straw	31	31
	Sales of glycerine	113	113
	Effects of crude oil	311	311
Benefit	substitution		
	CO2 abatement	80	80
	SOx abatement	66	66
	NOx abatement	1	1
	TSP abatement	1	1
	CO abatement	1	1
	Sub total	2,141	2,141
	Benefit increased	859	544

Table 4. Social benefit-cost analysis of biodiesel production and consumption per kiloliter / 7 7 7

The benefits and costs evaluated from the viewpoint of farmers, who provide the feedstock of biodiesel, include the opportunity cost of growing rape. Payments from subsidies, as well as sales of rapeseed and straw, are also analyzed to evaluate farmers' benefits. The opportunity cost, the difference of incomes between rape and barley cultivation, is 161,622 thousand won per 10 ares²⁷).

In the case of substituting rapeseed for barley, the cost exceeds the benefit by 54,641 million won for 34,752 hectares of total cultivable area without any support. If there is a direct payment program from the gov

²⁷⁾ The average cultivation area of barley during the recent three years (2004~2006) was 932 ha. The income from barley in 2006 was 264,856 won/10a, and the income from rape (transferred into a value of 2006) was 103,234 won/10a.

			Unit: Minion won
	Items	With direct payment	Without direct payment
	nems	value	value
<u> </u>	Opportunity cost	56,167	56,167
Cost	Subtotal	56,167	56,167
Benefit	Rural landscape preservation	59,078	
	Sales of straw	1,526	1,526
	Subtotal	60,605	1,526
Benefit changed		4,438	54,641

Table 5.Benefit-cost analysis of domestic rape production

ernment for landscape preservation, growing rape would be profitable as the total benefit exceeds the cost by 4,438 million won²⁸⁾, and the share per hectare is 128 thousand won

Conclusions

The development of biodiesel, which has been mostly driven by the EU, is urgently required to substitute fossil fuels in Korea, especially when international prices of oil and the dependence on energy imports are taken into account. In the near future, consequently, the biofuel industry, especially biodiesel, will make progress, and it is expected to take up quite a proportion of the Korean energy market.

As we have mentioned before, the biodiesel production with rapeseed leads to quite different results depending on scenarios. Social benefit is positive when rape substitutes for barley, while it is negative if set aside lands are used for cultivation.

²⁸⁾ The government pays 1,700 thousand won per hectare from the direct payment program for rural landscape preservation.

From a farmer's point of view, growing rape would not be an economic activity, since the cost of the production is much higher than its benefit even under the substitution scenario. A proper amount of subsidy, hence, is definitely required as an incentive and it should be at least 1.572 thousand won per hectare. When it becomes necessary for the government to support rape production in a set aside land, the government burden of supporting the production will be heavier.

If biodiesel is assumed to be the only biofuel we are able to develop, about 395 thousand hectares of land should be filled with rape to meet our plan to supply 552 million KL of biofuel by 2011. The arable land for barley is just 35 thousand hectares, however, and the biodiesel production capacity from the land is only 49 thousand KL, accounting for 0.0001% of the expected diesel consumption in 2007.

Without the technology development for producing biofuels, as well as feedstock, we would have to adopt socially and economically unviable production methods for feedstock. Otherwise, we should keep importing feedstock such as soybean oil. The import of feedstock from abroad, however, causes problems to the environment, economy, and energy security. Environmentally, we would not have any advantage of CO2 reduction, which is very important under the Kyoto Protocol. Economically, the import price of soybean oil is relatively high to lower the profit margins of biodiesel production. For energy security, feedstock import has the same effects as the import of crude petroleum; and we are unable to secure the independence of energy.

The development of domestic feedstock is a key factor in solving the above problems. The grain based biofuel, however, has limitation for market growth, since the feedstock overlaps with food or livestock feed. The problems associated with the grain based biofuel are already revealed in some leading countries of biofuel production. Oilseeds potentially also have these kinds of problems in the long run. It is required to develop various sources of feedstock other than agricultural products for the future.

When all factors are taken into consideration, we need to have a double track strategy in developing biofuel. Agricultural product development for feedstock will help activate the biofuel market at an early stage, since it is relatively easy to adopt in technical terms. This will boost the demand for feedstock and result in preserving farmers' income. To minimize the negative impacts from the conflictions between the alternative utilization of agricultural products, technological progress of the second or higher generation biofuel should be achieved in the long run.

Biofuel sector in most countries has been developing initially as a result of policy support and favorable tax regimes. Monetary supports, such as government loans, subsidies, and tax reductions, should focus on relevant participants to secure the supply of biofuels as well as feedstock in the short run, and these supports should be ceased as soon as possible to minimize the distortion of the market. The investment in the basic research of advanced technologies and economic feasibilities, however, is essential for the sustainable development of biofuel in the long run.

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http://www.ethanolrfa.org

부록 3

FANEA 회원기관 개요

1. 중국 농업과학원 농업경제발전연구소

(Institute of Agricultural Economics and Development, Chinese Academy of Agricultural Sciences: IAED/CAAS)

- 개요: 중국 최초의 전문 농업경제 및 과학기술 정책연구의 국가급 과학연구 기관이며 현재 관리직원 91명, 고급연구인력 42명, 중급연구인력 28명(박사 25명, 석사 20명)이 재직 중
- 설립연도: 1958년
- 주요 연구 분야: 농업경제 및 과학기술 정책, 지역 발전전략 및 농기업 투자 및 경영관리 등 분야의 조사연구, 각급 정부와 농업기업에게 정책 및 정보 지 원, 농업정책연구, 행정관리 및 기업경영, 고급인재 육성, 국제협력 및 학술교 류, 전문 출판물 간행
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- 인터넷 홈페이지: www.iae.org.cn
- 본원과의 관련성: 2003년 본원과 MOU 체결, 2003년 본원과 「동북아농정연 구포럼」공동 설치 및 운영

2. 일본 농림수산성 농림수산정책연구소

(Policy Research Institute, Ministry of Agriculture, Forestry and Fisheries: PRIMAFF)

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부록 4

FANEA 제5회 국제심포지엄 행사 사진

1) 심포지엄 기념촬영

















3) CAAS의 World Bank 과제 최종보고회

4) 현장 견학 사진

- 한촌하 농촌 관광 마을











활동보고서 M84 / 2007.12

동북아농정연구포럼 2007

등 록	제6-0007호(1979. 5. 25)
인 쇄	2007. 12.
발 행	2007. 12.
발행인	최정섭
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