UNIVERSIDADE FEDERAL DA BAHIA
FACULDADE DE CIÊNCIAS ECONÔMICAS
CURSO DE MESTRADO EM ECONOMIA

TEXTO PARA DISCUSSÃO Nº 26

O PROGRAMA DE ESTUDOS ECONÔMICOS E SO
CIAIS DAS REGIÕES "SEMI - ÁRIDAS "DO
ESTADO DA BAHIA

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Este "Texto para Discussão" está composto de dois trabalhos dis
tintos.

O primeiro, "O Programa de Estudos Econômicos e Sociais das Re-
giões Semi-Áridas do Estado da Bahia", que se refere ao escopo metodo-
lógico do Programa e nele apresentamos uma TAXONOMIA, para estudar
os principais fatores limitantes ao desenvolvimento da região e carac
terizar as interrelações destes fatores fisícos, biológicos, sócio-
econômico endogenos e exogenos na determinação e análise da dinâmi-
ca do sistema produtivo do Baixio e Adjacências. A desagregação destes
elementos e estruturação de suas interrelações são tarefas que pre-
tendemos desenvolver no futuro. Achamos que o presente texto neces-
sita de aprofundamento conceitual-metodológico para melhor guiar o
corpo técnico-científico do Programa. Encareço portanto a todos os
leitores enviar suas críticas e contribuições bem como contar com a
participação efetiva da comunidade acadêmica interessada em estudar
as questões regionais e nacionais do Semi-Árido.

O Segundo, "Farm Level Research in Semi-Arid Areas Preliminary
Results of the Reconnaissance Survey in Bahia, Brazil", constitui uma
versão inicial de alguns resultados da pesquisa de campo nas unidades
produtivas da Região do Baixio. Nesta versão foram identificadas
algumas características das unidades produtivas com comparações sub-
regionais (Irecê versus Xique-Xique) das tecnologias usadas (irriga-
das versus não irrigadas) e da escala (micro, pequena, média e gran-
des) das unidades produtivas. Esta versão será traduzida e ampliada
com outras pesquisas de campo que serão efetuadas na região, bem
como em o aprofundamento de hipóteses nela proposta.

O Programa já preparou um documento, Doc. 1, "A REGIÃO DE IRE-
CÊ: ELEMENTOS PARA UMA AVALIAÇÃO DAS PERSPECTIVAS E PROBLEMAS DE DE
SENVOLVIMENTO", que sintetiza as principais informações das trans-
formações sobre a região obtidas de fontes secundárias, da leitura
de documentos técnicos e contatos com representates de instituições
privadas e públicas. Portanto a primeira fase do Programa "Projetos
de Estudos do Sistema Produtivo do Baixio de Irecê e Adjacências"
(descritiva) tenta compreender genericamente as transformações só-

cio-econômicas recentes na região. Consideramos também que a leitura deste texto seja seguida pela leitura do Doc.1, que se encontra na bibliotecas dos mestrados filiados a ANPEC.

José Afonso Ferreira Maia
Coordenador do Programa

O Programa de Estudos Econômicos e Sociais das Regiões Semi-Áridas do Estado da Bahia contou, no período de elaboração deste estudo,com a cooperação das seguintes instituições:

BNB - Banco do Nordeste do Brasil S.A.

CODEVASF - Companhia de Desenvolvimento do Vale do São Francisco

FINEP - Financiadora de Estudos e Projetos

FUNDAÇÃO ROCKEFELLER

SUDENE - Superintendencia do Desenvolvimento do Nordeste

1. O PROGRAMA DE ESTUDOS ECONÔMICOS E SOCIAIS DAS REGIÕES "SEMI-ÁRIDAS" DO ESTADO DA BAHIA

1.1. EVOLUÇÃO CONCEITUAL DO ESCOPO DO PROGRAMA

O Programa de Estudos Econômicos e Sociais das Regiões Semi-Ari das do Estado da Bahia, originou-se de uma proposta de trabalho do Curso de Mestrado em Economia e outros Departamentos da UFBa, de estudo do impacto sócio-econômico de um grande projeto alco oleiro, desenvolvido pela COPENER - ... a ser localizado no Bai xio de Irecê (Município de Xique-Xique). Com a desativação do implemento daquele projeto, pelo menos temporariamente, a equi pe responsável por aquela proposta de trabalho decidiu repen sar o formato, escopo e metodologia da mesma para generalizá-la com uma proposta de estudos sobre as questões do desenvolvimen to sócio-econômico do semi-árido em geral, bem como com uma pro posta de trabalho que viesse a forçar e/ou garantir a sistemati zação de um esforço acadêmico contínuo nos diversos departamen tos da UFBa, para conhecer os problemas e/ou os principais fato res limitantes (físicos, políticos, culturais, etc.) que afetam o desenvolvimento dos sistemas produtivos e sociais das regiões semi-áridas. Este programa de trabalho constitui portanto um es forço de interpretação inter-disciplinar das condições de funci onamento da economia e da organização social das regiões do se mi-árido do Estado da Bahia.

Um programa de estudos como o presente é cada vez mais indis pensável e urgente, considerando os problemas sócic-econômicos das regiões semi-áridas do Estado da Bahia e o caráter insatis fatório do conhecimento sobre as mesmas. Além desta insuficiên cia, que contrasta com a já literatura existente sobre a região semi-árida do Nordeste Setentrional, a própria variedade de zo nas ecológicas no Estado da Bahia não está sequer bem delimita da e caracterizada. Os Estudos empreendidos através da SEPLANTEC/ Ba., estudos descritivos das micro-regiões administrativas, são geralmente definidos por uma tradição de comunicações e de pola

rização urbana, ainda que muitas destas possam coincidir   com
sub-unidades ecológicas. Tais estudos são contudo ainda   muito
introdutórios.

Toda política referente às zonas sujeitas à seca no Estado   da
Bahia caracteriza-se por maior debilidade e retardo   relativa-
mente à eclosão do flagelo do que em alguns outros Estados. Há
várias hipóteses que pretendem explicar o fenômeno: a maior de-
pendência que a economia estadual tem em relação à região sujei
ta à sêca; o menor povoamento relativo nas áreas baianas   de
menor pluviosidade que as de outros Estados, de que   resultou,
nestes, o povoamento ser maior e a calamidade da sêca   sentida
por uma população maior; o isolamento de muitas zonas sertane-
jas da Bahia em relação à capital; reduzida capacidade   reivin
dicatória na Bahia; etc. com efeito, entre as áreas mais ári-
das no Nordeste, algumas estão na Bahia; entre elas a do Baixio
de Irecê.

Nos anos recentes, entretanto, o crescimento geral da população
e a maior rigidez no processo tradicional de absorção das migra
ções no Centro-Sul do País estariam determinado um crescimento
significativo da densidade populacional na área baiana do Polí-
gono das Sêcas, enquanto as comunicações estão rompendo o secu-
lar isolamento. Dessa forma a sensibilidade para o fenômeno das
secas poderá estar aumentando. Estes fatores e as espectativa
criadas no recôncavo como "Pólo Petroquímico" exacerbam as mi-
grações para Salvador e Camaçari, num montante que não é absor-
vível pelas atividades metropolitanas.

Por outro lado, à medida em que crescem os recursos da economia
nacional e os da economia litorânea baiana em especial, mais se
impõe e se possibilita a desconcentração das oportunidades eco-
nômico-sociais. Essa desconcentração é uma condição para que os
efeitos dinâmicos das indústrias básicas se internalizam na Ba-
hia. Um adequado conhecimento da estrutura dos recursos, sub-re
gionalizada, é essencial para orientar a política de desconcen-
tração, particularmente no que diz respeito aos recursos   de

água superficial e subterrânea e possibilidades de irrigação, bem como à caracterização de condições pedológicas e outras que definam possibilidades novas de desenvolvimento agrícola. Temos, por exemplo, ainda em situação de quase desconhecimento, as chamadas serras úmidas ou semi-áridas. Temos, também, áreas cuja extrema aridez impediu o povoamento espontâneo, mas cujas condições de solo e de água subterrânea ou transportada por dutos de irrigação, podem permitir projetos novos de assentamentos humano. Baixio de Irecê, Raso da Catarina, a própria área de Tucano, poderiam estar entre essas possibilidades novas. Todas estas possibilidades dependem de pesquisas. A área da Caraíba Metais estaria também neste caso, além de outras com possibilidades imediatas maiores.

O programa de Estudos Econômicos e Sociais das Regiões Semi-Áridas do Estado da Bahia insere-se, portanto, num quadro em que ressaltam três aspectos críticos: a oportunidade e urgência de conhecimento de uma região praticamente não estudada até o presente, que, entretanto, apresenta, como veremos, uma variedade de situações de mudança que a tornam um laboratório excepcional de estudo; a presença de várias intervenções governamentais cujos impactos necessitam ser antecipados em termos econômicos, sociais e físico-ambientais, a fim de que sejam minorados seus efeitos desfuncionais; a necessidade de atrair para alí recursos públicos e privados, contribuindo-se para desconcentrar atividades econômicas no território do estado, a fim de aliviar pressões sobre o mercado de trabalho urbano e em particular sobre a região de Salvador.

O Programa deve por isso conduzir a:

. um conhecimento dos impactos previsíveis das intervenções governamentais;

. a implantação de um sistema de indicadores sobre o regime climático, para orientação das ações governamentais referentes aos períodos de estiagem;

. a definição de possibilidades de desenvolvimento agrícola, agro industriais e de exploração mineral;

. uma indicação de necessidades de pesquisas primárias visando o conhecimento de recursos e possibilidades;

. uma exploração em maior profundidade de situação e alternati-
vas de estratégias de desenvolvimento para o Baixio de Irecê
e adjacências.

Espera-se que, a partir de uma proposta de estudo das possíveis
alternativas de desenvolvimento de regiões no semi-árido no Nor-
deste, se levantem questões mais profundas, acerca da viabilida-
de de modelos significativos de desenvolvimento do semi-árido no
quadro mais amplo das alternativas da economia nacional.

Por esta razão, o Programa articula atividades de pesquisa da
área de concentração em desenvolvimento Econômico, do curso de
Mestrado em economia, com linhas de trabalho de outras unidades
da Universidade, dentre elas Geociências e Ciências Sociais. Pa-
ralelamente, por suas implicações ao nível de operacionalização
e da concepção de políticas regionais de desencolvimento, este
programa tem sólidos pontos de apoximação com o do governo esta-
dual da Bahia e com os de órgãos regionais de planejamento, cir-
cunstância que explica sua convergência com as atividades da
SUDENE, do Banco do Nordeste do Brasil, da CODEVASF e de outras
universidades nordestinas.

Esta situação institucional refletiu uma evolução na própria con
cepção do projeto, desde colocações específicas, acerca das pos-
sibilidades de implantação de um grande programa alcooleiro na
região de Irecê, e de suas possíveis consequências econômicas e
sociais; da consideração de projetos específicos de irrigação em
sub-regiões semi-áridas baianas; e do impacto de programas agro-
pecuários específicos, também de alcance sub-regional.

Torna-se claro, portanto, que o período de formação e amadureci-
mento do programa de pesquisa já compreende um esforço significa
tivo, de aperfeiçoamento dos enfoques de trabalho, da fundamenta
ção teórica e das questões de método.

O aperfeiçoamento dos enfoques de trabalho corresponde à própria
filosofia de tratamento dos problemas de desenvolvimento econômi
co e social regional, como se percebem suas interrelações no qua

dro na economia nacional, como a relação sociedade - meio físico
e como se enfrentam as questões de estruturação social no conjun
to do Nordeste e dos estados nordestinos. Justamente por sua in-
tegração com o desenvolvimento de atividades de docência - e com
diversos outros programas de pesquisas - a realização deste pro-
grama constitui um espaço de análise das próprias concepções teó
ricas que têm sustentado as análises e políticas regionais.

Do ponto de vista teórico propriamente dito, o programa oferece
uma oportunidade ímpar, de integrar tratamentos relativos:

a) à forma como evolui a relação sociedade-meio físico, ao longo
   dos processos de transformação da economia nordestina;
b) à forma como os processos econômicos e sociais são afetados pe
   los efeitos acumulados das modificações do meio físico.

As combinações dos níveis macro e micro-analítico, no econômico
e social geral. Aponta também questionamentos teóricos, destacan
do-se as condições das unidades familiares como referência   de
uma ampla gama de problemas sócio-econômicos, que se manifestam
nos âmbitos rurais e urbanos afetados por movimentos de redefini
ção das bases de formação e acumulação do capital.

1.2. OBJETIVOS DO PROGRAMA

Os objetivos do programa de pesquisa se descrevem do modo seguin
te:

A) Objetivos Gerais

   a) Estabelecer estilos de análise do desenvolvimento econômi
      co e social de zonas semi-áridas subdesenvolvidas do meio
      brasileiro (i), utilizando teorias e instrumentos de análi
      se, desenvolvidos em situações similares; (ii) desenvolven
      do procedimentos adaptados à realidade brasileira;   (iii)
      desenvolvendo procedimentos de análise comparativa, nos ní
      veis da análise física, da análise econômica e social e da
      utilização de técnicas específicas de produção, de comerci
      alização e de consumo.

b) Oferecer alternativas de política econômica e social, que possam ser aproveitadas, em diferentes escalas de generalização, para o tratamento de problemas do Nordeste, em particular, considerando como principais referências os problemas de planejamento do desenvolvimento econômico e social do vale do Rio São Francisco, problemas relativos ao uso de irrigação, problemas gerais de comercialização de produtos básicos e as inter-relações entre o desenvolvimento do semi-árido e dos vales úmidos da região, bem como das chamadas serras úmidas.

c) Examinar o potencial e a validez de técnicas de desenvolvimento do semi-árido, no campo da exploração agro-pecuária, do controle do uso da água, da energia não convencional, de combinações de técnicas de transportes com os padrões de uso dos espaços rurais, e, finalmente, também dos problemas do desenvolvimento de centros urbanos no meio semi-árido.

d) Examinar a compatibilidade de objetivos econômicos de povoamento da sub-região em estudo, com objetivos sociais de elevação do nível de vida da população e com problemas de preservação e enriquecimento do solo, sob maiores densidades demográficas.

e) Estabelecer bases de pesquisa multidisciplinar integrada, que permitam desenvolver linhas de atividade integradoras de trabalhos universitários de pesquisa e docência a nível da pós-graduação, bem como de relações entre a Universidade e a comunidade.

