Table 1. Object-Oriented Packages for Agent-Based Modeling

	SWARM	RePast	Ascape	CORMAS
Developers	Santa Fe Institute/ SWARM Development Group	University of Chicago	Brookings Institute, Washington, D.C.	CIRAD, Montpelier, France
Start development	Early 1990s	Early 1999	1997	1996
Website	http://www.swarm.org	http://repast.sourceforge.net/	http://www.brook.edu/es/dynamics/models/ascape	http://cormas.cirad.fr
Language	Objective C/Java	Java	Java	Smalltalk
Operating system	Unix/Linux, Mac OSX, Windows	Windows, Unix/Linux, Mac OSX	Windows, Unix/Linux, Mac OSX	Windows, Unix/Linux, Mac (???)
Required experience	Strong skills	Some Java programming, or Python for Simbuilder	No experience of running existing models, basic skill for changing models, and strong skills to make major extensions	None, if attending the training courses, basic skills in programming otherwise
Event driven?	Yes	Yes	No	No
GIS connection	Kenge/GIS library: http://www.gis.usu.edu/swarm/	Agent Analyst; open-source integration with OpenMap under development	Beta version	Generic methods to import/export maps from/to MapInfo, both for vector and raster formats. With ArcView, a dynamic link via Access has been successfully tested by using ODBC and DDE
Spreadsheet connection	No	Yes	Yes	Yes
Statistics of runs	The statistical package R, and Splus clone, handles the statistics	User can calculate statistics, the Colt library that comes with RePast provides some statistical functions, and RePast itself can calculate some simple network statistics	Many, like average and variance, Gini . . .	User can define which data to store
Main focus of applications	Natural and social sciences, military and commercial applications	Social science	Social and economic systems	Economic and ecological simulation, and natural resource management
Available demo-models	On the SWARM website there are only a few demo-models, but there are many journal publications, and a few books with SWARM applications	I think there are now more than 6 demo-models, plus many available from users	About 20–30 demo-models	Numerous models are described on website, with papers and electronic addresses of the authors.
Documentation	Yes	Yes	Yes	Yes
Tutorial	Yes	Yes	Rudimentary	Yes
Training courses	No	Yearly training courses at Agents meetings	No	Various courses are given each year; have produced many new users

	Netlogo	Simile	Mason
Developers	Brilliant, important people		Center for Social Complexity, GMU
Start development			2003
Website	http://ccl.northwestern.edu/netlogo/	http://simulistics.com/products/simile.php	http://cs.gmu.edu/%7Eeclab/projects/mason/
Language	Java	Java	Java
Operating system	Unix/Linux, Mac OSX, Windows	Windows	Mac OSX Unix/Linux, Window
Required experience	Ability to do simple, script-based procedural programming	None needed	Java or other OOP programming
Event driven?	No (?)	No, no event scheduler?	Yes
GIS connection	None	In development	None
Spreadsheet connection	?	?	?
Statistics of runs			
Main focus of applications	Very broad, mostly abstract	System dynamics modeling	MAS in 2 and 3 dimensions; social science applications
Available demo-models	Many available (verified and unverified)	Many available demo-models	
Documentation	Yes	Yes	Yes
Tutorial	Yes	?	
Training courses	?	?	No

Table 2. Matrix Classification of ABM/LUCC Models

		Agents	
		Designed	***Analyzed***
Environment	***Designed***	Cell #1: Abstract Balmann *Appendix 1* Polhill et al. – FEARLUS *Section 3.2* Torrens – SprawlSim *Section 3.9*	Cell #2: Experimental d'Aquino et al. – SelfCormas *Section 3.8* Opaluch et al. *Appendix 8*
	Analyzed	Cell #3: Historical Gumerman and Kohler *Appendix 3*	Cell #4: Empirical Berger *Section 3.4* Deadman et al. – LUCITA *Section 3.6* Huigen – MameLuke *Section 3.3* Manson – SYPR *Section 3.5* Parker et al. – LUCIM *Section 3.7*

Table 3. Purpose/Intent of ABM/LUCC Models in Matrix Classification

		Agents	
		Designed	***Analyzed***
Environment	***Designed***	Cell #1: Abstract Discovery of new relationships Existence proof	Cell #2: Experimental Role-playing games among stakeholders Laboratory experiments
	Analyzed	Cell #3: Historical Explanation	Cell #4: Empirical Explanation Projection Scenario analysis

Table 4. Verification and Validation Strategies for ABM/LUCC Models in Matrix Classification

		Agents	
		Designed	***Analyzed***
Environment	***Designed***	Cell #1: Abstract Theoretical comparisons Replication	Cell #2: Experimental Repetitions Adequacy of design
	Analyzed	Cell #3: Historical Qualitative "goodness of fit"	Cell #4: Empirical Quantitative "goodness of fit"

Table 5. Appropriate Software Tools for ABM/LUCC Models in Matrix Classification

		Agents	
		Designed	***Analyzed***
Environment	***Designed***	Cell #1: Abstract Easy-to-implement simulation packages	Cell #2: Experimental Flexible simulation packages with well-developed user interfaces
	Analyzed	Cell #3: Historical Advanced simulation packages interfaced with geographical information systems	Cell #4: Empirical Low-level programming languages