

()

()

*

(// : // :)

(((((

() (Kirchner et al., 1996) (Bockstaller & Girardin, 2003)
() (Meul et al., 2009)
(Gilmour, 1973) (Rigby et al., 2001)
(Mitchell) (& Sheehy, 1997)

(Bockstaller & Girardin, 2003)

(Gras et al., 1989)

(Girardin et al., 1999)

(Meul et al., 2009)

(Kalantari, 2001)

(Gilmour,

.1973)

(Crabtree & Brouwer, 1999;

Mitchell et al., 1995; Smith et al., 2000; Vos et al.,

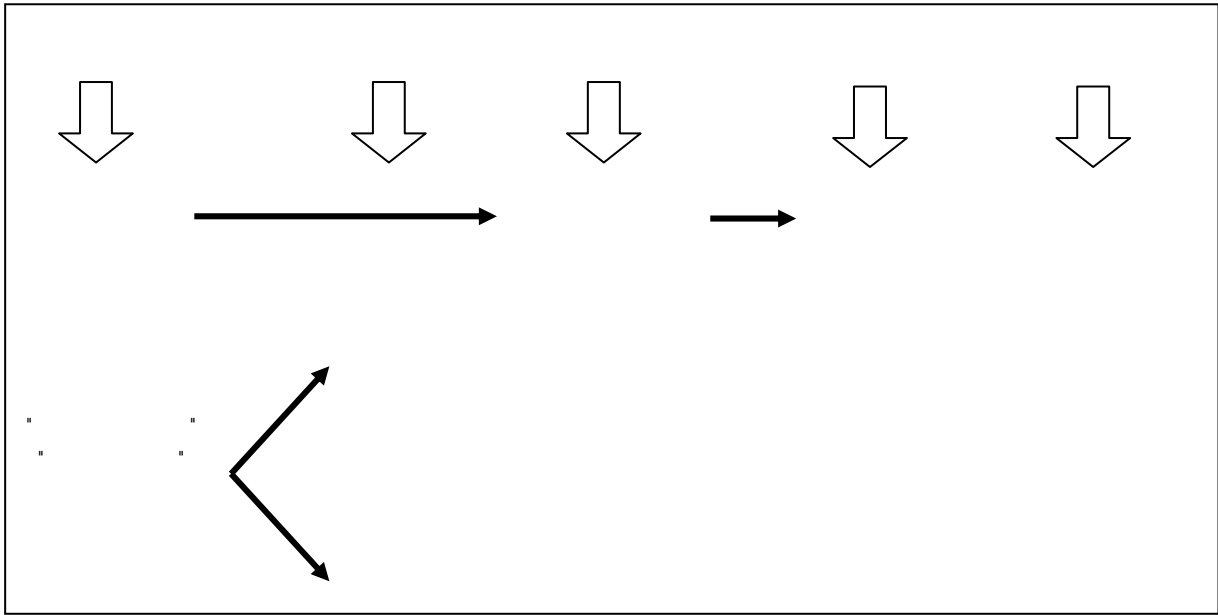
.2000)

(Cloquell-Ballester et al., 2006)

(Harrison, 1990;

3. Design Validity
4. Output Validity
5. End-use Validity

1. Simple Indicator
2. Composite Indicator



(Bockstaller & Girardin, 2003)

(Kalantari et al., 2006)

(Kalantari,
()

.2001)

$$CV = \frac{1}{\bar{y}} \left[\frac{1}{n} \sum_{i=1}^n (y_i - \bar{y})^2 \right]^{1/2}$$

$$= y_i - \bar{y} = CV$$

= n

()

$$\bar{y} = \frac{1}{n} \sum_i y_i$$

(Williamson, 1965; Shankar & Shah, 2003)

$$CV_w = \frac{\sqrt{\sum_i (y_i - \bar{y})^2 \frac{P_i}{P}}}{\bar{y}}$$

= CVw

$$= \bar{y} \cdot i$$

$$= y_i$$

$$= P \cdot i$$

$$= p_i$$

= n

$$T = \left(\frac{1}{n} \right) \sum_{i=1}^n \left(\frac{Y_i}{u} \right) \log \left(\frac{Y_i}{u} \right)$$

5. Weighted coefficient of variation

-
1. Coefficient of Variation
 2. Williamson Coefficient
 3. Theil Index
 4. Herfindal Index

...