B) Objetivos Específicos

O programa contempla um conjunto de objetivos específicos vinculados ao anteriores objetivos gerais que, por sua vez, abrangem:

I - uma sequência de elementos do programa em seu conjunto;

II - elementos próprios dos projetos específicos de pesquisa
que concretizam o programa;

III - elementos próprios das interrelações do programa com as
instituições que dele participam, direta e indiretamen-
te.

Objetivos Específicos do Programa

a) Reunir materiais de teoria e análise da economia do semi-
árido, que possam ter aplicação, direta ou indireta, para
o caso do Nordeste do Brasil em geral e da Bahia em parti-
cular, com avaliação da pertinência e da relevância desse
material, nos aspectos substantivos e metodológicos da con
tribuição que eles oferecem.

b) Estabelecer um mapa exaustivo de interrelações entre o Pro
grama e outras linhas de pesquisa de outros setores da
UFBa., de modo a identificar mecanismos específicos de in-
tegração com outros programas docentes, derivando resulta
dos que possam ser aproveitados nas atividades regulares no
campo das ciências sociais.

c) Fortalecer as bases das atividades docentes no campo do
desenvolvimento econômico e social, considerando as modali
dades em que estes estudos podem ser realizados na estrutu
ra organizacional disponível na Universidade; e procurando
internalizar as experiências a que se possa chegar, de tra
balhos combinados com órgãos públicos de planejamento.

d) Induzir a realização de estudos específicos dos sistemas de
infra-estrutura no Estado da Bahia, em particular no binô-
mio transportes-energia, com aspectos específicos do uso
da energia não convencional, e do planejamento multi-modal
dos transportes.

a) Objetivos do Estudo Econômico

I - Explicar o funcionamento da economia das regiões
semi-áridas, como parte da economia do Nordeste em
seu conjunto, como parte da economia baiana em seu

conjunto e como.um tipo de economia, com seus pró
prios mecanismos de formação de capital, de cria-
ção de emprego, de formação de renda familiar   e
de acumulação de capital.

II - Estabelecer as interrelações entre o funcionamen
to da economia do semi-árido e o dos demais tipos
de regiões, considerando as modalidades especifi
cas como elas estão articuladas umas com as   ou-
tras.

III - Examinar as condições em que se pode verificar uma
elevação dos níveis de vida da população da re-
gião e as condições em que essa elevação dos ní-
veis de vida pode ser compatível, ou interdepen-
dente, de uma maior densidade demográfica.

IV - Analisar os programas e políticas em curso, possí
veis opções de política regional de desenvolvimen
to econômico e social, em forma integrada com al-
guma ou algumas opções de desenvolvimento econômi
co e social da Bahia em seu conjunto.

V - No que corresponde especificamente aos estudos de
economia agrícola, o projeto contempla objetivos
ao conhecimento dos processos em curso na econo-
mia agrícola, destinguindo os âmbitos de pesquisa
de economia do produtor e de economia dos estabe-
lecimento agropecuários e de situação fundiária.
Em seu conjunto, estas linhas de trabalho estarão
subordinadas à análise dos circuitos de financia-
mento e comercialização, mas considera-se que os
objetivos destes estudos transcedem os limites da
análise de economia agrícola, identificando-se com
os objetivos do estudo econômico em seu conjunto.

VI - Identificar e avaliar as estratégias de utiliza-
ção dos recursos naturais da região.

b) Objetivos do Estudo Sócio-Antropológico

I   - Conhecer as condições de estruturação sócio-econô
       mica das sub-regiões semi-áridas, identificando os
       mecanismos de expansão das relações capitalistas
       pelas quais se estruturam suas novas relações de
       classe.

II   - Identificar os grupos sociais locais, sedimenta-
       dos a partir das relações econômicas e políticas
       tradicionais, bem como dos mecanismos agora vigen
       tes de incorporação dos mesmos à economia capita-
       lista em expansão e aos processos políticos e cul
       turais paralelos.

III - Estudar os padrões e os processos de mudanças nas
       relações intra e intergrupos, ao longo das trans
       formações da base econômica e do papel do Estado
       na vida regional.

IV   - Identificar as condições e mecanismos de recruta-
       mento e remuneração da força de trabalho, condi-
       ções de trabalho e práticas de consumo da mesma.

V   - Analisar as interrelações entre os movimentos mi-
       gratórios, as condições de ocupação da mão-de-obra
       e a renda real das famílias.

c) Objetivos do Estudo de Geografia

I   - Reconhecer as características físicas do semi-ári
       do no Estado da Bahia e suas repercussões, come-
       çando pelos estudos físicos relativos à região do
       Baixio de Irecê.

II   - Analisar as características físicas do ordenamen-
       to do espaço das sub-regiões de estudo, começan-
       do pela sub-região de Irecê.

III - Especificamente, no que corresponde ao funciona-
mento atual das sub-regiões semi-áridas na Bahia,
o projeto de estudo geográfico, deverá reunir tra
balhos em diferentes especialidades neste corpo de
disciplinas, chegando a interpretações integradas
da morfologia do espaço regional e do funcionamen
to de seus componentes urbanos, em relação com a
estrutura do Estado da Bahia em seu conjunto.

1.3. UTILIZAÇÃO DOS RESULTADOS DE PESQUISA

Com suas características de programa a longo prazo, este progra
ma tem as seguintes vertentes principais de aproveitamento   de
seus resultados:

a) Incorporação de novos elementos de conhecimento das   regiões
   semi-áridas, para fins de docência e como elemento de   apoio,
   direto e indireto, para outros programas de pesquisa.

b) Utilização dos resultados acadêmicos, para fomentar   relações
   com outras universidades ou órgãos congêneres, no Brasil e no
   exterior, favorecendo a melhoria das atividades   universitá-
   rias em geral.

c) Utilização indireta de material produzido nas pesquisas regio
   nais, como informação de base para a identificação de   opções
   de política de desenvolvimento econômico regional.

d) Aproveitamento de material específico produzido no   programa
   de pesquisa, para informar na realização de programas de   in-
   vestimentos e de política de desenvolvimento em geral na   re-
   gião.

Vale ressaltar que o desenvolvimento de um sistema de   análise
multidisciplinar para estudar as regiões do Semi-Árido produzirá
de um lado um conhecimento analítico de uma região do Semi-Árido
e por outro lado o desenvolvimento de um enfoque perfeitamente ge
ral aplicável para outras regiões e/ou para o Semi-Árido do Nor-
deste como um todo.

1.4. ESTUDO DO SISTEMA PRODUTIVO DO BAIXIO DE IRECÊ E ADJACÊNCIAS

Tratando-se de um programa interdisciplinar de pesquisas, abrangente no tempo e no espaço, decidiu-se estabelecer uma programação por etapas que permita um aprofundamento e/ou expansão gradual de temas e hipóteses concernentes aos problemas do desenvolvimento das regiões semi-áridas. Procurou-se, por outro lado, iniciar tais estudos em uma área específica que ofereça um cenário amplo e diversificado com respeito a características históricas e físico-ambientais, e que seja objeto efetivo de políticas econômicas a níveis nacional, regional e estadual. Com isso, pretende-se testar hipóteses sobre processos de transformação econômico-social, bem como avaliar alternativas de intervenção do Estado.

A "Micro-região do Baixio de Irecê e Adjacências", aqui delimitada pelos municípios de Xique-Xique, Sento-Sé, Irecê, Presidente Dutra, Canarana, Cafarnaun, Barra do Mendes, Ibipeba, Ubaí, Central, Jussara e Gentio do Ouro, apresenta, sem dúvida, características muito positivas para estudos que possam subsidiar a formulação de estratégias de desenvolvimento econômico regional.

Do ponto de vista teórico, esta região oferece, inquestionavelmente, subsídios para o estudo de variados processos de transformação desde aqueles acionados por intervenções de grande porte, aos que caracterizam uma estratégia gradualista de mudança.

As estratégias de desenvolvimento regional polarizam-se entre dois modelos básicos:

a) com ênfase em operações em grande escala;

b) com ênfase em intervenções interativas.

O enfoque das transformações estruturais induz que qualquer aumento significativo auto-sustentável de bem-estar de uma população requer transformações radicais das relações de produção ou do ambiente físico (irrigação em grande escala, no caso de uma

região semi-árida). O enfoque "gradualista" sustenta que existem técnicas agronômicas, por exemplo, que podem ser utilizadas para melhorar, em curto prazo, as condições de segurança e bem-estar da população, a um custo pequeno para as disponibilidades nacionais de recursos, em contraste com o enfoque "estruturalista" de investimentos de longo prazo. Estes melhoramentos de pequeno custo desenvolverão a capacidade produtiva da população no campo e equilibrarão as tendências migratórias no interior.

O Projeto Sobradinho, um exemplo de operação de grande efeito sobre o meio físico e com implicações sócio-econômicas de grande escala, é um tipo de intervenção da primeira categoria, observável no contexto da região. Podemos aí estudar seu impacto sobre o meio físico, sobre o sistema produtivo, sobre a estrutura social e sobre as condições de vida das populações recolonizadas e/ou afetadas diretamente pelo lago (margem nordeste de Xique-Xique, Nova Iguira e toda a margem do município de Sento-Sé).

Tomando-se a margem oeste de Xique-Xique, por exemplo Capixaba, temos a oportunidade de estudar o sistema produtivo e social das populações ribeirinhas do São Francisco, com padrões de cultivo de vazante relativamente tradicionais e menos afetados pelo lago uma vez que, a penetração nas margens do Rio São Francisco se faz mais extensa e consequentemente sujeita a maior variação de vazantes e cheias. Aí podemos encontrar ainda o "Modus Operandi" tradicional de estratégias de sobrevivências das populações ribeirinhas.

Tomando a sub-área do Município de Gentio do Ouro encontramos aí uma população até então dedicada na sua maior parte do tempo à atividade de mineração (cristal, pedra semi-preciosas ...), completada com uma agricultura de subsistência, ilhada pela falta de comunicações e acesso em transportes modernos, cuja topografia também imprime uma restrição a novas tecnologias de preparo do solo, bem como à introdução de novos cultivos. Com a barragem de Mirorós, nesta região, extendendo-se até o extremo sudoeste de Xique-Xique, espera-se também defrontar com problemas de ca-

racterísticas distintas na implantação de um novo perfil de sistema produtivo-social que explore as potencialidades deste projeto de grande impacto e produza benefícios sociais distribuídos entre a população da região e as populações migrantes.

A área do Platô de Irecê por sua vez, que compreende neste estudo os municípios de Irecê, Central, Jussara, Presidente Dutra, Canarana, Cafarnaum, Barra do Mendes, Ibipeba e Ubaí, vem sendo sujeita a uma outra estratégia de intervenção governamental, de teor "gradualista", uma vez que procura atender as demandas das unidades produtivas, seja através do crédito, da comercialização, introdução de novas técnicas agrícolas e de novos cultivos, porém sem a precondição de um grande projeto de infra-estrutura, indivisível como a Barragem de Sobradinho e/ou Mirorós. Nesta região, todo o projeto de irrigação é divisível, projetos de poços artesianos, para atender especificamente à demanda de cada unida de produtiva e portanto, cujo custo de financiamento e/ou eficácia da irrigação depende da relação custo/benefício privado, incidindo diretamente na unidade produtiva onde seja realizado o investimento. Sendo esta área uma região dr fronteira mais recente que Xique-Xique, espera-se que a mesma apresente um outro perfil de estruturação social, fundiário e urbano, distinto do perfil das outras áreas mencionadas.

Essa variedade de intervenções, seja através grandes projetos caracterizados por indivisibilidades, seja via uma estratégia gradualista caracterizada por um sistema de investimentos divisíveis a nível das unidades produtivas, permite o conhecimento de processos diversificados no que diz respeito a elementos econômicos, políticos, culturais, sociais e físico-ambientais, fazendo do espaço estudado um laboratório para a análise comparativa de processos variados de transformação sócio-econômica.

Dentro de uma área que pode-se manejar, a Universidade terá assim a oportunidade de discutir os méritos relativos da "transformação estrutural" e da "transformação gradual", como estratégias ou enfoques de desenvolvimento econômico e social.

1.5. METODOLOGIA GERAL

O projeto de Estudo do sistema Produtivo da Região do Baixio de
Irecê e Adjacências está concebido para ser executado em aproxi-
madamente dois (2) anos a partir de janeiro/1984, programado com
as seguintes fases:

A. Uma fase descritiva: levantamento de informações secundárias
   e pesquisas de reconhecimento - Estudo de reconhecimento pre-
   liminar.

B. A Fase Analítica: Análise inter-disciplinar, dos fatores ou
   elementos biológicos, físicos, demográficos, econômicos, polí
   ticos, etc.

C. Formulação de Estratégias e de Política: Assessoria a Órgãos
   competentes.

D. Estudos de Acompanhamento e Avaliação.

E. Extensão.

A fase descritiva define-se por um levantamento da situação exis
tente na região estudada. Durante esta fase, os pesquisadores es
tarão comprometidos a produzir um conhecimento sumário do "esta
do-das-artes" nos seus campos de especialização concernentes aos
problemas da região em estudo.

