

**Title:**

**CONTRIBUTION TO THE  
SUSTAINABLE RURAL  
DEVELOPMENT IN DEVELOPING  
COUNTRIES. CASE STUDIES.**

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# *Abstract*

- The sustainable development in rural areas depends, inter alia, on know-how transfer and adequate training/education of land-user that is a pillar of the rural economy.
- There is no doubt that the agricultural extension plays a very important role in promoting peasant's knowledge and improving his technologic thinking whereby putting it on more economic base.
- The rural extension is a continued process that extends the former basic education level (given by school or courses) for, mainly, rural population employed within the agricultural sector.

# *Abstract*

- A methodological approach represented by introduction of technological and managerial programs can be of great assistance to the extension workers.
- Institutional building properly prepared by respective authorities and professionally provided with know-how is the base of the whole process.
- Agricultural Technology Management Program was conceived and built by ITSA researchers to help extension workers in the developing countries.
- Projects of Advisory Centres in Mali and Jordan have been implemented to conduct advisory activities among agricultural producers focusing especially on the small-scale farming.

# ***Introduction: World Food Summit - Six Years After***

- The World meeting named **WORLD FOOD SUMMIT: SIX YEARS AFTER<sup>(1)</sup>** held this year in Rome focused on progress achieved from the *World Food Summit* (1996, Rome).
- The World Community once again affirmed its readiness to fulfilling obligations regarding the World Food Security that had been formulated by the **“Rome Declaration on the World Food Security”** and **“World Food Summit Plan of Action”**.

# ***Introduction: World Food Summit - Six Years After***

- The only *consistent political and economic approach* of the World Community to the problem of “Food Security” can result in relevant solution.
- The approach must be backed by intensive forms of technical (development) assistance provided by developed (industrial) countries for developing (less developed) countries and immediate responsibility of national governments for the Food Security of their population.
- Realistic rural development requires especially mass forms of education, e.g. instruction of peasants and other rural population in main activities they execute.

# *Rural Extension: Mission and Constraints*

- The rural extension is a form of non-formal agricultural education for rural population. The most part of this instrument focus on the farmer as the main rural producer.
- The rural extension can contribute, sometimes by a decisive way, to both economic growth and human resource development in rural areas. Its impact is more significant in the most backward regions than in the rest of the Third World.

# *Rural Extension: Mission and Constraints*

- Methodological and institutional background is another constraint.
- Number of rural (agricultural) specialists in the developing regions has considerably grown however the small-scale farmer and sometimes medium-size farmer are helpless because the ratio “extension worker : farmer” goes up to 1 : 2000.
- The payment conditions of extension workers do not represent any proper incentives for extension workers

# *Rural Extension: Mission and Constraints*

- The Institute of Tropical and Subtropical Agriculture is involved since many years in the rural extension services for/in less developed countries.



# ***Institutional Building: Case Studies***

## ADVISORY CENTER IN JORDAN (AJLUN)

- The Advisory Centre establishment is an organic follow-up of the previous project “Crossbreeding of local Awassi Sheep with Imported Meat Breeds.
- It was found that very good results achieved by well-thought-out crossbreeding had not been disseminated. The Jordan Ministry of Agriculture that runs the agricultural extension was not interested to inform farmers about the research.

# ***Institutional Building: Case Studies***

## ADVISORY CENTER IN JORDAN (AJLUN)

- The only solution appeared to establish an Advisory System run by the University.
- Research and extension will especially focus on animal production, being this branch the main agricultural sector in the Ajlun Region. E.g.
  - run register of animals for breeding and their selection,
  - make reproduction of sheep and goats.
  - improve nutrition of ruminants.
  - practical demonstrations and training courses for farmers and students.