:

$$= y_i \quad = n \quad = T$$

$$= u_i$$

/

)

) log n (

(Shankar & Shah,

(

.2003)

/

)

/ (

/

/

/

/

$$H = \sum_i^n \left(\frac{y_i}{\sum_i^n y_i} \right)^2$$

(

= n

= H :

. i

= y_i

.(Salimifar, 2002)

()

(Kalantari, 2001)

/ / /
 / / /
 / / /
 / / /
 / / /
 / / /
 / / /
 / / /
 / / /
 / / /
 / / /
 / / /

()

()

()

()

()

()

"

"

/

()

()

(CV)

/ / /
/ / /
/ / /
/ / /
/ / /
/ / /
/ / /
/ / /
/ / /
/ / /
/ / /
/ / /

()

()

()

()()

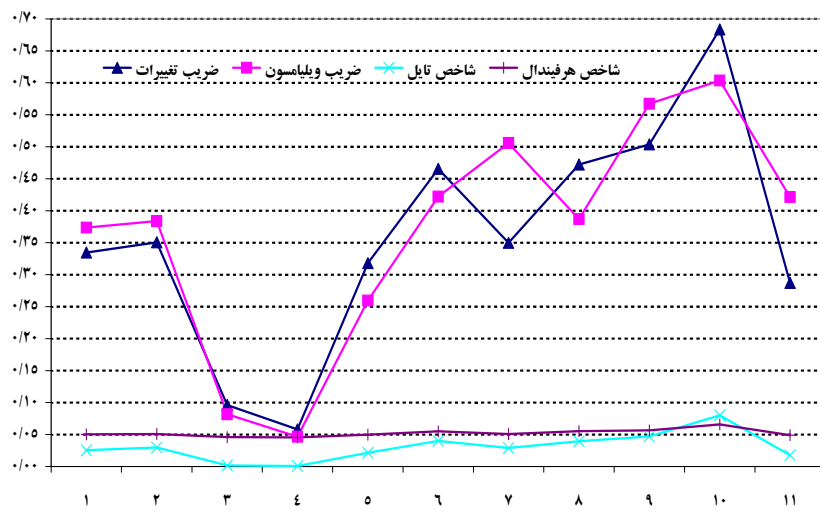
()

()

/	/	/	()
/	/	/	()
/	/	/	()
/	/	/	
/	/	/	()
/	/	/	
/	/	/	
/	/	/	
/	/	/	()
/	/	/	
/	/	/	
/	/	/	()
/	/	/	()
/	/	/	
/	/	/	

/	/	/	
/	/	/	()
/	/	/	()
/	/	/	
/	/	/	()
/	/	/)
/	/	/	(
/	/	/	
/	/	/	
/	/	/	()
/	/	/	
/	/	/	
/	/	/)
/	/	/	(
/	/	/	
/	/	/	

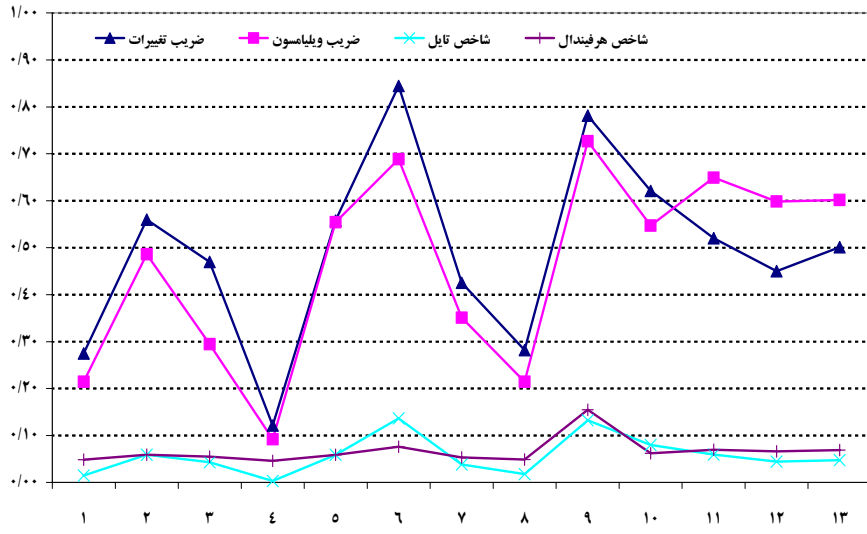
()



()

)

(



()

''