A fase analítica objetivará a explicação da evolução do sistema
agrícola na área do Baixio ... e, aqueloutras vizinhas, escolhi
das na fase descritiva. Nesta fase, se procuraria explicitar as
relações entre os fatores físicos, biológicos, econômicos etc.
no processo de determinação dos resultados e do desempenho do
sistema produtivo. Desde já deve ser esclarecido que estamos tra
tando de caracterizar três principais sistemas produtivos: 1)
pequenas explorações de subsistência e sem irrigação (geralmente
sem direitos permanentes à terra); 2) pequenas explorações com
irrigação; 3) grandes explorações geralmente com direitos de pro
priedade, as quais podem ser distinguidas, ainda, conforme dis
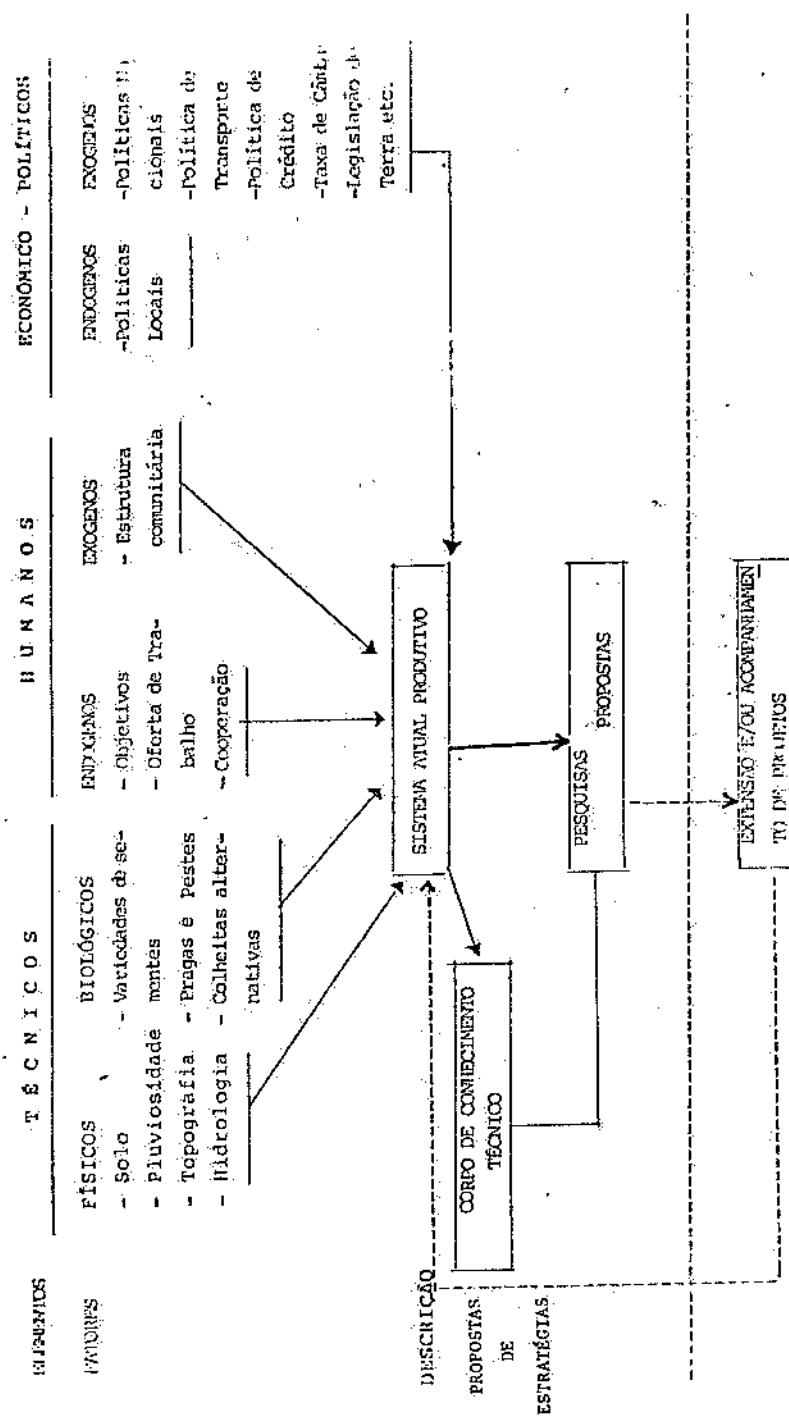ponham ou não de irrigação.

Da fase analítica espera-se obter uma identificação das restrições que limitam cada sistema a mover-se a um mais alto nível de renda e/ou segurança de suas unidades produtivas. (Não podemos negligenciar a importância da segurança como um dos objetivos primários do pequeno produtor). Considera-se bem provável que a solução para as restrições pode ser encontrada a partir do acervo de conhecimentos adquiridos nesta fase analítica. Os pesquisadores em cada área analizarão se a solução parcial que propõem para a liberação daquelas restrições é compatível com a melhora do sistema como um todo ou se a mesma tem um custo efetivo líquido.

Quando não for possível identificar soluções a partir do corpo de conhecimento adquiridos até então, os pesquisadores deverão propor linhas de pesquisas que permitirão o desenvolvimento do estoque de conhecimentos para, assim, retor-alimentar o modelo analítico.

No esquema em anexo, apresentam-se alguns dos vários elementos técnicos, humanos, econômicos e políticos que determinam os sistemas de unidades produtivas existentes. Especialistas em cada área terão a responsabilidade primária de coletar e sintetizar as informações descritivas em cada área. Entretanto, sendo o Programa inter-disciplinar, as relações entre os vários elementos serão debatidos interdisciplinarmente.

Embora cada setor possa coletar informações secundárias sobre os fatores que, se acredita, restringem o sistema produtivo, torna-se necessário definir a interação destas informações para estabelecer inferências confiáveis. Por isso, o Programa executou um projeto de levantamento amostral de unidades produtivas divididas igualmente em duas áreas do Baixio e adjacências: a) área potencialmente irrigável; b) área onde a irrigação não é possível. O levantamento coletou informações básicas sobre o tamanho e nível de técnicas das unidades produtivas, critérios de tomadas de decisões quanto à produção, consumo, comercialização, investimento etc., movimentos migratórios e estratégias de sobrevivência utilizadas pelas unidades produtivas. Executado em seus resultados começam a ser processados e deverão informar o próximo relatório do Programa.

ANEXO: UMA TAXONOMIA PARA O ESTUDO DO SISTEMA
PRODUTIVO NO SEMI-ÁRIDO

ELEMENTOS

FATORES

T É C N I C O S

FÍSICOS
- Solo
- Pluviosidade
- Topografia
- Hidrologia

BIOLÓGICOS
- Variedades de sementes
- Pragas e Pestes
- Colheitas alternativas

B U M A N O S

ENDÓGENOS
- Objetivos
- Oferta de Trabalho
- Cooperação

EXÓGENOS
- Estrutura comunitária

ECONÔMICO - POLÍTICOS

ENDÓGENOS
- Políticas Locais

EXÓGENOS
- Políticas nacionais
- Política de Transporte
- Política de Crédito
- Taxa de Câmbio
- Legislação da Terra etc.

SISTEMA ATUAL PRODUTIVO

CORPO DE CONHECIMENTO TÉCNICO

PESQUISAS   PROPOSTAS

EXTENSÃO E/OU ACOMPANHAMENTO DE PROJETOS

DESCRIÇÃO

PROPOSTAS DE ESTRATÉGIAS

FARM LEVEL RESEARCH IN SEMI-ARID AREAS
PRELIMINARY RESULTS OF THE RECONNAISSANCE
SURVEY IN BAHIA, BRAZIL

Howard Elliott*
July 1984

FARM-LEVEL RESEARCH IN SEMI-ARID AREAS:
PRELIMINARY RESULTS OF THE RECONNAISSANCE SURVEY IN BAHIA, BRAZIL

Howard Elliott

I. Introduction to the Studies on Semi-Arid Areas

In response to the continuing drought affecting semi-arid areas of
Bahia, the Federal University of Bahia proposed a series of studies which
would comprise a multidisciplinary program of social and economic studies
of the development of semi-arid areas of Bahia. Individual scholars,
coming from economics, geography, sociology and anthropology identified
topics of primary importance to their disciplines. To turn the
individual proposals into a multidisciplinary program of studies it
became necessary to identify a common geographic focus of the study,
agree on a common framework of analysis, and make the individual studies
complementary where possible. In the initial phase, the team agreed to
limit its examination to the two municipalities of Irece and Xique Xique,
the principal areas of action of the Company for the Development of the
San Francisco Valley. The various disciplinary specialists agreed to
work within a basic framework which looked at the semi-arid areas as a
system in which different types of farms have evolved in response to
physical, biological and human constraints. Government interventions
through the development of infrastructure and through agricultural
policies may lift certain of these constraints, although the impact of
such policies may not be uniform across all classes of farmers. As one
of the initial projects, the University proposed to carry out a
"Reconnaissance Survey" (called the "Estudo de Preconhecimento") from
which information would be generated to assist in identifying the
principal problems which required study in depth.

The Reconnaissance Survey was considered a necessary precursor to a
larger program of studies of the semi-arid interior of Bahia since it was
designed to produce data in a form not available from other sources.
This survey was to have the following advantages:

1. it would provide household information covering the areas of
demography, education, farm management and rural development practices
which is not collected or not reported by the census or other surveys

2. the data collected at the household level covering personal and
farm characteristics would allow researchers to relate farm management
and household behavior to a range of factors such as education, access to
land, and availability of credit and development services.

3. the survey would request information about recent changes in farm
size and household composition taking place since the onset of the
drought, and

4. the survey would cover an area chosen for its agro-climatic
importance and data would be reported as such rather than for political
administrative regions as is done in the census.

II. The Reconnaissance Survey

As originally proposed, the Reconnaissance Survey was designed to provide quick information on the situation of households in the study area which could be used to identify principal constraints to development for in-depth study by disciplinary specialists. It was not intended to be a baseline study for permanent monitoring of the area although the experience gained by the University in designing and carrying out such a study was a valuable preparation for such monitoring work.

The final design of the survey instrument represents a compromise between the need to collect rapid reconnaissance information and the need to be comprehensive in our coverage of both the geographical and disciplinary areas. The questionnaire was divided into eleven parts as follows:

1. Demographic Information on Household residents
   -age, education, principal activities
   -length of residence in area,
   -recent migrations

2. Inventory of buildings and Farm Equipment
   -houses, barracks, barns, warehouses, silos etc
   -mechanized equipment: tractors, implements, trucks etc
   -equipment for animal traction, implements, carts etc

3. Sources and Use of Water
   -surface and groundwater sources
   -type of irrigation (if any)
   -crops irrigated

4. Access to the Land
   -size of farm and type of title
   -number of tarefas planted or effectively occupied
   -changes in size of farm since drought
   -plans for expansion or contraction
   -principal constraints to expansion
   -cropping system

5. Production and Marketing of Crops
   -crops harvested and proportion marketed
   -characteristics of purchaser, place of sale and method of transport
   -changes in crop mix since drought

6. Stock of Animals and Offtake
   -number of cattle, swine, and small ruminants
   -losses, sales, purchaser, place of sale, method of transport
   -sales of animal products
   -changes in livestock holdings since drought

7. Use of Hired Labor of permanent and temporary labor force·
   -use of hired labor by principal farm activity
   -periods of labor scarcity, if any
   -method of payment

8. Access to Credit
        -sources and use of credit
        -reimbursement or extension of credit

9. Sources of Information
        -technical information
        -price information
        -crop information
10. Problems with Drought and Floods
        -problems encountered
        -assistance from official and private sources

11. Social and Geographic Integration
        -distance travelled to obtain goods and services
        -travel outside state and region
        -membership in farm, church, or political organizations

   The entire questionnaire, administered by trained interviewers, could
be answered by a willing respondent in approximately one hour and ten
minutes. While a questionnaire of this length approaches the limit of
time that one can impose on a respondent, it did manage to collect
information on a very wide range of subjects of interest to all the
disciplines represented in the project.

   The survey was carried out primarily by interviewers drawn from the
final year class of agricultural students of the Technical Agricultural
High School of Irece. The students proved to be very good interviewers.
They were well trained in agriculture and knew both the vocabulary of the
questionnaire and the meaning of the questions. As students drawn from
the study area they were easily accepted by farmers in the area. Through
an arrangement made with the School, participation in the survey was made
part of the student's study program in rural extension and rural
sociology. Students were paid for each interview that they completed
correctly (as verified by their teachers responsible for the return of
the questionnaires). They were also expected to use the information they
collected as the basis for a term report on some problem of agricultural
development identified by their field experience. With this double
incentive, we had few worries about the seriousness with which they
approached their task. The students were trained by professors from the
University of Bahia in the method of approaching the farmers and
administering the questionnaire. Each student received a manual which
explained the meaning and potential use of each question and the way in
which it should be asked. For certain communities in the Xique-Xique
region, the study relied on personnel of EMATERBa who were familiar with
the area and for whom the information would be professionally useful. It
was felt that access to these communities, in which EMATERBa was working,
was best achieved through that organization to avoid confusion on the
part of the communities about the nature and purpose of the study.
Because many farmers were uncertain about the impact that large scale
projects would have on their occupation of the land, it was felt that the
extension workers who were known to farmers were the best people to carry
out the interview.

Throughout the study, the team received excellent cooperation from CODEVASF both in the choice of the survey area and in the provision of transport for the interviewers.

The survey was carried out during the months of October and November of 1983. Ideally, the survey should have taken place at least a month earlier so that there would have been no danger of imposing on farmers at a critical time in their crop year and while they were willing to take the time necessary to complete the interview. The delay in carrying out the survey was associated with a delay in receiving funding approved in principle, in Brasilia. In fact, the team was able to interview farmers before planting had actually begun because of delayed rains. In order to advance the work, the Rockefeller Foundation provided a mixture of grants and advances which enabled the survey to take place ahead of the rains.

The survey was stratified by agro-climatic region and size of farm. The two geographic areas were Xique -Xique and Irece. Farms were divided into "micro" (less than 50 tarefas), "small (50-150 tarefas), "medium" (150-500 tarefas) and "large"(more than 500 tarefas). It was decided to treat farms with irrigation as a special class of farm and a sample of irrigated farms in both Xique Xique and Irece was made. In total, the survey covered more than 400 households from these two municipalities.