# ***Institutional Building: Case Studies***

## **ADVISORY CENTER IN JORDAN (AJLUN)**

- Proper response on actual pressing needs of the rural producer.
- The Steering Committee has been proposed as composed of elected farmers, university specialists in the field (JUST) and Czech specialists..
- The project platform does not offer a classical extension service model however the institution (Centre) can effectively group the research and dissemination functions





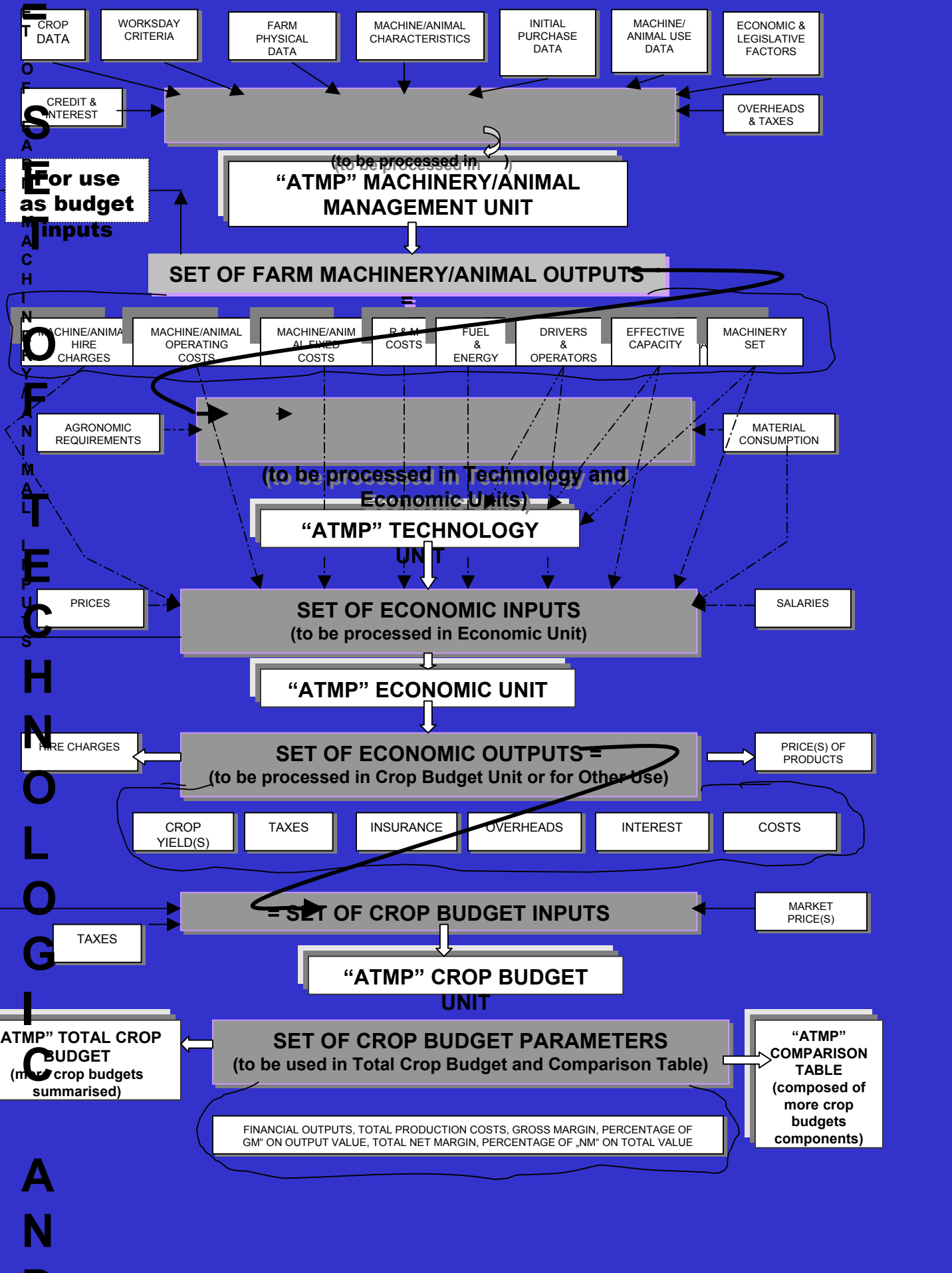
# *Methodological Approach:*

## *ATMP*

- The importance of economic mechanization in context with reasonably conceived technology has often been addressed.
- Such a technology needs not to be sophisticated mechanization however, it should assure optimum profit at reasonable costs on the respective level
- The concept of the **ATMP** was worked out and prefers the agricultural producer – farmer without respecting the level of his farming.