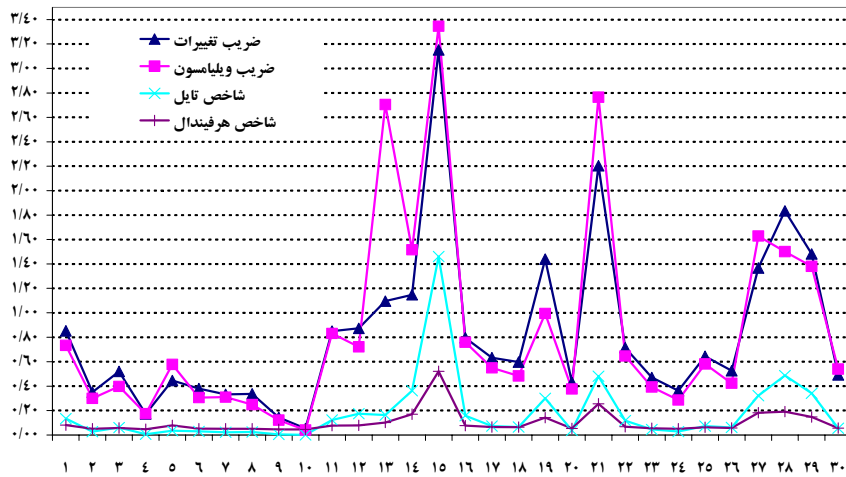
''

''

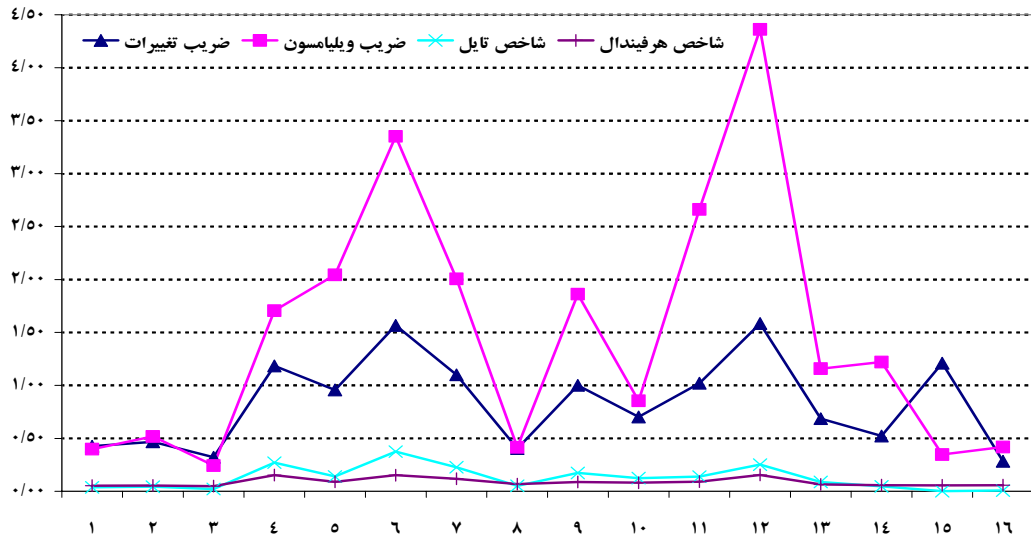
''

''

''



()



)

"(

"

"

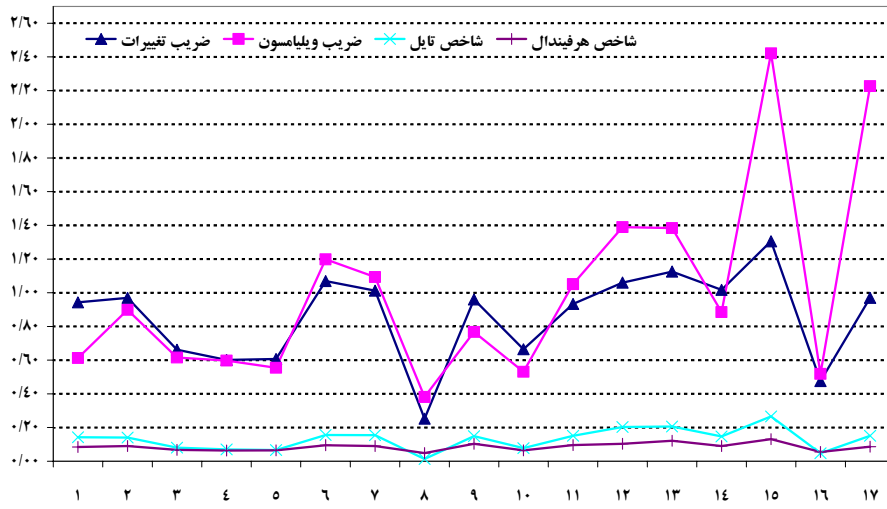
()