III. Preliminary Results

It is the purpose of this section to present descriptive statistics on many of the principal demographic, farm structure, and socio-economic variables that were included in the survey and to identify certain topics for further study which follow from this preliminary analysis. Since the objective of the reconnaisance survey was to provide information about the study area which could be used by other disciplinary specialists to formulate hypotheses for in-depth studies, we have chosen to present the information in five modules with the data farm-level data tabulated by size, region, and technology. We have defined five modules:

      A. Demographic Module
      B. Farm Structure Module
      C. Farm Change Module
      D. Socio-Economic Module
      E. Information and Marketing Module

For each module we have chosen to present the information in three ways:

      1. By Region: Irece versus Xique-Xique
      2. By Size of Farm: Micro, Small, Medium and Large farms
      3. By Technology: Irrigated versus Non-Irrigated farms

We compare Xique Xique with Irece in order to see to what extent we may treat the data as two parts of one large sample of farms in the semi-arid Northeast or to what extent we are dealing with two culturally and geographically distinct areas. From the point of view of demographic and personal characteristics the regions are more similar than dissimilar but the differences which exist in cropping systems and technology produce some differences in farm structure and behavior that are significant. Therefore, we provide comparative data on Irece and Xique Xique throughout the report. We also report information on the basis of size

and technology. The total sample was first broken down into farms "with"and "without" irrigation. These subsamples were further divided into size classes as noted above. In this way we are able to see the influence of region, size, and technology on the variables which describe the structure and behavior of farms in the study area. The data are presented in such a way that other researchers may use them to formulate hypotheses about the interaction among the variables themselves as well as about the influence of size, region, and technology.

Since the debate over development strategy seems to return to the issues of small farms versus large farms and small scale irrigation versus irrigation on a large scale, the presentation of descriptive information on farms in each class is a contribution to the debate. In creating the sample of irrigated farms we have actually created a sample of "farms with irrigation" rather than "farms where the principal method of cultivation is irrigation". Therefore, the sample of irrigated farms will include both "micro" irrigated farms (with fewer than 50 tarefas but most of which is irrigated) and very large farms with some irrigated areas. (On the average this area is not much larger than the area irrigated on micro farms). In future work it will be necessary to see how the size of the overall farm affects cropping activities carried out on that part which is irrigated. For example, one might raise the question of whether or not large farmers receive credit more easily for the irrigated part of their farms; whether they irrigate as intensively as the smaller specialized farmer with almost the same area under irrigation; and whether their relations with agricultural services and marketing networks are the same.

A. The Demographic Module

In the demographic module we report on the number of adults (people over age 16) residing in the household, the education of the head of household, and the numbers of people who have moved into ("in-migrants") or moved out of the household ("out-migrants") since the onset of the drought. Respondents were asked to identify the members of the household with their ages, relationship to the head of household and principal activity. The respondent, usually the head of household, was then asked to indicate the year in which the drought began for his particular farm. The respondent was then asked to indicate the names of members of the household who had left the household to reside elsewhere since the beginning of the drought, their relationship to the head and the motive for leaving the household. Similar information was requested for people joining the household since the beginning of the drought.

In this preliminary report, we consider only the number of adults in the household and the number of in-migrants and out-migrants. We expected to find that the number of adults was greater on large farms and on irrigated farms because of a greater absorptive capacity. We also expected that in times of economic distress, such farms would also have a higher rate of in-migration and a lower rate of outmigration than smaller non-irrigated farms.

There does not appear to be any major difference in the distribution of households by number of adults between the regions of Irece and Xique-Xique as seen in Table A.1.a. One might notice a small tendency for the percentage of households with more than five adults to be greater in the sample of irrigated farms than in the sample of those without irrigation, but since the mean and modal number of adults in the household is the same in both samples we cannot say that the type of technology used has a significant effect on household size. Nor is the number of adults in the household apparently related to farm size. One might have expected that irrigated farms, because of the labor intensity of the technique, and large farms, because of their absorptive capacity, would have a larger number of adults in the household through the retention of grown children or the absorption of married children into the household. The data, however, seem to point to the existence of nuclear families. (A head of household was not expected to record a married child with his or her spouse living on the same farm if they were not actually living and eating together in the same household). It should be possible in future work to study the impact on employment generation of farm size and type of technology but at the moment we simply note that irrigation and larger farms do not generate larger numbers of adults in the household.

Part of the personal information collected by the survey included the number of years of formal education completed by each family member. In this preliminary look at the data we are interested in the level of formal schooling of the heads of household (Tables A.1.b - A.3.B). The first observation that meets the eye is the low general level of formal schooling received by heads of household in our sample and presumably the region as well. The large majority of heads could not claim to have completed primary school. We confirmed our expectation that the heads of farms with irrigation would be clearly superior in formal education to those of non-irrigated farms. There is also a significant difference in favor of Irece over Xique Xique in the mean and modal level of education as well as in the percentage of heads of household completing four years of primary education (Table A.1.b.). Moreover, the survey shows a positive relationship between the size of farm and the mean level of education of heads of household. The direction of causation is probably from farm size to number of years of education rather than the reverse, but one of the essential areas of future investigation should be the study of the role of formal education in the promotion of agricultural change in the semi-arid areas of the Northeast. It should, in theory, be possible to relate access to credit, adoption of new techniques, and the use of information to formal level of education. However, the generally low level of formal education found in this sample makes it difficult to demonstrate the impact of education where fewer than 20% of respondents have more than four years of primary education, a level often considered the threshold for permanent literacy.

Table A.1

THE DEMOGRAPHIC MODULE
GEOGRAPHICAL BREAKDOWN

	XIQUE XIQUE		IRECE	
	IRRIGXIQ (n = 62)	NONIRRIG XIQ (n = 197)	IRRIG IRECE (n = 19)	NONIRRIG IRECE (n = 126)
a. Number of Adults				
% of HH with:				
0/no answer	1.6	0.0	0.0	0.0
1	16.1	4.0	5.2	2.3
2	25.8	37.5	15.7	38.8
3	22.5	17.7	26.3	20.6
4	9.6	17.2	26.3	20.6
Median No.	3.0	3.0	4.0	3.0
Modal No.	2.0	2.0	3 and 4	2.0
% with 5+	14.6	11.2	21.1	8.0
b. Education of Head of HH				
% of HH with:				
0 years	20.9	58.8	21.0	35.7
1	9.6	13.1	15.7	13.4
2	8.0	7.6	5.2	7.9
3	12.9	4.5	15.7	12.6
4	25.8	7.1	21.0	19.8
>4	22.6	4.6	21.1	11.6
Mean	4.13	1.81	4.08	2.56
Med	3.0	analf	3.0	2.0
Mode	4.0	analf	4.0	analf
c. Number of In-migrants				
% of HH with:				
0/NA	64.5	90.3	73.6	82.5
1	20.9	4.5	10.5	12.6
2	8.0	3.0	15.7	3.1
3	6.4	1.0	0.0	0.7
4	0.0	1.0	0.0	0.7
>4	0.0	0.5	0.0	0.0
d. Number of Out-migrants				
% of HH with:				
0/NA	58.0	75.5	78.9	71.2
1	32.2	12.2	15.7	16.0
2	6.4	7.1	5.2	7.2
3	.3.2	2.0	0.0	2.4
4	0.0	3.0	0.0	3.2
>4	0.0	0.5	0.0	0.8

Table A.2

THE DEMOGRAPHIC MODULE

IRRIGATED FARMS

	Size Breakdown:				
	Total (n = 81)	Micro (n = 25)	Small (n = 17)	Medium (n = 15)	Large (n = 24)
a. Number of Adults					
% of Households with:					
0/no answer	1.2	-0.0	5.8	0.0	0.0
1	13.5	0.0	17.6	33.3	12.5
2	23.4	32.0	29.4	20.0	12.5
3	23.4	40.0	11.2	13.3	20.8
4	13.5	16.0	5.8	6.6	20.8
Med	3.0	3.0	2.0	2.0	4.0
Mode	2, 3	3.0	2.0	1.0	4.0
% with 5+	16.1	8.0	23.6	20.0	16.7
b. Education of HH					
% of Heads with:					
o/NA years	20.9	28.0	17.6	26.6	12.5
1	11.1	12.0	5.8	20.0	8.3
2	7.4	16.0	0.0	6.6	4.1
3	13.5	20.0	17.6	6.6	8.3
4	24.6	16.0	41.1	13.3	29.1
4+	22.3	8.0	17.6	26.7	37.5
Mean	4.13	2.9	4.2	3.96	5.45
Median	3.0	2.0	4.0	2.0	4.0
Mode	4.0	0.0	4.0	0.0	4.0
c. No. of In-migrants					
% of HH with:					
0/NA	66.6	60.0	88.2	80.0	50.0
1	18.5	20.0	5.8	13.3	29.0
2	9.8	16.0	5.8	6.6	8.3
3	4.9	4.0	0.0	0.0	12.5
4	0.0	0.0	0.0	0.0	0.0
d. No. of Out-migrants					
%.of HH with:					
0/NA	62.9	64.0	76.4	46.6	62.5
1	28.3	28.0	11.7	40.0	33.3
2	6.1	4.0	11.7	13.3	0.0
3	2.4	4.0	0.0	0.0	4.1
4	0.0	0.0	0.0	0.0	0.0
>4	0.0	0.0	0.0	0.0	0.0

Table A.3

THE DEMOGRAPHIC MODULE

NON-IRRIGATED FARMS

	Size Breakdown			
	Micro (n = 169)	Small (n = 76)	Medium (n = 53)	Large (n = 25)
a. Number of Adults				
% of Households with:				
0/no answer	0.0	0.0	0.0	0.0
1	2.3	6.5	3.7	0.0
2	44.9	36.8	18.8	36.0
3	17.7	15.7	22.6	28.0
4	20.1	17.1	20.7	8.0
Med	3.0	3.0	4.0	3.0
Mode	2.0	2.0	3.0	2.0
% w 5+	15.0	11.9	15.1	12.0
b. Education of HH				
No. of Heads of Household with:				
0/NA	56.2	52.6	39.6	20.0
1	15.9	10.5	9.4	12.0
2	7.6	6.5	9.4	8.0
3	7.1	9.2	5.6	12.0
4	7.6	15.7	20.7	12.0
> 4	5.4	5.3	15.1	36.0
Mean	1.63	1.98	3.97	3.78
Med	0.0	0.0	2.0	3.0
Mode	0.0	0.0	0.0	5.0
c. No. of In-migrants				
% of HH with:				
0/NA	86.3	88.1	86.7	88.0
1	8.8	6.5	5.6	8.0
2	2.3	3.9	3.7	4.0
3	.05	0.0	3.7	0.0
4	1.1	1.3	0.0	0.0
> 4	0.5	0.0	0.0	0.0
d. No. of Out-migrants				
% of HH with:				
0/NA	76.1	71.0	76.9	60.0
1	13.6	14.4	11.5	16.0
2	6.5	9.2	5.7	8.0
3	1.1	3.9	3.8	0.0
4	2.3	1.3	1.9	16.0
> 4	(0.6)	0.0	(1.9)	0.0

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Turning to migration behavior, we note in Tables A.2.c and A.3.c that there appears to be a significant difference between the irrigated and non-irrigated households in the percentage of households declaring one or more new arrivals since the beginning of the drought. (The questionnaire asked the head of household to state the year in which the drought is considered to have begun for his area and then to say how many new arrivals to or departures from his household had taken place since that date). As such our intention was to date the onset of the drought and to collect information on migration behavior that could be related to the drought.

In the sample of non-irrigated farms, we note that farm size does not appear to have been a major factor in the inflow of new household members since the percentage of households declaring no in-migrants is the same across the size of farm classes. However, in the sample of irrigated farms (Table A.2.c.) it appears as if micro and large farms are more likely to receive in-migrants than the small and medium-sized irrigated farms. Why this should occur is not clear and the occurrence merits further investigation. It is plausible that the farms with irrigation that we identified as "micro" are of recent origin and have several members of the household who are recent arrivals (possibly since the beginning of the drought). The "large" farms with irrigation are usually mixed farms with multiple crop, horticulture, and livestock operations. They certainly would have a considerable absorptive capacity to receive new or returning family members.

There do not appear to be any significant differences between Xique Xique and Irece with respect to the percentage of households declaring a given number of out-migrants since the drought (Table A.1.d). There does appear to exist a consistent difference beteen the samples of irrigated and non-irrigated farms which holds true for both regions and across the size of farm (Tables A.1.d-A.3.d).

It is in comparing the "in-migration" and "out-migration" figures, presented in section "d" of Tables A.1-A.3, that we confirm the general phenomenon of net emigration characteristic of the semi-arid areas of the Northeast during this time of drought. In all categories of farm, the percentage of households declaring at least one or two out-migrants is significantly greater than the percentage of households declaring the same number of in-migrants. There also appears to be generally higher movement in both directions among households in the irrigated sample than in the non-irrigated sample. A more detailed look at migration behavior should be possible using information collected on the reasons given for migration.

In short, households in the study area may be described as composed of nuclear units with approximately three adults in the unit. The head of the household has received some primary education but probably not completed a full four years. There is a flux of population both in and out of the area but the trend since the drought has been to net out-migration.

B.   The Farm Structure Module

In this section we present information on the structure of farms in
the sample. The sample was purposely stratified by size: data were
collected on "micro", "small", "medium" and "large" non-irrigated farms
and a separate sample was collected on "farms with irrigation". The
sample of farms with irrigation was not stratified by size but an ex post
stratification is presented in the tabulations. We find the sample of
"farms with irrigation" (called "irrigated farms" for simplicity) to
contain roughly equal numbers in each of the farm size classifications
(See Table B.1.e). When we look at the area actually irrigated, however,
we find the differences to be not very great among the smaller and
larger farms. . However, there are differences in the size distribution
of irrigated area between the Irece and Xique Xique samples. A larger
percentage of the irrigated farms in the Irece region fell in the range
of 0-10 tarefas of irrigated area than in the Xique Xique sample. This
probably reflects the existence of specialized irrigated horticulture in
Xique Xique based on pump irrigation from rivers. In Irece, the
irrigated cropping appears to be often only one activity among many on a
larger mixed farm and often done from a well. An analysis of the
different types of irrigation and of the characteristics of the irrigated
farms is an important topic for detailed study. Since one of the
objectives of the program of studies of semi-arid areas is to evaluate
alternative methods of improving incomes and the level of living of
populations in semi-arid areas a better understanding of the
characteristics of farmers currently using irrigation is essential.