- The main task is being to help farmers appreciate the role of costing operations.
- The main recipient is extension worker who should help the farmer by his services of sustainable farming that includes both appropriate technological solution and economical approaches to the farming.

# ***CONCEPT OF THE “ATMP” AGRO-EXPERT PROGRAM***

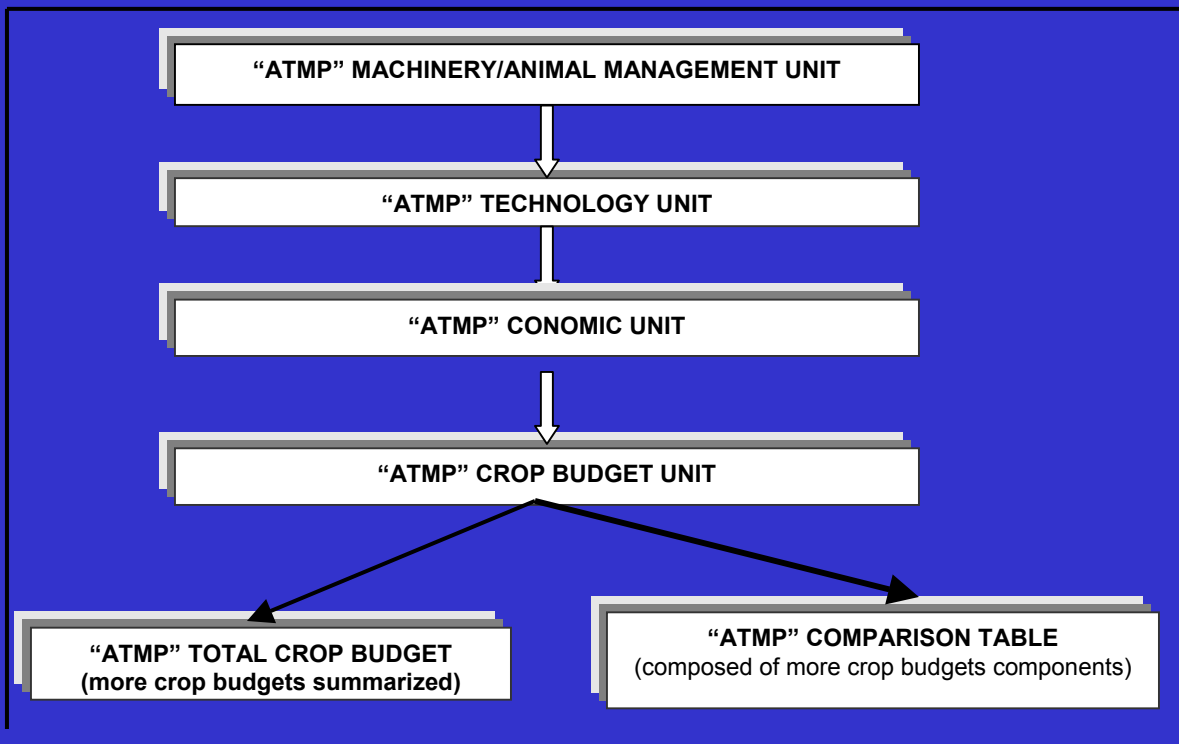
- The program is conceived as technical-economic facilitator that should make easier the life of extension workers.
- The main outputs of the above program will be a reasonable (appropriate) technology for growing main crops, and possibility of comparison of different crops on basis of their budgets (crop budgets).
- The main criterion for the comparison will be a net margin the farmer gets from its crop.
- Agronomic requirements as well as environmental aspects are included in the technology conception, which ensures sustainability of the farming.