"

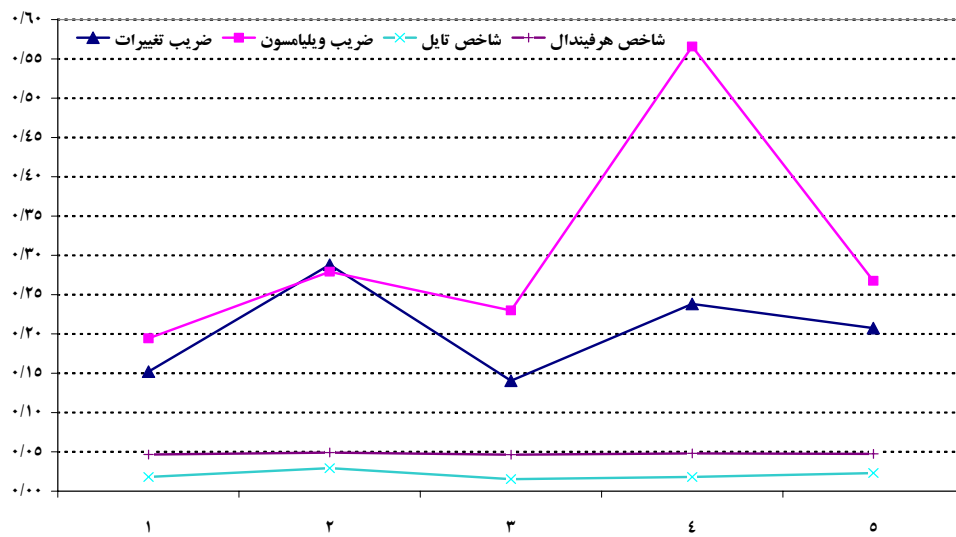
" "

"

"



()



/ / /

()

/ /

...

:

/ / /

.

/

/ / /

.

/ / /

/ / /

/

.

/ /

/ / /

/

/ /

/ / / / /

.

/

/ / /

.

/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/ 7	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/

REFERENCES

1. Bockstaller, C. & Girardin, P. (2003). How to validate environmental indicators? *Agricultural Systems*, 76, 639–653.
2. Cloquell-Ballester, V. A., Cloquell-Ballester, V. A., Monterde-Diaz, R. & Santamarina-Siurana, M. C. (2006). Indicators validation for the improvement of environmental and social impact quantitative assessment. *Environmental Impact Assessment Review*, 26, 79–105.
3. Crabtree, J. R. & Brouwer, F. M. (1999). Discussion and conclusions. In: Brouwer, F.M., Crabtree, J.R. (Eds.), *Environmental Indicators and Agricultural Policy*. CAB International, Wallingford, pp. 279–285.
4. Gilmour, P. (1973). A general validation procedure for computer simulation models. *Australian Computer Journal*, 5, 127–131.
5. Girardin, P., Bockstaller, C. & van der Werf, H. M. G. (1999). Indicators: Tools to evaluate the environmental impacts of farming systems. *Journal of Sustainable Agriculture*, 13, 5–21.
6. Gras, R., Benoit, M., Deffontaines, J. P., Duru, M., Lafarge, M., Langlet, A. & Osty, P. (1989). Le Fait Technique en Agronomie. Activite´ Agricole, Concepts et Me´thodes d'E´tude. In: Bockstaller, C., Girardin, P., (Eds.). How to validate environmental indicators? *Agricultural Systems*, 76, 639–653
7. Harrison, S. R. (1990). Regression of a model on real-system output: an invalid test of model validity. *Agricultural Systems*, 34, 183–190.
8. Kakwani, N. C. (1980). *Inequality and poverty methods of estimation and policy applications*. The World Bank. New York: Oxford University Press.
9. Kalantari, K. (2001). *Regional planning and development (theories and techniques)*. Khoshbin publication. Tehran. (In Farsi).