In Tables B.1.d - B.3.d. we find that farmers in both Irece and Xique
Xique claim access to more land than that covered by the unit included in
our survey. Farmers were asked if they had other property "in addition
to this property" and to state the location and the number of tarefas.
We expected there to be a rather clear difference in the use of other
land among the classes of farm; larger farms were expected to own other
areas more frequently than smaller farms and, if anything, we expected
the small irrigated cultivator to be limited to his plot of land. We
were surprised to find that all farm classes mentioned access to some
other piece of land.

The relationship between size of farm and number and location of
other properties is not presented here and could be the subject of future
work. For the moment we simply note a few basic observations. First,
farmers with irrigation, which on the average have larger farms than
those without irrigation, also claimed the use of larger areas of "other"
land not covered in depth in this survey. Even the micro-irrigated farms
claimed to have the use of land beyond that studied in this survey equal
to several times the average area irrigated.(Tables B.2.d and B.3.d).
This claim is in striking contrast to that of the micro and small farmers
in the non-irrigated sample who declare relatively small areas of
additional land. A special study of the origins, method of entry to
irrigated cultivation, and means of access to the land and agricultural
credit and services by these irrigated small farmers is a priority for
future researchers.

Table B.1

THE FARM STRUCTURE MODULE
GEOGRAPHICAL BREAKDOWN

	XIQUE XIQUE		IRECE	
	IRRIGXIQ (n = 62)	NONIRRIG XIQ (n = 197)	IRRIG IRECE (n = 19)	NONIRRIG IRECE (n = 126)
a. Area of Farm:				
% of farms in class:				
Micro (50 ta)	29.8	50.7	31.5	41.2
Small (50-150 ta)	26.2	25.0	15.7	31.6
Med (150-500 ta)	15.7	15.6	26.1	17.4
Large (500+ ta)	28.1	8.0	26.1	9.6
Mean	527.5	159.41	354.1	165.6
Stand Deviation	867.4	332.3	429.2	264.4
b. Area Irrigated:				
% of farms with:				
Area Irrig				
0-10	19.6		68.4	
10-20	27.8		10.5	
20-30	11.4		10.5	
30-40	19.6		0.0	
40-50	9.8		0.0	
50-60	3.2		5.2	
60-70	1.6		0.0	
70-80	1.6		5.3	
80-90	3.2		0.0	
90-100	0.0		0.0	
c. Area with Title				
Mean	479.6	132.2	352.6	139.9
Stand Deviation	825.6	324.1	430.4	243.7
d. Use of Other Area				
Mean	723.4	78.6	840.5	237.5
Stand Deviation	2880.4	381.7	2235.1	1753.0

Table B.2

FARM STRUCTURE MODULE
IRRIGATED FARMS

VARIABLE	Total (n = 81)	Breakdown by Farm Size: Micro (n = 25)	Small (n = 17)	Medium (n = 15)	Large (n = 24)
a. Area of Farm (ta)					
Mean	486.79	24.36	96.47	279.8	1274.3
Stand Deviation	787.75	14.51	35.80	108.68	977.3
Median Class					
Modal Class					
b. Area Irrigated					
Mean	26.6	15.3	26.6	16.1	31.2
Stand Deviation					
Median Class	10-20	10-15	20-25	0-5	30-35
Modal Class	0-10	10-15	30-35	0-5	0-5
% Farms with					
Area Irrigated					
0-5	21.0	12.0	0.0	53.8	23.8
5-10	14.0	20.0	20.0	76.0	4.7
10-15	11.2	28.0	6.6	0.0	0.0
15-20	15.4	16.0	20.0	15.3	9.5
20-25	9.8	8.0	6.6	15.3	9.5
25-30	2.8	4.0	0.0	0.0	4.7
30-35	14.0	4.0	33.3	0.0	19.0
35-40	2.8	8.0	0.0	0.0	0.0
40-45	28.0	0.0	6.6	7.6	0.0
45-50	5.6	0.0	6.6	0.0	14.2
Number of Outliers	10.0	10.0	2.0	2.0	3.0
c. Area with Title					
Mean	449.85	15.28	84.11	279.8	1267.8
Stand Deviation	751.29	19.17	44.95	108.68	965.7
d. Use of Other Area					
Mean	750.8	105.4	83.1	940.9	1777.4
Stand Deviation	2730.1	293.8	194.6	2103.8	4605.3

Table B.3

FARM STRUCTURE MODULE
NON-IRRIGATED FARMS

VARIABLE		Breakdown by Farm Size:		
	Micro (n = 169)	Small (n = 76)	Medium (n = 53)	Large (n = 25)
a. Area of Farm (ta)				
Mean	23.0	92.84	289.05	1039.9
Stand Deviation	14.48	30.81	99.63	500.5
Median Class	14-20	80-90	250-300	500-1000
Modal Class	10-15	50-60	250-300	500-1000
b. Area Irrigated				
Mean				
Stand Deviation				
Median Class				
Modal Class				
c. Area with Title				
Mean	20.0	74.11	221.7	916.9
Stand Deviation	41.0	46.6	129.3	595.6
d. Use of Other Area				
Mean	21.15	54.48	123.35	1246.5
Stand Deviation	82.24	202.51	269.58	3941.8

The above discussion leads naturally to the question of the type of title to the land enjoyed by the different types of farmers and the method by which they gained access to the land.

A. In general, we note that the great majority of farmers in both Irece and Xique Xique claim title to the land (Table B.4.a). We do not discount the possibility that some farmers overstated their degree of claim to the land and claimed title where there might exist only a long period of occupation but no official title. It is even possible that some farmers were unwilling to admit that they had less than full title out of fear that such information could lead to an attempt by someone to claim title to their lands. Therefore, we use these figures with some caution because of the possibility of overreporting of titles by those who in fact do not have title. Nevertheless, there appear some significant differences among the classes of farm which should be noted.

On the average, a higher percentage of farmers in Irece claim full title than in Xique Xique. Perhaps this reflects the longer period of occupation by owner-operators in Irece which resulted from the earlier investment in road links to the rest of Bahia. The recent paving of the road Irece-Xique Xique has been a force for the development of irrigated horticulture in the region, often practised by immigrants from Pernambuco. Particularly noticeable is the large percentage of "micro" irrigated farmers in the Xique Xique region who are renting their land. (Table B.5.a). It would prove to be an interesting and useful exercise to study the market for rented farmland in the Xique Xique area: Who are the tenants? Who are the landlords? On what conditions is the land rented? and How does this affect the efficiency of land use?

There remains a significant proportion of micro and small farmers in the sample who are occupying their land as posseiros (without title and without renting). A study of the origins of such farmers, the length of their occupation of the land and the status of their legal rights will be an important precursor to any program to develop the area. Field interviewers and extension personnel working in the region reported that farmers are concerned about the impact that large-scale irrigation projects in the area might have on their claim to the land.

At the level of aggregation of the data we are using there is not much to be seen in the variable called "Sources of Water" reported in Tables B.4.b, B.5.b. and B.6.b. Irrigated farms usuall draw their water from a river or stream. Irrigation in Xique Xique appears to be much more tied to the presence of a river or stream than in Irece. As one expects, the larger the farm the more likely it is to have multiple sources of water. In this preliminary analysis we have not tried to rank the secondary sources of water but it quite clear that the larger the farm the more important become the manmade sources of water: wells, dugouts, and tanks.

The use of tractors is the norm for farms in the study area although ownership and rental patterns differ across the different classes of farms. A farmer in Irece is more likely to own his own tractor than one in Xique Xique (Table B.4.c). This may reflect the greater need for a tractor in the cultivation of field crops on a large scale such as beans, maize and castorbean than in preparing the land for intensive horticulture. Farmers with irrigation are more frequently owners of their own tractors than farmers without irrigation (Tables B.4.c-B.6.c) and, as expected, the percentage of farmers owning their own tractors increases

Table B.4

FARM STRUCTURE MODULE
GEOGRAPHICAL BREAKDOWN

	XIQUE XIQUE		IRECE	
VARIABLE	IRRIGATED (n = 52)	NONIRRIGATED (n = 197)	IRRIGATED (n = 19)	NONIRRIGATED (n = 126)
a. Method of Access to Land				
No answer	0.0	0.0	0.0	3.1
With title	75.8	64.4	89.4	81.7
Without title	6.4	24.3	10.5	6.3
Inherit (sem tit)	1.6	1.5	0.0	0.7
Rent	12.9	5.0	0.0	4.7
Part with/ part without	3.2	0.0	0.0	3.1
b. Source of Water				
No answer	0.0	2.0	0.0	6.3
Piped to farm	0.0	3.0	0.0	9.5
River/stream	79.0	35.0	10.5	0.0
Dugout/barrage	0.0	2.0	0.0	0.7
Well	0.0	22.3	21.0	30.1
Cistern	0.0	4.0	0.0	11.9
Truck	0.0	1.0	0.0	3.1
Tank/reservior	0.0	0.5	0.0	3.9
Other	0.0	5.5	0.0	3.1
Multiple source	20.9	24.3	68.4	30.9
c. Use of Tractor				
Not used/no answer	9.6	43.1	10.5	13.4
Owns	32.0	8.1	57.8	35.7
Rents	58.0	47.0	31.5	45.2
Borrows	0.0	0.0	0.0	0.0
Both owns & rents	0.0	1.0	0.0	0.0
d. Type of Irrigation				
None	---	100.0	---	100.0
Sulcos	61.2	---	47.3	---
Aspersion	1.6	---	26.3	---
Drip	0.0	---	10.5	---
Infiltration	4.8	---	5.2	---
Inundation	25.8	---	0.0	---
Other	6.4	---	10.5	---
e. Use of Animal Traction				
None/No answer	79	67.5	31.5	16.6
Oxen	0	0	0	0
Mule/burro	0	3.5	0	6.3
Horse	1.6	4.5	21	19
Owns Equipment	.			

Table B.5

FARM STRUCTURE MODULE
IRRIGATED FARMS

VARIABLE	Breakdown by Farm Size:				
	Total (n = 81)	Micro (n = 25)	Small (n = 17)	Medium (n = 15)	Large (n = 24)
a. Method of Access to Land					
No answer	0.0	0.0	0.0	0.0	0.0
With title	79.0	44.0	88.2	100.0	95.8
Without title	7.4	20.0	5.8	---	---
Inherit (sem tit)	1.2	4.0	0.0	---	---
Rent	9.8	28.0	5.8	---	---
Part title/ part without	2.4	4.0	---	---	4.1
b. Source of Water					
No answer	---	---	---	---	---
Piped to farm	---	---	---	---	---
River/stream	62.9	76.0	76.4	53.3	45.8
Dugout/barrage	---	---	---	---	---
Well	4.9	---	5.8	13.3	4.1
Cistern	---	---	---	---	---
Truck	---	---	---	---	---
Tank/reservior	---	---	---	---	---
Other	---	---	---	---	---
Multiple source	32.0	24.0	17.6	33.3	50.0
c. Use of Tractor					
Not used/no answer	9.8	20.0	11.7	6.6	0.0
Owns	38.2	24.0	29.4	33.3	62.5
Rents	51.8	56.0	58.8	60.0	37.5
Borrows	0.0	0.0	0.0	0.0	0.0
Both owns & rents	0.0	0.0	0.0	0.0	0.0
d. Type of Irrigation					
None	---	---	---	---	---
Sulcos	58.0	68.0	76.4	40.0	45.8
Aspersion	7.4	4.0	5.8	13.3	8.3
Drip	2.4	0.0	5.8	6.6	0.0
Infiltration	4.9	4.0	0.0	13.3	4.1
Inundation	19.7	24.0	11.7	13.3	25.0
Other	7.4	---	---	13.3	16.6
e. Use of Animal Traction					
None/No answer	67.9	92	64.7	40	62.5
Oxen	0	0	0	0	0
Mule/burro	0	0	0	0	0
Horse	6.1	0	5.8	20	4.1
Owns Equipment	25.9	8	29.4	40	33.3

with the size of the farm. We expect this percentage to rise with farm size not only for technical reasons relating to the minimum cultivated area at which ownership becomes profitable but also for financial reasons associated with the availability of credit for investment purposes. It may be possible to generate additional information about the importance of credit and effect of size of farm on tractor ownership in future work.

The survey data clearly demonstrate that tractor rental rather than tractor ownership is the predominant means of access to mechanization. A study of tractor hire services and the method of fixing custom rates in the study area would greatly increase our understanding of the constraints to agricultural development in the region. Since the amount of credit granted for certain crops is based on EMATERBa's estimate of custom rates, EMATERBa may have an (un)intended role in fixing the price of services in the region. If tractor services may be hired in timely fashion and at reasonable prices, the low level of ownership of tractors may not be a problem.

There is some ambibuity in the data concerning animal traction (Tables B.4.e, B.5.e and B.6.e). We find a much higher percentage of respondents claiming ownership of specific equipment and implements for animal traction than we find farmers indicating actual use of draft animals. Since animal traction is a technology which can improve the conditions of farmers who do not have credit for tractor hire or the purchase of motorized equipment, it merits careful study. In spite of the low number of practitioners, there are some observations we can make. First, the use of animal traction is significantly higher in Irece than in Xique Xique both in the sample of irrigated households and in the sample of non-irrigated households. There appears to be a tendency for the ownership of equipment and implements for animal traction to increase with the size of the farm up to the medium range but not to increase thereafter, as if the large farms were fully committed to tractorized cultivation.