# “ATMP” Units Characteristics

Five functional units create backbone of the ARGO-EXPERT structure.



# *“ATMP” Machinery/Animal Management Unit*

- It is positioned at the starting point of the whole Program and processes mostly technical and managerial data concerning machinery, animals and Labour.
- Fed with a set of farm machinery/animals inputs it offers output parameters for their use in another Program units.
- **Main inputs:**
  - *Crop data;*
  - *Worksdays criteria;*
  - *Farm physical data;*
  - *Machine/animal characteristics;*
  - *Initial purchase data;*
  - *Machine/animal use data;*

# ***“ATMP” Machinery/Animal Management Unit***

- **Farm machinery/animal outputs:**
  - *machinery/animal hire charges;*
  - *machinery/animal operating costs;*
  - *machinery/animal fixed costs;*
  - *repair & maintenance costs;*
  - *fuel/energy & lubricants;*
  - *drivers & operators;*
  - *effective capacity;*
  - *machinery set.*
- **Its outputs completed with agronomic requirements and material consumption are supplied (as inputs) to the following Technology Unit.**



# “ATMP” Technology Unit

- Design of technologies as sequences of working operations.
- Objectives:
  - construct the technology on desired technologic level;
  - process output data from the “ATMP” *Machinery/Animal Management Unit*;
  - incorporate the machinery sets, animal draught sets or hand-tool sets into individual operations.
- parameters from the “ATMP” *Machinery/Animal Management Unit* are used:
- *machinery set*;
  - *effective capacity*;
  - *drivers & operators*;
  - *fuel/energy & lubricants*.
- The complete range of operations represent the whole cycle of working processes..



# ***Costing Unit***

## ***(Economical Spreadsheet)***

- The Set of Economic Inputs as supplied from the “ATMP” Machinery/Animal Management Unit is completed with prices of materials and salaries of driver and operators.





# ***“ATMP” Comparison Unit***

It is a table serving for comparison of effectiveness of different crops grown under comparative production conditions.

This facilitates sound decision-making. The user can choose which alternative technology to use.  
Inputs for the Comparison

# ANNEX

## Economic Consideration on Machinery Systems

Operation: \_\_\_\_\_ Payer of V.A.T.: \_\_\_\_\_  
 System: \_\_\_\_\_ Field Capacity: \_\_\_\_\_  
 Price of Machine: \_\_\_\_\_ Price of Energ. Means: \_\_\_\_\_ Type of Power: \_\_\_\_\_

### 1. Input Data

Machine	En. Means	Other Data
Annual Use:	Annual Use:	Interest on Capital.
Own Fin. Resource:	Own Fin. Resource:	Credit Rate:
Useful Life:	Useful Life:	Discharge Period:
Depr. Rate:	Depr. Rate:	No of Instalments:
Road Tax Rate:	Road Tax Rate:	Repayment?:
Insurance Rate:	Insurance Rate:	Adv.Paym.:
Mand. Insurance:	Mand. Insurance:	El. En. Consumpt.:
Garage Rate.:	Garage Rate:	Price of kWh:
Repair Factor:	Repair Factor:	Fodder Costs:
No of Operators:	No of Drivers:	Medical Expenses:
Power Input:	Rated Power:	Grooming Costs:
Wage of Operator:	Wage of Driver:	Other Care Costs:
Fuel Consumption:	Price of Fuel:	Other Taxes:

# Fig. 1 Card for Power Units (including Animals)

## Wheel Tractor Zetor 3320.5 Zetor 3320.2

Producer: ZETOR, a.s. Brno

### Technical Data:

Code:	121004	Rated Power:	33,1 kW	Price in H.C.:	377600 Kč
Prec. type:	TR	No Driver:	1	Rate of Exch.:	Kč 1,00
Masse:	2 680 Kg	Repair Factor:	1,00	Price in S.C.:	377600 Kč
Width:	1 800 mm	Depreciation Period:	6	Annual Use:	1300 h/y
Length:	3 308 mm			Depreciation Rate:	12,5 %
Height:	2 614 mm				