- ...
- :
10. Kalantari, K., Asadi, A., Fami, H. S. & Abdollahzadeh, G. (2006). Validation of extension indices for ranking Iranian provinces extension education activities. *Agricultural Journal*, 8 (2), 57-70. (In Farsi).
 11. Kirchner, J. W., Hooper, R. P., Kendall, C., Neal, C. & Leavesley, G. (1996). Testing and validating environmental models. *The Science of the Total Environment*, 183, 33-47.
 12. Meul, M., Nevens, F. & Reheul, D. (2009). Validating sustainability indicators: Focus on ecological aspects of Flemish dairy farms. *Ecological Indicators*, 9 (2009) 284 – 295
 13. Mitchell, G., May, A. & McDonald, A. (1995). PICABUE: A methodological framework for the development of indicators of sustainable development. *International Journal of Sustainable Development and World Ecology*, 2, 104-123.
 14. Mitchell, P. L. & Sheehy, J. E. (1997). Comparison of prediction and observations to assess model performance: a method of empirical validation. In: Kropff, M.J., Teng, P.S., Aggarwal, P.K., Bouma, J., Bouman, B.A.M., Jones, J.W., Van Laar, H.H. (Eds.), *Applications of Systems Approaches at the Field Level*, Vol. 2. Kluwer Academic Publishers, Dordrecht, pp. 437-451.
 15. Rigby, D., Woodhouse, P., Young, T. & Burton, M. (2001). Constructing a farm level indicator of sustainable agricultural practice. *Ecological Economics*, 39, 3, 463-478.
 16. Salimifar, M. (2002). Study on changing trend of industrial development levels and regional development in Iran during 1976-1996. *Jornal of Economy Researches*, 61. (In Farsi).
 17. Shankar, R. & Shah, A. (2003). Bridging the economic divide within countries: A scorecard on the performance of regional policies in reducing regional income disparities. *World Development*, 31 (8), 1421-1441,
 18. Smith, O. H., Petersen, G. W. & Needelman, B. A. (2000). Environmental indicators of agroecosystems. *Advances in Agronomy*, 69, 75-97.
 19. Vos, P., Meelis, E. & TerKeurs, W. J. (2000). A framework for the design of ecological monitoring programs as a tool for environmental and nature management. *Environmental Monitoring and Assessment* 61, 317-344.
 20. Williamson, J. G. (1965). Regional inequality and process of national development: a description of the patterns. *Economic Development and Cultural Change*, XIII (4, Part II), 2-84.

Formulating and Validation of Suitable Indices for Analyzing Spatial Agricultural Development Inequalities (Case Study of Fars Provinces)

GH.H. ABDOLAHZADE¹, KH. KALANTARI², A. ASADI³, AND J. DANESHVAR⁴

1, Gholamhossein Abdollahzade, Faculty Member, Gorgan University of Agricultural Science and Natural Resources2- Khalil Kalantari, Associate Professor, Faculty of Agricultural Economics and Development, University of Tehran3- Ali Asadi, Associate Professor, Faculty of Agricultural Economics and Development, University of Tehran4- Zheila Daneshvar Ameri, Asistant Professor, Faculty of Agricultural Economics and Development, University of Tehran

(Received: Feb. 4, 2008- Accepted: Jul. 2, 2008)

ABSTRACT

The main aim of current paper is formulating and validation of suitable indices in order to analyzing spatial agricultural development inequalities in Fars province. The study was carried out in two phases. In phase one with review of literature, regarding agricultural development, spatial inequality, and indicators, 92 agricultural development were identified. These indices were classified in five components as under: 1) social;-cultural, 2) structural-performance, 3) technical-management, 4) economical, and 5) infrastructural-services. These indices were validated by 57 experts who randomly were selected from faculty members of 6 Iranian agriculture faculties as research samples. In order to meet experts consensus and validate the indicators, statistical methods such as mode, mean, standard deviation and coefficient of variation were used. In second phase, data was collected for 87 validated indices, through 2003 agricultural census and Fars statistical yearbooks for 2004 to 2007, by using Coefficient of Variation (CV), Williamson Coefficient, Theil Index and Herfindal Index, the spatial inequalities of each indicator in Fars provinces were analyzed. The result showed that, except four indices, the rest of 87 indices are appropriate for analyzing spatial agricultural development inequalities. Calculating inequalities coefficients also revealed that economical-financial and structural-services indicators such as; agricultural credit institutes, agricultural and rural industries and rural and agricultural cooperative are in high inequality situation. The calculated composite index also showed that Shiraz county is ranked in first position and Khorambid county in the last position in this context.

Key words: Agricultural Development, Validity, Indicator, Spatial Inequality, Fars Province.

* Correspondent Author:

E-mail: khkalan@ut.ac.ir