Turning to the data on farm irrigation, we present a breakdown of the sample of irrigated farms by type of irrigation. The field interviewers recorded the farmer's description of the type of irrigation without actually visiting the field, which fact may lead to some distinctions among types of irrigation that are more semantic than real. In Table B.4.e, we note that the primary method of irrigation in Xique Xique is to pump water to the field and let it run along the furrows (sulcos). By moving the hose or tying the ridges the farmer can stop the water from entering furrows that have received sufficient water. Farmers in Xique Xique also refer to irrigation by inundation (inundaçao) as being the next most important method. In most countries new to irrigation, "inundation" seems to describe a primitive form of irrigation in which water is pumped to the field, often drowning the low spots while leaving the high spots dry. It tends to have harmful effects on the fertility of the land. Without further study, it is difficult to say if farmers mean the same thing when they talk about irrigation by sulcos and irrigation by inundation, but inundation seems to be practised by all sizes of farm with irrigation in Xique Xique. In Irece, irrigation is most frequently said to be done along the furrows using the method proposed by EMATERBa.

Table B.7

FARM STRUCTURE MODULE
GEOGRAPHICAL BREAKDOWN

	XIQUE XIQUE		IRECE	
	IRRIGATED	NONIRRIGATED	IRRIGATED	NONIRRIGATED
VARIABLE	(n = 62)	(n = 197)	(n = 19)	(n = 126)
a. Cropping System:				
Not specified	4.8	12.6	0.0	3.1
Feijao (alone)	0.0	1.5	0.0	1.5
Feijao & milho	1.6	18.7	10.5	19.0
Feijao-milho-mamona	3.2	31.4	15.7	55.5
Feijao-milho-outro	6.4	7.6	10.5	3.9
Cenoura	0.0	0.0	10.5	0.0
Cebola	29.0	0.0	0.0	0.0
Mixed horticulture	45.1	5.0	47.3	5.5
Mandioca	0.0	0.0	0.0	0.0
Feijao-outro	1.6	2.0	0.0	0.0
Tree crops	1.6	4.0	0.0	7.9
Mixed tree & field crops	0.0	0.5	0.0	.7
Milho & outro	3.2	1.0	5.2	.7
Mamona (alone)	1.6	11.1	---	.7
Milho (alone)	0.0	2.0	---	.7
Other	1.6	2.0	---	.7
b. Number of Cattle				
Mean	16.5	4.01	35.7	6.7
Stand Deviation	40.0	12.46	71.0	29.9
c. Number of Swine				
Mean	4.88	1.5	4.05	1.84
Stand Deviation	17.54	6.86	11.39	6.98
d. Number of Small Ruminants				
Mean	20.97	6.4	.52	3.34
Stand Deviation	54.31	18.99	1.57	18.57

Table B.8

FARM STRUCTURE MODULE
IRRIGATED FARMS

VARIABLE	Breakdown by Farm Size:				
	Total (n = 81)	Micro (n = 25)	Small (n = 17)	Medium (n = 15)	Large (n = 24)
a. Cropping System:					
Not specified	3.7	0.0	0.0	13.3	4.1
Feijao (beans)	0.0	0.0	0.0	0.0	0.0
Feijao-milho	3.7	0.0	5.8	13.3	0.0
Feijao-milho-mamona	6.1	4.0	0.0	6.6	12.5
Feijao-milho-outro	7.4	0.0	11.7	13.3	8.3
Cenoura	2.4	4.0	0.0	0.0	4.1
Cebola	22.5	36.0	28.4	6.6	12.5
Mixed garden crops	45.6	40.0	52.9	46.6	45.8
Crops & fishing	0.0	0.0	---	---	0.0
Manioc	1.2	0.0	---	---	4.1
Feijao & other	1.2	4.0	---	---	0.0
Tree crops	0.0	0.0	---	---	0.0
Mixed tree & field crops	3.7	4.0	---	---	8.3
Milho & other	1.2	4.0	---	---	---
Mampha (alone)	0.0	0.0	---	---	---
Milho (alone)	1.2	4.0	---	---	---
b. Number of Cattle					
Mean	21.0	.84	3.53	9.8	61.4
Stand Deviation	49.2	2.26	6.70	12.7	76.4
c. Number of Swine					
Mean	4.69	.8	3.35	---	12.63
Stand Deviation	16.24	2.04	7.39	---	27.99
d. Number of Small Ruminants					
Mean	16.17	2.16	24.71	1.8	33.7
Stand Deviation	48.22	8.60	69.74	6.44	62.3

Table B.9

FARM STRUCTURE MODULE
NON-IRRIGATED FARMS

	Breakdown by Farm Size:			
VARIABLE	Micro (n = 169)	Small (n = 76)	Medium (n = 53)	Large (n = 25)
a. Cropping System:				
Not specified	7.1	14.4	7.5	8.0
Feijao (alone)	1.7	0.0	0.0	8.0
Feijao-milho	18.9	17.1	18.8	24.0
Feijao-milho-mamona	42.6	43.4	35.8	32.0
Feijao-milho-outro	7.6	1.3	9.4	4.0
Cenoura	0.0	0.0	0.0	0.0
Cebola	0.0	0.0	0.0	0.0
Mixed garden crops	3.5	6.5	7.5	8.0
Mandioca	0.0	0.0	0.0	0.0
Feijao-outro	1.1	2.6	0.0	0.0
Tree crops	4.7	7.8	5.6	4.0
Mixed tree/field crops	0.0	0.0	0.0	0.0
Milho/other	1.1	1.3	0.0	0.0
Mamona (alone)	7.6	3.9	11.3	4.0
Milho alone	1.7	1.3	1.8	---
b. Number of Cattle				
Mean	1.29	2.68	7.79	32.12
Stand Deviation	6.18	10.06	17.25	61.89
c. Number of Swine				
Mean	1.24	2.10	2.43	1.12
Stand Deviation	1.30	13.01	22.70	41.84
d. Number of Small Ruminants				
Mean	3.14	3.81	8.71	15.92
Stand Deviation	13.0	13.01	22.70	41.84

When we turn to the cropping systems that are practised in the study area we are impressed with the lack of variety which was found (Tables B.7, B.8 and B.9). On the non-irrigated farms, the beans + maize + castorbean rotation (feijao + milho + mamona) had captured more than half the farmers in Irece and a third of the farmers in Xique Xique. When we add those farmers with some permutation of the system (beans and maize alone or beans, maize and some other crop such as cotton) we have evidence of the great specialization of the area. Field interviwers and extension personnel report that the credit and marketing systems have favored concentration on these crops and that, in particular, the credit system has forced farmers to plant these crops in pure stands rather than in association. This lack of diversification of farms; dependence on credit, and rigidity in planting methods has increased the farmer's risk of disaster as well as dependence in the continuation of current credit arrangements.

In the irrigated sample, onions appear to be the principal crop grown, as reflected in the high percentage of farmers who cited only this crop as a principal production. In this preliminary report we have not attempted to break the other products down more finely and have simply recorded a large percentage of farms involved in "mixed horticulture". It is important to note, however, that even in this sample of irrigated farms, we have more than a third of the farms which have declared their principal cropping system to be one of the "beans + maize + other" cropping systems. In future work we will try to develop additional information on the relationship between the irrigated and non-irrigated activities which take place within the same large farms.

Livestock is an important part of the farming system of the study area but there are important differences between farms in the Xique Xique and Irece regions and among farms classed by size. The first thing to note in Table B.7.b. is the fact that farms in Irece have larger numbers of cattle on the average than farms in Xique Xique. This holds true for both the irrigated and the non-irrigated sample. Since the average area of farms is not larger in Irece than in Xique Xique this represents an important difference in the farming system. The second thing to notice is that the number of cattle and the size of the farm are positively related (as one would expect). It also appears as if irrigated farms have more cattle on the average than non-irrigated farms. However, referring back to the average size of farm data presented earlier, we note that irrigated farms are on the average larger than non-irrigatd farms, which fact explains their apparent tendency to have more cattle. When one compares the number of cattle found on micro, small,and medium farms there is not much difference between the irrigated and non-irrigated samples It is only with the large farms that the difference becomes striking and there we note that the average size of large farm is much larger as well in the irrigated sample.

Similar reasoning may be applied to the raising of swine and small ruminants. The sample has pointed to the existence of certain large farms with diversified crop and livestock activities. One thing which stands out, however, is the apparent importance of small ruminants on the small irrigated farms, primarily in Xique Xique. It is necessary to look more closely at the role small ruminants play in the farming system of farms of different size.

C. The Change Module

In this module we are interested in studying recent changes in farm structure or behavior. By "recent changes" we mean those changes which have occurred since the onset of the drought and which may be attributed to the drought. For the moment we restrict ourselves to questions about changes in area of the farm since the drought, plans to increase area in the current cropping year (1983-84) and identification of the principal constraints to expansion. The results of this investigation are reported in Tables C.1. through C.3.

The first thing to note is the apparently small percentage of farms which reported changes in the size of farm since the onset of the drought. Roughly 75-80% of the farms in the sample reported that no changes had taken place.(Tables C.10.a-C.12.a). For those farms reporting some change in area, the response to the drought was more frequently an expansion in the area cultivated than a reduction. Farms with irrigation tended to expand the area irrigated as well as the area planted in rainfed conditions. Farmers without irrigation were three times as likely to expand the area planted in rainfed conditions as to reduce it. This tendency is a natural one at the farm level since it represents a desire to compensate for the risk of crop losses under stress conditions by planting a larger area. However, the tendency to push cultivation onto more and more marginal land in response to drought may cause important ecological damage when practised on a large scale. The tendency to expand the area planted was common to all sizes of non-irrigated farms. Micro farms appear to have had greater difficulty in expanding than the farms in other size classes.

When questioned about their plans for expansion or contraction of their farms in 1983-84, small farmers seemed to talk in terms of larger percentage increases than larger farms if one divides the average "planned increase" for the current cropping season by the average area of farms in that size class. Irrigated farmers were not significantly different from non-irrigated farmers in their avowed plans to expand the area planted.

Farmers were also requested to identify the principal constraints to expansion of their farms. The first thing to note is that the percentage of farmers who did not mention any constraints (and presumably do not have constraints) is much higher among irrigated farmers than among dryland farmers. Where a constraint was mentioned it was most frequently "credit". Only among "micro" farmers, in both the irrigated and non-irrigated sample was "land" mentioned as a separate constraint to expansion of their farms. "Credit" obviously is a proxy for all constraints since the farmer could attribute his inability to buy land to a lack of credit for investment purposes. Labor was not generally considered to be a constraint to expansion. Given the high level of underemployment and the reduced activity due to the drought most farmers interviewed mentioned that they could always find the labor they required. Even those farmers who mentioned labor as a constraint often did not identify the operations for which labor was in scarce supply. Small and medium sized irrigated farmers mentioned labor as a constraint more frequently than non-irrigated and large farms. One would expect this to be the case because of the greater labor intensity of irrigated

Table C.1

CHANGE VARIABLES
GEOGRAPHICAL BREAKDOWN

	XIQUE-XIQUE		IRECE	
	IRRIGATED n= 62	NON-IRRIGATED n= 197	IRRIGATED n= 19	NON-IRRIGATED n= 126
VARIABLE				
a. Change in Farm since drought				
None/not specified	79	83.2	73.6	73.8
Expand Irrigation	6.4	-	15.7	-
Reduce Irrigation	1.6	-	-	-
Expand Dryland	6.4	11.6	-	19.8
Reduce Dryland	-	4.5	5.2	4.7
Exp Irr/Red Dry	-	-	-	-
Exp Irr/Exp Dry	6.4	0.5	5.2	-
Red Irr/Red Dry	-	-	-	0.7
Red Irr/Exp Dry	-	-	-	-
b. Planned Increase in Area				
Mean	32.98	10.5	4	189.69
S.D.	69.29	51	7.99	1934.5
c. Principal Constraint to Expansion				
None/not specified	50	27.9	42.1	27.7
Labor	8	7.6	5.2	3.1
Credit	29	44.6	31.5	48.4
Land	4.8	13.1	21	17.4
Market	1.6	0	0	0.7
Other	6.4	6.5	0	2.3

Table C.2

CHANGE VARIABLES
BREAKDOWN BY FARM SIZE: IRRIGATED

	TOTAL SAMPLE n= 81	MICRO n= 25	SMALL n= 17	MEDIUM n= 15	LARGE n= 24
VARIABLE					
a. Change in Farm since drought					
None/not specified	77.7	84	76.4	80	70.8
Expand Irrigation	8.6	8	11.7	6.6	8.3
Reduce Irrigation	.1.2	4	0	0	0
Expand Dryland	4.9	4	0	6.6	8.3
Reduce Dryland	1.2	−	5.8	0	0
Exp Irr/Red Dry	−	−	0	0	0
Exp Irr/Exp Dry	6.1	−	5.8	6.6	12.5
Red Irr/Red Dry	−	−	−	−	−
Red Irr/Exp Dry	−	−	−	−	−
b. Planned Increase in Area					
Mean	26.1	6.08	13.9	19.6	59.8
S.D.	61.8	20.9	30.6	33.9	98.7
c. Principal Constraint to Expansion					
None/not specified	48.1	40	41.1	46.6	62.5
Labor	7.4	0	17.6	13.3	4.1
Credit	29.6	32	29.4	33.3	25
Land	8.6	20	5.8	6.6	0
Market	1.2	0	5.8	0	0
Other	4.9	8	0	0	8.3

Table C.3

CHANGE VARIABLES
BREAKDOWN BY FARM SIZE: NON-IRRIGATED

VARIABLE	MICRO n=. 169	SMALL n= 76	MEDIUM n= 53	LARGE n= 25
a. Change in Farm since drought				
None/not specified	82.8	73.6	79.2	76
Expand Irrigation	–	1.3	–	–
Reduce Irrigation	–	–	–	–
Expand Dryland	10.6	23.3	13.2	24
Reduce Dryland	5.3	2.6	7.5	–
Exp Irr/Red Dry	–	–	–	–
Exp Irr/Exp Dry	0.5	–	–	–
Red Irr/Red Dry	0.5	–	–	–
Red Irr/Exp Dry	–	–	–	–
b. Planned Increase in Area				
Mean	8.39	9.89	19.69	910.4
S.D.	48.76	29.10	55.92	4337.1
c. Principal Constraint to Expansion				
None/not specified	26	30.2	26.4	36
Labor	6.5	3.9	7.5	4
Credit	44.3	50	50.9	36
Land	21.3	7.8	9.4	4
Market	0	0	–	4
Other	1.7	7.8	5.6	16

farming. However, farmers may cite labor as a constraint to expansion
not because it is physically scarce but simply because they think it
"costs too much".It will be necessary to investigate the constraints to
the expansion of farms in much more detail with attention to the
particular constraints facing different type of farmers.