Engine		Chassis		Other Parameters	
Type:	Zetor 5201	Type:	Frameless	Slope Assesibility:	DEG
No of Cylinders:	3	Track:	1350-1800 mm	Control Positions:	regulated
Bore:	102 mm	Wheelbase:	2123 mm	Lift Force Capacity:	19 kN
Stroke:	110 mm	Ground Clearance:	462 mm	Max. Drawb. Force:	kN
Capacity:	2696,5 ccm	Height of Linkage:	mm	3 Point Hitsch:	ront and rear
Max Torque:	160,83 Nm	No of Axles:	1	Fuel Cons.@ 50 % of Power Utiliz.):	5,2 l/h
Rated Speed:	2200 1/min	Weight Distr. Rear:	70 %		
Max. Torque Sp.	1500 1/min	Tyre Front:	6.00-16		
Max. Speed:	1/min	Tyre Rear:	12.4-28		
S.F.C.:	251 g/kW/h	Speed Range:	max.25 km/h		
PTO Speed:	540 1/min	No of Speeds: Forw.:	10		
	1000 1/min	Reverse:	2		

### Work Operation:

Code	Description	U	Fuel Consump.	Hour Capacity	Dayly Capacity
5151	Tractor Utilization - Low Use of Power	h	4,1		
5152	Tractor Utilization - Medium Use of Power	h	5,9		
5153	Tractor Utilization - High Use of Power	h	7,6		

# Fig. 2 Cost Estimation Screen

<b>2. Cost</b>										
<b>Machine</b>			<b>Power Unit</b>				<b>Mach. Set</b>			
Item	Kč/Y	Kč/ha	Sum Kč/ha	Item	Kč/Y	Kč/ha	Sum Kč/ha	Item	Kč/ha	Sum Kč/ha
Amortiz.:				Amortiz.:				Amortiz.:		
Inter. on C.				Inter. on C.				Inter. on C.		
Interest:				Interest:				Interest:		
Road Tax:				Road Tax:				Road Tax:		
Insurance:				Insurance:				Insurance:		
Mand. Insur.				Low Insur.:				Low Insur.:		
Garage:				Garage:				Garage:		
Repairs				Repairs:				Repairs:		
<b>Sum:</b>				<b>Sum:</b>				Energy:		
								Labour:		
Fodder Cost				Grooming Cost				<b>Sum:</b>		
Medical Expens.				Other Care:						
Other Taxes				Supp.Mat.Costs				<b>Variable Cost:</b>		
Labour Cosumption:										
			Lh/ha							



# Fig. 4 Example of a Technology Spreadsheet

## AGRICULTURAL COSTING SHEET

**MAIN INPUT COSTS** Costs (Cur. per hectar)

Seed and seedlings : .....	Remarks 1 : .....
Fertiliser 1 : .....	Remarks 2 : .....
Fertiliser 2 : .....	Remarks 3 : .....
Fertiliser 3 : .....	Remarks 4 : .....
Farmyard manure : .....	Remarks 5 : .....
Pesticides 1 : .....	Remarks 6 : .....
Pesticides 2 : .....	Remarks 7 : .....
Pesticides 3 : .....	Remarks 8 : .....
Pesticides 4 : .....	Remarks 9 : .....
Water : .....	Remarks 10 : .....

No.	Fixed costs + R & M						F & L, Energy		Labour				Hire costs	
	Power unit		Equipment		Total				Driver		Operators			
	cur/hour	cur/ha	cur/hour	cur/ha	cur/hour	cur/ha	cur/hour	cur/ha	cur/hour	cur/ha	cur/hour	cur/ha	cur/hour	cur/ha
1.														

***Fig. 5 Example of a Costing  
Spreadsheet***