D. The Socio-Economic Module

In this module we present preliminary descriptive statistics on the
use of credit and the use of hired labor. We must be careful in using
this data because of the large number of farmers who provided no
information. Respondents were asked if they had used credit during the
crop year 1982-83. If the response was positive they were asked to
identify the source, indicate the amount, describe the objective and say
whether or not it had been reimbursed. We expected to find that large
farms and irrigated farms had greater access to credit than smaller and
non-irrigated farms. If this did not show up in their access to
operating credit it was expected to show up surely in their greater
access to credit for investment purposes. Tables D.1a-D.3a show that a
majority of farmers in the irrigated sample in Xique Xique reported the
use of credit for operating costs (custeio) while a majority of the
non-irrigated farmers either failed to answer the question or used no
credit at all. In the Irece sample, a majority of farmers reported the
use of credit for operating costs. There were very few respondents in
the entire sample who reported the use of credit for investment
purposes.

In reporting the amount of credit received (D.1.c, D.2.c, and D.3.c)
we give the percentage of farmers in each subsample either who did not
answer the question or who received no credit. Since there were such
large numbers who did not answer or who received no credit, we decided to
report the amount of credit received by the subsample of those farmers
who received some credit. For such farmers we provide the cumulative
frequency distribution showing the percentage who received less than a
specific amount. For example, the first column of Table D.1c shows that
15.5% of irrigated farmers who used some credit received less than Cr$
750,000; Column 2 indicates that 84.7% of the non-irrigated farmers
received less than this amount.

Without making excessive claims about the meaning of the data, we
note that the majority of non-irrigated farmers in the Xique Xique area
received no credit (or did not answer the question). Those who did
receive credit were almost totally in the below Cr$ 1.000.000 class On
the other hand, only 24% of the irrigated farmers received less than Cr$
1.000.000. Clearly, farmers with irrigation are better credit risks than
farmers without. Size is obviously positively correlated with the amount
of credit received both in the irrigated and the non-irrigated samples.

There are striking differences among the subsamples in the
percentage of farmers who repaid the credit that was granted to them. In
the irrigated subsample, most of the farmers who gave an answer claimed
to have reimbursed the credit that they had received.. On the other
hand only a small percentage of farmers without irrigation claimed to
have reimbursed the credit; the majority mentioned PROAGRO in describing
the current status of their outstanding loans. Among the irrigated

farms, we note that the micro and small farms show as high a frequency of reimbursement as the large farms with irrigation. Several interesting hypotheses might be explored in future work. One such hypothesis might bo that the small and micro irrigated farmers are specialized in horticulture, are often rentors of the land, and cannot default on their loans. On the other hand, the medium and large farms with some irrigation have probably used credit for their rainfed activities and it is these crop losses which explain the relief given by PROAGRO.

Table D.1

SOCIO-ECONOMIC VARIABLES
GEOGRAPHICAL BREAKDOWN

	XIQUE-XIQUE		IRECE	
VARIABLE	IRRIGATED n= 62	NON-IRRIGATED n= 197	IRRIGATED n= 19	NON-IRRIGATED n= 126
a. Use of Credit				
None/no answer	27.4	62.9	42.1	31.7
Operating Costs	72.5	33.5	52.6	67.4
Investment	–	2.5	0	0
Both Inv.+ Op.Costs	–	0.5	5.2	0
b. Amount of Credit				
Mean	2429.5	204.2	427	690.1
S.D.	5041.9	803.0	687.5	1924.2
c. Credit: % Farms				
None/no answer	17/62 27.4	125/197 63.5	9/19 47.3	40/126 31.2
% less than				
100,000	2.2	13.8	20	3.4
250,000	4.4	52.7	30	23.2
500,000	11.1	76.3	40	53.4
750,000	15.5	84.7	50	72.
1000,000	24.4	90.2	80	76.7
2000,000	57.7	97.2	90	90.6
3000,000	80.0	97.2	100	95.3
5000,000	86.6	98.6	–	98.8
d. Result of Credit				
No answer	41.9	63.5	47.3	34.1
Reimbursed	46.7	1%	5.2	5.5
Extended	4.8	10.6	5.2	22.2
Forgiven	1.6	2	–	2.3
Protested	–	1%	–	–
Pro Agro	4.8	21.8	42.1	35.7

Table D.2

SOCIO-ECONOMIC VARIABLES
BREAKDOWN BY FARM SIZE: IRRIGATED

VARIABLE	TOTAL SAMPLE n= 81	MICRO n= 25	SMALL n= 17	MEDIUM n= 15	LARGE n= 24
a. Use of Credit					
None/no answer	30.8	32	23.5	40	29.1
Operating Costs	67.9	68	76.4	53	70.8
Investment	0	-	-	0	
Both Inv.+ Op.Costs	1.2	-	-	6.6	
b. Amount of Credit (,000)					
Mean	1959.7	968.7	2676.4	858.3	3172.8
S.D.	4879.5	1109.2	3766.7	1321.1	7371.2
c. Credit: % Farms					
None/no answer	32%	36%	23.5%	40%	33.3%
% less than					
100,000	5.4	0	0	11.1	11.7
250,000	9.0	6.2	7.6	11.1	11.7
500,000	16.3	6.2	7.6	11.1	35.2
750,000	21.8	12.5	7.6	22.2	41.1
1000,000	34.5	18.7	23	66.6	41.1
2000,000	63.6	87.5	46.1	77.7	47.0
3000,000	83.6	93.7	76.9	88.8	76.4
5000,000	89.0	100.0	84.6	100.0	76.4
d. Result of Credit					
No answer	43.2	48	23.5	53.3	45.8
Reimbursed	37.0	36	64.7	13.3	33.3
Extended	4.9	8	5.8	0	4.1
Forgiven	1.2	4	0	0	0
Protested	0	0	0	0	0
Pro Agro	13.5	4	5.8	33.3	16

Table D.3

SOCIO-ECONOMIC VARIABLES
BREAKDOWN BY FARM SIZE: NON-IRRIGATED

VARIABLE	MICRO n= 169	SMALL n= 76	MEDIUM n= 53	LARGE n= 25
a. Use of Credit				
None/no answer	60.9	34.2	41.5	52
Operating Costs	37.2	60.5	56.6	48
Investment	0.5	3.9	1.8	0
Both Inv.+ Op.Costs	0.5	0	0	0
b. Amount of Credit				
Mean	128.1	454.3	500.7	1778.8
S.D.	270.7	655.6	762.6	4433.7
c. Credit: % Farms				
None/no answer	60.9%	34.2	43.4	52
% less than				
100,000	15.1	6	0	0
250,000	56.0	30	20	0
500,000	86.3	56	43.3	25
750,000	92.4	74	60	58.3
1000,000	95.4	80	66.6	66.6
2000,000	98.4	94	93.3	66.6
3000,000	100.0	98	96.6	66.6
5000,000	100.0	100	100.0	83.3
d. Result of Credit				
No answer	62.1	34.2	43.3	56
Reimbursed	2.3	2.6	5.6	0
Extended	13.0	19.7	16.9	12
Forgiven	2.3	2.6	1.8	0
Protested	0	1.3	1.8	0
Pro Agro	20.1	39.4	30.1	32

It is clear, from Table D.3.d., that for the large number of non-irrigated farms in the study area extensions of credit or the relief granted under PROAGRO is the essential condition for their survival.

Although the data from the Reconnaissance Survey are only indicative, we have demonstrated the importance of further study of the way in which agricultural credit is allocated, used, and reimbursed by the different classes of farms. Moreover, the absence of investment credits, even among the larger farmers, is a phenomenon which should be studied. Is it an unfavorable investment climate which has reduced the demand for investment credit, or is it a lack of credit facilities and reduced supply of credit which explains the absence of credit for investment purposes in our sample?

In turning to the use of hired labor, we note that most farms in the study area use temporary hired labor which is drawn from the region itself. Respondents were asked to say whether or not they employed wage labor and to indicate if this wage labor was temporary or permanent. Additional information, not discussed here, was collected on the sex and method of payment of this wage labor force. Under current drought conditions few farmers note a labor scarcity. Irrigated farms hire permanent laborers much more frequently than non-irrigated farms as would be expected in an activity which offers employment on a year-round basis. Proposals for the expansion of irrigated cultivation in the study area are often based on the labor-creating effects of irrigated cultivation and the stabilization of employment that it offers. It is hoped that in future work we will be able to use data from the Reconnaissance Survey to study the employment-generating effects of irrigation as practised in the study area.

As mentioned earlier, a special study of the personal characteristics, wages, and working conditions of agricultural laborers in the study area would be of great value.

Table D.4

HIRED LABOR
GEOGRAPHICAL BREAKDOWN

| | XIQUE XIQUE | | IRECE | |
| | IRRIGATED | NONIRRIGATED | IRRIGATED | NONIRRIGATED |
VARIABLE	(n = 62)	(n = 197)	(n = 19)	(n = 126)
Use of Hired Labor				
None/no answer	8.0	42.0	15.0	17.4
Permanent	12.0	6.0	21.0	5.5
Temporary	46.7	44.0	21.0	58.7
Both perm & temp	32.2	7.1	42.1	18.2

Table D.5

HIRED LABOR
IRRIGATED FARMS

| | Breakdown by Farm Size: | | | |
| | Micro | Small | Medium | Large |
VARIABLE	(n = 169)	(n = 76)	(n = 53)	(n = 25)
Use of Hired Labor				
None/no answer	43.7	27.6	11.3	16.0
Permanent	4.7	2.6	15.0	8.0
Temporary	43.7	60.5	54.7	48.0
Both perm & temp	7.6	9.2	18.8	28.0

Table D.6

HIRED LABOR
NON-IRRIGATED FARMS

| | Breakdown by Farm Size: | | | | |
| | Total | Micro | Small | Medium | Large |
VARIABLE	(n = 81)	(n = 25)	(n = 17)	(n = 15)	(n = 24)
Use of Hired Labor					
None/no answer	9.8	20.0	0.0	20.0	0.0
Permanent	14.8	12.0	11.7	20.0	4.0
Temporary	40.7	48.0	52.9	33.3	11.0
Both perm & temp	34.5	20.0	35.2	26.0	24.0

E. The Marketing and Information Module

In this part of the survey we attempted to gain information about the marketing practices of farmers in the study area and the way in which they obtain their price and technical information. . Any program to improve the level of income and productivity of farmers will have to deal with questions about the structure and performance of the marketing system. Will current structures be able to handle the increased output? Are there problems with local monopoly of transportation or warehousing facilities which prevent the benefits of price rises in the urban markets from being transferred back to the producer? What are the particular services rendered to the producer by the marketing agents?

The Reconnaissance Survey is not able to answer these questions directly. It does, however, point out certain differences in the marketing arrangements of different classes of farmers. Information about where farmers sell their output, to whom they sell it and how it is transported to market is recorded in Tables E.1 to E.3. We note first a higher percentage of farmers who sell their product at the farm gate among non-irrigated farmers than is the case among irrigated farmers. The irrigated farmers indicate with a greater frequency that they sell their product directly in the city to a wholesaler. This dealer generally provides the transportation to take the crop to the warehouse. The non-irrigated farmer with greater frequency sells his product at the farm gate to a truck driver or trader, who also provides the transportation of the product to market. It would be instructive to study the characteristics of these trucker/traders and whether the truck driver is simply an agent of a wholesaler from the town or is a small entrepreneur himself. In spite of our attempt to capture the role of government or cooperatives in marketing, there was almost no mention of sales to cooperatives or to government programs. If there were to be a major expansion of production as a result of development efforts the question of government marketing programs and cooperatives will certainly arise.

Table E.1

MARKETING
GEOGRAPHICAL BREAKDOWN

VARIABLE	XIQUE XIQUE		IRECE	
	IRRIGATED (n = 62)	NONIRRIGATED (n = 197)	IRRIGATED (n = 19)	NONIRRIGATED (n = 126)
a. Place of Sale				
No Answer/Not Spec	9.6	44.6	21.0	26.1
Na Rama (while growing)	1.6	1.5	5.2	1.5
Farm Gate	12.9	38.0	31.5	53.9
Market	3.2	7.6	5.2	11.9
City (dealer)	72.5	8.1	36.8	6.3
Cooperative	0.0	0.0	0.0	0.0
b. Buyer of Output				
No Answer/Not Spec	9.6	44.6	15.7	26.1
Warehouse	4.8	4.5	15.7	11.1
Truck Driver	8.0	16.2	10.5	37.3
Trader	77.4	33.5	57.8	25.3
Gov't Program	0.0	.5	0.0	0.0
c. Method of Transport				
Not Specified	11.2	46.7	10.5	26.1
Cooperative	1.6	0.0	0.0	.7
Own Transport	16.1	9.1	21.0	14.2
Buyer	61.2	38.0	68.4	52.3
Other	9.6	6.0	0.0	6.3

table E.3

MARKETING
IRRIGATED FARMS

VARIABLE	Total (n = 81)	Breakdown by Farm Size:			
		Micro (n = 25)	Small (n = 17)	Medium (n = 15)	Large (n = 24)
a. Place of Sale					
No Answer	12.3	4.0	5.8	26.6	16.6
Na Rama (while growing)	2.4	0.0	11.7	0.0	0.0
Farm Gate	17.2	12.0	5.8	46.6	12.5
Market	3.7	4.0	0.0	0.0	8.3
City (dealer)	64.1	80.0	76.4	26.6	62.5
Cooperative	----	----	----		
b. Buyer of Output					
No Answer/Not Spec	11.1	4.0	5.8	26.6	12.5
Warehouse	7.4	8.0	5.8	0.0	12.5
Truck Driver	8.6	4.0	11.7	13.3	8.3
Trader	72.8	84.0	76.4	60.0	66.6
Government Program	----	----	----	----	----
c. Method of Transport					
No Answer/Not Spec	11.1	4.0	5.8	33.3	8.3
Cooperative	1.2	0.0	0.0	0.0	4.1
Own Transport	17.2	20.0	23.5	6.6	16.6
Buyer's Transport	62.9	68.0	58.8	53.3	66.6
Other	7.4	8.0	11.7	6.6	4.1

Table E.3

MARKETING
NON-IRRIGATED FARMS

VARIABLE	Breakdown by Farm Size:			
	Micro (n = 169)	Small (n = 76)	Medium (n = 53)	Large (n = 25)
a. Place of Sale of Output				
No Answer/Not Spec	39.6	35.5	24.5	56.0
Na Rama (while growing)	0.0	3.9	3.7	0.0
Farm Gate	44.3	46.0	45.2	36.0
Market	9.3	9.2	11.3	4.0
City (dealer)	6.5	9.2	15.0	4.0
Cooperative	0.0	0.0	0.0	0.0
b. Buyer of Output				
No Answer/Not Spec	39.6	35.5	24.5	56.0
Warehouse	7.1	6.5	11.3	0.0
Truck Driver	18.3	34.2	30.1	24.0
Trader	34.2	22.3	33.9	20.0
Gov't Program	0.0	1.3	0.0	0.0
c. Method of Transport				
Not Specified	41.4	35.5	26.4	56.0
Cooperative	----	1.3	----	----
Own Transport	8.8	10.5	18.8	12.0
Buyer	43.7	43.4	49.0	32.0
Other	5.9	9.2	5.6	----

The Survey also attempted to collect information about the farmer's sources of price and technical information. A wide range of potential responses to the question about sources of price information was listed in the questionnaire, however, the responses tended to concentrate on the radio, friends, traders, and direct observation in the market. Very little information appeared to have been received through farmer-oriented organizations such as EMATERBa, Fundfran, farm unions and the like. (See Tables E.4 - E.6). Moreover, there do not appear to be large differences among the farm types with respect to their sources of price information. It is important to note the importance of the radio as a source of price information for all farmers.

When we turn to the transmission of technical information, which is a more complex type of information to convey to farmers, we find significant differences among the farm types. In the first place, we note that there was a relatively high percentage of farmers who reported no source of technical information (or no response to the question). The fact that this percentage is much higher than in the case of the price information question may be taken as an indication that a large number of farmers feel they had no source of technical information. Moreover, more farmers in the non-irrigated sample reported no source of technical information than in the irrigated sample (see Tables E.4.b. E.5.b, and E.6.b)

Since there is a significant difference in the response rate among the subsamples in Table E.4.b., we record the percentage of non-responses or no source of technical information and then provide a breakdown of the positive responses (eg. 37% of irrigated farms in Xique Xique did not specify a source of technical information but 64.4% of those which did mention a source cite EMATERBa as the source.).

In Tables E.5 and E.6 we have reported a percentage breakdown which includes the "non responses" and "no source" respondents. This demonstrates the differences between the samples. Non-irrigated farms are much more likely not to have cited a source of technical information than irrigated farms and the difference between the two samples is almost totally due to the difference in the percentage of farmers citing EMATERBa as a source of technical information. From the sample, therefore, it would appear as if EMATERBa is concentrating its activities disproportionately on the farmers with irrigation. Since the sample does not show major differences in the percentage of small and large farms citing EMATERBa as a source of information, we are led to believe that the irrigation rather than size of farm is the factor which is associated with EMATERBa as a source of information. The way in which EMATERBa functions in the study area, the nature of its clients, and the focus of its efforts should be studied directly. The Reconnaissance Survey has simply provided information which implies that there is a strategy oriented towards the irrigated farmer irrespective of size.

    Finally, the respondents were asked if they had travelled outside of the study area. Interviewers recorded the responses by destination: Rio/Sao Paulo, Brasilia, other states in the Northeast, and other states not elsewhere specified. We expected to find travel to other states of the Northeast to be important given the frequent mention of migrants from other states coming to Bahia to farm. The reponses are recorded in Tables E.4.c.-E.6.c. The most obvious observation is that there is a very high percentage of respondents who had not travelled outside of Bahia (among which many who had not travelled to Salvador). The second obvious observation concerns the importance of Sao Paulo as the primary destination of those who travelled. The highest percentages of respondents who had travelled were found among the irrigated farmers, but specifically among the micro-irrigated farmers and the large irrigated farmers. Their destination was Sao Paulo. This piece of information about the micro irrigated farmers, when added to information about their level of education and access to credit, serves to identify many of them as rural capitalists and not small peasant farmers who managed to acquire some irrigation equipment. It will be necessary to combine information about the origins of irrigated farmers with information about access to credit and information before making inferences about the general capacity of all farmers in the region to assimilate irrigated techniques.

Table E.4

INFORMATION
GEOGRAPHICAL BREAKDOWN

		XIQUE XIQUE		IRECE	
	VARIABLE	IRRIGATED (n = 62)	NONIRRIGATED (n = 197)	IRRIGATED (n = 19)	NONIRRIGATED (n = 126)

a. Source of Price Information

0.	Not specified	14.5	7.6	0.0	1.5
1.	Radio	8.0	30.4	36.8	38.8
2.	TV	---	1.5	21.0	5.5
3.	Employer	1.6	1.0	5.2	0.0
4.	Amigo/parente	24.1	25.3	21.0	20.6
5.	Comerciante	24.1	12.6	0.0	13.4
6.	Ematerba	8.0	5.5	0.0	.7
7.	Fundfran	0.0	0.0	0.0	0.0
8.	Feira/Praca	16.1	15.2	15.7	15.8
9.	Sindicato	0.0	0.0	---	---
10.	Funrural	0.0	0.0	---	---
11.	Other	3.2	0.5	---	3.1

b. Source of Information
About New Techniques

0.	Not specified	37.0	61.4	47.3	72.2
1.	Radio	2.5	10.5	20.0	34.2
2.	TV	0.0	---	10.0	11.4
3.	Employer	2.5	---	---	---
4.	Amigo/parente	15.3	17.1	20.0	22.8
5.	Comerciante	5.1	3.9	---	---
6.	Ematerba	64.4	50.0	50.0	14.2
7.	Fundfran	2.5	1.3	---	---
8.	Feira/Praca	2.5	11.8	---	5.7
9.	Sindicato	0.0	---	---	2.8
10.	Funrural	0.0	---	---	---
11.	Other	2.5	5.2	---	8.5

c. Travel

0.	None	48.3	73	68.4	55.5
1.	Sao Paulo	33.8	20.8	15.7	30.9
2.	Brasilia	0	1	0	0.7
3.	Other Northeast	9.6	1	5.2	2.3
4.	Other (n.e.s.)	8	4	10.5	10.3

Table E.5

INFORMATION
IRRIGATED FARMS

			Breakdown by Farm Size:		
VARIABLE	Total (n = 81)	Micro (n = 25)	Small (n = 17)	Medium (n = 15)	Large (n = 24)

a. Source of Price Information

0.	Not specified/none	11.1	12.0	5.8	20.0	8.3
1.	Radio	14.8	24.0	5.8	13.3	12.5
2.	TV	4.9	0.0	0.0	6.6	12.5
3.	Patrao	2.4	0.0	0.0	6.6	4.1
4.	Friend/Relative	23.4	16.0	41.1	26.6	16.6
5.	Trader	18.5	28.0	11.7	0.0	25.0
6.	Ematerba	6.1	0.0	17.6	0.0	8.3
7.	Fund Fran	0.0	0.0	0.0	0.0	0.0
8.	Market	16.0	16.0	17.6	20.0	12.5
9.	Sindicato	0.0	0.0	0.0	0.0	0.0
10.	Funrural	0.0	0.0	0.0	0.0	0.0
11.	Other	2.4	4.0	0.0	6.6	0.0

b. Source of Technical Information

0.	None/Not specific	39.5	40.0	47.0	46.6	29.1
1.	Radio	3.7	0.0	0.0	6.6	8.3
2.	TV	1.2	0.0	0.0	0.0	4.1
3.	Patrao	1.2	0.0	0.0	0.0	4.1
4.	Friend/Relative	9.8	16.0	5.8	6.6	8.3
5.	Trader	2.4	4.0	0.0	0.0	4.1
6.	Ematerba	37.0	36.0	41.1	33.3	37.5
7.	Fund Fran	1.2	0.0	5.8	0.0	0.0
8.	Market	1.2	0.0	0.0	0.0	0.0
9.	Sindicato	0.0	0.0	0.0	0.0	0.0
10.	Funrural	1.2	0.0	0.0	0.0	0.0
11.	Other	2.4	0.0	0.0	6.6	4.1

c. Travel

0.	None	53	40	64.7	73.3	45.8
1.	Sao Paulo	29	36	17.6	13.3	41.6
2.	Brasilia	0	0	0	0	0
3.	Other Northeast8.6	8.6	8	5.8	13.3	8.3
4.	Other (n.e.s.)	8.6	16	11.7	—	4.1

Table E.6

INFORMATION
NON-IRRIGATED FARMS

VARIABLE		Breakdown by Farm Size:			
		Micro (n = 169)	Small (n = 76)	Medium (n = 53)	Large (n = 25)
a. Source of Price Information					
0.	Not specified/None	3.5	10.5	3.7	4.0
1.	Radio	37.2	28.9	30.1	32.0
2.	TV	2.3	2.6	5.6	4.0
3.	Patrao	0.0	1.3	1.8	0.0
4.	Friend/Relative	23.6	25.0	28.3	8.0
5.	Trader	15.3	9.2	5.6	24.0
6.	Ematerba	1.7	7.8	3.7	4.0
7.	Fundfran	0.0	0.0	0.0	0.0
8.	Market	14.7	13.1	18.8	20.0
9.	Sindicato	0.0	0.0	0.0	0.0
10.	Funrural	0.0	0.0	0.0	0.
11.	Other	1.1	1.3	1.8	4.0
b. Source of Technical Information					
0.	None/Not specified	67.4	69.7	50.9	72.0
1.	Radio	5.3	3.9	13.2	4.0
2.	TV	1.1	0.0	3.7	0.0
3.	Patrao	0.0	0.0	0.0	0.0
4.	Friend/Relative	6.5	6.5	5.6	8.0
5.	Trader	1.1	1.3	0.0	0.0
6.	Ematerba	13.0	11.8	15.0	16.0
7.	Fundfran	.5	0.0	0.0	0.0
8.	Market	3.5	2.6	5.6	0.0
9.	Sindicato	.5	0.0	0.0	0.0
10.	Funrural	0.0	0.0	0.0	0.0
11.	Other	.5	3.9	5.6	0.0
c. Travel					
0.	None	69.2	63.1	62.2	64
1.	Sao Paulo	24.8	27.6	18.8	28
2.	Brasilia	1.1	0	1.8	0
3.	Other Northeast	1.1	2.6	0	4
4.	Other (n.e.s.)	3.5	6.5	16.9	4

Conclusion

The Reconnaissance Survey was carried out to provide up-to-date information about farm structure and behavior in two semi-arid municipalities of the State of Bahia. A direct interview survey of more than 400 heads of household covered major demographic, farm structure, and socio-economic aspects of farming in the study zone. The analysis of the sample provided three ways of classifying farms: by geographic region, by size, and by technology. Each of the ways of presenting the data served to highlight important factors at underlying farm structure and behavior and should help disciplinary specialists to formulate hypotheses about development strategy.

The data describe an area of nuclear households experiencing net out-migration since the beginning of the drought. The general level of formal education is low among heads of household in the sample, however, higher levels are noticeable among the group of irrigated farmers and among the large farmers.

The use of tractors for cultivation, whether owned or rented, is widespread in all classes of farm although there remain some farmers who appear not to use trators. Most farms employ some hired labor, primarily temporary workers from within the region, but there are some large farms and irrigated farms which employ workers on a permanent basis. It is apparent that there is a problem of underemployment in the region since most farmers do not mention labor as being a constraint that they face if they wished to expand their farms. The conditions of this hired labor force need additional study.

There appear to be two types of irrigated farm: 1) the micro-irrigated farm specialized in market horticulture, and 2) the large mixed farm with irrigation among its activities. The characteristics of irrigated farmers require in-depth study if irrigation is to be understood as a potential solution to the problem of low incomes in the semi-arid areas of Bahia. From the characteristics of the farmers currently practising irrigation, it is not evident that it would be the local popultion who would benefit from the introduction of irrigation on a larger scale.

From the description of the cropping systems practised in the study zone, there appears to be some reason to be concerned about the increasing concentration on two or three crops accompanied by the abandonment of mixed farming once prevalent in the region and the increasing level of risk that this implies for the farmer. This does not deny the benefits that have come from the cash crops (and the credit which supports them) but simply notes that the system is quite dependent on present institutional arrangements. Credit seems to be be sustaining large numbers of farmers over the drought years, however, there are some farmers who do not participate in the system.

Most farmers receive price information from the radio or by direct observation in the market, while EMATERBa is the primary source of technical information. However, EMATERBa seems to have been much more important to the irrigated farmers than to the non-irrigated farmers. The

irrigated farmers distinguish themselves from the rest of the sample by the higher level of education of their heads, by their greater access to credit and technical information, and by their greater links to the outside world. Thus the adoption of irrigation as the solution to the problem of low incomes in the study area requires not simply the installation of pumps and tube wells but a more generalized attempt to provide improved formal education, more technical information, and wide distribution of services to the farmers of the area.

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